THE T&R BULLETIN

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GREAT BRITAIN

BRITISH EMPIRE
RADIO UNION

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THE INCORPORATED
RADIO SOCIETY of GREAT BRITAIN
and the
BRITISH EMPIRE RADIO UNION

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OUR COMING OF AGE

ON July 5 next the Incorporated Radio Society of Great Britain celebrates the 21st anniversary of its formation, and to mark this important occasion we have pleasure in placing before our members a special commemorative issue of this Journal.

We are very proud to include a congratulatory message from our Patron, H.R.H. the Prince of Wales. We have also been honoured with contributions from many of our Past Presidents, and other prominent members, including Sir Oliver Lodge, Senatore Marconi, Brig.-General Sir Capel Holden, Sir Ian Fraser, Dr. W. H. Eccles, Mr. Rene Klein, Mr. Leslie McMichael, Mr. Gerald Marcuse.

We are very grateful to all who have sent us greetings and especially we desire to tender our loyal thanks to H.R.H. the Prince of Wales for his message and his continued interest in our work.

We feel sure that our many distinguished contributors will share our pride in the fact that the Society is now so firmly established. To many of them we owe the foundation upon which our present organisation stands.

Elsewhere in this issue will be found a somewhat abridged history of the Society, a composite work prepared by various contributors, each of whom was best acquainted with the activities of the Society during the period for which he was responsible. In this article mention has been made of many well-known figures connected with the Society from its early days, but it has not been possible to pay an adequate tribute to the hundreds of other members who have helped the Society in its march of progress. Without singling out any particular name we take this opportunity of thanking everyone who has rendered service to the Society at any time in its history.

As we celebrate our Coming of Age we can feel proud of the Society's past achievements and we can look forward with every confidence to the future. Each passing month sees an increase in our membership both at home and abroad, and we believe that few amateur organisations can offer better facilities to its members. It will be our endeavour to continue to extend our sphere of usefulness in every possible direction ; so with the passing of Youth let us go forward in the same pioneer spirit that has typified the amateur movement since 1913.

* * * *

Within the pages of this issue appear two important technical contributions, one an article dealing with new master oscillator drive circuits, and the other a description of a new telephony and continuous wave low-power transmitter. Both mark important advances in transmitting technique, and their publication at this juncture is opportune. By adapting the principles outlined by the authors, transmitting amateurs may rest assured that their stations are in keeping with modern practice, and that their transmissions will be of the highest order.

ST. JAMES'S PALACE,
S.W.1.

11th May 1934.

On the occasion of the 21st anniversary of the Radio Society of Great Britain it affords me great pleasure to offer you my sincere congratulations on the material assistance which has been afforded by the Society and its individual members in the development of wireless as we now know it.

Wireless telegraphy and broadcasting are outstanding achievements of the age and their rapid progress during the last decade would have been impossible without the enthusiasm and research of the amateurs, headed by the Radio Society of Great Britain.

Edward P

PATRON.

CONGRATULATIONS

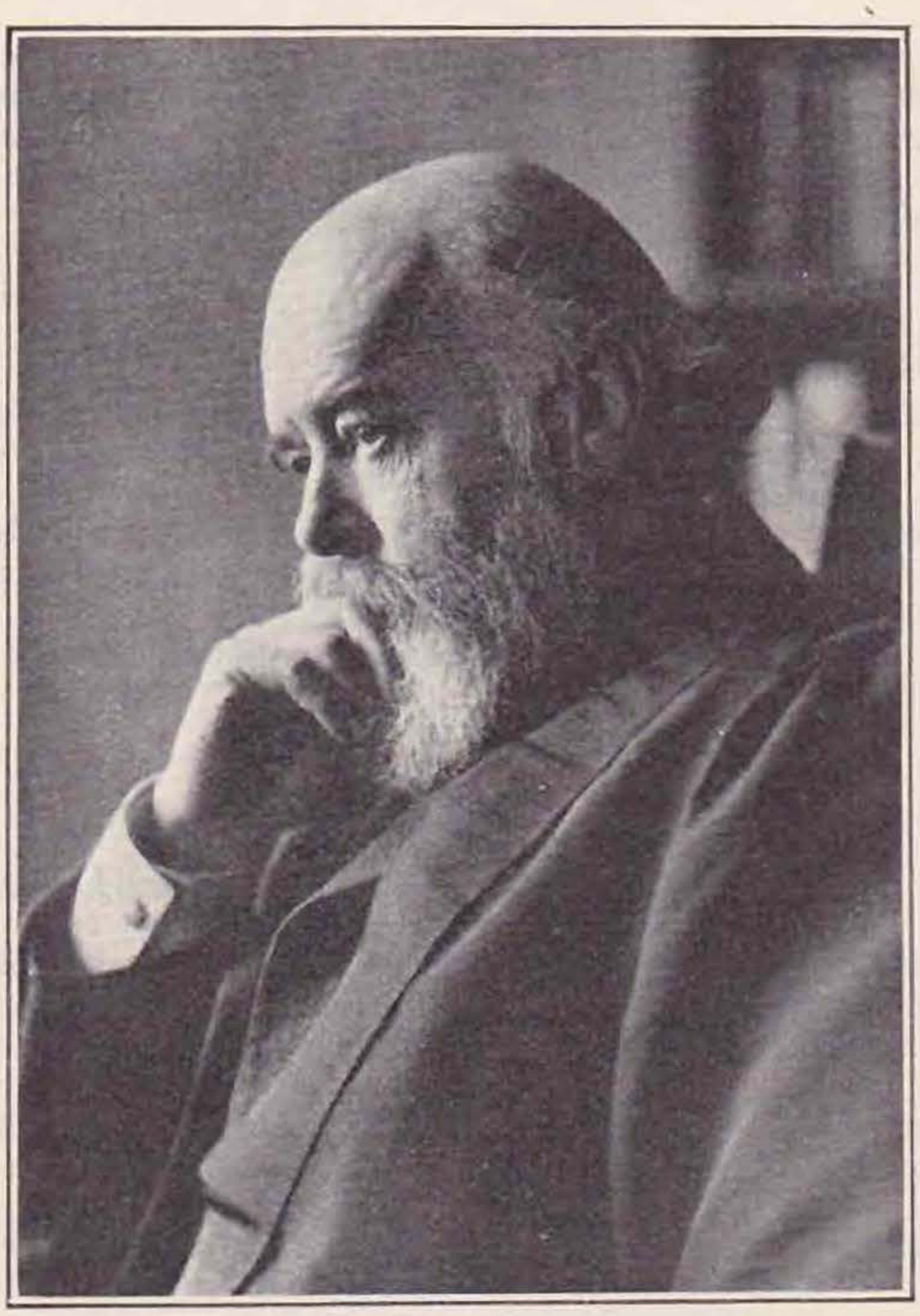
WITH A SENSE OF DEEP APPRECIATION WE PUBLISH BELOW MESSAGES OF CONGRATULATION WHICH HAVE REACHED US FROM MANY QUARTERS. THE SOCIETY IS INDEED PROUD TO KNOW THAT ITS WORK IS HELD IN SUCH HIGH ESTEEM.

From SIR OLIVER LODGE, D.Sc., Honorary Member, Past President.

The Radio Society of Great Britain has lived through twenty-one of the most interesting years in history. It was born on the eve of one of the greatest catastrophes the world has known. It is itself one of the instruments for good that can prevent such a tragedy from happening again. Through the long arm of wireless, the countries can learn to co-operate. Without sympathy and understanding the nations must perish. On its coming of age, I wish the Radio Society of Great Britain a continued power of wielding its influence for good.

From SENATORE GUGLIELMO MARCONI, G.C.V.O., Honorary Member.

On the occasion of its twenty-first anniversary, I wish to congratulate the Radio Society of Great Britain for the rapid progress it has made, and for all it has done in promoting the development of radio science and practice. I also convey my most sincere wishes for the continued success of the Society.



Oliver Lodge — G Marconi

From W. H. ECCLES, Esq., D.Sc., F.R.S., Past President.

Looking back upon the years 1923 *to* 1925, *when I was President, my recollection is that they were years of rapid changes in the Society and in Wireless generally. The Wireless Society of London had revived after the war, and had expanded its organisation in order to receive as members all the wireless amateurs in the country, taking the new title of The Radio Society of Great Britain. But, after one or two years, the members who wished to take part in well-arranged transmitting work, found that their interests were not guarded as energetically as they desired, so many of the transmitter members broke away to form a special Transmitters' Society. My task was to heal this split, to bring transmitters into prominence in the counsels of the R.S.G.B., and to ensure that facilities and opportunities for long-distance transmission were made available for the largest possible number of members. Fortunately, the new Society amalgamated in February,* 1924, *with the older one, and a greatly strengthened T. & R. Section advanced to take part in the DX work with short waves then triumphantly in full blast in America. These were exciting times, for during that winter signals were received by our members from hundreds of American amateurs, and our transmitters began to shorten their inductance coils and their aerials. As everybody now knows, all this activity quickly led to every ocean being spanned by our members in the course of the year—perhaps the most remarkable year in the history of the R.S.G.B.*

From Brigadier-General Sir CAPEL HOLDEN, K.C.B., F.R.S., M.I.E.E., Past President.

As one of the Past Presidents of the Radio Society of Great Britain, it gives me great pleasure to contribute a few words of greeting and congratulation to the Society on attaining its 21*st birthday on July* 5*th.*

During the few years I was on the Council, I was deeply impressed with the loyal support and earnestness of the various members of that body, at a time when the prospects were not so rosy as they are now, and the membership was comparatively small.

It was my privilege in my Presidential address in January, 1927, *to call attention to the work done by members of the Society on the short wave-bands, members who eventually distinguished themselves as pioneers and blazed the trail of long distance transmission with small power inputs, and made practical use of the Kennelly-Heaviside layer for this purpose.*

I was also able to call attention to another invention which has since shown outstanding qualities of merit. I refer to the copper oxide rectifier, which had just been invented, and which has now proved its utility and permanence, not only in radio instruments, but in many other directions. The R.S.G.B. has undoubtedly a past history of which it can justly be proud, and a future which one can confidently predict will keep it well to the front in its own sphere, now world-wide, of radio communication.

From SIR IAN FRASER, C.B.E., M.P., Past President.

I can think of no better organisation for a young technically minded person to join than the Radio Society of Great Britain. The interest, education, experience, and friendship that result from active membership—especially as a transmitter—are of the greatest value.

I am glad to think that the R.S.G.B. is still going strong, and congratulate its officers and members upon attaining official recognition. This is a testimony to the wise management of the officers, the skill of the members, and the impulse of all to be of service in case of emergency.

I congratulate the Society on the attainment of its 21*st Birthday, and wish it Many Happy Returns of the Day.*

From RENE H. KLEIN, Esq., F.R.S.A., M.I.R.E., Vice-President and Founder.

It is with feelings of both pleasure and pride that I offer to the Radio Society of Great Britain my heartiest congratulations on their coming of age.

As the founder, in conjunction with my present co-director, Leslie McMichael, of the London Wireless Club, from which the existing society has grown, it is very gratifying to look back over these 21 *years and realise that the perfection to which the science of radio has now reached is due in no small measure to the untiring efforts of the British amateur.*

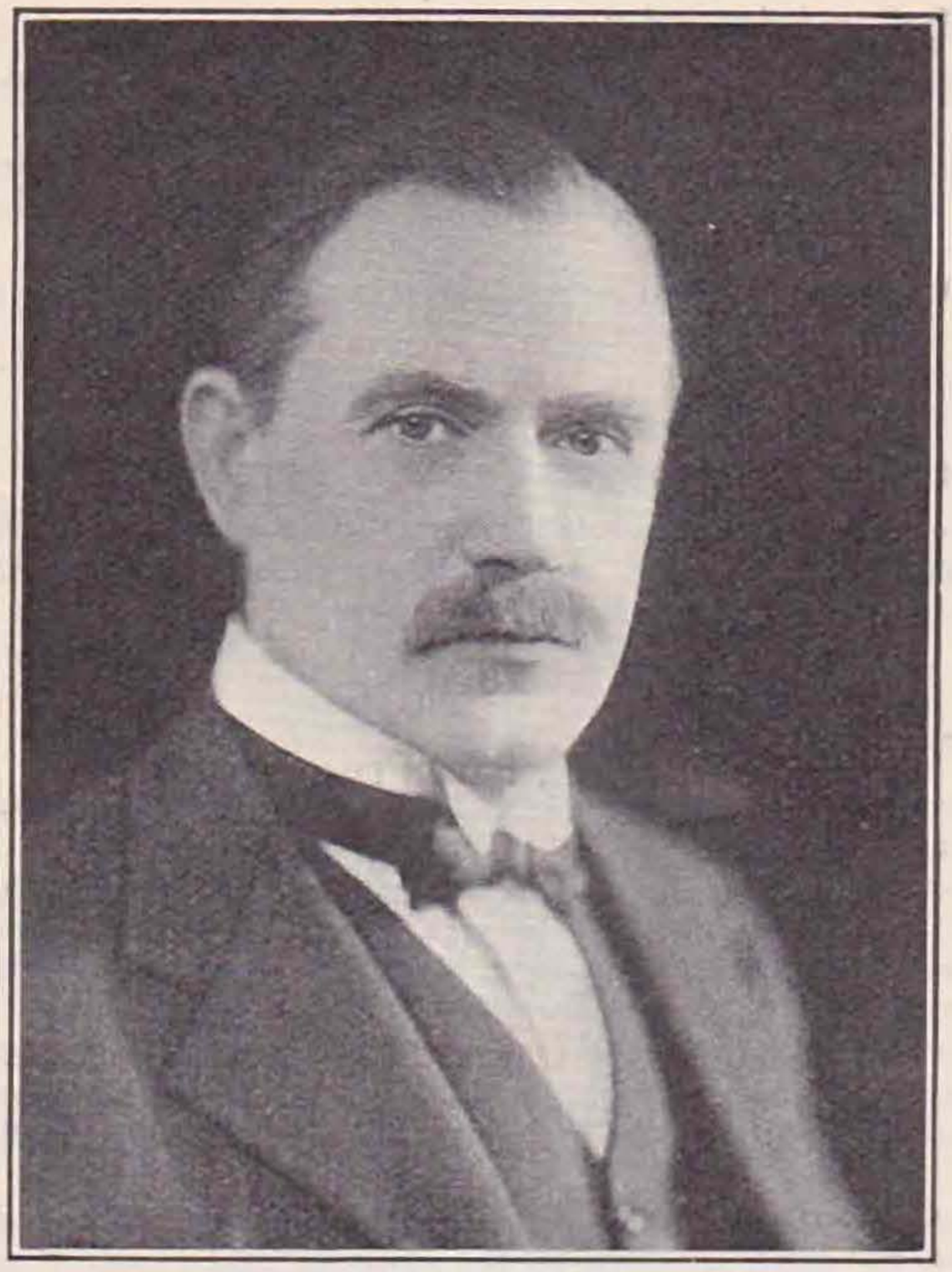
I did not realise, when the idea of forming the London Wireless Club presented itself to me, that it would prove such an important link in the development of what has now become of paramount importance to peoples of all nations—Broadcasting.

I would once again congratulate the Society, the Executives, and its members, and may the Society continue to progress in the future as it has done in the past.

From the Rt. Hon. SIR H. KINGSLEY WOOD, M.P., His Majesty's Postmaster-General.

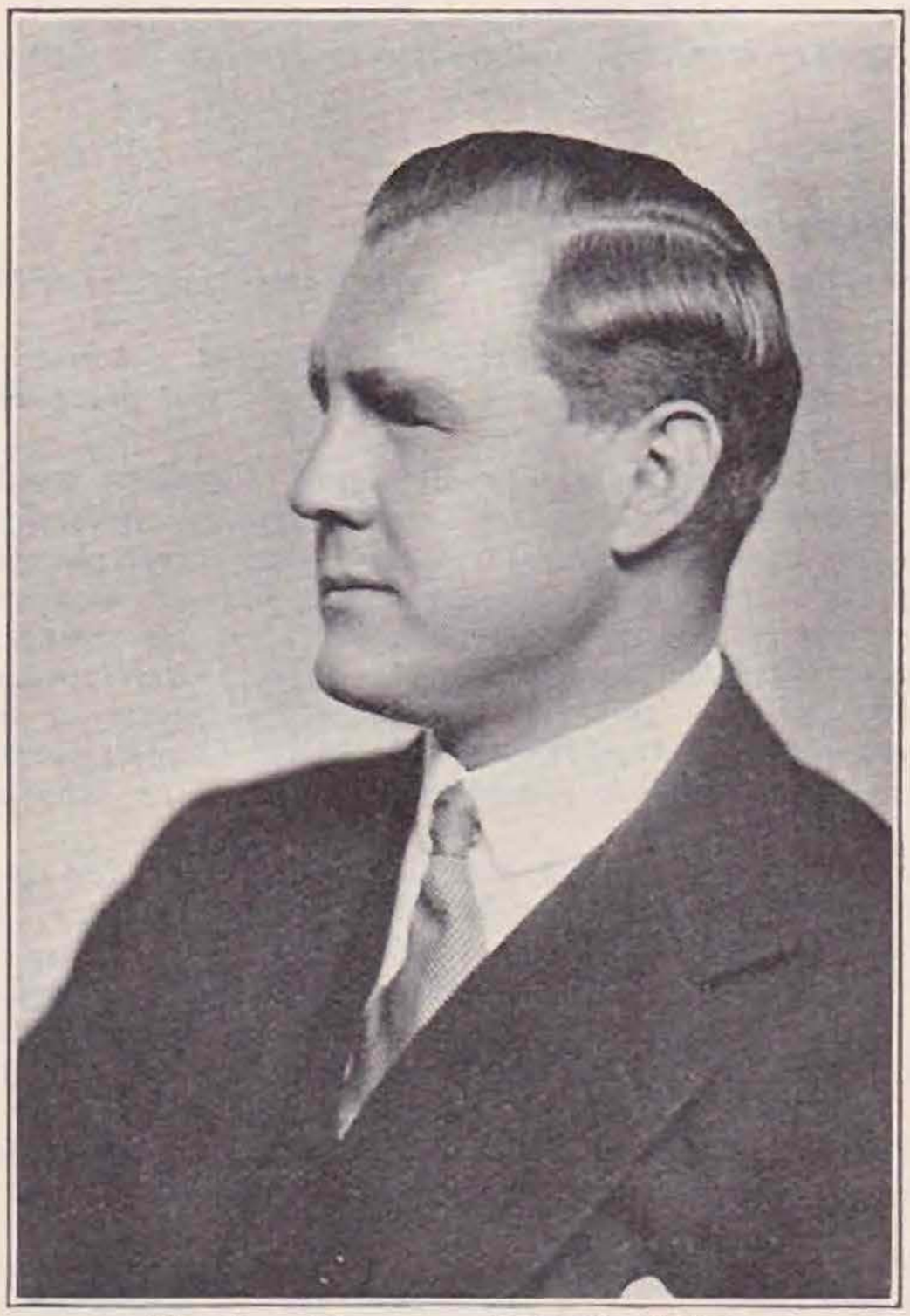
It affords me much pleasure to offer my congratulations to your Society on the occasion of its twenty-first anniversary. Ever since the Society was formed, its relations with the Post Office have been of the friendliest character.

Like my predecessors, as Postmaster-General, I much appreciate the valuable work accomplished by amateurs in the field of wireless experiment and research; and I wish the Radio Society of Great Britain many years of continued success and prosperity.

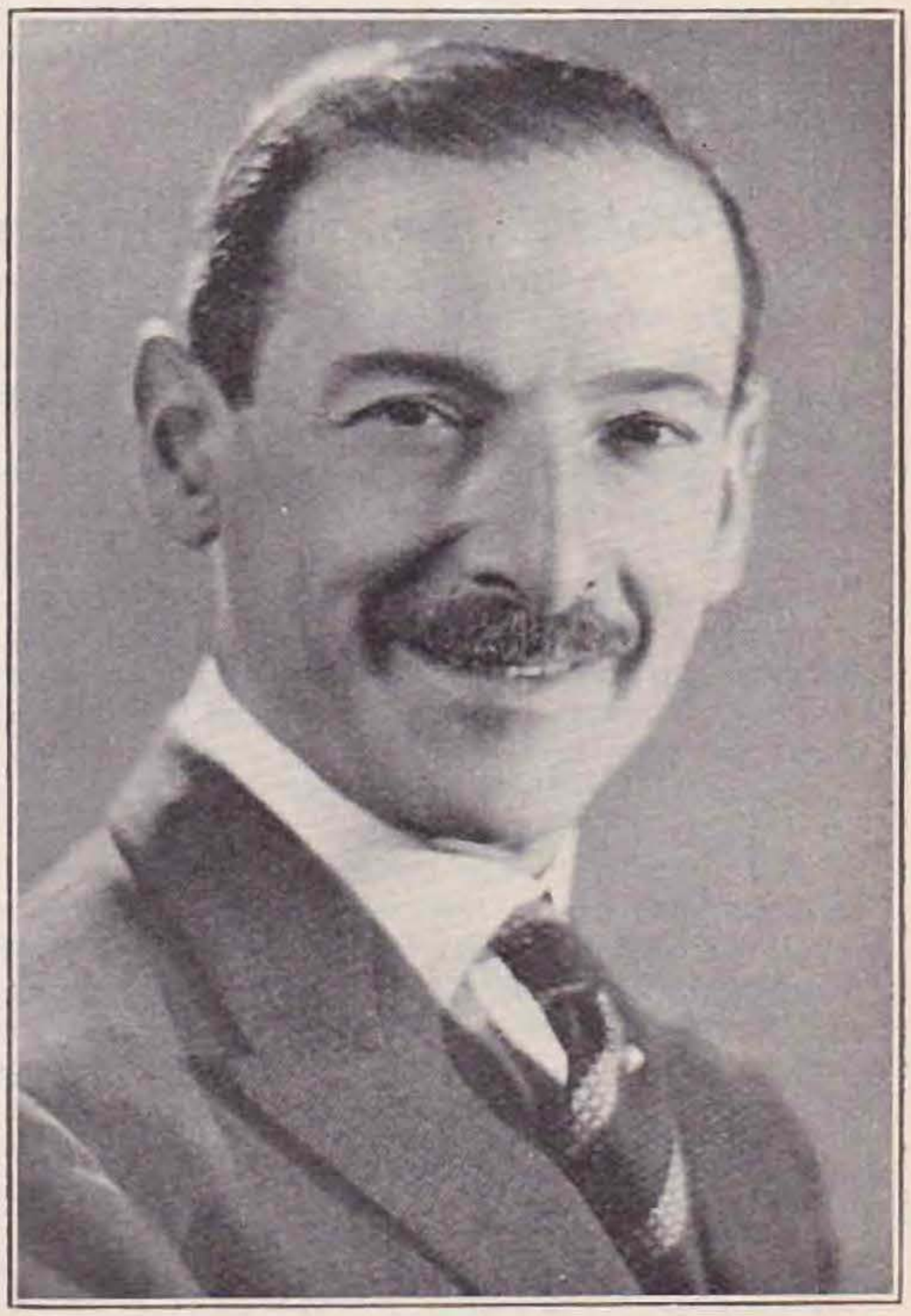


W. H. Eccles, D.Sc., F.R.S.
President, 1923-4

Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S.
President, 1926-27.



Sir Ian Fraser, C.B.E., M.P.
President, 1928.



Rene H. Klein, Esq., F.R.S.A., M.I.R.E.
Founder.

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From Vice-Admiral G. K. CHETWODE, C.B., C.B.E., Admiral Commanding Reserves.

It is with great pleasure that I offer my congratulations to the R.S.G.B. on the occasion of their twenty-first birthday.

The Society has been closely associated with the R.N.W.A.R. from its commencement and has given willing help to this reserve of national importance, besides producing many enthusiastic members for its ranks

I would like to take this opportunity of thanking the Society for its helpful co-operation and to wish it all success in the future.

From SIR JOHN REITH, Director-General of the British Broadcasting Corporation.

The B.B.C. heartily congratulates the Radio Society of Great Britain on its twenty-first anniversary. The Society has done an immense amount to encourage public interest in wireless communication; its experiments have been and are of great value to the country and to the science.

From LESLIE McMICHAEL, Esq., M.I.E.E., Vice-President.

In congratulating the Radio Society of Great Britain on the attainment of its majority, and as one of the original Founder Members, I am naturally thinking back to the early days of the movement.

Surely, there was never such enthusiasm for any cause as was shown in the early days of the Society, and how this enthusiasm has been maintained and fostered is one of the secrets of the success of the R.S.G.B., and one of the main reasons that such an enormous amount of useful work has been done for the cause of Wireless and the Wireless Experimenter over the past 21 years.

With a membership of over 2,000, those who are now responsible for the present activities of the Society have indeed a heavy responsibility, and though conditions have changed almost out of recognition from the early days, there is still a vast field to be covered by the best type of Experimenter, as represented by the members of the R.S.G.B.

My close connection with the foundation and first ten years of the Society, including a long period as Honorary Secretary, gave me a very real insight into the work involved in the running and building up of the organisation, and I know full well the work it has meant for the Officers and Executive Members in the immediate past to bring the Society to its present important position.

Some ten years ago the history of the Society to that date was written. May I suggest that our 21st birthday would be an appropriate time to add further pages to that history, and to put on permanent record the many added achievements of the general work of the Society up to the present day.

May I wish the Society, now that it has attained the stage of manhood, still greater success in the future, and a still larger membership.

From L. F. FOGARTY, Esq., M.I.E.E., Honorary Treasurer, 1913-1922.

I am grateful for this opportunity of sending a message of greeting to the Council and Members of the Radio Society of Great Britain on the occasion of its "Coming of Age."

It is not easy to realise that 21 years has elapsed since a few fellow enthusiasts, meeting at a house in West Hampstead, successfully laid the foundations of an organisation which eventually grew and prospered into the Radio Society of Great Britain, with Royal patronage.

I imagine that young men form a fair proportion of the present membership, and, therefore, would naturally have but hazy ideas or recollections of pre-war years and of the conditions under which wireless communication was then conducted, and for that reason, they cannot visualise as I do the enormous changes which have taken place in this branch of science during the last 25 years, nor could the younger members appreciate the manifold difficulties of the early experimenters. I feel, however, that even the youngest member has every right to be proud of the important part which the amateur has played in the development of radio transmission and reception. In the first place, no one will ever know the full extent of the technical services rendered to the country by the members of the original Wireless Society of London during the Great War, but I know that almost without exception, every member served the nation in one capacity or another.

It is, perhaps, only the older members who realise that the knowledge and facilities now at the easy disposal of the latest tyro were still unavailable or only imperfectly understood less than twenty years ago, but such knowledge as was then available had enormous value to a nation committed to the greatest war in history, by reason of its scarcity and its possession by so small a number. There is no doubt in my mind but that the knowledge and experience gained during those strenuous years was ultimately employed to the benefit of mankind in the development of Broadcasting and in the building up of the Radio Industry in this country.

I well remember that it was entirely due to the practical demonstration given by the members of the Radio Society, and to the pressure which they brought to bear upon the Government, that Broadcasting was first brought into existence in this country.

As one who has been in constant touch with radio development since the time when the late Sir William Preece first encouraged Marconi's early experiments in this country, I can say without fear of contradiction that the amateurs have contributed largely to the advancement of this particular branch of knowledge, especially in the direction of short wave transmission and reception, and were, in fact, conducting regular

transmissions between places widely spaced on the earth's surface at a time when professional interests denied that such transmissions were commercially feasible.

It is very pleasant to realise that now that the Society is able to look back upon 21 years of useful and constructive service, its present members are not unmindful of the zeal and labour expended by that small group of men who first of all conceived its original formation, and who worked so unsparingly to lay the solid foundations on which the present edifice is built. The history of the Society shows that this early work was well done, and I am proud to have shared with Mr. R. H. Klein, Mr. L. McMichael, and Mr. Hope-Jones the honour of bringing the original organisation into existence, and subsequently to have served as Treasurer for close upon ten years.

I most heartily congratulate the Council and Members on the "Coming of Age" of the Society, and tender my earnest wishes for its continued prosperity.

From HIRAM PERCY MAXIM, Esq., President, American Radio Relay League.

On the occasion of the twenty-first anniversary of the Radio Society of Great Britain, may I extend the felicitations of a younger brother, the American Radio Relay League?

Our two organisations have lived to see the day come when amateur radio is officially accepted the world around as one of the recognised branches of radio communication. In my own case, this surpasses the most optimistic dreams of twenty years ago. For twenty years our two societies have laboured unselfishly for the protection of amateur radio as an institution, realising more each year its value and importance. Without the intelligent and altruistic effort which your Society has made for a generation, amateur radio communication would not have attained the high position it now occupies, and on this happy occasion I desire to express the thanks and appreciation of American amateurs.

It would seem that your Society, having lived to achieve "man's estate," may not have finished its work. There are generations of men to come, and it appears reasonable to believe that private, individual radio communication may be valuable to them, as it has been to us. Indeed, the destiny of amateur radio communication may be unimaginably more important than we of to-day suspect; just as it is more important to-day than we pioneers imagined would be the case a generation ago. With this possibility in mind, I am led to hope that it may be given to the Radio Society of Great Britain to carry on as successfully during the next twenty-one years as it has during the past twenty-one.

Leslie McMichael, Esq., M.I.E.E.
Vice-President. Honorary Secretary, 1921-1922.

F. L. Fogarty, Esq., M.I.E.E., F.R.S.A.
Honorary Treasurer, 1913 *to* 1923.

From HUGH S. POCOCK, Esq., Editor, *The Wireless World.*

" London has hitherto been without a wireless club, but at a meeting held on July 5th an association was formed under the title of ' The London Wireless Club,' having for its object ' the bringing together of all amateurs interested in wireless telegraphy and telephony.' "

This brief record, which appeared in The Wireless World *of August,* 1913, *announced the birth of an organisation which now, after* 21 *years as the Radio Society of Great Britain, is more firmly established and a more united body than ever before, and having to its credit a long list of achievements, some of which have had a profound bearing on the present state of development of wireless communication and broadcasting.*

One of the most impressive of the early meetings of the Society, which I well remember, was undoubtedly the inaugural address of the first President, the late Mr. Campbell Swinton, F.R.S., which took place at the Institution of Electrical Engineers on January 21, 1914.

Not long after this meeting, which may be regarded as a landmark in the history of the Society, came the War, which deprived amateurs of their facilities to conduct experiments, but which offered great scope for their abilities which were placed at the disposal of their country. My own pre-War licence is still in my possession, although I believe most of these were collected by Post Office officials for cancellation. Almost as soon as hostilities were imminent, a notice was sent to licensees suspending their licences, and it is interesting to note that this document shows, by the date of the imprint, that it was prepared, with characteristic Post Office efficiency, long before the War ; no doubt in preparation for such an emergency.

It was after the War that the amateur was first confronted with the necessity for making a stand for what rights he possessed to resume his experimental activities. With the War all former rights had disappeared, but when peace was restored, the recovery of pre-War facilities became the chief aim of amateur organisations, under the headship of the Radio Society.

It may be said that it was due entirely to the firm, yet tactful handling of a difficult situation by the Society and its affiliated societies, that freedom to resume experiments was regained. Next came amateur broadcast transmissions, which led to the establishment of the first regular broadcasts from Writtle, Chelmsford, by the Marconi Company, acting as the agents of the Radio Society of Great Britain, to whom the permit for these broadcasts was originally granted by the Post Office.

After the external political activities of the Society had thus been brought to a successful issue, the Society began to put its own house in order. The future policy of the organisation had to be settled, and it was natural that differences of opinion should arise. The Society had attracted members of all grades of wireless knowledge, and there were those who thought that the Society should become an institution for the professional, whilst others urged that the purely amateur status should be maintained. The arguments were often heated on both sides, but the original conception of the Society prevailed, and to-day it remains the representative body of British amateur wireless, although membership is still open to professionals who are amateurs at heart.

The record of the Society is one of constant vigilance in the interests of the amateur fraternity, in return for which the members, by their efforts, have contributed to the status and dignity of the association by achievements in technical progress which have on many occasions astonished the technical world, and contributed much to our knowledge.

The Radio Society of Great Britain comes of age this month. May the good work go forward, and the Society, in its mature years, continue to progress and earn for itself fresh laurels in the future.

From F. J. CAMM, Esq., Editor, *Practical Wireless.*

Hearty congratulations on attaining your twenty-first birthday. Having watched your progress since the formation of the Wireless Club of London in 1913, *I feel that you have done more than your share in bringing radio to its present state of perfection, and I hope that you will continue your excellent work of co-ordinating and guiding the work of the real amateurs.*

Yours is the cementing influence which holds them together, and the expansion of our Empire Broadcasting service has largely been due to your efforts.

A large portion of the history of radio development is written in your records. May your work expand.

From H. J. DYER, Esq., Editor, *The Wireless and Gramophone Trader.*

I am glad to send my congratulations to the President, officers and members of the Radio Society of Great Britain on the occasion of the 21*st anniversary of the foundation of their Society.*

The R.S.G.B., since its inception, has done much to further the interests of amateur radio in this country, while it has also contributed to the successful growth of the radio industry. Many of its members have done, and are still doing, good work on the manufacturing and retail side of the trade.

I wish the Society every success in the future.

From NORMAN F. EDWARDS, Esq., Editor, *Popular Wireless.*

Heartiest congratulations and good wishes to the R.S.G.B. on the anniversary of its 21*st birthday.*

The invaluable work done by your Society since its inception is known the world over, and I am proud to take this opportunity of being allowed to pay my tribute.

May your Society flourish and continue as it has done in the past to serve as a model and inspiration to all those interested in the development of radio.

From BERNARD JONES, Esq., Chief Editor *Amateur Wireless, Wireless Magazine, Television.*

May I give myself the great pleasure of offering congratulations to the Radio Society of Great Britain on the occasion of its 21st Birthday. "I am twenty-one to-day" must mean a very great deal to the society that has done so much for the amateur radio movement in this country and the British Dominions.

The R.S.G.B. has banded together amateur listeners and transmitters, has watched their interests, has been the buffer-body between them and the Post Office, and has consistently done its best to see that the amateur is officially licensed and recognised.

It is to be warmly congratulated on its formation of the British Empire Radio Union, by means of which our countrymen in the Dominions are kept in touch with radio events at home.

The keen and appreciative amateur knows that the R.S.G.B. has always been quick to obtain privileges for the genuine experimenter and to use its undoubted influence to prevent any threatened curtailment of amateur interests.

I with all its well-wishers trust that the Society will continue to progress from success to success.

From F. H. ROBINSON, Esq., Editor, *The Broadcaster.*

The twenty-first birthday, which your Society is to celebrate on July 5, is indeed an important occasion.

Twenty-one years in the history of radio is a long time, and 1913 must, from the point of view of the average listener to-day, seem almost pre-historic in a radio sense.

With over six million licences to-day, it is difficult to realise what conditions in radio were like when your Society was born. Certainly the progress which is so evident to you as you attain your majority must have given your Society great pleasure, for in no small part is that progress due to the efforts of your members, especially during the early years.

I hope that your next twenty-one years will show as much advancement in the science in which we are both so interested.

From A. F. BULGIN, Esq., Director, A. F. Bulgin & Co., Ltd.

To attain the age of 21 years is considered a landmark in the life of a man, how much more so in the history of such a well-known Society as The Radio Society of Great Britain!

I am only too delighted to add to the many congratulatory messages which I am sure you will receive, particularly as I have been fully conversant with the early pioneering work so ably carried out and constantly maintained by the keen body of radio enthusiasts who form your members.

Modern high quality transmission and reception is now an accepted fact, but it is doubtful whether it would ever have attained its present state without the invaluable aid of your Society.

Wishing you every success in your future activities.

From G. S. LAUGHTON, Esq., Director Messrs. Stratton & Co., Ltd.

I am more than pleased to contribute my congratulations to the R.S.G.B. on the event of its 21st anniversary.

British amateur radio interests can only be protected by a strong combined organisation, and I think the officers and members of the R.S.G.B. deserve every congratulation on the present strong position and high status which their Society holds.

I am also gratified to notice from recent editions of the BULLETIN *that the Society is not standing still, but has many new activities in hand.*

To these activities and the future position of British Amateur Radio as represented by the R.S.G.B., I extend my very best wishes for continued success.

From LIEUT.-COLONEL G. D. OZANNE, Commanding City of London Signals, T.A.; Manager Wingrove & Rogers.

It gives me particular pleasure to offer my congratulations on the occasion of your 21st Birthday in view of the great help which your Society has been to the Services, and I refer particularly to the Royal Corps of Signals, Territorial Army.

Wireless is becoming more and more important in this Corps, and there is no doubt that the research work which has been carried out by members of the Society, and the example set by them, has encouraged many young men to become interested, and numbers of these have turned to Territorial Signals for the facilities they require for transmitting work.

From J. M. G. REES, Esq., Director, Varley (Oliver Pell Control, Ltd.).

From my intimate knowledge of the great amount of valuable experimental work carried out by the members of the oldest Radio Society in the world, it affords me the greatest pleasure to congratulate the Radio Society of Great Britain on attaining its twenty-first birthday.

The sustained efforts of your members have contributed in a marked degree to the advancement of radio as a means of entertainment, and have materially assisted in the linking up of the Empire.

TWENTY-ONE YEARS OF PROGRESS.

A History of the Radio Society of Great Britain.

THE preparation of an accurate and authentic history of the Incorporated Radio Society of Great Britain is in no wise a simple task, for the reason that no single individual can claim to be thoroughly conversant with every phase of its existence, from its inception up to the present time. In compiling these notes, therefore, the writers have been compelled to rely upon a good deal of collected information, and accordingly desire to thank all those who have assisted them in their task. Especial thanks are due to Mr. Rene Klein, the founder of the Society, who lent a book of collected press cuttings which form an exceptionally valuable record of the Society's early history; and to Mr. Maurice Child, for assisting us to fill up certain gaps in the chronological account which follows.

The history of the Society can be divided roughly into three parts, the pre-war period, the immediate post-war period, and that period which followed the amalgamation of the T. & R. Section with the main body. The first and second periods were separated by some four years during which time the Society was, to quote one of our Past-Presidents, "in a state of suspended animation." During those years considerable progress in the science of radio was accomplished, mainly due to war-time exigencies, but for amateurs the period was one of complete silence. When the Armistice was declared in November, 1918, those still interested in the experimental aspect of the subject found themselves in a new world, where every known principle had been changed by the advent of the thermionic valve.

1913.

To Mr. Rene Klein, whose portrait we have been able to include in another page, belongs the honour of founding the Society. In a letter which he sent to the press during the summer of 1913, Mr. Klein deplored the fact that there was no association in London whereby amateurs interested in radio problems could meet and discuss their hobby. To fill this obvious want he invited such persons to communicate with him, with the result that on July 5, 1913, a meeting was held at his West Hampstead residence, and it was there and then decided to form the London Wireless Club, with Mr. Klein filling the Secretarial position. Much publicity was given to this newly-formed organisation, and many of our readers will remember reading *The Wireless World* report of this meeting, which has been reproduced in our publicity pamphlets from time to time. The subscription was fixed at 10s. 6d. per annum (with an entrance fee of 2s. 6d.) for Town members, and 5s. per annum for Country and Foreign members. The first General Meeting of the Club was held on Tuesday, September 23, 1913, at the Westminster City School, Palace Street, Westminster, when the objects of the Association were discussed, and a Committee appointed to draw up the rules. The foundation officers were as follows:—

Chairman, F. Hope-Jones, Esq., M.I.E.E. Secretary, R. H. Klein, Esq. Treasurer, L. F. Fogarty, Esq. Committee: Messrs. H. F. Brand, M.A., B.Sc., Leslie McMichael, W. I. Shaw, V. W. Delves Broughton, W. I. Fry, E. W. Kitchen, A.M.I.C.E., Dr. F. C. Knight.

At this meeting it was announced that the Presidency had been offered to Dr. Sylvanus Thompson, but owing to other duties, he had been unable to accept, although he had consented to become a Vice-President. The Committee were authorised to negotiate for suitable accommodation, and a letter was read from Mr. A. W. Gamage, offering rooms at 107, Hatton Garden, which offer was eventually accepted. A communication was received from Sir A. F. King, on behalf of the Postmaster-General, weloming the formation of the Club, and indicating that certificates issued by its Advisory Committee would be accepted as qualifications for the granting of experimental licences. At this meeting, too, it was decided that the name of the Club should be changed to the Wireless Society of London, and an intimation to this effect was issued to all members in a letter dated October 10, 1913.

1914.

The first important meeting of the Society took place in the Lecture Theatre of the Institution of Electrical Engineers, on January 21, 1914. In the meantime many eminent gentlemen had joined the Society, and from among their number the late Mr. A. A. Campbell Swinton, F.R.S., had been chosen as first President. This post he continued to hold for a period of seven years.

The keen interest shown by Mr. Swinton was readily communicated to the members, and it was largely due to his personality that the Society made such rapid progress in the early days. At the meeting referred to above, he delivered his presidential address, and the occasion has since passed into radio history as an important landmark. This was the first meeting of the Society attended by the writer of this part of the history, and all who were present retain vivid memories of that eventful evening. The hall was crowded, and every seat occupied some while before the meeting was due to commence, and the writer, in company with many others, was compelled to stand against the wall at the back. A collection of early radio apparatus was shown on the table in front of the chair, and a special aerial donated and erected by, we believe, Messrs. A. W. Gamage, was installed in the roof. It had been arranged that a wireless message of greeting was to be sent to the Society by Commandant Ferrie during the meeting, via the Eiffel Tower Station in Paris, and special arrangements had been made for its reception. These included a syphon recorder and an epidiascope for

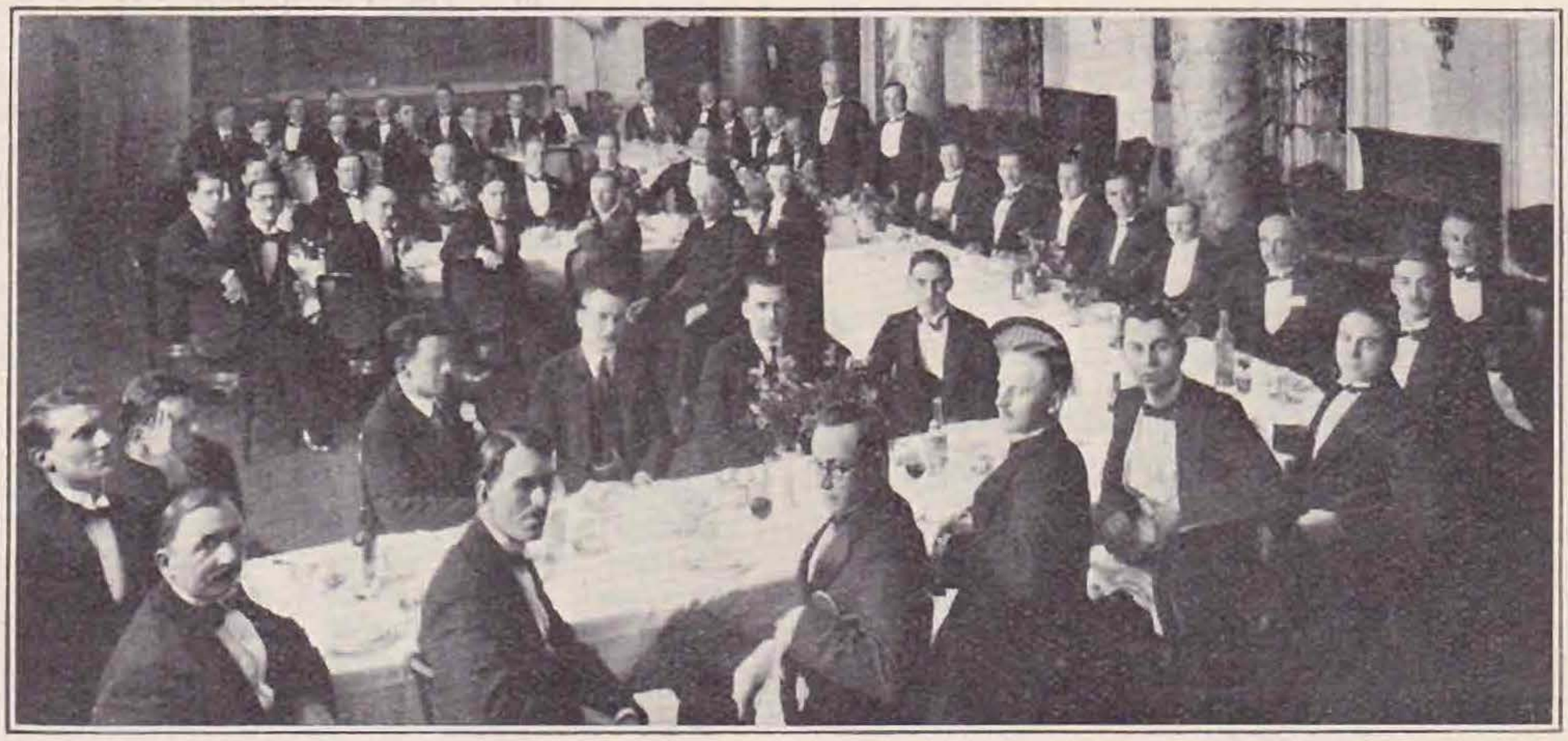
projecting the received signals from a tape on to the screen. As loud-speakers were at that period unknown, an organ pipe was set up in one corner of the hall, and operated by a valve relay attached to the syphon recorder. Tuning was effected by means of a large variometer. The President announced that in order to ensure the effective reception of the message, he had asked the Admiralty (who at that period possessed the only station in London powerful enough to cause jamming) to refrain from transmitting during the time the message was expected. This they had promised to do, providing no message of special importance was required to be handled. But, alas! the organ pipe had scarcely commenced its task of delivering the message before the high-pitched note of the Admiralty transmitter broke in! In spite of this unfortunate interruption, the audience were able to follow the message completely, and the President, at the conclusion of the demonstration referred in a jocular manner to the interference, pointing out

A telegram thanking Commandant Ferrie for his message was despatched from the meeting. The President then went on to describe the possibilities of radio, illustrating them with many experiments, including one showing the use of manometric flames as possible amplifiers of signals.

Other messages were received from pre-arranged sources, one of which emanated fron the station of Mr. Maurice Child located at Earls Court. Mr. Campbell Swinton also looked into the future, and foretold the coming of the day when we should be entertained by radio programmes in our own homes.

At the conclusion of the lecture a vote of thanks to Mr. Campbell Swinton was proposed by Sir Henry Norman, M.P., and carried unanimously by acclamation.

This historic meeting was largely noticed in the scientific journals, and by the daily papers, and as a result the interest aroused was considerable.



DINNER TO THE DELEGATES OF THE UNITED STATES AND CANADA.
Held at Waldorf Hotel, London, April 24, 1925.

Mr. H. Bevan Swift in the chair, supported by G. Marcuse, G2NM, on his left, and Hiram P. Maxim, President, A.R.R.L., on his right. K. B. Warner (Secretary, A.R.R.L.), Captain Ian Fraser, M.P., E. D. Simmonds, G2OD, to the left of the Chairman. E. D. Ostermeyer. G5AR, F. A. Mayer, G2LZ, and Maurice Child in foreground.

that either war had started, or Mr. Winston Churchill had resigned! Unfortunately the first part of his prophetic utterance came true only a few months later.

The message sent by Commandant Ferrie, who had already been elected a Vice-President, reads as follows :—

"Le Commandant Ferrie presente au President et aux collegues honores de la Wireless Society of London ses distinguees salutations et l'assurance de ses sinceres sympathies. Vive Angleterre, Vive l'entente cordiale."

"Commandant Ferrie presents his compliments to the President and his distinguished colleagues of the Wireless Society of London, and assures them of his sincere sympathy. Long live England, and long live the Entente Cordiale."

It has often been claimed that the Radio Society of Great Britain is the oldest organisation of its kind in the world, but this is not the case, because it is now known that a club had been established in Derby some little time before the London Club commenced operations. It is also believed that similar associations had been formed in Liverpool and Leicester, but the writers have been unable to obtain confirmation of these facts. It *is* known, however, that during the year 1912 the Wireless Institute of Australia was founded, and is still in existence; therefore, the W.I.A. can, we think, justly claim the honour of being the oldest Radio Society in the world.

Following the important meeting just recorded, further gatherings took place during the first eight months of 1914, and during this period the Society can be said to have become firmly established. At about this time the Society collected together

numerous scientific instruments, thus allowing members to carry out, at their Hatton Garden headquarters, much useful experimental work.

The Great War broke out on August 4, 1914, and all Society activities promptly ceased. The apparatus which had been so carefully collected was sealed up by the Post Office, and the few transmitting stations in operation followed the same fate. Many Society members joined the Colours, where their technical skill proved of the utmost value, but it is not possible in this account to give details of their activities during the war period, although numerous developments which proved of immense value to H.M. Forces, can be attributed to them.

1918.

At the termination of hostilities, in November, 1918, amateur radio activities did not immediately recommence, in fact it was predicted by many at the time that the facilities previously enjoyed would be very much curtailed, if not entirely withheld. Interest, however, was gradually aroused, especially amongst those who had had war-time experience in some branch of wireless engineering, and particularly where the members concerned had had the opportunity of using the early types of thermionic valves which had been put into service during the last two years of the war. Very few amateurs had a sound knowledge of the operation of these " magic bottles," but fortunately a little book entitled " The Oscillating Valve," written by Mr. H. W. Bangay, became available, and this, supplemented by articles in the technical press, gave amateurs an insight into their general principles. The valve altered all pre-conceived ideas of radio, consequently very little pre-war apparatus was of use in dealing with the new order of things. Instead of the damped wave of the spark transmitter we now had the continuous wave generated by the oscillating valve. A vast search for information was the natural result, and numerous groups and associations were set up throughout the country by men interested in the subject.

1919.

The first post-war committee meeting of the Wireless Society of London was held at the offices of the President, in Victoria Street, Westminster, during July, 1919, and at this meeting the future policy of amateur radio was thoroughly discussed. A notice was formulated and sent to all pre-war members, advising them that the Society intended to re-open its activities, and shortly afterwards a general meeting was called, at which Mr. Campbell Swinton delivered an interesting lecture on the subject of valve amplifiers. This was followed later by a lecture on High Frequency Amplification, given by Mr. Maurice Child, who demonstrated a six-valve resistance coupled amplifier which had been used towards the latter part of the war, employing Marconi V24 tubular-type valves.

1920.

The extraordinary interest in radio developments about this time led to the formation of numerous local radio societies throughout the country, and it was felt that if these organisations could in some way become associated with the London Society a powerful body of radio amateurs would be formed. With this object in view, a circular letter was sent to every known society inviting them to become affiliated with the Wireless Society of London, and as a result over 220 societies applied for and were granted affiliation. In February, 1920, a meeting of these societies was convened in London, and many important matters were discussed with representatives of the G.P.O. in attendance.

1921.

In 1921 the late Dr. Erskine Murray succeeded Mr. Campbell Swinton as President, and the secretaryship passed into the hands of Mr. Leslie McMichael. The excellent work effected by Mr. McMichael is well known to many of our present members.

During this year many transmissions of gramophone records were sent out by amateurs for the benefit of their colleagues, on 440 and 1,000 metres, and prominent among those operating in the London area were Mr. W. W. Burnham (2FQ), Mr. Walker (2OM) and Major Parker (2ON). These transmissions were eagerly looked forward to, and aroused a great deal of interest outside amateur circles. In addition, there started at about this time the Dutch Sunday afternoon concerts. It soon became apparent that these transmissions were providing valuable entertainment to a steadily growing number of interested members of the public, but at the same time it was clear that some organisation was essential in order to prevent unnecessary interference occurring between stations. The Society therefore petitioned the P.O. to grant licences for organised transmissions, and after some initial difficulties permission was granted for short broadcast programmes to be transmitted once a week. As the Society itself possessed no apparatus capable of carrying out a nation-wide series of transmissions, arrangements were made for the Marconi Scientific Co., of Chelmsford, to undertake this work, and it was as a result of these negotiations that the famous Writtle station became established. Programmes were transmitted for a period of one hour each Tuesday evening, and were under the control of Capt. P. P. Eckersley, who afterwards became Chief Engineer of the British Broadcasting Company. These early experimental transmissions formed the basis for the broadcasting service which commenced a few months later.

1922.

The year 1922 was an important one for the Society, for many important events took place during this period under the Presidency of the late Admiral Sir Henry Jackson, G.C.B., K.C.V.O., F.R.S., D.Sc. His acceptance of the Presidency was regarded as a great honour, as Sir Henry had been mainly responsible for the radio progress in the Navy during and just after the War. His presidential address was delivered on January 25, 1922, when he chose as his main subject for discussion, " Direction Finding and the Use of Frame Aerials."

An important outcome of the amateur broadcast transmission previously referred to was that many new amateurs became desirous of carrying out experiments, consequently the Post Office found it desirable to issue call-signs in alphabetical order, commencing with the prefix number 2. These had to be extended later to groups commencing with either the number 5 or 6.

The announcement that H.R.H. the Prince of Wales had graciously consented to become patron of the Society, was made at a general meeting held in London on October 25, 1922. At this same meeting an appeal was read from Captain Ian Fraser, in which he asked the members to assist him in a scheme to provide instruction to war-blinded soldiers.

On November 22, 1922, at the fifty-first general meeting of the Wireless Society of London, it was decided to change the name to the Radio Society of Great Britain.

International D.X. Work.

Up to this time most of the transmitting amateurs in this country had confined their attentions to communications within the British Isles, and in many cases to purely local work within their immediate neighbourhood. Telephony work had become a primary attraction, and considering the limitations insofar as apparatus was concerned, good progress had been made in the direction of quality and modulation, but mention must here be made of the pioneer short-wave work carried out by a group of keen amateurs who had begun to realise that if long distant communications were to be established, wavelengths lower than those in general use at the time must be employed. Up to this time amateurs in general were precluded from transmitting messages outside the British Isles, and in only a very few cases were they permitted to use powers in excess of 10 watts.

The first organised attempts at communication between the British Isles and abroad took place during 1920, when several first contacts with neighbouring European countries were recorded, but the ultimate goal in the minds of these early workers was the bridging of the Atlantic. *The Wireless World* during the winter of 1920 collaborated with the A.R.R.L., and by means of valuable publicity in the columns of that paper, a number of British amateurs set about the task of receiving signals from American amateur stations working on wavelengths in the neighbourhood of 200 metres. Unfortunately no success attended these efforts, but, not be be deterred, a second series of tests were arranged during the winter of 1921, and on this occasion more elaborate plans were made both at home and in America. An outstanding example of the thoroughness with which our American colleagues prepared for the tests, is to be found in the fact that one of their best amateurs in the person of Mr. Paul Godley was sent over with a special receiver, which was attached to an enormous Beverage antenna system, and set up at Ardrossan, Scotland. Success attended these efforts, and whilst the results in the light of present-day knowledge were small, the quest was achieved, for the Atlantic had been spanned for the first time by amateur radio. Mr. Godley's log at the conclusion of the tests showed that he had received 17 out of the 79 U.S.A. stations transmitting, and when his report was analysed, it showed that the vast majority of the successful stations had employed the c.w. system using thermionic valves. This fact is now regarded as the turning point in the long battle which had waged up to that period between the adherents to spark, and those who believed that c.w. would eventually become universally employed.

On the occasion of these tests the Radio Society of Great Britain offered valuable prizes to British amateurs receiving the greatest number of American stations, and the winner in this first DX Contest was Mr. W. R. Burne, of Sale, Cheshire, with a total of seven stations heard. The organisation of both series of tests was undertaken by Mr. Phillip Coursey, then a leading member of the Society, and it was undoubtedly due to his enthusiasm that success finally came to British amateurs. This contest clearly demonstrated that amateur com-

FIRST ANNUAL CONVENTION. HELD IN LONDON, SEPTEMBER 17 and 18, 1926.

Mr. H. B. Swift in the Chair; left to right at top table: G. F. Gregory, G5PZ; J. E. Nickless, G2KT; G. Marcuse G2NM; M. Child, Capt. Hampson, G6JV; J. A. J. Cooper, G5TR; at small table: E. D. Simmonds, G2OD, and S. R. Wright, G2DR. Also in the photograph, front foreground, Arthur E. Watts, G6UN; Cecil Goyder, G2SZ; J. Wyllie, G5YG; F. L. Hogg, G2SH; C. A. Jamblin, G6BT; A. D. Gay, G6NF; G. W. Thomas, G5YK; T. A. St. Johnston, G6UT; E. D. Ostermeyer, G5AR; and J. Clarricoats, G6CL.

munication *was* possible across the 3,000 miles of the Atlantic ocean, although few realised that if the stations had but worked on lower wavelengths, even more satisfactory results would have been achieved.

At the conclusion of these tests it was decided to endeavour to establish two-way communication with the U.S.A., and accordingly the Society sought permission from the G.P.O. to erect and equip a station at Putney, London, on a site owned by the Metropolitan Water Board. Sanction was given, and through the co-operation of the M.W.B., and the County Electric Supply Co., Ltd., an aerial was slung up from one of the Electric Supply Company's chimney stacks on adjoining ground. The call sign used was 5WS, and the station was operated by Messrs. P. R. Coursey, Hamilton, Lee, Child, Phillips and Blake. The apparatus used was a combination of personal, borrowed or donated parts, and the valves were lent by the Marconi Co., whilst current was supplied free by the County Electric Supply Co., Ltd. The first transmissions from this station took place on December 21, 1922, after many weeks of strenuous effort on the part of the Committee. At first the signals failed to reach the other side, but later in the tests reports were received from nine or ten American amateurs, which compensated the operators for the hectic time they had experienced. Unfortunately, two-way communication was not established at this period, but during the next winter information was received that extraordinary results had been obtained by M. Leon Deloy, 8AB, of Nice, France, who had established communication with American amateurs on a *wavelength of approximately* 100 *metres.* This news led Mr. J. A. Partridge (2KF), of Merton, to reduce wavelength, with the result that contact with the American station 1MO was established and maintained for a period of over an hour on the morning of December 17, 1923. *The dawn of International DX had broken at last.* This success resulted in a stampede by British and foreign amateurs to the lower wavelengths, regardless of the fact that special permits had not at that time been obtained ! In a few months phenomenal distances had been covered by amateurs working on wavelengths below 100 metres, and amongst the early British pioneers must be mentioned Mr. Cecil Goyder (2SZ), of Mill Hill, London, who effected the first contact with New Zealand on October 19, 1924, when he worked Z4AA ; Mr. E. D. Simmonds (2OD), who contacted the same station on the following day, and made the initial Australian contact with A3BQ a month later on November 13, 1924 ; Mr. F. Hogg (2SH), Mr. J. A. Partridge (2KF), Mr. Gerald Marcuse (2NM) and Mr. H. Ryan (5BV). Space will not allow a detailed account of the apparatus used by these pioneers, but it is interesting to recall that even in 1924 Mr. Simmonds was using a master oscillator transmitter and supersonic receiver. The first telephony contact with New Zealand was effected by 2OD during March, 1925, using a wavelength of 96 metres. This same station made history on May 2, 1925, by establishing communication with Australia for the first time on 23 metres. The initial Australian contact on this wavelength was made by 2OD on May 17, 1925.

To regulate matters, the authorities were approached during 1924 with a view to the removal of the ban on transoceanic working, and this was ultimately agreed to, and special permits were granted, for short-wave working, to selected members approved by the Society.

1923-24.

In 1923 Dr. W. H. Eccles became President, and Mr. Coursey Hon. Secretary. During this year, as the work undertaken by the Society had greatly expanded, it was decided to move into more suitable quarters, with the result that our present offices at 53, Victoria Street were rented, and a paid clerk employed to deal with the rapidly growing business. Special sections were formed during this year to cope with the various activities of the Society, including a Schools Section, which had a brief but useful existence under the leadership of Mr. R. F. Hibberd.

The Transmitting Movement Begins.

It was about this time that a movement began to take shape which was to completely change the future policy of the Society. Up to 1923 the number of transmitting amateurs in the country had been relatively small, probably not in excess of 200, but with the removal of many irksome restrictions, an impetus had been given to those with a flair for transmitting. It was not surprising, therefore, to find that such persons should express a desire to be more fully represented when matters affecting their welfare were discussed. It should here be mentioned that whilst the Society was interested in all classes of experimental wireless work, a very large proportion of its members were not directly interested in transmission.

The earliest attempt to cater for the needs of the transmitting amateur seem to have been initiated by the old Manchester Wireless Society, for we find in *The Wireless World* for August, 1922, a statement to the effect that a British Wireless Relay League had been formed. Later, in January, 1923, Mr. Hugh Pocock, editor of that journal, was elected secretary of the League. Some 100 British transmitters were in association, and among the list of members appear such well-known names as Maurice Child, W. E. Corsham (2UV), J. Croysdale (5US), Captain W. Hampson (6JV), F. L. Hogg (2SH), R. Kirlew (6KW), A. N. Jackson Ley (2DM), Leslie McMichael (2FG), W. H. Marston (2PD), F. A. Mayer (2LZ), Hugh Pocock, Capt. G. C. Price (2OP), J. W. Riddiough (2SZ), R. L. Royle (2WJ), K. Secretan (5LF), H. Stopher (5GF), F. L. Stollery (5QV), S. R. Wright (2DR).

In July, 1923, the League approached the R.S.G.B., and requested the Society to take over its members.

On receipt of this request, Dr. Eccles set about the task of catering for the needs of this class of amateur within the Society, and the initial step to meet this demand was the recognition of a Transmitter and Relay Section of the R.S.G.B. From then, until 1927, the T. & R. Section was representative of British transmitting amateurs, and for sentimental reasons that name is still kept alive in the title of our monthly journal.

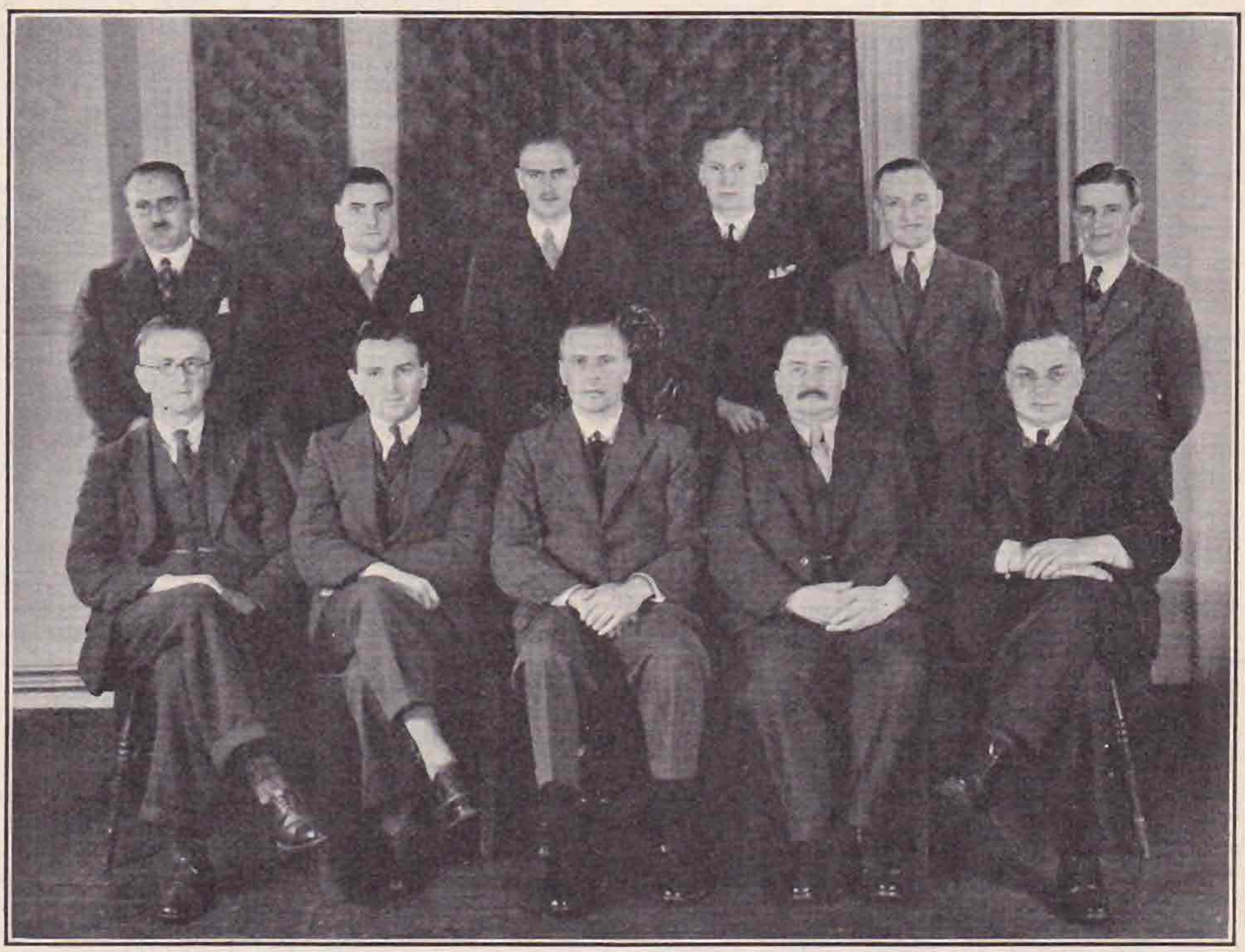
It is interesting to recall Dr. Eccles' words announcing the formation of this Section. He said :

" *The British Wireless Relay League in July last became absorbed into the Radio Society of Great Britain under conditions which will ensure the continuance of*

its activities, and give it the advantage of the financial and administrative support of the larger body. The Committee of the Society have now decided to make preparations for the organisation of an attractive programme of relay work for the winter, and for this purpose have arranged to establish a special section of the Society called the 'Transmitters and Relay Section.' The work of the Section will be guided by a Committee democratically elected from within the Section, and will have several grades of membership. The present epoch is critical in the history of the amateur movement in this country. The advent of broadcasting and the possibility of the rapid growth in the number of broadcasting stations, each of which will require a special band in the already crowded spectrum of wavelengths, calls for a united and definite statement by the amateurs of their own claim to an adequate waveband. There is at the moment some danger that the needs of the amateurs will be overlooked unless by union they bring to bear upon the Departments of State concerned an influence equal to that of any other interest.

" It will be realised that if through lack of cohesion British experimenters are ultimately barred from the use of transmitting apparatus, the progress of wireless discovery and invention in this country will be crippled, and many of the honours of pioneer work in the still unexplored regions of our wonderful subject will be left to other nations."

During the time that negotiations were being conducted between the R.S.G.B. and the British Wireless Relay League, another organisation with similar objects began operation. Known as the Radio Transmitters' Society, it held its first meeting in London under the chairmanship of Capt. Ian Fraser, on October 10, 1923. This Society represented some 75 transmitting amateurs living in the London district, and had as its officers Capt. Eckersley (President), Capt. H. S. Round (Vice-President), Capt. I. Fraser (Chairman), Gerald Marcuse (Hon. Secretary) and H. S. Walker (Hon. Treasurer). Well-known transmitters in the persons of Kenneth Alford (G2DX), F. L. Hogg (G2SH), J. E. Nickless (G2KT), J. A. Partridge (G2KF) and E. J. Simmonds (G2OD) were members of the Committee.



COUNCIL, 1934.

Back row, left to right: J. Clarricoats (G6CL) (Secretary), J. W. Mathews (G6LL), G. W. Thomas (G5YK), J. D. Chisholm (G2CX), V. M. Desmond (G5VM), E. A. Dedman (G2NH). Front row: T. A. St. Johnston (G6UT), A. D. Gay (G6NF), A. E. Watts (G6UN) (President), E. D. Ostermeyer (G5AR), H. Bevan Swift (G2TI).
(Absent from Group: J. C. Watts (BRS246) and H. C. Page (G6PA).)

The objects of the Society were (*a*) to promote and safeguard the interests of the members, and to secure for them the greatest possible freedom for experimental transmissions; (*b*) to promote meetings and discussions, and to arrange and provide mutual technical assistance; (*c*) to assist members

to obtain reasonable concessions from the licensing authorities; and (*d*) to co-operate with other organisations having similar objects.

It was quickly realised, however, by the Chairman and other officers that the amateur cause would be better served if a direct liaison with the R.S.G.B. could be effected. We find, therefore, that within six months a meeting had taken place between the T. & R. Section and the R.T.S. The result of this meeting led in February 26, 1924, to the amalgamation of the R.T.S. with the T. & R. Section.

It seems appropriate to mention that the conflicting views which were presumably responsible for the formation of these two outside organisations should have been merged into one united whole at this stage, for within a few months of the amalgamation being settled, we record the visit to these shores of the American Radio Relay League Delegates, on their way to the inaugural meeting of amateur interests in Paris, from which gathering sprang the International Amateur Radio Union. The photograph reproduced herewith shows Mr. Hiram Maxim and Mr. K. B. Warner, as the guests of honour, with Mr. H. Bevan Swift in the chair. To the right of Mr. Maxim will be noted Captain Durrant, of Iraq fame, and beyond him, Major Borrett, of Canada, who was a contributor to THE BULLETIN in its early days.

In the December, 1933, issue of THE BULLETIN we recorded incidents connected with the tenth anniversary of International high frequency radio work, and it is of interest to recall that these early records were only made possible through the close co-operation between the amateurs of England, France and U.S.A. during the winter of 1923.

1925.

In 1925 the Society was honoured by Sir Oliver Lodge accepting the Presidency, and his address dealing with the "Radiation of Matter" was yet another of the classic lectures which have been delivered to the Society.

We are pleased to be able to include in this issue a message from this illustrious scientist.

During Sir Oliver's Presidency, an important Parliamentary event took place in which the Society was deeply concerned. This centred around an attempt to pass a Bill amending the original Telegraph Act. The necessity for amendment arose from the fact that certain anomalies existed in the Act, which were difficult to apply to the new conditions set up by the advent of broadcasting. As an example, the original Act classified an experimenter as a person who sent and received messages, therefore, by the strict wording of the Act, any one in the possession of a simple receiving set, could not be called an experimenter, and therefore was not liable for a licensed fee. The new Act was intended to not only put this anomaly right, but it sought to impose restrictions which would seriously hamper the genuine experimenter. The Society consequently decided to oppose the passing of the Act, and a circular was sent to all Affiliated Societies explaining the reason for opposition. An application was also made for the Society to present its case before the Committee of the House of Commons, which was granted. At the same time, the daily Press, sensing that the amateur radio movement was in danger, threw in their weight on our side, with the result that the Bill, as originally presented, was withdrawn, and another Act was ultimately brought in which confined its attention to the ratification of simple broadcast licences and the regulation of the broadcasting services of the country.

During these momentous years, when new countries were being contacted for the first time, almost daily, the amateurs of this country were dependent entirely upon *The Wireless World*, and, later, *Experimental Wireless*, for news of both national and international importance, and no history would be complete unless the fullest possible credit were given to the editors and publishers of these journals for the assistance and courtesy they have accorded to us throughout the 21 years of our existence.

It became apparent, however, almost immediately international DX work became possible, that if full advantage was to be taken of the field offered, a members' journal was essential. To-day, when our BULLETIN arrives with the regularity of clockwork (unless you have failed to remit your subscription !), it seems difficult to visualise that those pioneers who decided to launch Vol. I, No. 1, had to do so with mixed feelings as to whether or not it would be favourably received. Fortunately, the writer of these particular notes has been given a free hand in their preparation, and therefore he is able to lay the credit for this development (probably the most important in our history) on the shoulders of the man directly responsible—Mr. H. Bevan Swift (Past President, Past Hon. Secretary, and our present Hon. Editor). As Chairman of the T. & R. Section, it was his responsibility to authorise the expenditure of the initial cost of producing the first issue, and by good fortune he had as an able lieutenant, Mr. J. A. J. Cooper, who had at that time just taken up the secretaryship of the Section. Neither Mr. Cooper nor Mr. Swift had had previous experience of editorial work, but a glance at the early issues will show that they had struck the right note. Many pages could be devoted to the work undertaken by those who have been responsible for editing THE BULLETIN during its nine years of existence, but brief reference must be made to the excellent progress during the four years (1929-1933). With restricted frequency allocations and more and more stations taking the air annually, the necessity for providing reliable and up-to-date technical information became of increasing importance. It was therefore fortunate that a well-known amateur in the person of Mr. G. W. Thomas (G5YK) should have found himself able to shoulder the responsibilities of Editor. Supported by a keen group of assistants, THE BULLETIN, during his period of editorship, reached a state nearing perfection.

1926.

In 1926 Brig.-Gen. Sir Capel Holden, K.C.B., took up the rôle of President, a position he held for two years, and in his presidential address he described many early experiments carried out by him at home and abroad. During this year a scheme was inaugurated for the registration of approved radio dealers. In collaboration with the Wireless League, a Joint Committee was formed to undertake the work, and the scheme continued until 1933, when the Council of R.S.G.B., feeling that the Society then had so little concern in the

care of the broadcast listener to whom the scheme mainly applied, decided to withdraw. The work has since then been carried on by the Wireless League alone.

During this year it was decided, as the Society was increasing in size and importance, to apply to the Board of Trade for a Charter of Incorporation (as a Company limited by a guarantee, and not having a capital). This was granted, and the Charter bears the date September 25, 1926. The signatories to the original Articles of Association were Brig.-Gen. Sir Capel Holden, Messrs. M. Child, O. F. Brown, J. H. Reeves, H. R. Halliwell, G. Marcuse and H. Bevan Swift. The incorporation was effected with the valuable assistance of the Society's Hon. Solicitors, Messrs. Fearnley Owen, of Cornhill, who have acted exclusively in that capacity since the Society was founded. The original Articles were afterwards found to be somewhat unsuitable for operation in later years, and were accordingly amended by permission of the Board of Trade during 1933.

The year 1926 witnessed further important advances, and it was during this period that attention was given to the needs of the increasing number of non-transmitting members interested in short-wave work. In order to more effectively assist them in the exchange of reports, the BRS system was inaugurated. British Receiving Stations have since then been regarded with the highest favour by transmitting amateurs in all parts of the world, and the method adopted whereby such stations are officially listed has been copied by almost every other organisation.

We must now record yet another important step in our history for which credit must be given to Mr. Bevan Swift. The providing of means for social intercourse between members had for long been regarded as of importance, but it was not until September, 1926, that this could be realised. Our First Annual Convention was attended by most of the well-known amateurs of the day, whilst many others will be recognised from the photograph as present-day officers of the Society. That Convention is by many regarded as the turning point in our history, for from then on the aim of the Society was directed mainly towards the furtherance of high-frequency short-wave work.

At this period the transmitting fraternity, together with a few members interested in short-wave reception, were regarded as members of the T. & R. Section, and as such (unless they had paid a Society subscription !) had no status as members of the parent body. It became clear, however, during 1926 that the T. & R. Section members were to all intents and purposes financing the R.S.G.B., consequently the desirability of merging the T. & R. Section with the main body became a matter of urgent necessity if continuity of action was to be obtained. At the annual general meeting of the Section held on December 17, 1926, a majority vote in favour of fusion was carried. From January 1, 1927, therefore, the T. & R. Section ceased to function, and all members of that section automatically became members of the R.S.G.B.

1927.

A feature of the year 1927 was the formation of a Wireless Associations Advisory Committee to the British Broadcasting Corporation. This Committee was the outcome of a suggestion made at the time the Corporation was formed, and two delegates were selected from each Association ; those representing the R.S.G.B. being Messrs. Maurice Child and H. Bevan Swift. A number of meetings were held at the old Savoy Hill headquarters of the B.B.C. under the chairmanship of Capt. Ian Fraser, but after a year or two the meetings were discontinued, it evidently being considered that little advantage was apparent to the broadcast service by their continuance.

It was at the 1927 Convention that Capt. Hampson (G6JV) made his suggestion regarding the formation of an Empire Relay League, but as will be mentioned later, this did not take on a definite shape until 1929. Those who attended this Convention will remember the discussion which took place regarding the use of telephony on the 45 metre band. We seem to remember hearing this matter raised on other occasions during the past seven years !

1928.

Capt. Ian Fraser, M.P., became President in 1928, with Mr. Gerald Marcuse as Acting Vice-President, and Mr. H. Bevan Swift filling the hon. secretary position, while Mr. E. J. Simmonds acted as treasurer. Capt. Fraser, it will be remembered, had already served the Society as Chairman of the old T. & R. Section now fused with the main body, and his election was a popular one.

The year 1928 saw the birth of the Society's Experimental Section, known until April, 1934, as Contact Bureau. The originator and first manager of this important section, Mr. T. P. Allen (GI6YW), of Belfast, is still one of the leading radio technicians in the country, and is also an official reviewer for THE T. & R. BULLETIN. Inaugurated to put members interested in kindred subjects into contact with one another, Contact Bureau won a high place in amateur history.

During the autumn of this year the Society published for the first and probably the last time a list of amateur call-signs which were combined to form a station log book. This work was carried out by Mr. C. A. Jamblin, then QRA Manager, but it was found that in spite of supplements giving corrections and additions, the book quickly became out of date. As a result, it was decided not to repeat the effort.

THE B.E.R.U. FORMED.

It was towards the latter part of the same year that our President, Mr. A. E. Watts (G6UN), began his campaign amongst British Empire amateurs. He was quick to appreciate that as the leading Amateur Radio organisation in the Empire, it had at its very door the machinery available for linking up overseas amateurs into one big organisation which would eventually regard all amateur problems through the viewpoint of the Empire. Little need be written regarding the enormous progress which has been made overseas, except that it is of interest to record that the British Empire Radio Union, as this overseas body is called, has now close on 500 members in association with official representatives in every Dominion and Colony.

1929-1934.

In the following year, 1929, Mr. Gerald Marcuse (G2NM) became President, a post which he held for two years. His early amateur work conducted from his Caterham station, is too fresh in our memory to need comment, except that it should be borne in mind that as a result of his transmissions to the Empire, Empire Broadcasting was inaugurated from the Daventry short-wave station

The progress since 1929 has been so marked, and the knowledge of that progress so well known to most of our readers, that little more need be added to make this historical account reasonably complete. One or two important events of National and Empire importance are, however, worthy of record.

The first, known as the Loyal Relay, was a direct outcome of the opening up of the B.E.R.U. Annually in June, Empire amateurs vie with one another for the honour of transmitting loyal greetings to our Patron, H.R.H. the Prince of Wales, on the occasion of his birthday. The first Loyal Relay was instituted in 1930. During 1931 a further Empire project known as the B.E.R.U. Contest, was launched. This event takes place annually in February, and during the four week-ends of that month British Empire amateurs devote their attention to effecting inter-Empire contacts, and valuable trophies are awarded to those registering the highest scores. The year 1932 will be remembered as the year during which the Royal Naval Wireless Auxiliary Reserve was launched with the assistance of the Society, and thanks to the liaison which was thus established with the Admiralty authorities, our future at important International Conferences is likely to be safeguarded. Towards the later part of this same year Mr. Arthur Watts represented the I.A.R.U. at the Madrid Telegraphic Conference.

During 1933 the first National Field Day was organised, and it is anticipated that this will now become an annual event of importance.

Mention must be made of the assistance given during the past few years by our many District Representatives. During 1930 it became apparent that if good progress was to be made in the provinces, some better means of keeping in touch was necessary. With the assistance of our Secretary, Mr. John Clarricoats, the District and County scheme was put into operation, and mainly due to his efforts in attending as hon. secretary the many Annual District Conventionettes, a bond of understanding and appreciation has grown up between headquarters and the provincial membership.

Until the end of 1932 the secretarial duties had been undertaken in an honorary capacity by various members of Council, but with an increasing membership, it became necessary at that stage to appoint a full-time officer. From 1929 Mr. Clarricoats had carried a gradually increasing load as hon. secretary, and therefore it was but natural that the choice of a permanent secretary should fall upon him. The position of hon. treasurer has, since 1929, been filled by Mr. E. Dawson Ostermeyer (Executive Vice-President).

Lectures.

Before concluding this account, reference must be made to the many important lectures which have been delivered to the Society, and whilst it is not possible to record these at length, it is interesting to recall that the modern moving-coil loud-speaker with its attendant baffle board was first introduced to the radio world by Dr. N. W. McLaughlan at an R.S.G.B. lecture in London. Although moving-coil speakers were not new at this time, having been invented some years before by Sir Oliver Lodge, Dr. McLaughlan was the first to demonstrate its real virtues when combined with a scientifically designed baffle. The commercial development of these speakers was largely brought about as a result of this lecture.

Another lecture of outstanding interest was that given by Mr. Cecil Goyder, in 1926, when he described his system of frequency doubling from a crystal controlled oscillator. This system contributed in no small measure to the rapid advances made in amateur and commercial short-wave technique, it having been appreciated that the manufacture of fundamental crystals for use on very short wavelengths were an impractical proposition. Mr. Goyder afterwards added to his achievements by describing to the Society his system known as the "Goyder lock."

Reference must be made to the kindness shown to the Society from its earliest days by the Institution of Electrical Engineers. Every possible assistance has been given us by the Council of that body, who have for the past 20 years permitted us to use their magnificent home on the Victoria Embankment, London, for our meetings and Conventions.

No doubt the Institution Authorities had the foresight some years ago to see that the young man who adopted radio as his hobby might readily become the important radio or electrical engineer of the future. In this they have been fully justified, for the Society can claim a large number of members who have graduated to professional rank, many of whom now hold important posts at home and abroad. The debt of gratitude owed by the Society to the Institution of Electrical Engineers is a very large one, and fully appreciated by old and new members alike.

The Society and the G.P.O.

Finally, our thanks are due to the Engineer-in-Chief of the G.P.O., and to his assistants, who have at all times given our requests for greater facilities the utmost consideration. Without their cordial co-operation the amateur radio movement in Great Britain would be behind, instead of to the fore-front among nations.

. . . And so we close this historical account of a Society upon which the sun never sets.

REPORTS WANTED.

W2ETQ (New Jersey) on his 7120 kc. transmissions.
W8AXR (Ohio) on his 7036 kc. transmissions.

Stray.

G2OU (G. White), 55, Clarence Street, Derby, would appreciate reports on his 7 mc. signals.

AROUND THE EMPIRE

We are featuring in this article a survey of amateur activities in various parts of the British Empire.

On the occasion of our own 21st Anniversary we extend Greetings to our Sister Societies, and trust that when the time arrives we may have the pleasure of joining with them in their own Coming of Age celebrations.

Canadian Fifth District.

By A. Leonard Cusden, VE5HJ.

IT is with great pleasure that we of the Canadian Fifth District offer the R.S.G.B. our warmest and heartiest congratulations on its Coming of Age. It is through the efforts of the R.S.G.B. that the British Empire Radio Union has become a means of linking up the amateurs of the Empire, and whilst we in Western Canada are unable to effect regular contacts with Great Britain, Africa and India, nevertheless, we are at all times desirous of taking our part in the formation of Empire friendships.

Up to three years ago British Columbia had not become radio-minded to the same extent as other parts of the Empire, but to-day we have over 300 active amateurs united together for the advancement of our hobby in the making of world friendships.

May the R.S.G.B. and B.E.R.U. continue to extend their sphere of influence at home and abroad.

Ceylon and South India.

By G. H. Jolliffe, VS7GJ.

THE Radio Club of Ceylon and South India commenced operations on November 24, 1922, at a public meeting organised by a few radio enthusiasts; it was then known as "Ceylon Wireless Club." During 1923 the name was changed to the "Ceylon Amateur Radio Society," and later, owing to expansion in South India, it became known as the "Radio Club of Ceylon and South India."

Its objects are to encourage and organise the development of amateur radio telegraphy and telephony, and to promote broadcasting in Ceylon and South India. In recent years the club has become affiliated with the Incorporated Radio Society of Great Britain, and the British Empire Radio Union. Its relationship with the Postal and Broadcasting authorities is most cordial, all of whom are most anxious to encourage amateur activity.

In March, 1928, the club inaugurated a scheme for providing wireless receiving facilities in all the principal hospitals and institutions in Ceylon, and as a result, six large institutions have been equipped, all of which are working most satisfactorily.

Three years ago, under the auspices of the Education Department of the Ceylon Government, special school broadcasts were arranged, and these are transmitted each weekday throughout the school sessions.

Although many amateur call signs appear in the printed lists, the number of stations active is small, and even of those that are on the air many use very low power.

Absence of mains in the bungalows dotted around the plantations, and the difficulty of obtaining suitable components, are all against a rapid increase in the number of transmitting stations, but steady progress is being made, and new calls are being issued at regular intervals.

Owing to the great distances which separate stations, Group meetings are impossible, but a well-supported Letter Budget provides a useful link.

The active amateurs are at all times anxious to effect Empire QSO's, and each and all are doing their best to increase the B.E.R.U. membership in this part of the world.

On behalf of the Radio Club of Ceylon and South India, I tender our sincerest good wishes to the R.S.G.B. on the occasion of its 21st anniversary.

Malta.

By F. Johnstone, BERS209.

THE history of amateur radio in Malta previous to 1930 appears to be legendary, so I will be content with facts. Early in 1930, three amateurs were known to have receiving stations, although they were not officially B.E.R.S. men. The trio continued logging stations until 1932, when a transmitter was introduced. Owing to the non-issue of licences, freak calls were used, notably VP8PQ, VP2AC. America was worked on a number of occasions, but serious work could not be contemplated owing to the licence difficulty. In January, 1933, five members of the Royal Navy, BRS 161, 116, 167, 134, and exG5SV, gathered on H.M.S. *Shropshire* and the question of call signs was solved by the suggestion of VP3, followed by two letters—this call was further modified to VP3 followed by the operator's initial letter. A community 2-watt transmitter was rigged up, but alas, no QSO's were obtained. Amateur radio at this period was very difficult—the utmost secrecy had to be observed, and one hour on the key necessitated many hours of preliminary labour. About March, 1933, Mr. Haskell, BRS134 wrote to the Government regarding licences, but no reply was received. Another attempt three months later produced a statement that "the matter is under consideration." In the meantime, more BRS members en-

rolled, and the R.S.G.B. appointed BRS134 as representative for Malta. He left for England about September, 1933, and Mr. Cunningham, BRS161, took over. November, 1933, saw great activity in the transmitting line, and the VP3 calls, with their T4 notes rasped over the then known world—Europe. Our representative again approached the Government, and by the end of the year our goal was in sight. New members continued to join us, and VP3X, after a great struggle, managed to participate in the Senior Contest, 1934—" G's " giving us the majority of points.

May, 1934, sees the licences in real form, and by June we hope to be on the air with official calls.

(*Note.*—It is anticipated that the prefix for Malta will be ZB1.—Ed.)

Northern India.

By J. G. MacIntosh, VU2LJ.

THE history of the amateur movement in India seems to be lost in obscurity, mainly for the reason that most of the early workers were connected with some branch of the Services, and only remained in the country for a short time.

In more recent years excellent work has been done by individual stations, and particular mention should be made of the part played by VU2CS, and 2FR, who, during the time when the Indian Broadcasting Company were rebuilding their experimental short-wave station, relayed transmissions from the Calcutta Broadcasting Station. This work was undertaken in order not to disappoint listeners, and the quality of the transmissions was equal to those sent out by the professional stations.

VU2CS, it will also be remembered, had an important part in the recent Mount Everest Expedition, handling all the traffic from the base camp before the main station could be put on the air. This included a relay of H.E. The Governor's speech from Government House.

During the trial flights by Imperial Airways, before the regular air service commenced between Calcutta and Rangoon, VU2LZ carried out many tests with their planes, maintaining 100 per cent. contact with telephony for a distance of over 200 miles.

These three instances go to prove that the radio amateur in India occupies an important place in public affairs.

The one unsurmountable difficulty in the country is static, which rises to R8 on 7 mc. for six months of the year. Such conditions are undreamt of in the colder zones.

The B.E.R.U. membership in Northern India is now in excess of 50, and represents nearly 1-10th of the total B.E.R.U. membership, a very high figure considering the scattered nature of the centres of activity. In certain parts of the Province no radiating permits are granted, but it is hoped that this condition will be rectified in the near future.

On the occasion of the 21st birthday of the R.S.G.B., and on behalf of all Northern India amateurs, I wish to convey sincere congratulations. I trust that July 5, 1934, will mark the beginning of a new era in the progress of the Society, and that it may continue to champion the rights of the amateur, and at all times provide the stimulus for those who seek the advancement of radio science.

Northern and Southern Rhodesia.

By J. W. Mavis (ZEJE).

ON behalf of the B.E.R.U. membership in Northern and Southern Rhodesia, I have very great pleasure in conveying to you our heartiest congratulations and sincere good wishes on the occasion of the coming-of-age of the Society.

The present-day membership goes to prove the high esteem in which the Society is held, not only in the Homeland but in the far-flung outposts of the British Empire, and we as members resident in the Rhodesias extend our sincere thanks to you all, both past and present, for the capable manner in which you have fostered the cause in the interests of the overseas radio amateur.

In conclusion, we will do our utmost to uphold the prestige and further the interests of the Society, which we trust will be endowed with continued prosperity in the years to come.

South Africa.

By R. C. H. Taylor.

AS in the case of most of our sister societies organised amateur activity is of comparatively short duration. At the same time it is interesting to note the several phases of radio development which led up to the formation of the South African Radio Relay League in 1925.

With this in view we go back to the period of the Boer War (1899-1902) when military operations were assisted by the operation of several field stations, though no record can be found to show that this service was of material advantage.

Of amateur activity at this period there is no record, and it is not until 1912 that we learn of isolated groups of amateurs working " spark " in several of the larger towns. Contact between stations more than a few miles apart was out of the question, and no attempt was made to organise along lines such as we have to-day.

The advent of the Great War, of course, saw the immediate cessation of all amateur activity, and there the thread of the story is lost for the time being.

In June, 1924, 21 licensed amateur transmitters were operating in the Union of South Africa and Rhodesia, several of whom, even at this early stage, were experimenting with telephony. Their efforts, while lacking greatly in the technique which is characteristic of modern high-quality transmissions, were nevertheless received and enjoyed over a surprisingly wide range (Commercial broadcasting commenced in June, 1924, with regular nightly programmes from the Johannesburg station. Undoubtedly the efforts of our pioneers paved the way for this service by whetting the appetite of the public and showing just what could be done even with the limited apparatus then available.)

It was not until the publication, in May, 1924, of *Radio*, South Africa's first radio journal, that the question of organising began to be considered. It is certain that the S.A.R.R.L. owes its existence to the efforts of Messrs. Raymond Coombs and L. E. Green, of the editorial staff of that paper. These two pioneers soon collected around them a nucleus

of prominent experimenters, and the South African Radio Relay League came into being, membership being strictly limited to those holding transmitting licences. The wisdom of this policy subsequently became evident when many of the radio societies which were formed about this time petered out after a brief career.

By May of 1925 the organisation had been considerably increased and the sub-continent split up into territorial divisions extending as far north as Kenya and Uganda.

One of the first official acts was the relay of loyal greetings via amateur stations to H.R.H. the Prince of Wales, K.G., on the occasion of his visit to South Africa.

In June, 1925, international radio history was made when Streeter (A4Z) established the first DX contact with Braggio (CB8) of Buenos Aires.

In January, 1926, Mr. Joseph White, M.C., A.M.I.E.E., accepted the office of President, and it is pleasing to record that he holds this position to-day. To him the League owes a great debt on account of the skilful way in which he has guided its destinies through troublous and disheartening times.

About this time the ranks of the League were thrown open to any person not in possession of a transmitting licence but professing a genuine interest in the science of radio.

During September and October of 1926 an event took place the recounting of which will be of interest to readers of the BULLETIN. This was the Silver Springbok Contest, in the course of which amateurs throughout the United States concentrated on effecting two-way contacts with South Africa. The event was won by Borden (U1CMX), with some 35 contacts to his credit, while in South Africa, Marks (A3B) topped the list with 307 American contacts. The prize of a silver springbok was duly presented by the Editor of the *Rand Daily Mail* to 1CMX.

We come now to a consideration of present phases of the League's activities, and it is fitting that a word should be said at this stage regarding the government of this organisation of ours. As has already been stated, the sub-continent was originally split up into a number of territorial divisions, the headquarters of which were situated at convenient points. The control of each of these territories was vested in a committee, the chairman of which was also a member of the Executive Committee at League Headquarters in Johannesburg. In view of the fact that in most cases he was hundreds of miles away and unable to attend meetings at Headquarters, a proxy assumed his place on the central executive. The weaknesses of this system very soon became apparent. It was impossible for the proxy to function satisfactorily. Whenever business of importance came before the Executive it had to be referred back to the Divisions before it could finally be voted on and disposed of. For years, agitation against this system continued, sponsored by those who suffered most under its limitations. Eventually, early in 1932, an entirely new Constitution was adopted, and so far has proved most satisfactory. Supreme control is now vested in a Council which meets monthly at League Headquarters in Johannesburg, and is elected annually by ballot of the membership. The Divisional committees continue to function as before. The business of the League is conducted by honorary officials, whose spare time is almost entirely devoted to the work.

Membership is divided into four grades, Full, Associate, Empire (applicable to British subjects resident outside the Union of South Africa) and Foreign. The number of members to-day remains fairly steady at about 400, of whom, it is pleasing to note, a fair percentage are amateurs in other parts of the world, including Great Britain and the United States. This fact is particularly gratifying to us in view of the greater facilities offered by Societies overseas.

The League's development has been bound up largely with that of its news-organ. In 1926 the "*F.O.*" *Bulletin* made its first appearance and was extremely well received by the scattered membership. It consisted of four mimeographed sheets, and was published fortnightly. After an honourable life it was superseded by a printed journal, *Q.T.C.*, published monthly, which, now in its fifth year, continues to flourish and find its way into all parts of the world. It is surprising how this little 20-page publication has won through despite a world depression and a consequent decrease in revenue.

Contests are frequently held. Three floating trophies change hands annually. They are the H. O. S. Trof, donated by Mr. Raymond Coombs, the C. & B. Trophy, awarded to the amateur who performs the most meritorious feat of the year, and the Akyab Trophy. The C. & B. Trophy has been held by both Mr. Macgregor, the first South African to effect contact with New Zealand in the good old days, and Mr. Drennan, who gave 10-metre work a great fillip by working Germany at a time when very little was known about this band.

A recent contest which aroused considerable interest was a relay of messages through each of the five territorial divisions which comprise the Union. The best time put up was 2½ hours, which is remarkable in view of the natural disabilities at present affecting short-distance work.

South Africa, by virtue of her geographical position, can truly be said to be unique where, at times, conditions prevail which are found in no other part of the world. An analysis of the bands is instructive.

1.7 mc.—Very seldom used.

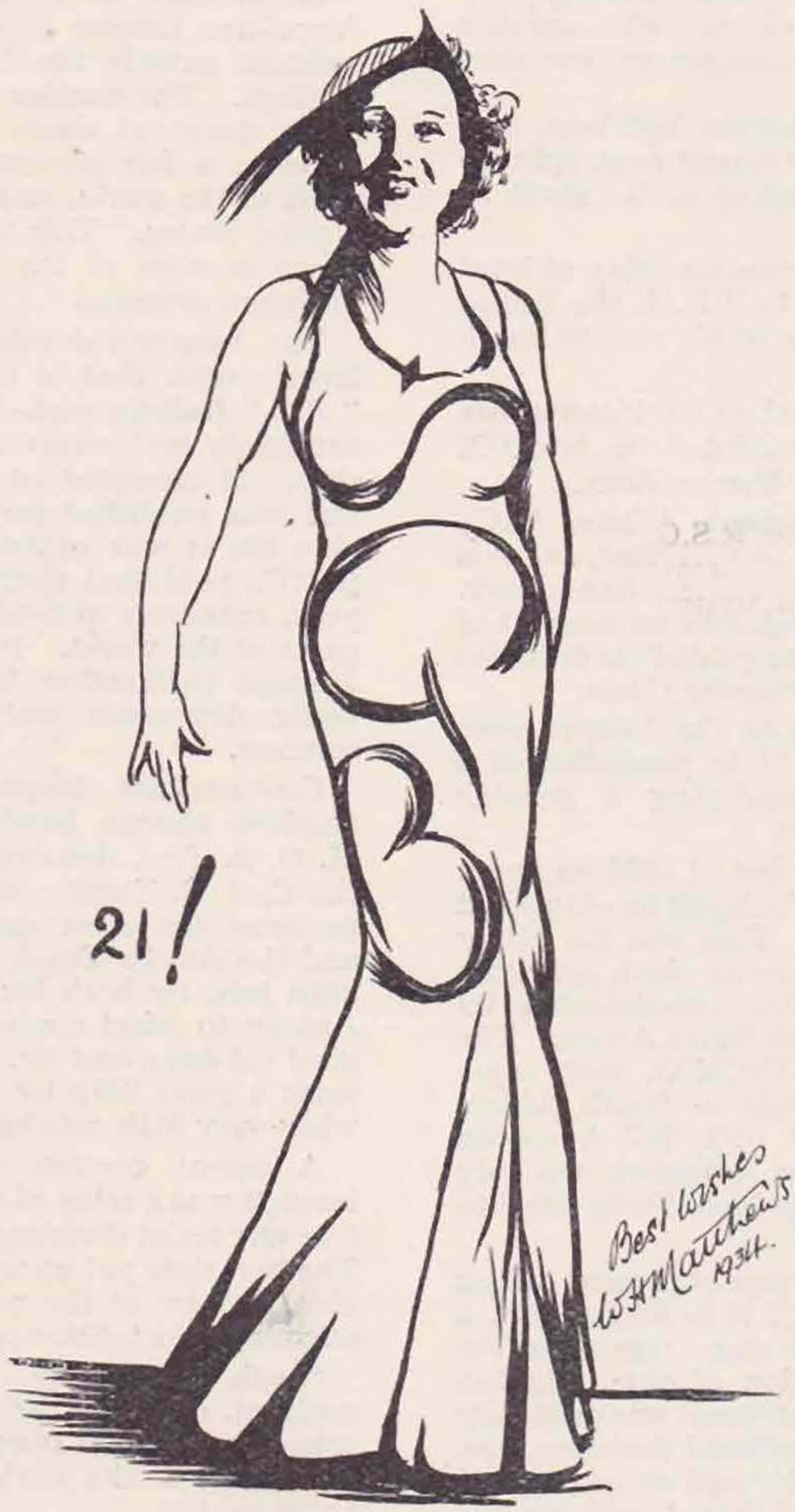
3.5 mc.—Unusable during summer (October-March), on account of constant and terrific QRN. Enjoys a fair measure of popularity during winter when conditions prevent local contacts on higher frequencies.

7 mc.—Generally recognised as the most popular band for all-round working. During winter months, signals on this band from stations between 10 and 500 miles away, fade out suddenly at sunset and do not usually reappear until the following morning. This phenomenon, when it first appeared, caused quite a little consternation.

14 mc.—Used for DX contacts in a few isolated instances. Was a most popular band a few years ago.

28 mc.—Not used at all at time of writing.

(*Continued on page* 434)



GREETINGS

Greetings to thee, whose name resounds away
Beyond the sea. Oh! Great Society.
Greetings to thee upon this happy day
That thou attainest thy majority.

A child of Britain! Well dost thou uphold
The glories of the land that gave thee birth.
The band of workers that thy wings enfold,
Culled from the ranks of finest men on earth.

Swinton and Marcuse, Simmonds, Goyder, Swift;
What names uncovered when thy flag's unfurled.
And others, great or lesser, strive to sift
Each scientific secret of the world.

Thou hast accomplished in thine infant span,
What politicians have for æons sought,
That bond of friendship linking man to man.
Thine efforts crowned; while theirs have led to nought.

And in that place where honour ne'er can die,
Thy name's embellished in a golden scroll;
Right proudly may'st thou raise thy head on high.
Lead on! Lead on! The sky shall be thy goal.

"PIPS."

PIONEERS

The pioneer work achieved by Messrs. E. J. Simmonds (G2OD) and Gerald Marcuse (G2NM), will for all time be remembered by radio amateurs and engineers alike. We are fortunate in being able to present personal accounts from both of these distinguished members.

G2NM.

THE Coming-of-Age of the R.S.G.B. coincides with my own 21st anniversary of interest in amateur radio, my activities dating back to 1913, when a spark coil and crystal detector were associated with my pre-war call EGX.

It gives me much pleasure to chronicle a few personal experiences which have fallen to my lot during the past two decades, and I trust that the information will serve to interest both old and new members alike. Prior to 1914 I, in company with most amateurs of the day, amused myself listening to various ship-to-shore stations and to the Eiffel Tower time signals. The range of my transmitter was then in the neighbourhood of 5 miles, whilst one of the " big noises " of the day, operated under the call MSX, and using several kilowatts of spark or rotary gap, was capable of effecting communications up to about 100 miles.

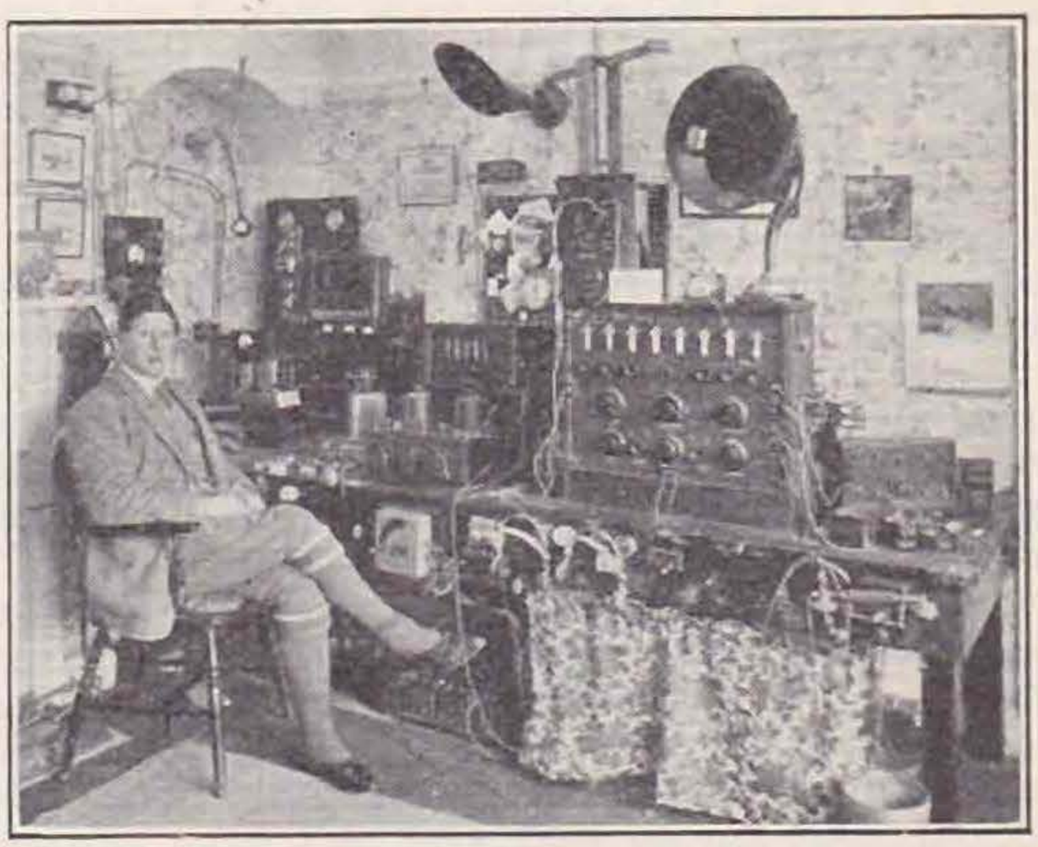
I remember hearing, on the outbreak of war, the German station at Norddeitch saying " the greatest excitement prevails in Germany." With the war came the Post Office van which collected all my apparatus, such as it was, and I did not see it again until my return from War service in 1919.

In due course 2NM came into being, using spark, but by dint of much labour a " wonderful " valve receiver was evolved, and this, together with much of my earlier apparatus, reclines to-day in my museum. I was then working in Bristol, and it was always necessary to arrange a schedule, otherwise many abortive hours would be spent in listening for signals. One of my early friends in those days was 2HQ, who I am glad to say is again on the air and working regular schedules with my station.

During this time numerous visits were paid to Government service depots with a view to obtaining oddments suitable for our purposes. Permission was also granted to carry out tests on 1,000 metres using c.w. and telephony, but work on these high wave-lengths was of short duration, owing to aircraft demands, with the result that we were " pushed down " to 440 metres. I have distinct recollections of the transmissions from 2BZ, 2FQ, 2KF, 2OM, and 2QQ, which made Sunday mornings the brightest periods in our weekly routine.

With the advent of 2MT (Writtle), for which the R.S.G.B. was largely responsible, an eye was cast on commercial broadcasting, with the result that in the space of a few months we were relegated to work below 200 metres.

It is unnecessary for me to describe how the early amateurs, or, as Sir Oliver Lodge once said, " You fellows who mess about with vacuum tubes," set about the task of proving to the world that worthwhile two-way communications could be established over enormous distances with simple apparatus on these despised frequencies, but it is interesting to recall such incidents as the special tests organised by Mr. Philip Coursey and the foresight of the A.R.R.L. in sending over Paul Godley to set up a receiving station in Scotland.



Mr. Gerald Marcuse, G2NM, with the apparatus used during the first Trans-Atlantic tests.

The photograph which accompanies this article was taken during the first trans-Atlantic tests on 200 metres when my 200-watt signals were heard in U.S.A. and Canada on five nights out of ten. It was only a week or so ago that I had the pleasure of again working W1AJA, the first American amateur to report on my signals.

It is regrettable that most of the old timers have faded away until to-day I am one of the few original trans-Atlantic brass pounders active. Even in these days I have accomplished something which I have been trying to do since my first contact with New Zealand, i.e., make contact with ZL during the three periods of the day, morning, mid-

day and evening. This was achieved during the 1934 B.E.R.U. tests. During the eclipse tests some years ago, ZL stations were heard most of the day, but I cannot remember ever having been able to work them throughout the 24-hour period until this year.

I must add here that I have never since the old 100-metre days heard such signals as those we used to receive from U.S.A. and New Zealand, and many early workers will remember the terrific signals put out by W1BII and ZL4AG. I am most disappointed with the poor progress which has been made with short-wave receivers, and I firmly maintain that the old original short-wave receivers with the exception of present-day band-spreading devices, were as good, if not better, than those in general use to-day, in spite of new designs and new valves. As an old-timer I regard the most important problem for the Society's R.E.S. to solve is that of the design of a simple super-het. I might mention here that, with the adoption of high-frequency work, one obtains longer periods of audibility with the Antipodes than in the old days, when a three-hour period was the longest we could expect. Signals on the present 80-metre band do not, in my opinion, compare at all favourably with those received ten years ago. These remarks apply not only to amateurs' signals, but to commercial stations alike.

The best all-round band the amateur has used was that around 32 metres, and it was on this band that the Philippines were worked with ease around 14.00 G.M.T., and it was also on this wavelength that my early Empire broadcasting transmissions were carried out during 1926 and 1927. These transmissions blazed the trail of Empire broadcasting, and were instituted in response to requests from all over the world, following the success of my 45-metre telephony transmissions. I should like to pay a tribute here to the great help given me at this time by my old friend and fellow worker, Cecil Goyder. With his assistance we built one of the first high-power crystal-controlled transmitters on this side of the Atlantic.

One of the most interesting events in my experience was the formation of the I.A.R.U. at the Paris meeting in 1925, when I had the honour of being elected Vice-President of the Union by delegates from 25 nations. The many old hands who accompanied me on that visit will have pleasant recollections of an enjoyable stay, and will not forget the Lady in White!! Following the Paris Conference we had the pleasure of entertaining the American and Canadian delegates, during which time visits were made to the Mullard works and Croydon aerodrome. A lunch at 2NM was also included in the programme.

An amusing incident occurred during my historical telephony tests when I was regularly working the American cruiser *Seattle* with Fred Schnell on board. One morning at 6 a.m. I was awakened by loud knockings on the door, to find a true American, who proceeded to tell me that he did not believe I had been in communication with the *Seattle*, and to prove the point, wished to ask the boat four questions. I took the "doubting Thomas" into the shack called Schnell, asked the four questions, and received the replies. The Yankee faded back to town!!!

I have vivid memories of an enjoyable visit from Frank Bell (Z4AA), who, during his honeymoon in England, had the pleasure of working back to New Zealand on numerous occasions from my station at Caterham.

My wireless chess match between Oxford University and Harvard caused a stir, and was the first chess match played by radio. I had the pleasure of meeting the Harvard players when in Boston during my flying visit across Canada and America some years ago. I also had the pleasure of visiting the A.R.R.L. Headquarters at Hartford, and I wonder whether Eddie Hardy will remember getting on the train at Iam and travelling with me for an hour and then having to walk home some 20 miles in the dead of night? True ham spirit. At a recent London meeting I had the pleasure of meeting Mr. Larnder, who was present at my initiation as a Rotab (Royal Order of Trans-Atlantic Brasspounders).

To-day, when we hear of numerous amateur contacts with Expeditions, it is interesting to recall that 2NM, by his communication with the Rice Expedition on the Upper Amazon, was the first British station to work with an Expedition in the field. The information obtained proved of great value to the Royal Geographical Society.

In conclusion I can only say that I am happy to have shared in various record-making transmissions, and it is gratifying to think that we have secured records which will stand for all time. It has been a great source of satisfaction to me to have watched the progress and strides made by the Society during the past 21 years, and I am proud and honoured to have been a President of the Society. I am happy to think that during my association with the Society I have in a small way been able to add my share in the building up of what is to-day undoubtedly a pillar of amateur radio. I wish the R.S.G.B. and all its members long life and prosperity.

G. MARCUSE.

G2OD.

IN 1912 the writer became interested in the development of wireless telegraphy, and established a transmitting and receiving station at Acton.

In those days, as there were no means of signal amplification, it was necessary to give particular attention to the design of the aerial system, and losses owing to aerial screening and poor earth systems were eliminated as far as possible, by using stranded wire and laying down a complete network of wires for the earth system. The station at Acton used two aerials, (1) a four-wire cage of Admiralty type, horizontal length 60 ft., and (2) a two-wire aerial, with flat top 100 yards long. The short aerial was used for transmission and reception, mainly up to 1,000 metres, and the longer aerial

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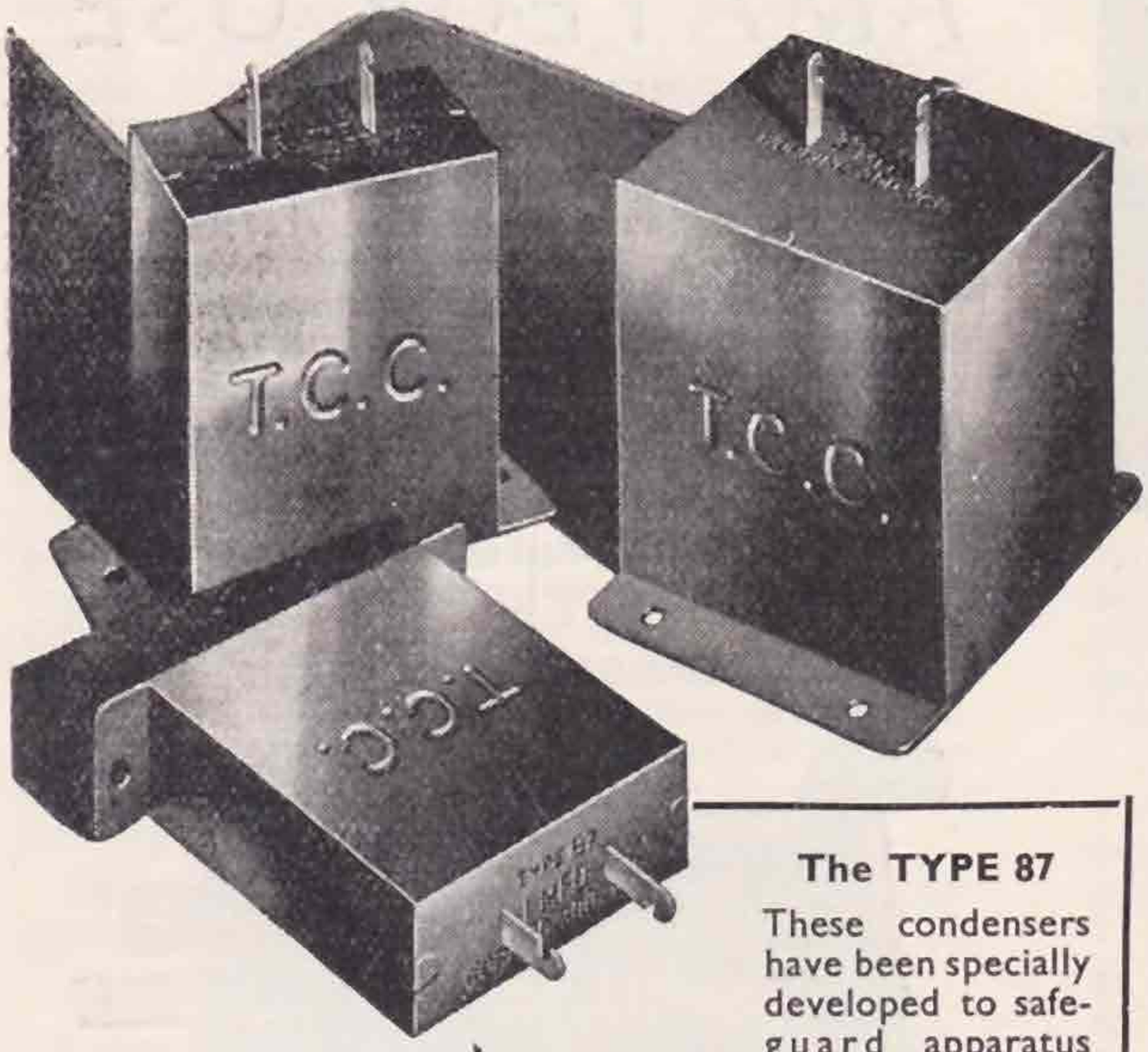

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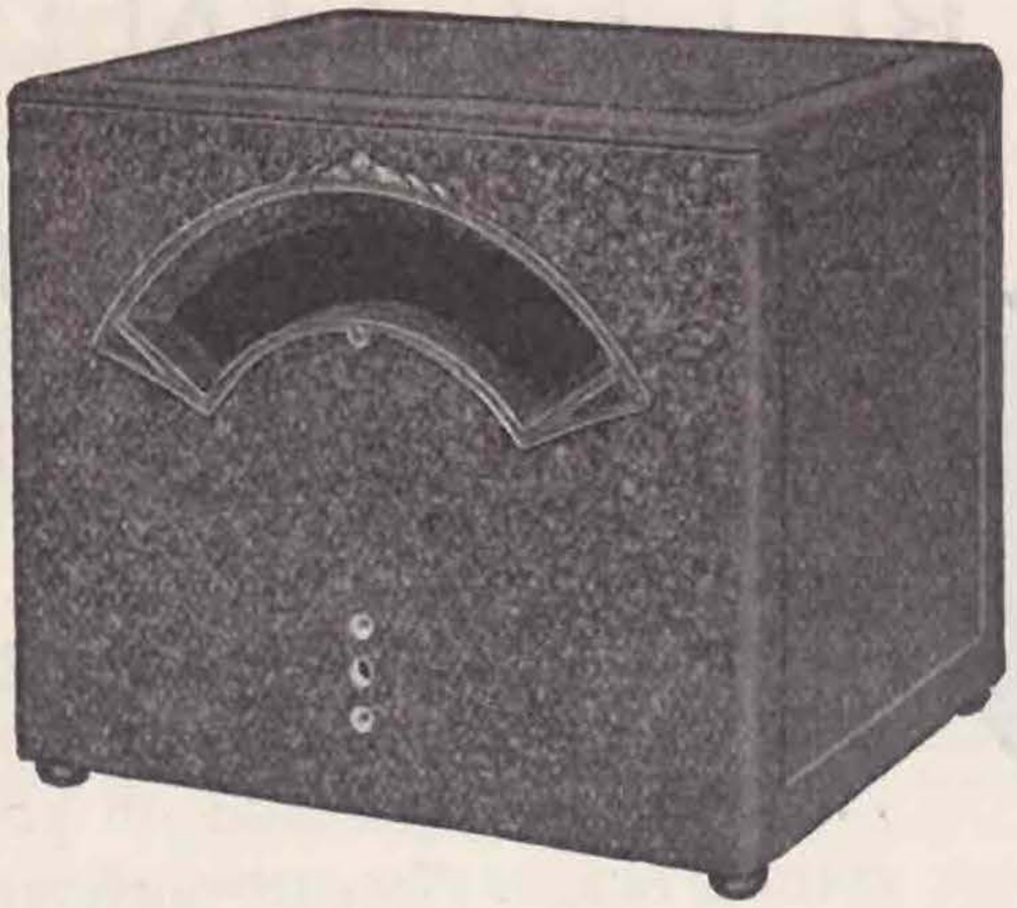

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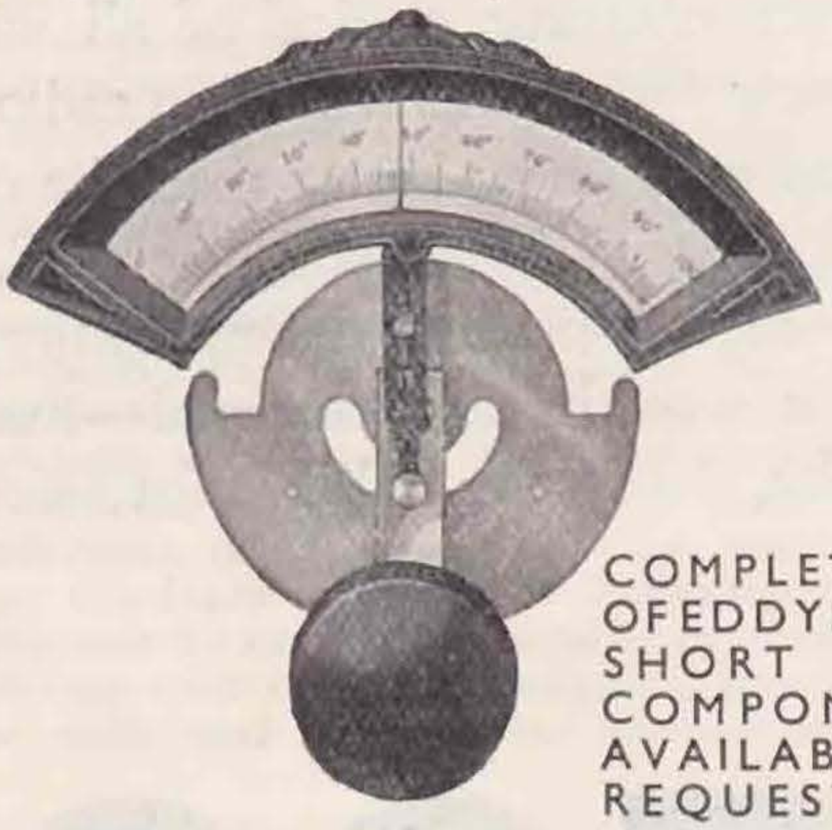

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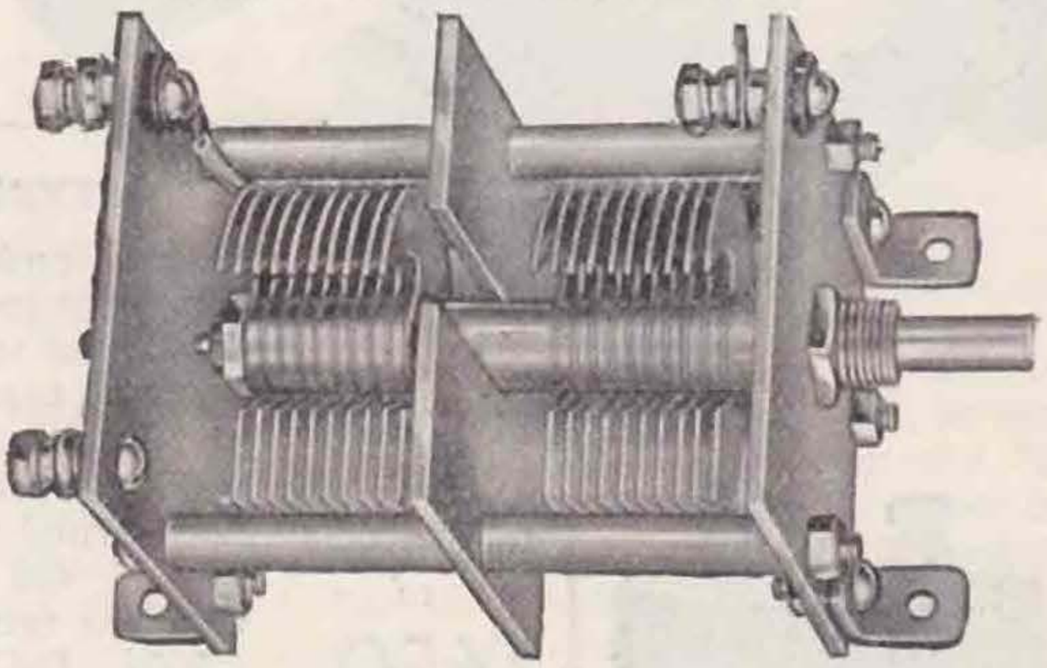

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for the reception of the long wave stations, particularly the Marconi spark station CDN at Clifden, Ireland, then transmitting on about 6,000 metres. In those days it was considered a great feat to receive CDN on a crystal detector.

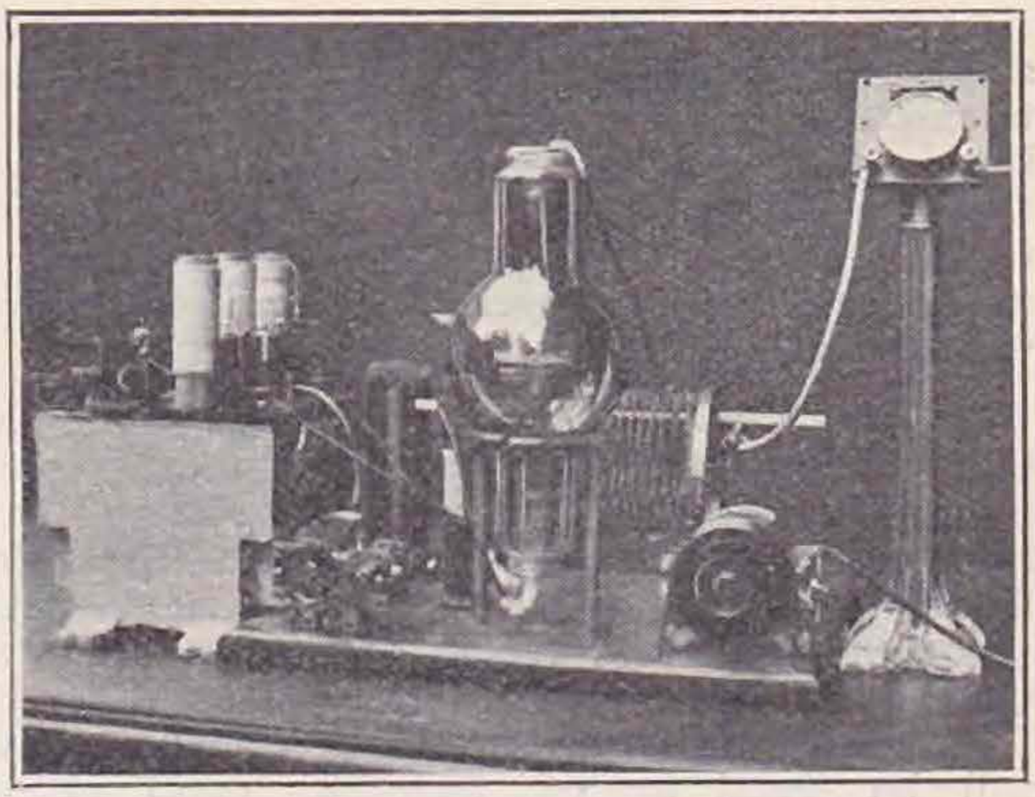
Considerable attention was devoted to the design of the receiving apparatus to cut down the high frequency losses, by the use of spaced turns and large diameter wire for the coils, and in consequence, tuning coils for long waves were several feet in length. The usual detectors were carborundum, and for greater sensitivity, zincite and bornite, also the electrolytic detector, consisting of the usual fine platinum wire immersed in sulphuric acid.

The transmitter consisted of a ¼-in. spark coil with quenched gap and oscillation transformer, and with this equipment, and the receivers then in use, communication was possible over a few miles.

On the outbreak of war in 1914, all experimental stations were dismantled, and the apparatus placed in P.O. Stores, but the practical knowledge gained before the outbreak of hostilities proved of value, and the writer joined the Wireless Section of the Royal Engineers, passing through the Instructional Schools at Worcester, and later was attached to the Instructional Schools at Newport Pagnell. Subsequently there was service in Ireland with the rank of Mechanist Staff Sergeant in charge of the military wireless equipment in Ireland.

This afforded considerable opportunity for experimental work with thermionic valves of the types then available, both transmitting and receiving, also the planning of power supplies and associated equipment, and this experience formed a ground-work for the experimental work undertaken after the War.

Mr. E. J. Simmonds (G2OD),
Vice-President and late Honorary Treasurer.



The apparatus used by Mr. E. D. Simmonds (G2OD), in May, 1925, to effect first two-way daylight contacts on 20 metres with Australia and New Zealand.

During the latter part of 1919, a wireless telegraph station was established at Gerrards Cross, and was one of the first stations licenced after the termination of the Great War.

Until 1923 experimental work was mainly directed to the reception of wireless signals, and especially the automatic recording of morse signals from transatlantic stations. In 1923, G2OD was granted additional facilities by the General Post Office, including permission to transmit telephony on certain exclusive wavelengths for experimental purposes, and as soon as these sanctions were received, transmissions were made at predetermined times on short wavelengths, as it was believed that very great distances could be spanned by choosing a suitable wavelength at certain times of the day or night.

In December, 1923, the first two-way contact on short waves was made between Canada and Great Britain, the stations concerned being Canadian 1BQ and G2OD, and the wavelength used being 116 metres. This success encouraged further efforts, and as experiments had demonstrated that the signals reached the greatest strength during the sunrise and sunset periods, a series of transmissions extending over several months were transmitted daily at these periods from G2OD. Each transmissions was prefixed by a code-word which was constantly changed, in order that particular transmissions could be identified from the reports of reception.

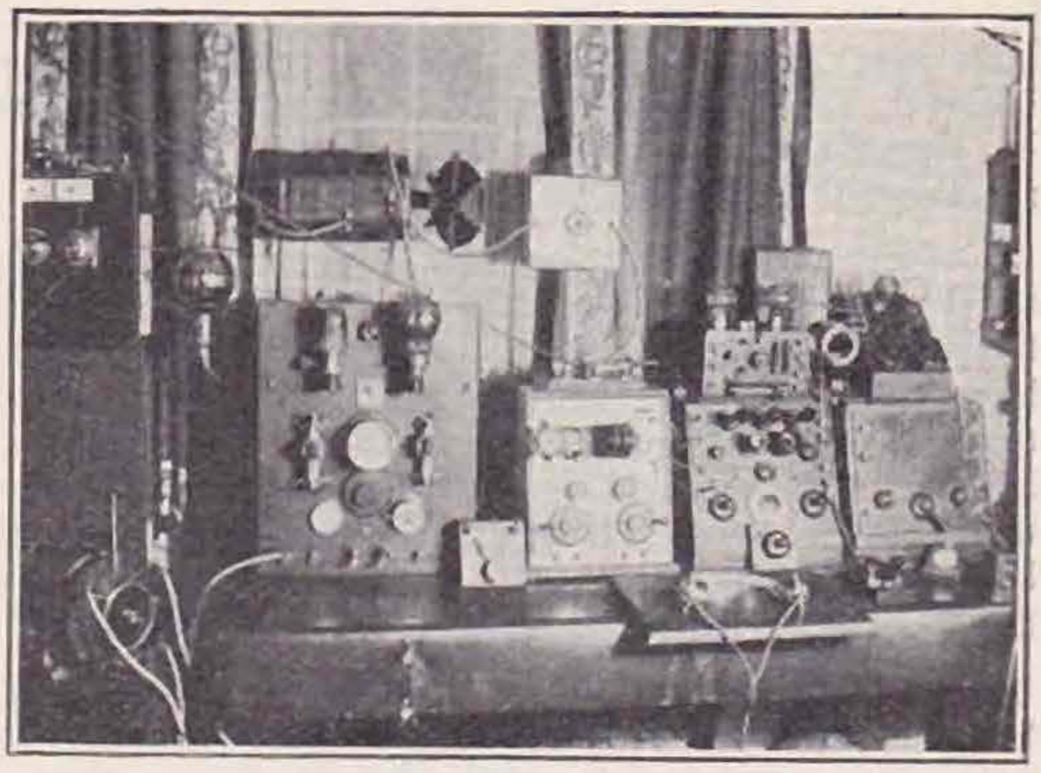
On October 17, 1924, a cable was received from Mr. Frank Bell, of Weihemo, New Zealand, who reported that he had picked up the signals transmitted from G2OD on October 16, complete with the code word " Zinco." The wavelength used was 95 metres, and G2OD was thus the first European short-wave station to be heard in the Antipodes. The result of this experiment was far-reaching, and outstanding, and radio engineers and physicists were unable to explain this phenomena, as it had always been accepted that short waves were only

suitable for communication over comparatively short distances. It, therefore, became necessary to carefully examine these experiments and formulate fresh theories to account for the results, and the commercial interests quickly realised the technical and commercial possibilities which would result from the development of low power short wave stations for long distance communication.

As this *résume* of the work undertaken at Station G2OD is only intended as a short historical account, the results of many important experiments have been omitted, and, as far as possible, technical details have been neglected, but full details of the apparatus employed, the value of the results attained, and the necessity for the revision of the old theories relating to the propagation of short waves will be found in the technical press of the period.

In closing these short notes, it is thought that brief reference to the important short wave results attained as a result of the experiments at G2OD may be recounted with interest.

1923, *December*.	First two-way contact with Canada on 116 metres. Stations, Canadian 1BQ and G2OD.
1924, *October*.	G2OD first short wave station heard in Antipodes.
1924, *November*.	First two-way short wave contact between Australia and Great Britain. Stations, Australian 3BQ and G2OD.
1925, *January*.	First two-way contact between Mexico and Great Britain, Stations, Mexico 1B and G2OD.
1925, *March*.	Intelligible speech was transmitted for first time to New Zealand by G2OD.
1925, *May*.	First two-way contact in daylight on 20 metres between Australia and Great Britain. Stations, Australian 2CM and G2OD.
1925, *May*.	First two-way contact on 20 metres between New Zealand and Great Britain. Stations, New Zealand 4AG and G2OD.

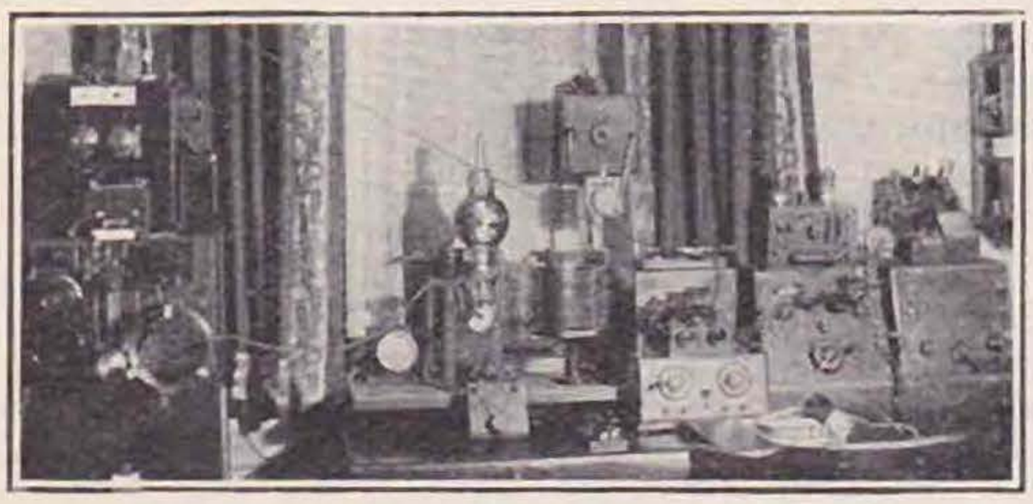


The initial contact between Great Britain and Canada was effected by G2OD during December, 1923, using this transmitter. The synchronous rectifier can be seen in the left-hand corner, and the superheterodyne receiver on the right.

1925, *February*.	First two-way contact between Argentine and Great Britain. Stations, Argentine CB8 and G2OD.
1925, *September*.	First two-way contact on 20 metres between Buenos Aires and Great Britain. Stations, BA AF1 and G2OD.
1925, *November*.	Telephonic communication established with Ship GFUP stationed off Hong Kong.
1926, *March*.	Intelligible telephony transmitted by G2OD to Australian 2CM on 44 metres.

The whole of the experimental and constructional work at the station G2OD was carried out by the writer, and receivers embodying the superheterodyne principle have been used exclusively since 1923. The constructional article by the writer in *Experimental Wireless* for October, 1923, describing a receiver of this type, is believed to be the first technical description published in this country.

E. J. Simmonds.



The transmitter used by G2OD for the first Australia-Great Britain contact in November, 1924. Signals from this station were heard a month earlier in New Zealand, and were the first from Britain recorded in the Antipodes.

Sir Ian Fraser

The announcement in the King's Birthday Honours List that a Knighthood had been bestowed on Captain Ian Fraser was read with special interest by the many Society members who have been associated with him in the past. The honour bestowed on our Past President is but a fitting reward for the services he has rendered to the nation, and it is with pleasure we recall the fact that Sir Ian was for several years closely connected with the amateur movement as mentioned in the historical review of the Society published elsewhere in this issue.

We offer him our sincere congratulations.

A 10-WATT C.W. AND TELEPHONY TRANSMITTER.

By A. E. Livesey (D.F.H.), G6LI.

Several new features are incorporated in this transmitter including an absorber valve keying system, and frequency changing in the anode circuit of crystal oscillator.

PART I.

The General Design.

IN presenting this specially constructed unit, the author has been guided entirely by modern ideas, of which perhaps the most important is efficiency.

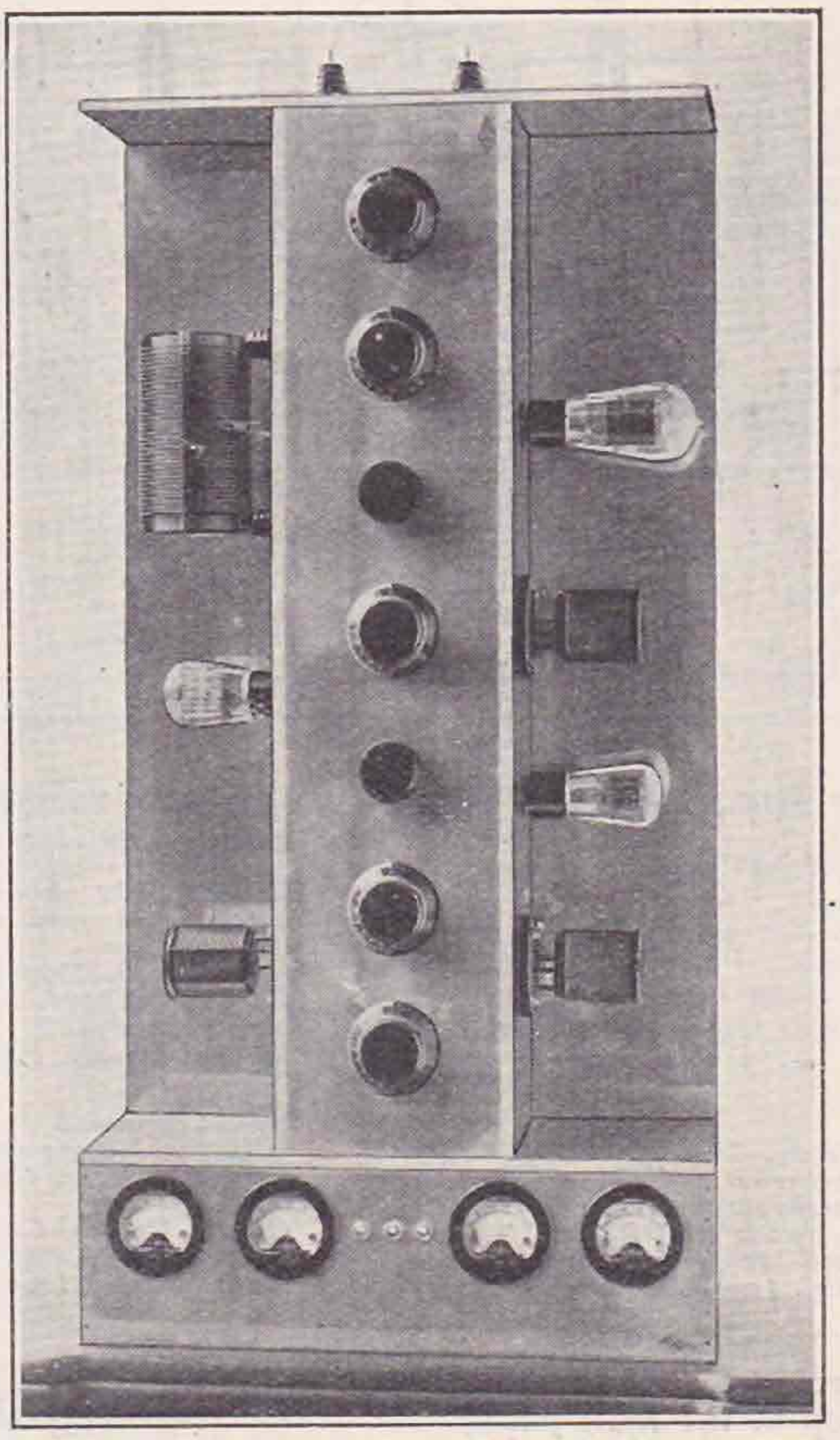
The time has passed when we might with reasonable preservation of prestige announce that our transmitters had been made exclusively from parts selected carefully from junk stores, the family box-room and the village carpenter.

We might, conceivably, have screwed these oddments on to a flat board, or perhaps copied the latest American craze and crushed them into a number of dark, narrow shelves, mercifully concealed by a shining frontage of very dubious bakelite.

To consummate this outrage of the laws of Heinrich Hertz we should have wound a number of rather palsied coils—not one being the same size as any other—and proudly plugged in several hopelessly obsolete six-volt valves whose clear, yellow, glass bulbs convey most easily the bilious nature of their characteristics.

Had we been very daring, we might have shrieked feverishly into a semi-paralysed microphone, coupled to the aerial coil.

To-day, there are still some of these appalling nightmares in actual use. There are transmitting amateurs who will never see the "light of day" but through the printed pages of the Bulletin, and, with this end in view, the author presents a transmitter incorporating designs, circuits and material which have appeared and have been widely advocated in the pages of the Bulletin itself.



Front view of 10-watt transmitter with screens removed.

The actual construction of the complete transmitter offers very little difficulty, everything is accessible, every part can be inspected clearly, yet we have tried hard to break away from the cast-iron conventional layout and the very ordinary warped plywood frames and boards.

Material

The entire framework or shell of the transmitter is made up of planks and blocks of "Plymax"—a relatively modern composition made by the Peto-Scott Co., consisting of seven-ply wood having rolled aluminium sheet cemented to one surface.

This material needs only wood screws for the fixing of all parts, is thoroughly rigid, forms a complete shield to static fields, and, above all, adds a lastingly clean, polished surface as pleasing to the eye as it is efficient.

Layout

At the very best, the ordinary unit offers three or four surfaces for the mounting of parts. Generally, bread-board layouts provide only two surfaces—not shielded from one another.

The design of this transmitter contains six surfaces for the radio-frequency components, three shielded from the remainder.

For the meters and suplly controls there are still another six faces—again shielded from the R.F. components.

Only one little shelf is utilised in the horizontal—for mounting the crystal holder.

An imposing line of uniform tuning dials is seen at the front, unbroken by the usual array of assorted meters. Four Ferranti meters arranged side by side for instant comparison are housed in the power portion of the transmitter, their insulated cases

secured by a special fastening device at the back, their surfaces lying flush with the polished facia.

Centrally are arranged in the lower panel three BULGIN Q.M.B. control switches, two of them breaking the supplies and the other possessing one throw for C.W. and the opposite throw for telephony —quite a simple change-over device.

At the back of the unit appear the terminals for the supplies and two permanent connections to the modulating unit, which it is definitely not advised be crammed in with the radio-frequency circuits. We see also the three controlling knobs of the VARLEY power potentiometers regulating the oscillator and first amplifier high-tension pressures.

Dimensions

The approximate over-all height of the unit is 3 ft. 10 ins., the power panel being 6 ins. high. The width is about 20 ins., and the attractive feature is the depth, which is less than 7 ins. This allows the entire transmitter to stand close against a wall and to take little more than a fraction of the space usually accorded to its old-fashioned brothers. Its height is of little matter, generally. One may argue that the meters are too far from the controls. This is a matter of taste, and arises from the absolute necessity for isolating radio-frequency from D.C. supplies.

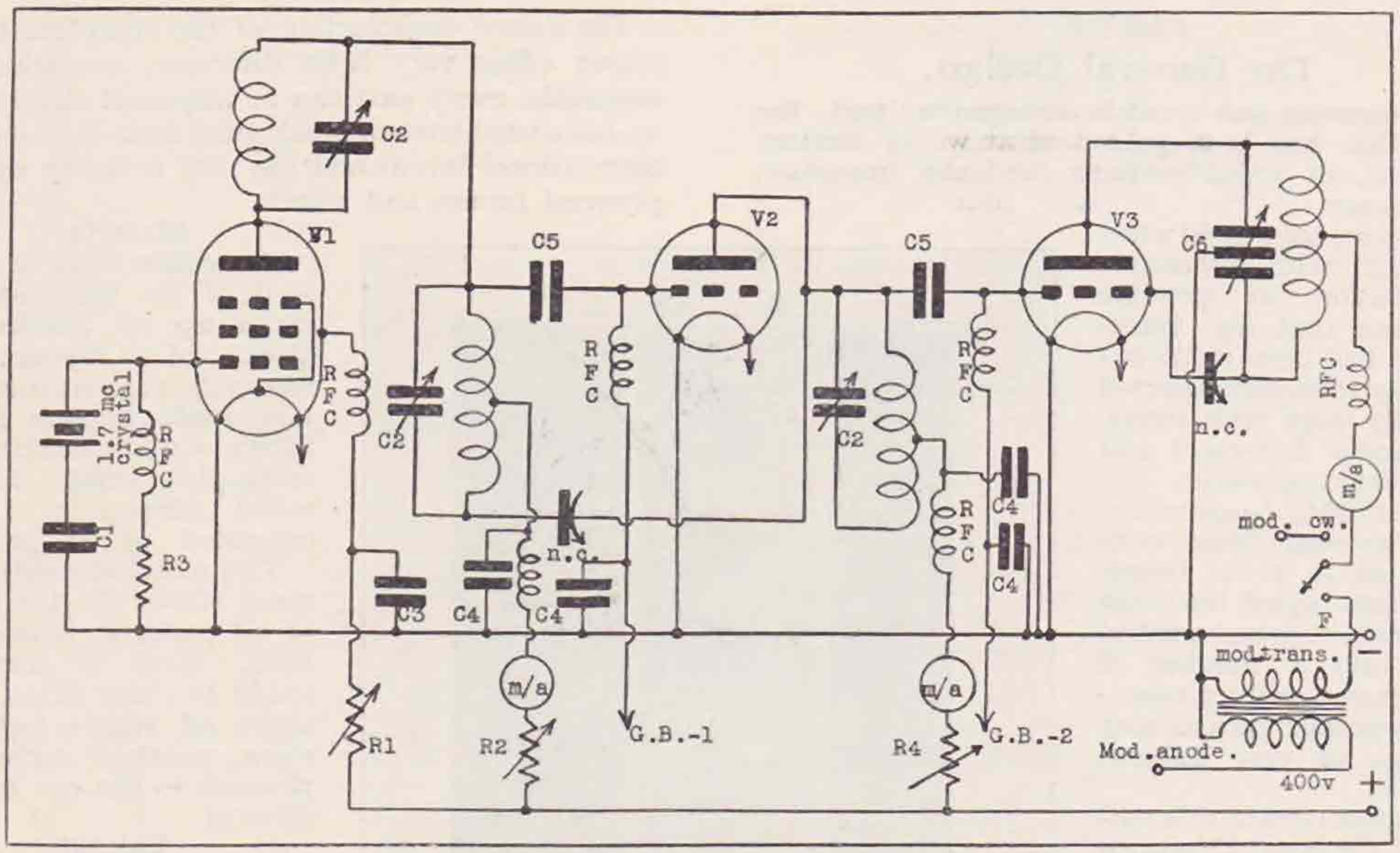


Fig. 1.

CIRCUIT FOR 10-WATT C.W. AND TELEPHONY TRANSMITTER.

C1 T.C.C. 0.006 mfd. (500v.).
C2 Polar Type C variable 0.00025 mfd.
C3 T.C.C. 0.004 mfd. (500v.).
C4 T.C.C. 0.002 mfd. (500v.).
C5 T.C.C. 0.0001 mfd. (500v.).
C6 Cyldon 0.0002 mfd split stator type.
R1 Varley 15,000 ohm variable (15 watts) power potentiometer.
R2 Varley 10,000 ohm variable (15 watts) Power Potentiometer.
R3 Varley 20,000 ohm (1 watt).
R4 Varley 5,000 ohm variable (15 watts) power potentiometer.
NC Eddystone 0.00005 mfd.
V1 Mullard PM24M.
V2 Tungsram P4100.
V3 Marconi-Osram PX25.

Clix bias battery plugs.
Belling-Lee type B terminals.
Bulgin single-pole double-throw switch.
Bulgin double-pole single-throw switch.
Bulgin single-pole single-throw switch.
Quartz Crystal Co. enclosed-type crystal holder.
Polar condenser dials, 3-in. type.
RFC Eddystone Type 925
Clix Flush type valve holders.
Quartz Crystal Co. coils. (For details see text in Part 2.)
Quartz Crystal Co. coil bases.
Ferranti 0-50 ma. meters.
Quartz Crystal Co. stand-off insulators.

The Controls

Reading down from the top of the front panel, the controls are :—

1. Aerial and counterpoise, or feeders.
2. Power amplifier No. 2.
3. Neutralising for P.A. No. 2.
4. Power amplifier No. 1.
5. Neutralising for P.A. No. 1.
6. Oscillator circuit No. 2.
7. Oscillator circuit No. 1.

Wire Mesh Shields

The open sides and back of the transmitter present opportunity for improvement, and accordingly they have been cased-in with large aluminium wire mesh through which an inviting view of the parts is obtained, whilst they are thoroughly and smartly encased and at the same time partially shielded. The sides open on hinges to permit the changing of coils and valves. The back mesh fits into place.

The Valve Position

Considerable argument may be raised as to the bad practice of setting valves in anything but the vertical. Readers in sympathy with this movement may not have noticed that almost every valve is made with the anode in line with the plate and grid pins, so that if these two pins are set in the vertical the filament of the valve cannot droop into the grid. In any case, in these modern days of low temperature filaments, sagging is out of date! The valve has definitely ended its useful 1,000 hours by the time that sag takes place, and the robust types of valve chosen for this transmitter are still less likely to show defects of the above kind.

General Features

The transmitter is designed primarily for the 1.7 and 3.5 mc. bands and for the use of not more than 10 watts input. It is arranged so that either telephone or code may be used at will. The telephony must be high quality, and the modulation chosen is transformer-fed anode control. The code must be keyed so that the least possible number of spurious emanations occur. Valve keying solves most of this trouble—if not all.

Modulation

The author would like to acknowledge at this juncture the kind assistance rendered by Mr. A. E. Wood (G5AW) in selecting suitable values of parts, etc., for the modulating side of the design. A high-gain two-stage amplifier is all that is required for modulating and the anode to filament load imposed on the modulator by the correct setting of the modulated stage is matched up correctly with a specially constructed auto-transformer having a ratio of 1 to 1.34.

Modulation is carried out in the final stage, so that the control does not have an opportunity of affecting the frequency such as might take place if the middle stage were controlled.

Further, one of the advantages of modulating the third valve is the fact that ample drive for peak modulation values may be obtained by boosting up the power of the first amplifier, if needed. Another, that "Class C" operation is then employed.

It should be remembered that the instantaneous power of a fully modulated 10-watts carrier will rise to some 40 watts! At this point, enough drive is needed to avoid distortion.

Modern Parts Used

The use of the new type of three-pin plug-in coils made by the Quartz Crystal Co. eliminate all uncertainty in logging the settings of the dials, and the problem of mounting effectively to the base-board.

Slow-motion condensers for tuning, without the use of cumbersome dials, and double-spaced vanes ensuring constant capacity.

A heavy-type coil mounted on stand-off insulators is efficient in the final amplifier.

Valves with short grid base and ample rating for the work in hand.

A continuously variable voltage source to the anodes of the first two valves, provided by potentiometers, allow the correct drive to be selected immediately.

An exceptionally unusual all-insulated terminal is employed for the supply leads.

Keying

Valve keying may be arranged, according to the circuits shown in either the middle stage or the last stage. It is a matter of personal requirements, power supply stability, interference, etc. The valve made to do the keying work in this case is the modulator. Why have it lying useless when using Code? By biassing it well beyond cut-off (found by dividing the working anode voltage by the amplification factor, or by trial and error), it can be arranged in series with the anode supply to the valve which it controls. Shorting out the bias with the key breaks no current, but allows the controlled valve to take supply. As the key is lifted, the bias naturally cuts off all the conductivity, and the wave is thus effectively keyed. By making the valve oscillate at perceptable frequency—or motor-boat—it may be used for the "dotting" portion of a semi-automatic key! Other well-known methods of keying may be of course used.

Circuit Details

The Oscillators

A 250-volts Pentode may be used as the oscillator in conjunction with the special frequency-doubling device incorporated in the anode circuit—as shown by the diagram.

The object of the circuit is to make use of the very high second harmonic output of Pentodes. The first circuit in series with the anode can be tuned to the frequency of the crystal, and the second circuit to twice that frequency. Thus, a single 1.7 mc. crystal carries the operator over two bands.

For working at the fundamental of the crystal, the first of the anode coils is shorted out.

It will be noticed that the crystal anode coil is centre-fed, as are all coils in the transmitter. This gives proper R.F. balance to the tank circuits, and the choke is not then called upon to do much work or to introduce the customary losses.

In this case the centre tap serves for adapting the the circuits to the special form of neutralising employed in the middle stage, and which many readers will remember was strongly recommended by G2OA at the Convention Discussions in 1933, and has been in use consistently for three years at the author's station until recently replaced by the new split-stator tank circuits.

The remainder of the circuit is in accordance with recent Bulletin designs.

The First Amplifier

This is conventional, with the exception of the neutralising. A 400-volts power valve is used here. The chief object of the stage is to provide isolation from the oscillator.

The Final Amplifier

This is the modulated amplifier. Its tank circuit is of the split-stator variety, giving improved stability, balance, good and constant neutralisation, irrespective of coil changes and better output with less loss in the supply source.

A Cyldon Series-Gap condenser serves for the tuning, and stands the 400 volts applied across its plates.

For telephone operation the anode voltage is reduced to some 300 volts, and a 10-watts carrier is radiated. It must be remembered that this carrier is equivalent to 20 watts when fully modulated.

Aerial coupling devices are to be described in the next part.

To modulate a 10-watts carrier, 5 watts of audio power are needed, and a Pentode capable of giving 6.3 watts audio into its optimum load is used to modulate.

This stage may be keyed by the modulator for C.W.

The anode of the valve is coupled through one side of the modulating transformer, the modulator being coupled through the other.

The Meter Panel

The meters are arranged to read the anode currents of each stage, and the fourth meter reads that of the modulator—which is connected to the radio part of the transmitter only through two audio lines. The modulator unit has a separate filament supply, and it is suggested that a separate anode supply is used for the first valve following the microphone.

It should be clearly understood that economy in meters is utterly false. One must be able to compare readings collectively to check neutralising, feed-back, etc. One should remember that the meters tell a much more faithful story than the man at the other end of the carrier.

Adaptability

There is little doubt that the unit will operate at 14 and 7 mcs. with good efficiency, for which one more crystal and two sets of coils would be needed. The ample spacing of the R.F. components should then be of service.

In the next part will be described full operating and constructional details, the tuning procedure and the type of results that may be expected.

(*To be concluded*).

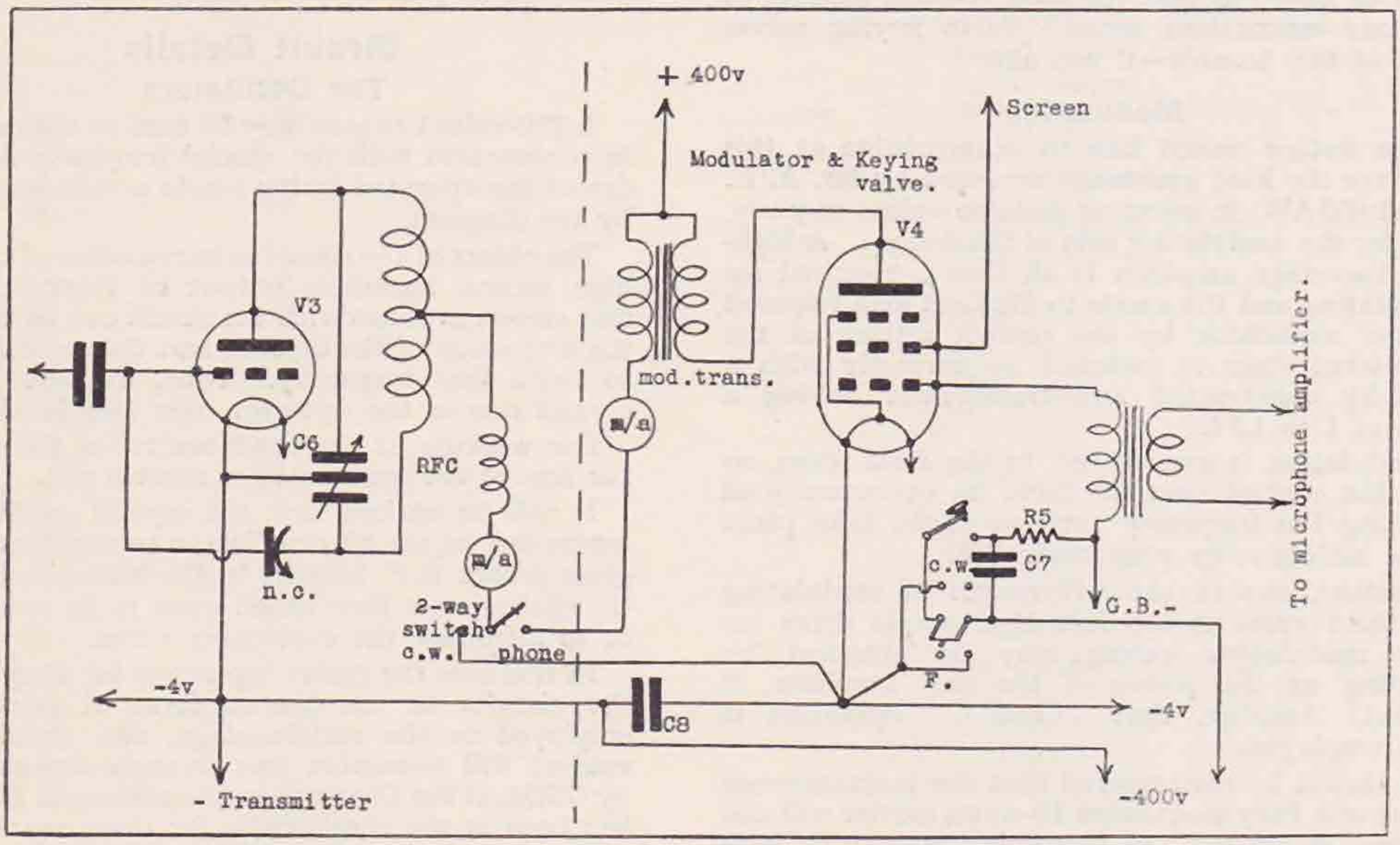


Fig. 2.

KEYING AND MODULATION ARRANGEMENTS APPLIED TO THE FINAL STAGE.

V3 Marconi Osram PX25.
V4 Marconi Osram PT16.
Mod. Trans. Details in text (Part 2).
C8 2 mfd T.C.C. 500v. type.

Note.—The valve from microphone to the PT16 is a Marconi Osram MH41.
R5 and C7 combine to form grid bias coupling. Details in text.
When c.w. is used negative 400 volts is removed from the modulating circuit. This is replaced for telephony and the key is simultaneously taken out of circuit. The transformer may be shorted out for c.w. if excessive voltage drop occurs.

Empire Calls Heard.

G6YL, Miss B. Dunn, Felton, Northumberland. March and April, 1934.—14 mc. band: ve4du, 4nw, 4rh, vk2ev, vk4rv, vo8hk, vs2af, vs3ac, 3cm, vs6cf, vs7gj, vq4crl, vq4kta, vu2df, vu2ja, ze1jj, zs1h, 2a, 4m, 5a, 5n, 6aa.

W6FZY (Los Angeles) :—
7 *mc.* : zs2a (5 6 9), zs6b (5 5 9), zs6c (5 6 9), zt5r (5 5 9), zu6p (4 4 9).
14 *mc.* : g2hx (5 6 9), 2ma (5 6 9), 6py (5 9 9).
All above heard between April 20 and 30, 1934.

THE FOURTH ANNUAL B.E.R.U. CONTESTS

" Some men have achieved greatness in a night—but rarely without long and careful preparation."

STRANGE as it may seem, the words quoted under the title appeared on a calendar block for Sunday, February 25! What more appropriate epitaph could have been written as a finale to those four week-ends of Empire DX? Each year the B.E.R.U. Contest increases in popularity, and this, the fourth event of its kind, left all predecessors far behind, as far as keenness and the number of entries were concerned. We have, perhaps, one regret, and that concerns the challenge trophies themselves; we would have given much to have seen them continue their journies round the Empire, but it was not to be. The Senior Cup stays in Dunedin, the only change being one of address, for Jack Callender, ZL4BT, the winner, is a near neighbour and a great personal friend of Gav Samson, ZL4AI, the present holder, whilst G. H. Todd, VS7GT, retains the Junior. A Britisher in the person of G. C. Allen, BRS250, wins the Receiving Trophy, and from what we know of his prowess behind a pair of 'phones, no more fitting person could have been acclaimed the winner.

An outstanding achievement in the Senior event is to be found in the fact that Fred Miles, G5ML, for the fourth year in succession, has finished in one of the first two places. With a score just 200 points behind ZL4BT, it seems certain that had he been given the same number of ZL's to work as the winner had G's, his total would have been much higher. This is borne out by an examination of the two entry forms, for whereas ZL4BT obtained his QSO's from 143 contacts in 12 zones, G5ML had 119 QSO's in 16 zones. His ZL QSO's were, however, only 25, as against the winner's total of 88 G's.

Under the present method of scoring it would appear to be an odds on chance that New Zealand will continue to provide the winner for the Senior event unless more ZL's enter, in which case a British station may again prove successful. We hope, however, that before many years have passed one of our Canadian or South African colleagues, to say nothing of members in other parts of the Empire, will have the honour of bringing the coveted trophy to his country.

Third and fourth places in the Senior event were secured by British stations, G2ZQ, operated by John Hunter, finished some 80 odd points behind G5ML, whilst another South Londoner, Don Price, of G6HP, was some way behind his local DX colleague. Tying for fourth place, we find Gilbert Pollock, VK2XU, who led the Australian entry with a score of 789. He was closely followed by another New South Wales station, VK2OC, operated by Owen Chapman. Lt. Cole, SU1EC, only 5 points behind, had a score of 762, whilst eighth place was secured for New Zealand by Bob Stanton, ZL3AZ. Another Australian, in A. H. Mackenzie, VK4GK, finished ninth, and last place in the Senior roll of honour goes to L. H. Thomas, G6QB.

In the Junior event, VS7GT had a lead of 37 points over J. Shepherd Nicholson, VU2JP, whilst third place was secured for Great Britain by Jack Owner, G6XQ, with last year's Senior winner, G. Samson, ZL4AI, fourth. E. J. Dunkley VU2LZ, was fifth, only 2 points behind, and Gordon Ragless, VK5GR, had the honour of leading the Australians with a score of 354, closely followed by Jack de Cure, VK3WL. G. A. Shoyer, ZS1H, was the only South African to secure a top place, 17 points behind VK3WL. Lt. Beaumont, VU2FP, and F. W. Miles, G5ML, filled the ninth and tenth positions.

In the Receiving Contest, G. C. Allen, BRS250, with a score of 1035, finished 57 points ahead of Eric Trebilcock, BERS195. Another British station operated by Cyril Greenaway, 2BWP, finished third, followed by Messrs. Horton, BERS74, and Vale, BERS206, who tied for fourth position. Two Burton-on-Trent members, C. E. Jefferies, 2AMN, and C. A. Bradbury, BRS1066, tied for sixth place, with R. H. Sansbury, BERS150, eighth, P. Seymour, 2AZX, ninth, and P. Pennell, 2AAA, tenth.

Conditions During the Contest.

After a careful examination of all entry forms, an impression has been formed that conditions were at their peak during the first and second week-ends, with, if anything, best periods during the Sundays. The first week-end of the Junior produced fair conditions generally, but the last week-end appears to have been poor. By a coincidence the conditions during this Contest followed very closely along the lines of the 1933 event.

The Entries.

The high total of 150 entries were received for the Senior event, which compares very favourably with the figure of 119 recorded last year. One hundred and eight took part in the Junior, as against 83 in 1933, whilst the Receiving Contest had 25 supporters, compared with 24 in the previous year.

An analysis of the returns shows that 61 Britishers, 16 New Zealanders and 30 Australians, took part in the Senior event. In the Junior, Great Britain had an entry of 48, Australia 17, South Africa 10, and New Zealand 9.

Details of Leading Stations.

Following our usual practice we give below details of the equipment used by the leading stations in each event.

Senior Contest.

(1) ZL4BT ... Transmitter, C.O. ('59), 1st amplifier or F.D. ('47), B.A. P-p ('47's), Final P-p ('52's).
Receiver: 6-valve A.C. superhet, with regenerative I.F., giving single signal effect.
Aerial: 33 ft. vertical and 33 ft. horizontal.

(2) G5ML ... Independent transmitters for 7 and 14 mc., each with separate power supply. No details of arrangement or valves given.
Receiver: Eddystone Ham Band Two.
Aerials: 7 mc. matched impedance, 67 ft., top 130 ft. feeders; 14 mc., 67 ft. Zepp., 48 ft. feeders.

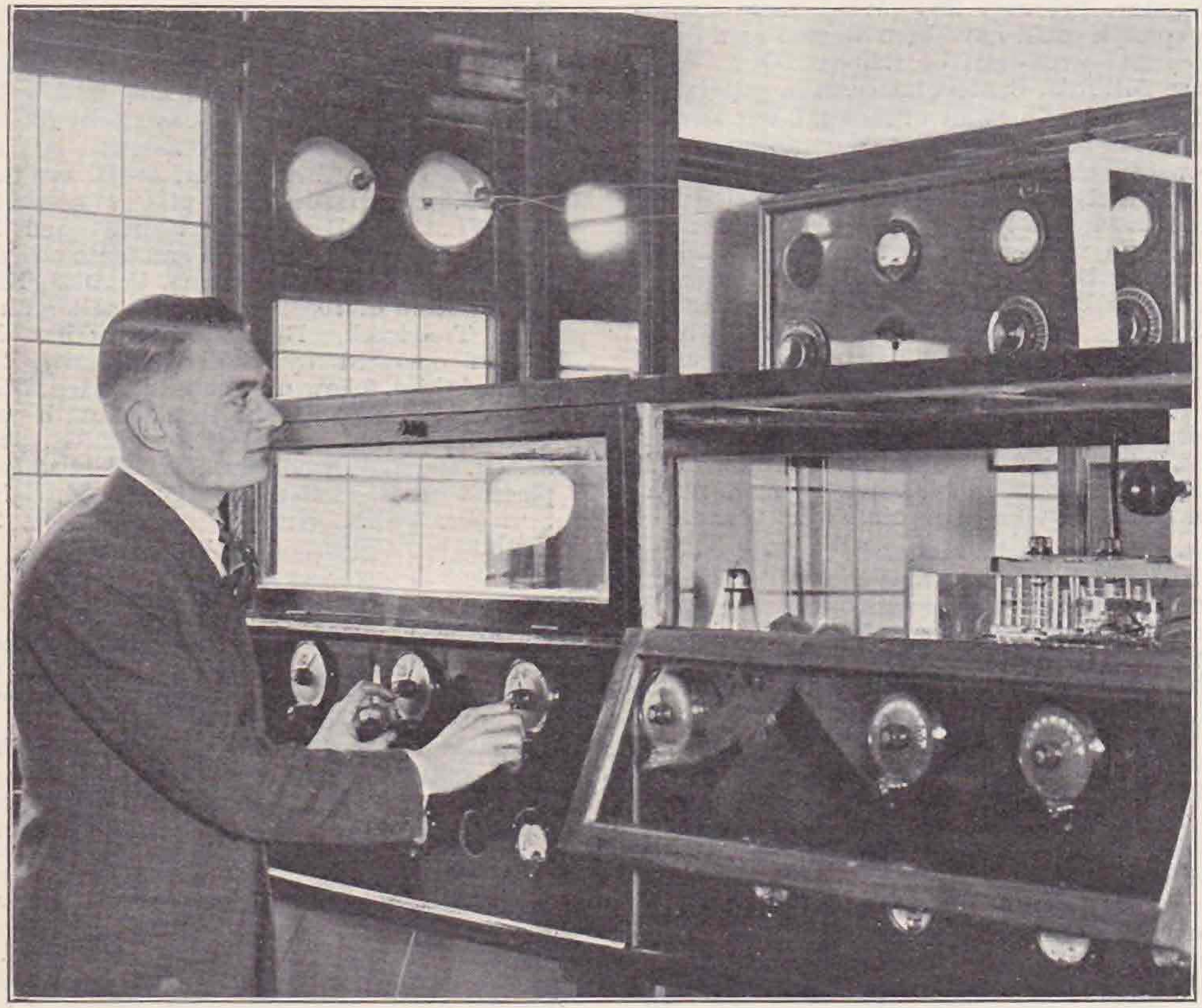
(3) G2ZQ ... Transmitter: C.O., F.D., T.P.T.G. Additional F.D. for 14 mc.
Receiver: O-v-P, with tone control.
Aerial: 21 metre voltage-fed Hertz.

(4) G6HP ... Transmitter: locked oscillator, T.P.T.G., with T61D in final.
Receiver: loose-coupled detector and L.F., resistance capacity coupled, all mains. Indoor aerial used.
Aerial: 21 metres, full-wave end-fed Hertz.

(4) VK2XU ... Separate transmitters for 7 and 14 mc., T.P.T.G., with Det. 1 and UX210 in final stages.
Receiver: detector and two L.F., with 50 volts H.T. Schnell circuit.
Aerials: tapped Hertz 66 ft. or 132 ft.

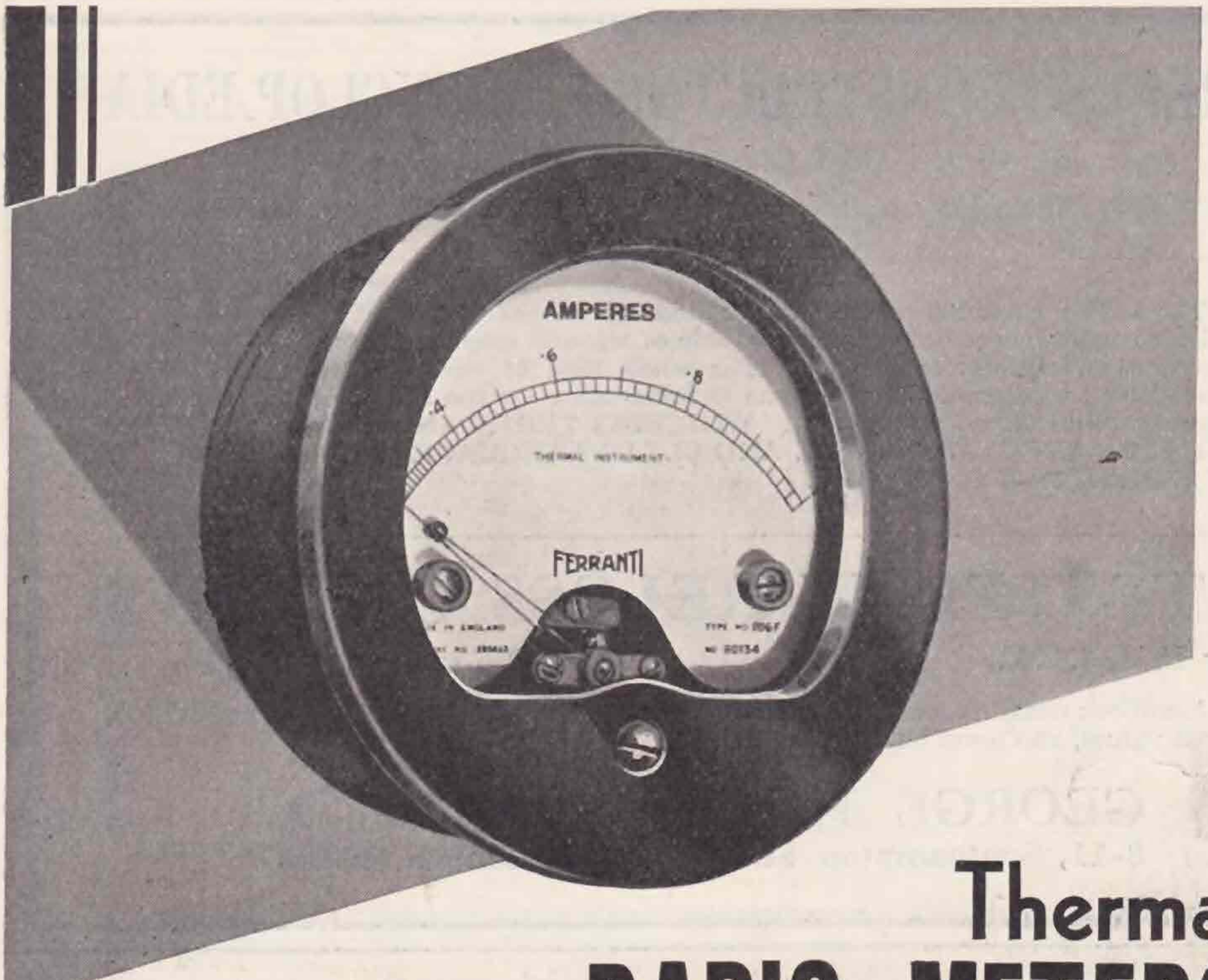
(6) VK2OC ... Transmitter: C.O. ('46), doublers ('46), B.A. (210), final T61D's in push-pull.
Receiver: as per QST, January, 1933, 3-valve R.F. ('58), detector (58), L.F. ('56).
Aerial: half-wave 42-metre Zepp.

(7) SU1EC ... Transmitter: C.O. LS5B sub-amplifier or F.D. LS5B, final T61D.
Receiver: 7-valve Hammarlund Comet Pro.
Aerial: 66 ft. matched impedance.



[Photo: "Midland Daily Telegraph."

F. W. Miles, G5ML, Leading British Station in B.E.R.U. Senior Contest, for the fourth year in succession.



Thermal RADIO METERS

Ferranti Thermal Radio Meters are of the Thermo-e.m.f. type; the movement, which is similar to that of the ordinary D.C. Meters, is connected to two thermo-couples placed near to, but insulated from, the heater wire.

This construction enables the instrument to be calibrated and used on D.C. with no reversal error; and when used on radio frequency circuits, the electrical separation of the two circuits avoids trouble due to the capacitance between the instrument and the earth. These meters are quite independent of wave form, and are suitable for any frequency up to 14 megacycles.

Ferranti wide open scale, 110°—2½". Meters below 0—1 ampere are subdivided as milliameters, so that they are of particular help when the current in the aerial is small.

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TABLE 1.—SENIOR TRANSMITTING CONTEST.

Position.	Name.	Call.	Input power in watts.	Points.
*1	J. C. Callender	ZL4BT	7 mc., 200 14 mc., 180	1,234
2	F. W. Miles	G5ML	500	1,033
3	J. Hunter	G2ZQ	200	951
4	H. D. Price	G6HP	245	789
4	G. Pollock	VK2XU	25	789
6	O. G. Chapman	VK2OC	200	767
7	E. S. Cole	SU1EC	7 mc., 140 14 mc., 70	762
8	R. T. Stanton	ZL3AZ	7 mc., 100 14 mc., 70	687
9	A. H. Mackenzie	VK4GK	50	654
10	L. H. Thomas	G6QB	50	641
11	H. A. M. Whyte	G6WY	200	630
12	R. A. Bartlett	G6RB	7 mc., 140 14 mc., 90	620
*13	M. Campbell	VK3MR	100	617
14	R. A. Holt	VK2HW	25	616
*15	W. A. Wilson	ZL2CI	250	601
16	J. B. Scott	VK2NR	Not stated	575
17	G. B. Ragless	VK5GR	60	565
18	J. J. Curnow	G6CW	250	556
19	G. A. Shoyer	ZS1H	50	524
20	G. H. Todd	VS7GT	24	518

*Non-member, B.E.R.U.

TABLE 2.—JUNIOR TRANSMITTING CONTEST.

Position.	Name.	Call.	Input power in watts.	Points.
1	G. H. Todd	VS7GT	23/24	571
2	J. S. Nicholson	VU2JP	7 mc., 12 14 mc., 14	534
3	J. S. Owner	G6XQ	25	498
4	G. G. Samson	ZL4AI	25	361
5	E. J. Dunkley	VU2LZ	25	359
6	G. B. Ragless	VK5GR	25	354
7	J. de Cure...	VK3WL	22	340
8	G. A. Shoyer	ZS1H	25	323
9	T. H. Beaumont	VU2FP	25	300
10	F. W. Miles	G5ML	25	291
11	J. H. Knowles	YI7RK	25	287
12	O. A. F. Spindler	VU2FY	10	282
13	F. Charman	G6CJ	25	255
13	W. A. Phillips	ZD2C	25	255
15	W. E. Lane	VQ4CRH	25	245
*16	R. E. Jones	VK3RJ	25	243
17	D. L. Martin	VU2BL	22/35	239
18	G. H. Jolliffe	VS7GJ	22	232
*19	Madeline Mackenzie	VK4GK	24.7	231
20	J. J. Curnow	G6CW	22/23	228

*Non-member, B.E.R.U.

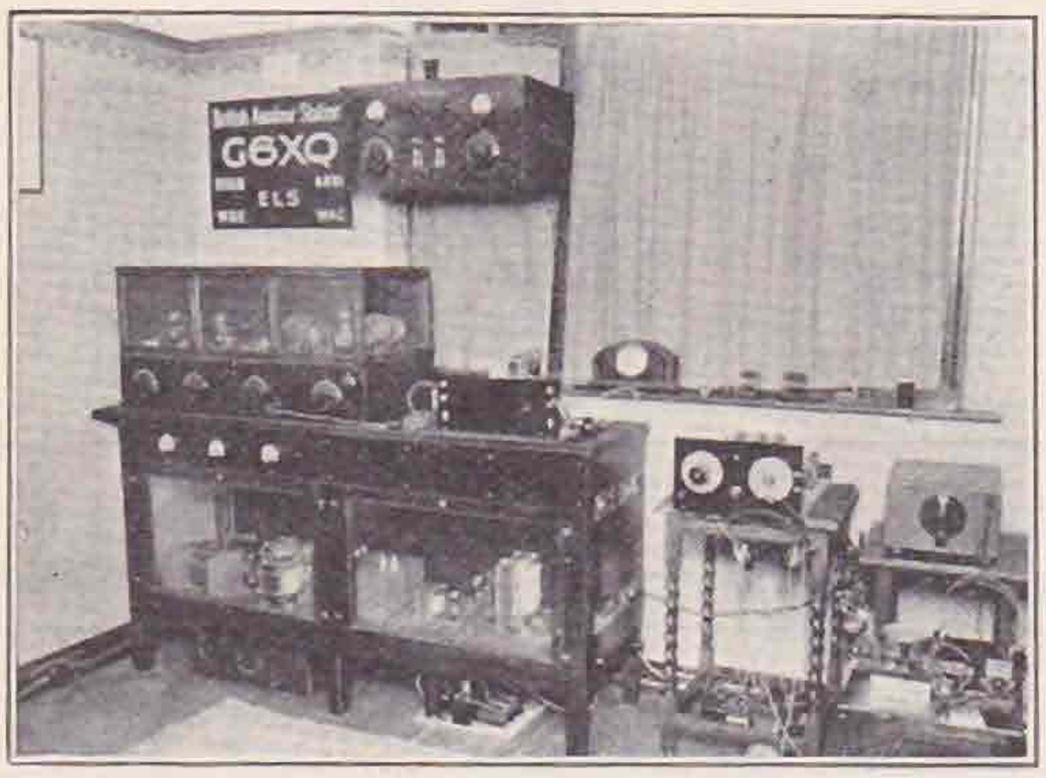
TABLE 3.—RECEIVING CONTEST.

Position.	Name.	Call Sign.	Points.
1	G. C. Allen	BRS250	1,035
2	E. Trebilcock	BERS195	978
3	C. J. Greenaway	2BWP	876
4	G. W. Horton	BERS74	803
4	L. S. Vale...	BERS206	803

(8) ZL3AZ ... Transmitter: 4 stages, using 210's in push-pull for final.
Receiver: 3-valve A.C., using '58 and '27 type valves.
Aerial: half-wave 40-metre Zepp.

(9) VK4GK ... Transmitters: C.O. ('47), F.D. (T.C. 04/10), P.A. Det. 1 and Ultraudion self-excited.
Receiver: electron coupled detector and one stage of L.F.
Aerial: Windom 66 ft. 6 ins. flat top.

(10) G6QB ... Transmitter: T.P.T.G. "Goyder locked."
Receiver: detector and resistance coupled L.F. stage.
Aerial: end-fed Hertz, 67 ft.



G6XQ—BIRMINGHAM.
Leading British Station in Junior (Low Power) Contest.

Junior Contest.

(1) VS7GT ... Transmitter: Remote-controlled C.O. (210), F.D. (210), P.A. (TB 04/10).
Receiver: S.D., detector and choke-coupled pentode.
Aerial: Half-wave 40-metre Zepp 45 ft. feeders.

(2) VU2JP ... Transmitter: T.P.T.G.
Receiver: Eddystone Ham Band Two.
Aerial: Universal type as described by F8RJ in T. & R. Bulletin, March, 1933.

(3) G6XQ ... Transmitter: C.O., F.D., F.D., P.A.
Receiver: O-v-1.
Aerial: V.F. Hertz.

(4) ZL4AI ... Transmitter: C.O. or E.C.O., F.D., B.A., with 852's in push-pull for final, H.T. 550 volts.
Receiver: 8-valve, including rectifier, single-signal superhet, with quartz crystal and I.F. filter.
Aerial: L type, 50 ft. high, 33 ft. each arm, 66 ft. feeders, fed at centre.

(5) VU2LZ ... Transmitter: C.O. (B.405) and 04/10 in final.
Receiver: Phillips type 2805, 1-v-1 from A.C., with 23 ft. indoor aerial.
Aerial: horizontal and vertical half-wave zepps.

(6) VK5GR ... Transmitter: Push-pull T.P.T.G., with UX210's on 14 mc. and 1 UX210 on 7 mc.
Receiver: 0-v-1.
Aerial: 66 ft. with Zepp feeders.

(7) VK3WL ... Transmitter: C.O. (247), F.D., 210, P.A. C.O., 4/10, on 14 mc. P.A. is F.D. coupled to aerial.
Receiver: 2-valve Schnell, with '58 and '56 type valves.
Aerials: Hertz Zepp fed, 66 ft. on 7 mc., half-wave Windom on 14 mc.

(8) ZS1H ... Transmitter: C.O., F.D., B.A., P.A. on 7 mc., C.O., F.D., F.D., P.A. on 14 mc.
Receiver: 0-v-2 resistance-capacity coupled.
Aerials: 1½ wave (half-vertical, half-horizontal) on 14 mc. 2 wave (two-thirds horizontal and one-third vertical), also on 14 mc., full-wave (two-third horizontal, one-third vertical) on 7 mc.
Receiving aerials: 45 ft. on 7 mc., 86 ft. on 14 mc.

(9) VU2FP ... Transmitter: T.P.T.G.
Receiver: 0-v-1,
Aerial: A.O.G. 66 ft. long.

(10) G5ML ... Transmitter: No details given.
Receiver: Ham Band Two.
Aerials: 7 mc. matched impedance north and south, 14 mc. single wire Hertz 99 ft. east and west.

Receiving Contest.

(1) BRS250 ... Receiver: 0-v-1 modified Reinartz.
Aerial: 50 ft. high, 70 ft. long, V-shape; earth used.

(2) BERS195 ... Receiver: 0-v-1.
Aerial: Inverted L.

(3) 2BWP ... Receiver: 0-v-2 Reinartz.
Aerial: Inverted L, 35 ft. high, 95 ft. long.

(4) BERS74 ... Receiver: 0-v-1.
Aerial: 100 ft. long, 30 ft. high.

(4) BERS206 ... Receiver: Untuned H.F. (224A), detector ('57), L.F. MHL4).
Aerial: Half-wave Zepp.

(6) BRS1066 ... Receiver: 0-v-2.
Aerial: Inverted L, 40 ft. long, 25 ft. high.

(6) 2AMN ... Receiver: S.G.-v-Pen. Separate receivers for 7 and 14 mc.
Aerials: half-wave doublet for 7 mc., inverted L, 66 ft., top 40 ft for 14 mc.

(8) BERS150 ... Receiver: Eddystone Ham Band Two.

Aerial: Inverted L, running north and south, top 66 ft., height 40 ft.

(9) 2AZX ... Receiver: 0-v-Pen.
Aerial: 33 ft. indoors and 2BI.

(10) 2AAA ... Receiver: Tuned screened-grid detector and resistance-coupled amplifier.
Aerials: 7 mc., 25 ft. long, 5 ft. high, 14 mc. 67 ft. long, 10 ft. high.

The Final Positions.

Senior Contest.

The positions of the first 20 stations are set out in Table 1; the following is a list of all other entrants, in order of finishing, with their scores:—

21, N. F. Ollivier, VK6FO, 512; *22*, W. A. Clark, G5FV, 491; *23*, F. M. Gray, VK5MU, 480; *24*, A. W. Alliston, G5LA, 478; *25*, A. E. Livesey, G6LI, 467; *26*, C. H. Chorley, G5YH, 458; *26*, F. T. Emeny, * VK3GQ, 458; *28*, R. G. F. Blake, ZL3AJ, 448; *29*, L. W. Parry, G6PY, 444; *30*, N. I. Bower, VU2JT, 442; *31*, F. Charman, G6CJ, 433; *32*, G. Brown, G5BJ, 418; *33*, V. M. Desmond, G5VM, 405; *34*, R. J. Beatson, * VK4BB, 389; *35*, L. Wickham, * ZL3FG, 380; *36*, A. Smith, G6VP, 373; *37*, H. C. Turner, G5OJ, 348; *38*, A. C. Simons, G5BD, 346; *39*, C. L. Ward, G5NF, 341; *40*, J. H. Knowles, YI7RK, 334; *41*, L. M. Mellars, ZL1AR, 328; *41*, J. Wyllie, G5YG, 328; *43*, S. U. Grimmett, * VK2ZW, 324; *44*, G. C. Wilmot, ZD2A, 307; *45*, W. P. Andrew, VE3WA, 301; *45*, O. A. F. Spindler, VU2FY, 301; *47*, J. Davies, G2OA, 299; *48*, H. V. Herschel, * VK4UK, 297; *49*, T. H. Beaumont, VU2FP, 279; *50*, C. S. Taylor, VE1BV, 278; *51*, R. A. Andrews, * ZL3GM, 276; *52*, E. J. Dunkley, VU2LZ, 275; *52*, J. W. J. Tyrrell, VU2BM, 275; *54*, D. C. McDonald, VK3DM, 267; *55*, W. B. Sydenham, G5SY, 265; *56*, J. D. Chisholm, G2CX, 262; *57*, A. O. Milne, G2MI, 261; *58*, R. Ohrbom, VK3OC, 254; *59*, W. A. Mead, G5YY, 250; *60*, J. C. Batchler, * VK7JB, 248; *61*, W. B. Stirling, G6RV, 240; *62*, A. F. E. Bott, G5VB, 230; *63*, G. H. Jolliffe, VS7GJ, 224; *64*, O. Egenes, ZT5R, 220; *65*, H. J. Buckley, ZS5U, 219; *66*, E. J. Laker, G6LK, 208; *67*, D. L. Martin, VU2BL, 201; *67*, S. A. Rance, VP3X, 201; *69*, G. Marcuse, G2NM, 200; *70*, W. E. Lane, VQ4CRH, 194; *71*, K. S. J. Rancombe, SU6KR, 185; *72*, D. Hunter, VP4AA, 184; *73*, S. G. Fisher, VQ4CRP, 183; *74*, E. Taylor, G5VQ, 180; *75*, R. E. Jones, * VK3RJ, 176; *76*, D. Brown, * ZL1HY, 175; *76*, E. H. Turner, VE2CA, 175; *78*, J. Lees, G2IO, 171; *79*, F. J. Fenner, XZC6FF, 164; *80*, B. A. Chapman, * VK2BA, 162; *81*, G. C. Price, G2OP, 160; *82*, H. R. Carter, VK2HC, 159; *83*, W. Browning, * ZU6E, 154; *84*, J. Clarricoats, G6CL, 149; *85*, L. C. Hunter, ZL3BJ, 148; *86* W. B. Gilhespy, G6GS, 146; *87*, L. A. Deane, VK5LD, 143; *88*, H. Bowman, * VK5FM, 142; *89*, R. H. Elliott, VP6MR, 135; *89*, R. H. Traill, * VK2XQ, 135; *91*, R. Holmes, G6RH, 133; *91*, W. G. Turnbull, ZL2CA, 133; *93*, R. F. Hilton, G6QK, 131; *94*, J. W. Gill, G6OS, 130; *95*, A. M. Clapp, * ZS6C, 128; *96*, H. M. Roberts, VK5MY, 127; *97*, B. W. Le Sueur, * ZU1J, 124; *98*, R. H. Cunningham, VK3ML, 123; *99*, J. A. Philpot, G5PL, 116; *100*, M. Howden, *, VK3BQ, 115; *101*, H. V. Wilkins, G6WN, 111; *102*, T. P. Allen, GI6YW, 109; *103*, N. H. Auret, ZU6W, 106; *104*, E. G. Ingram, G6IZ, 105; *105*, B. Hall, G2DZ, 103; *106*, C. W. Parton, ZL3CP, 101; *107*, J. J. McMath, VK3JJ, 99; *108*, P. D. Walters, G5CV, 98; *109*, R. C. Neale, G6GZ, 93; *110*, S. Riesen, G5SR, 91; *110*, J. H. Wetherill, G2TK, 91; *112*, T. H. Archer, VP6YB, 90; *113*, L. O. Rogers, G2HX, 85; *113*, J. S. Nicholson, VU2JP, 85; *115*, W. Fouhy, * ZL2LB, 81; *116*, T. Woodcock, G6OO, 79; *117*, R. M. Vickary, VK4RV, 78; *118*, D. Richardson, ZS1B, 76; *119*, J. Doull, * VE1FN, 72; *120*, H. Hornsby, G5QY, 71; *121*, A. Brown, G2WQ, 69; *122*, E. R. Radford, G2IM, 68; *123*, J. A. Cuthbertson, G5CU, 66; *124*, G. M. Salt, * ZL1CK, 63; *125*, H. Hodgens, EI5F, 60; *126*, A. S. C. G. Grant, * VE1EP, 58; *126*, C. W. Skarstedt, * VE2DR, 58; *128*, L. E. Pole, * ZL2MN, 54; *129*, W. W. Stevens, * ZL2HR, 53; *130*, R. D. Stiles, * VE2EW, 50; *131*, N. E. Huggett, G2PF, 49; *132*, A. W. Crabtree, * ZL2FQ, 48; *133*, C. F. Fox, VQ4LMA, 47; *134*, A. Hutchings, VK3HL, 42; *135*, H. J. Brunsden, * VK2BX, 41; *136*, A. D. Gay, G6NF, 40; *137*, R. D. L. Dutton, G6QQ, 38; *138*, C. R. Plant, G5CP, 37; *138*, J. W. Jeffrey, G2DI, 37; *140*, V. de Robillard, V8AF, 33; *140*, H. H. Bridgman, ZT1Z, 33; *142*, G. McL. Wilford, G2WD, 32; *143*, G. F. K. Ball, VQ3BAL, 30; *144*, H. G. Sandford, * ZL2AI, 27; *145*, W. J. H. Kempton, G2AI, 24; *146*, R. L. Belstead,, VK4EI, 18; *147*, J. W. Mavis, ZE1JE, 16; *148*, J. P. D. Mackasey, * VE1DE, 14; *149*, S. A. Pegrume, VQ4CRE, 13; *150*, K. T. Harvey, G5KT, 12.

*Non-member, B.E.R.U.

Junior Contest.

The positions of the first 20 stations are set out in Table 2; the following is a list of all other entrants.

21, V. de Robillard, V8AF, 218; *22*, F. J. Fenner, XZC6FF, 215; *23*, Miss Nelly Corry, G2YL, 201; *23*, G. Featherby, G5FB, 201; *25*, R. C. B. Barnes, G6DS, 194; *26*, A. G. Lapworth, G6DL, 182; *27*, K. S. Rancombe, SU6KR, 180; *28*, F. E. Frame, * ZL4BQ, 179; *29*, H. V. Herschel, * VK4UK, 166; *30*, R. A. Bartlett, G6RB, 158; *31*, J. Drudge-Coates, G2DC, 151; *32*, W. A. W. Stevens, *, ZL2HR, 147; *33*, D. Richardson, ZS1B, 145; *34*, E. H. L. Mazery, V8AB, 136; *34*, A. T. Cudmore, *, ZS5A, 136; *36*, L. O. Rogers, G2HX, 133; *37*, R. Holmes, G6RH, 132; *38*, N. Walding, * ZL1FT, 131; *39*, C. L. Ward, G5NF, 127; *40*, E. G. Ingram, G6IZ, 123; *41*, G. F. K. Ball, VQ3BAL, 120; *41*, L. A. Deane, VK5LD, 120; *43*, F. A. Adams, VK2ER, 118; *44*, E. H. Humphrey, * ZL2GN, 116; *45*, W. H. Tittley, * ZT5V, 114; 46, R. J. Traill, * VK2XQ, 111; *47*, R. L. Belstead, VK4EI, 110; *48*, R. S. Woodford, ZS3D, 109; *48*, H. F. Adcock, ZL2MM, 109; *50*, A. C. Simons, G5BD, 105; *50*, E. H. Swain, G2HG, 105; *52*, R. M. Vickary, VK4RV, 104; *52*, J. Clarricoats, G6CL, 104; *54*, G. A. Lewis, YI5GL, 103; *55*, D. Shanks, * ZT2A, 102; *55*, E. J. Laker, G6LK, 102; *57*, L. Wickham, * ZL3FG, 99; *58*, A. E. Dyson,

G6NJ, 98; *59*, H. C. Turner, G5OJ, 97; 60, L. A. Moxon, G6XN, 92; *60*, A. F. E. Bott, G5VB, 92; *62*, W. G. Pyke, G6PK, 91; *63*, W. B. Gilhespy, G6GS, 90; *64*, J. Davies, G2OA, 89; *65*, G. Edwards, G2UX, 84; *66*, J. H. Hargreaves, G5VO, 80; *67*, B. J. Nijenhuis, * ZS6V, 74; *68*, W. James, G6XM, 73; *69*, J. P. Stove, G5ZX, 72; *70*, L. W. Parry, G6PY, 70; *71*, J. F. Lategan, ZS4U, 69; *72*, C. S. Anderson, G6BC, 68; *73*, H. F. Yule, * ZU5B, 64; *74*, L. Cooper, G5LC, 63; *75*, J. MacIntosh, VS2AF, 61; *75*, F. E. Gilfillan, VQ4CRO, 61; *77*, W. A. Nokes, G2ZJ, 60; *78*, L. G. Blundell, G5LB, 56; *79*, G. E. King, ZE1JF, 53; *80*, J. W. Gill, G6OS, 52; *81*, E. J. Lake, * VK4EL, 51; *82*, C. A. Sharp, G6KU, 46; *83*, A. R. White, VK3AH, 45; *83*, C. W. Crook, G5BT, 45; *85*, C. F. Fox, VQ4LMA, 44; *85*, J. Lunt, ZT1Q, 44; *87*, J. W. Jeffrey, G2DI, 42; *88*, H. V. Wilkins, G6WN, 41; *89*, S. A. Taylor, G5TL, 39; *89*, S. J. Madden. * VK6MN, 39; *89*, H. M. Roberts, VK5MY, 39; *92*, W. H. Potter, * ZL1CC, 37; *92*, S. Buckingham, G5QF, 37; *94*, A. Fairhall, VK2KB, 35; *95*, R. D. L. Dutton, G6QQ, 34; *96*, H. C. Hornsby, G5QY, 32; *97*, H. T. Brunsden, * VK2BX, 31; *98*, H. R. Carter, VK2HC, 30; *98*, S. A. G. Cook, G5XB, 30; *100*, C. S. Pollard, G2GB, 26; *101*, H. E. Green, * ZL2GS, 21; *102*, S. A. Pegrume, VQ4CRE, 19; *103*, W. J. H. Kempton, G2AI, 16; *103*, J. Doull, * VE1FN, 16; *105*, K. E. B. Jay, G2HJ, 13; *106*, N. F. Ollivier, VK6FO, 12; *106*, G. Koenig, V8AC, 12; *106*, H. Hodgens, EI5F12.

*Non-member, B.E.R.U.

Receiving Contest.

The positions of the first 5 stations are set out in Table 3; the following is a list of all other entrants.

6, C. A. Bradbury, BRS1066, 797; *6*, C. E. Jefferies, 2AMN, 797; *8*, R. H. Sansbury, BERS150, 772; *9*, P. Seymour, 2AZX, 756; *10*, P. Pennell, 2AAA, 748; *11*, A. A. Hammond, 2ANM, 745; *12*, H. N. D. Bailey, 2BPY, 688; *13*, E. J. Williams, 2AYP, 679; *14*, L. F. Viney, BRS1186, 625; *15*, G. P. Anderson, BRS536, 583; *16*, G. A. H. Eckles, 2ATK, 523; *17*, R. J. G. Harvey, BRS744, 491; *18*, E. R. A. Henman, BRS802, 487; *19*, A. J. Woiwod, BRS1192, 452; *20*, J. Alexander, BRS822, 437; *21*, J. H. Wood, BRS1211, 355; *22*, G. Beckitt, BRS1317, 287; *23*, W. Robertson, BRS1092, 269; *24*, R. M. Flavill, BRS884, 193; *25*, J. K. Constable, 2AJI, 138.

Prefix Zone Certificate Winners.

In accordance with the rules, the following have qualified for Prefix Zone Certificates.

Senior Contest.

Australia ...	...	G. Pollock ...	VK2XU
Canada ...	...	W. P. Andrew...	VE3WA
Egypt and Palestine		E. S. Cole ...	SU1EC
Great Britain	...	F. W. Miles ...	G5ML
India (North)	...	N. I. Bower ...	VU2JT
India (South)	...	G. H. Todd ...	VS7GT
Kenya, etc.	...	W. E. Lane ...	VQ4CRH
New Zealand	...	J. Callendar ...	ZL4BT
South Africa	...	G. A. Shoyer ...	ZS1H

Junior Contest.

Australia ...	...	G. B. Ragless ...	VK5GR
Great Britain	...	J. Owner ...	G6XQ
India (North and Burma) ...	...	E. J. Dunkley...	VU2LZ
India (South)	...	G. H. Todd ...	VS7GT
Kenya, etc.	...	W. E. Lane ...	VQ4CRH
Mauritius ...	...	V. de Robillard	V8AF
New Zealand	...	G. G. Samson ...	ZL4AI
South Africa	...	G. A. Shoyer ...	ZS1H

Receiving Contest.

Australia ...	...	E. Trebilcock ...	BERS195
Great Britain	...	G. C. Allen ...	BRS250
India (North)	...	G. W. Horton...	BERS74

Certificates of merit will also be awarded to Messrs. J. Hunter and C. J. Greenaway, who finished third in the Senior and Receiving Contests.

In the case of the Zone award for North India and Burma in the Junior event, Council have decided, in view of the meritorious work effected by the two North India entrants, and the solo entrant from Burma, to waive the rules and have awarded a certificate to Mr. Dunkley as the leader in the combined zones.

For the reason that three entries were not received from certain zones, certificates cannot be awarded to the leading stations; this fact is regretted.

Comments.

An outstanding performance was put up by Miss Madeline Mackenzie, daughter of VK4GK. This young lady, only 11 years of age, finished 19th in the Junior with a score of 231 points. A certificate of merit is being awarded to her in recognition of her excellent effort.

The voluminous amount of correspondence which follows every B.E.R.U. Contest has been studied carefully by the Awards Committee, but owing to demands on space we are unable to give extracts on this occasion. Many views have been expressed regarding periods and times for future contests, and as this is probably the most important aspect, it is proposed to outline some views for consideration.

It seems to be generally recognised that 48-hour periods are too long for one-man operation; further that the first two week-ends in February appear to produce better radio conditions than the last two. With this in mind we consider it advisable to give thought to a proposal to reduce the periods to 24 hours and run the events on alternate week-ends.

In considering the question of hours, we realise the necessity of choosing a period which will be fair for the whole Empire. The suggested period, therefore, is 17.00 G.M.T. Saturdays to 17.00 G.M.T. Sundays.

Further, we are of the opinion that if the events are contested over alternate week-ends, any differences in radio conditions will be evened out; we are also appreciative of the fact that many contestants cannot devote two consecutive week-ends to a specific contest.

The Prefix Zone Chart method of scoring has been favourably received, but consideration is being given to suggestions that one point should be allowed for every contact over 1,000 miles and a bonus of 10, 20 or 30 points given for the first contact with each zone. Suggestions have also been received that a maximum number of contacts should be specified for inter-zone working,

but when this method was adopted in the 1932 Contest, criticism was raised.

The rules for the 1935 events will be drawn up during September, therefore concrete proposals from groups of members overseas or at home will be appreciated.

It was noticed during the judging of the Receiving Contest that several entrants claimed points for Empire stations heard in QSO with *foreign* stations. We are at a loss to understand how these members could have interpreted the rules of an Empire contest in such a way.

Another Receiving Contest entrant made the mistake of counting separate points for the Senior and Junior periods. His error caused the Awards Committee nearly two hours' extra work !

We were surprised to note that a fairly large number of transmitting entry forms had not been completely filled in. The rules and prefix zone chart should have made the drawing up of entries simplicity itself, but for some reason several members claimed no extra points for zones worked, whilst others left the whole scoring to be worked out at Headquarters.

In future all entries will be disqualified unless the forms are completely filled in.

We also observed that several non-financial members of the Society failed to make a statement regarding their financial standing with their national Society. These entries have been accepted on this occasion, but will be disqualified in future years.

Check Logs.

The most comprehensive log was that received from Mr. G. Sansbury, BERS150, of Quetta. We trust that members interested in a study of signal strength variations will make full use of this and the other check logs.

The following are thanked for sending reports of stations heard and worked :—

Arabia ...	...	W. Lockerby ...	BERS38
Canada ...	...	B. Naylor ...	VE5BI
		E. Turner ...	VE2CA
		H. J. Hocking...	VE5FG
		E. A. McCracken	VE3AM
Great Britain	...	S. W. Henton ...	G5VU
		W. H. Young ...	G2AK
		J. N. Smith ...	GI5QX
		H. W. Hamblin	G2UH
		R. G. Norman...	G5DP
		D. Heightman	G6DH
		H. L. Garfath...	G2BM
		W. Stirling ...	G6RV
New Zealand	...	L. C. Hunter ...	ZL3BJ
		R. G. F. Blake	ZL3AJ
		H. N. Shrimpton	ZL4AO
Australia ...	...	J. C. Batchler...	VK7JB
		J. J. McMath ...	VK3JJ
		G. W. Luxon ...	VK5RX
		F. S. Hanham...	VK3BJ
		(No reports given.)	
		F. A. Adams ...	VK2ER
		C. Harrisson ...	VK7CH
		P. E. Pernick ...	VK6PK
		A. A. Reimann	VK5JO
South Africa	...	A. A. Zeller ...	ZS6AA
Burma ...	...	W. G. Wedderspoon	VU2JB

Conclusions.

The Contest has again demonstrated that many Empire stations remain "dead" during many months in each year. Numerous calls were heard in London for the first time since February, 1934, and it is difficult to accept the view that radio conditions alone were responsible for their presence.

Thanks are extended to all competitors and to the Editors of overseas journals and our B.E.R.U. representatives who gave the event full publicity. We regret that in certain countries there was a shortage of entry forms, but this will be corrected in future.

SOME NEW IDEAS ON MASTER OSCILLATORS*

By G. W. Thomas (G5YK) and H. C. Page (G6PA)

Introduction

PRIOR to the days of crystal control many amateurs, especially those using high power, made use of the M.O.-P.A. combination for transmitting purposes. Some form of controlled transmission is always to be advocated, and it was found to be of great advantage in telephony working. An ordinary valve oscillator circuit, when modulated either by plate or by grid control, invariably suffers from frequency modulation, thereby giving an unsteady and spreading wave. The use of a stable oscillator followed by a neutralised power amplifier allowed one to arrange for amplitude modulation of the latter with the minimum of frequency modulation. Further, the unpleasant results of a swinging aerial in a gale were practically cured by such a controlled transmitter, as were also any small frequency changes caused by keying an oscillator.

The advent of crystal control showed the amateur an easy way to obtain the perfect signal, though it must be admitted that amateurs were probably keener on the use of crystal control than were some Commercial Radio Communication Companies. It was a simple and, comparatively, inexpensive system for the amateur, and usually gave him a pure and steady note without trouble. By being licensed to use frequency bands in harmonic relation with each other he was often able to use one crystal for all transmissions by making use of frequency multiplying stages for transmissions on the higher frequency bands. He lacked, however, freedom of movement. A commercial station is usually built for a specific frequency; an amateur station should be built for a band of frequencies. The commercial crystal controlled stations can always move their frequencies a little by altering the air-gap with which they work their crystals, or by altering the temperature of the oven in which is housed the oscillator. By far the majority of amateurs use no air-gap and no temperature controlled oven. Most crystals show a small frequency drift unless they are run at very low H.T. voltages, but usually the drift is not of sufficient magnitude to worry the amateur. Home-made crystals are, as a rule, worse in this respect than those from the crystal companies, due to irregular cut and imperfect grinding.

Probably most amateurs have at times wished they could move their frequencies, say 10 kcs., and avoid interference. The use of a monitor will enable the operator to "see" his position on the band with relation to other stations. The need for slight frequency adjustments is more apparent in the lower frequency bands where one can more easily hear the offending stations.

The authors of this article had maintained a weekly schedule on 3,500 kcs. for two years and they felt that means of adjusting their frequencies to suit conditions would prove very useful. In the pages that follow, accounts of experiments with slightly different types of oscillators are given in some detail. These are divided into two distinct headings, the first dealing with the subject from the point of view of the amateur limited to batteries for his sole source of power. The second deals with the apparatus at an A.C. station, and it will be seen that there is more scope for experiment here as a greater variety of valves are available. A further section deals with combined oscillator-doubler circuits. The experiments described in the first section were carried through at G6PA, while those referring to A.C. stations are the result of work at G5YK.

It should first be mentioned that experiments with the Franklin type of oscillator were tried but gave a low power output. Another system of mixing the oscillations from a variable frequency oscillator (say 500 to 750 kcs.) with a crystal on, say 3,000 kcs., and extracting the required output on 3,500 to 3,750 kcs. was also tried but proved unsatisfactory for the same reason. There appears, however, field for further experiment here, using the latest types of multi-electrode valves.

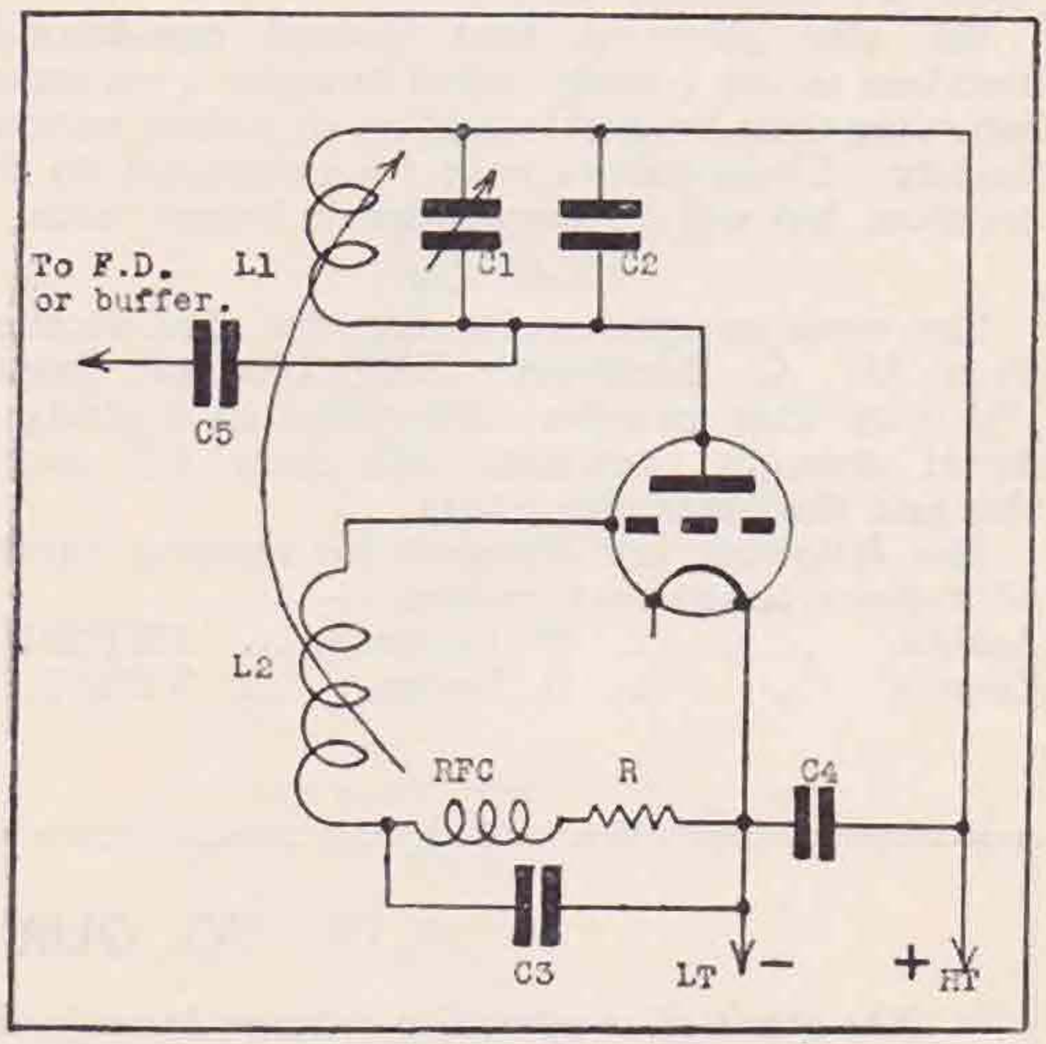


Fig. 1.
The Unity Inductance Oscillator for a directly heated triode.

C_1	.0005 mfd.	C_4	.01 mfd.
C_2	.0003 mfd.	C_5	.0003 mfd.
C_3	.0003 mfd.	R	50,000 ohms

The coils L_1 and L_2 may consist of 16 turns each for the 1.7 mc. band, and 7 turns each for the 3.5 mc. band wound to a diameter of 2½ ins., with 5 turns per inch. See text for further information.

The Battery Supplied Oscillator

The basic principle involved in this article is used both for D.C. and A.C. working, but the problems encountered are rather different. Economy of power is of minor importance to most stations working from public supply mains, whereas the station which is limited to battery power

*Paper read before the Society April 20th, 1934.

for both H.T. and L.T. supply must ensure that there is no waste of current. For this reason valves which are suitable for A.C. work are not suitable for D.C. work on the grounds of economy. The reasons for this will become apparent later.

Before proceeding with the design of an oscillator it will perhaps be well to consider the points desirable in such an instrument. In the first place good stability is essential, and second, for amateur work, fairly large R.F. output is also desirable. Good stability means, of course, that the frequency of the oscillator shall not be affected by temperature, by keying of subsequent stages, or by changes in battery voltage, either H.T. or L.T. The latter are of secondary importance as, of course, L.T. or H.T. accumulators do not vary much while in actual use.

Temperature variations on the other hand, can be quite serious, but their effect can be minimised by the choice of suitable condensers, and coils, and, of course, by the choice of a suitable valve.

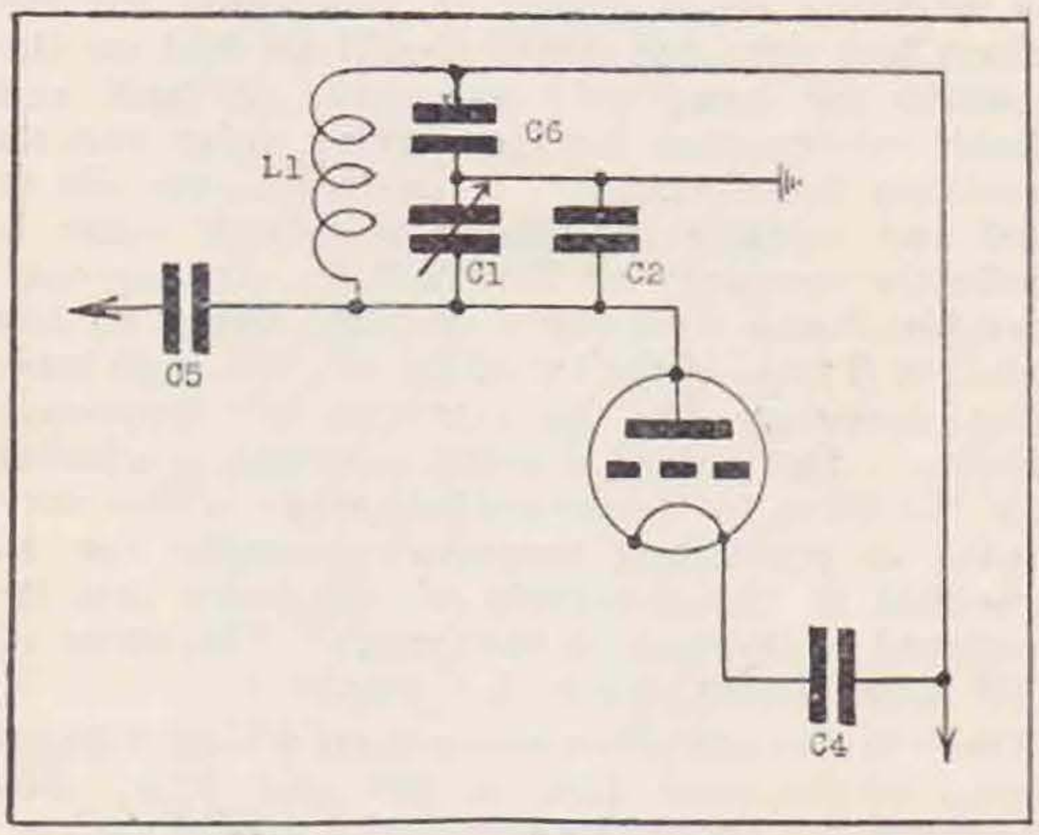


Fig. 2.

This arrangement of the tuning of the anode circuit (compare with Fig. 1) allows the rotor of the condenser to be earthed. The condenser C6 should be at least ten times the value of the variable condenser C1.

It is obvious that a badly over-run valve would be bound to cause trouble. Therefore it is desirable to use a valve of ample power rating.

To avoid trouble due to keying it is essential that in the case of an oscillator supplying power to a buffer working on the same frequency, the buffer must be properly neutralised. This does not apply where the buffer is used as a frequency doubler. The use of the oscillator to drive a P.A. directly is to be deprecated; an intermediate stage should always be used, either as a neutralised buffer, or as a frequency doubler. The use of the intermediate stage as a frequency doubler in the place of a buffer is preferable as the likelihood of pull between the stages is greatly reduced.

The foregoing gives a fairly good idea of the essentials required, and it will readily be appreciated that oscillators such as the Hartley, Ultraudion, etc., are hardly suitable for the purpose.

The Unity Inductance Oscillator

During work on frequency meter design at G6PA many types of oscillator were tried, but the Unity Inductance Oscillator showed itself to be by far the best as regards stability, and in particular in its immunity from voltage changes.

The Unity Inductance oscillator employs a circuit in which an anode coil is very tightly coupled to a grid coil, with one of the coils tuned by a variable condenser.

When it was decided to change over from C.C. to Master Oscillator no reason could be seen why this type of oscillator should not be used for power work, and preliminary tests with the oscillator set up in a biscuit tin fulfilled all expectations. Reference to Fig. 1 will show that there is nothing unusual about the circuit. If a metal cabinet is used, and this is strongly recommended both for the M.O. and the succeeding stage, care should be taken in mounting the plate tuning condenser, as both sides of this are at positive H.T. potential. If possible a condenser with an insulated spindle should be used, but if this is not available recourse to the arrangement in Fig. 2 will overcome the difficulty, and this is to be preferred to the insulation of the rotor of the condenser from the cabinet. The valve should be separated from the coil and condenser by a partition in the cabinet. This arrangement prevents the possibility of frequency

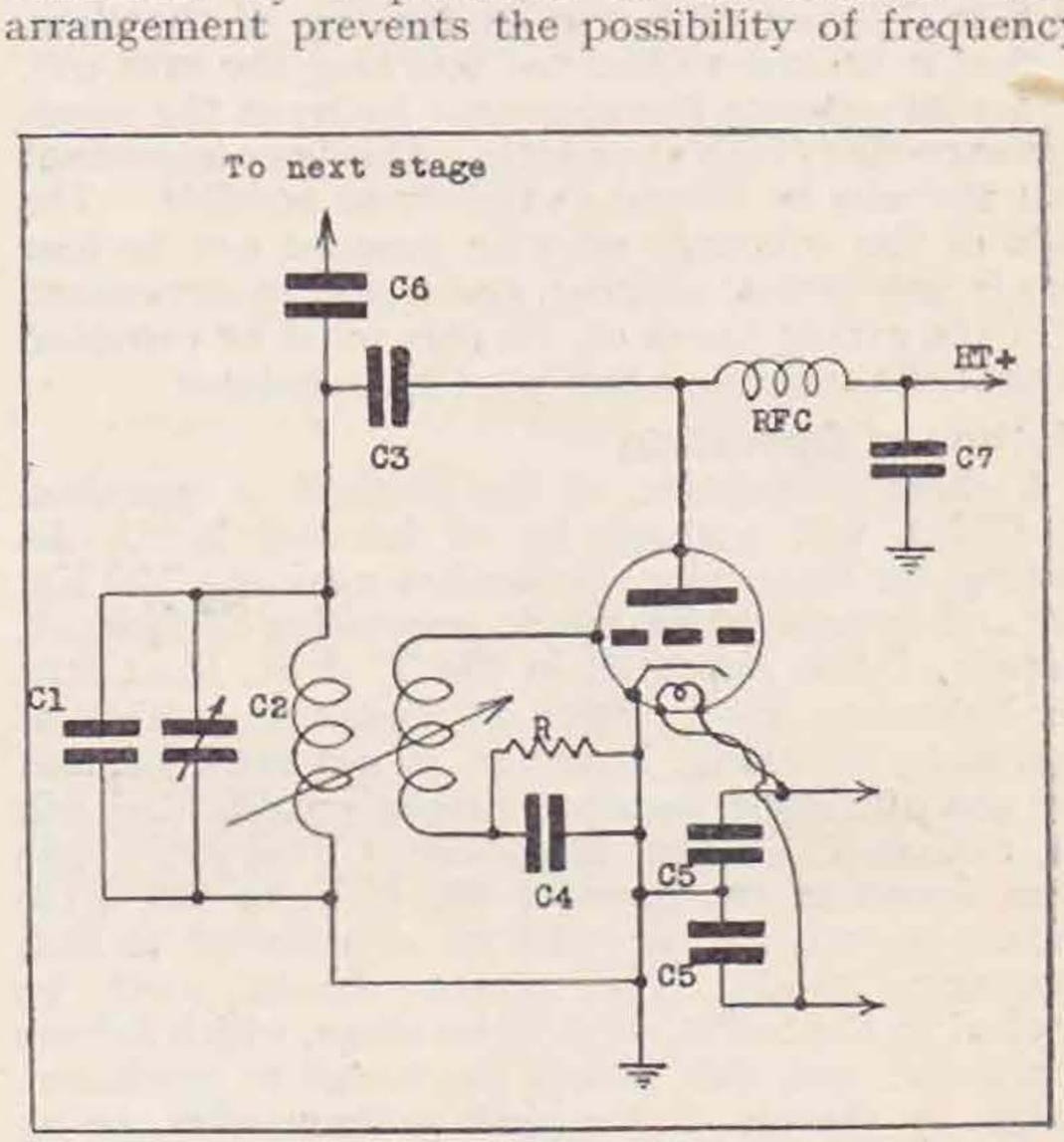


Fig. 3.

The Unity Inductance Oscillator for use with indirectly heated triodes.

C_1	.0003 mfd.	C_5	.01 + .01 mfd.
C_2	.0005 mfd.	C_6	.0003 mfd.
C_3	.0001 mfd.	C_7	.01 mfd.
C_4	.001 mfd.	R	20,000 ohms

The coils L1 and L2 may be wound as described in the text in connection with Fig. 1. With a mean diameter of 2.4 ins. and wound 5 turns per inch, they may be 18 turns each for the 1.7 mc. band and 9 turns each for the 3.5 mc. band. The variable condenser C2 will then be nearly all in for the 1.7 mc. band and nearly out for the 3.5 mc. band. It is admitted that this does not give good band spread, but allows the optimum capacity for efficiency and stability to be used for each band. Where operation in a single band only is required, the values of C1 and C2 could be so arranged to give very effective band spread.

drift due to the heat from the valve changing the constants of the tuning circuit.

Owing to the fact that the efficiency of a valve falls off considerably as the frequency at which it is operated is increased it is not a practical proposition to build a coil for fundamental work on 7 Mc., and therefore for 7 and 14 Mc. an oscillator operating on 3.5 Mc. is necessary. This in its turn makes necessary the use of one or two doubling stages, but it is considered that this disadvantage is quite outweighed by the gain in flexibility.

Throughout these tests valves of the LS5 type have been used as being the most suitable. With valves of this type the filaments can be switched on and off at the beginning and end of each transmission and very little frequency drift results subsequently.

It is not proposed to give full constructional details, as much must depend on the apparatus at the disposal of the constructor. In any case the only component which requires special construction is the coil, and it has been found convenient to wind this on ribbed ebonite former. The ribs should first be slotted in a predetermined manner as regards spacing and width and depth of slots, so that a grid circuit winding of enamelled wire of about 24 S.W.G. may be wound in the bottom of the slots. The anode coil is then wound with 16 S.W.G. enamelled wire in the top of the slots, so that it is close to but not touching the grid coil. In actual practice the clearance between the windings exceeds 1/16th of an inch. It is very important that the wire be wound as tightly as possible. The ends of the windings may be brought out to four pins in any desired manner, and a base to correspond with the arrangement of the pins must be provided so that the coils may easily be interchanged.

Method of Operation

A short description of the method of operation at G6PA will perhaps be of interest here. All settings for frequency are checked against a 100 Kc. bar and associated harmonic generating equipment. Details of this appeared in the T. & R. Bulletin for February, 1933. Such an elaborate method of frequency checking, however, is not essential, and the use of a good monitor, properly calibrated will be sufficient. When the desired frequency has been found in the monitor the H.T. to the drive should be switched on, and an adjustment to that frequency made. The power should next be applied to the buffer, or doubler stage, which follows the drive, and this should be tuned to resonance either by the aid of the plate milliammeter, or by the use of a flashlamp bulb and turn of wire coupled to the plate coil of the buffer. If the stage immediately following the drive is to be used on the same frequency as the drive, it will, of course, be necessary to neutralise that stage.

It is not proposed to describe the process of neutralisation here as it differs in no way from that required for any other driven set, no matter what the type of drive may be, and the man who cannot neutralise a C.C. set for instance should not attempt the operation of a transmitter such as this, which requires a certain amount of technical knowledge and skill.

Having neutralised the buffer stage, if it is not used as a frequency doubler, the P.A. H.T. may now be switched on and the plate tuning condenser adjusted in the ordinary way.

Listening in the monitor should give a good idea of the performance of the set, for as the P.A. plate tuning condenser is adjusted no change whatever in the frequency of the drive should occur. A slight pull between the drive and buffer may result when tuning these stages, but when the buffer is used as a frequency doubler there should be no pulling of the fundamental frequency at all. Should a bad pull occur at any stage during the proceedings it is almost certain to be due to either insufficient screening between the stages, or to poor neutralisation, the latter being the more likely.

It should be the aim of all well operated stations to cause as little interference as possible during the process of tuning, and providing the foregoing routine is closely adhered to the only signal that should be heard outside the station is the signal ready for use. The adjustment of the P.A. plate tuning and aerial tuning condensers should cause nothing but a variation in signal intensity.

Choice of Components

Perhaps it may appear somewhat out of place to say anything about design at this point, but the writers feel that due stress should be laid on the necessity for using only apparatus of rigid and reliable construction for the driving valve and its associated tuned circuit. In particular the use of fixed and variable condensers of reliable make is absolutely necessary as they will be carrying considerable Radio Frequency current, owing to the high C to L ratio of the tuned circuit, this high ratio being necessary in the interests of frequency stability. The use of a small coupling condenser from the drive to the succeeding stage is also very helpful in preventing frequency changes due to variations in the constants of the valve and its associated equipment in that stage. The value of .0003 Mfds. shown in Fig. 1 is ample.

There is also one other component which requires careful choice, and that is the grid leak. For preference this should be of the wire wound variety, but a resistance of the compound type, having a rating of at least two watts, should be satisfactory. During one period of test at G6PA considerable frequency drift was observed, and this was traced to the use of a metallised resistor of the one watt type as a grid leak. The inclusion of an HF choke and choice of another resistance effected a complete cure.

Comment on the buffer or frequency doubler and succeeding stages is unnecessary, these being in no way unusual. The D.C. version of this method of frequency control has been in use at G6PA for some five months or so now, and not once during that period has a true C.C. transmission been radiated. With one doubtful exception the reports have been pure C.C. at all times.

The Mains Supplied Oscillator

Experiments at G5YK, with an A.C. supply, were commenced using a similar circuit to that employed at G6PA. The oscillator proved very stable with an LS5 valve, but definite trouble was encountered in the use of A.C. filament supply, in spite of every care and the use of centre-tapped condensers and resistances across the filament. The note obtained was quite good and would have

been passed some years ago, but it lacked the purity of a battery-fed oscillator.

As the use of D.C. for the filament heating appeared a retrograde step, a trial was made with indirectly heated valves. Four types were available —a Mazda AC/HL, a Mullard 164V, an Osram MH4 and a Micromesh HL.A1. Of these the MH4 was undoubtedly the best. The HL.A1, in spite of its good paper characteristics, was troublesome. The Mullard and Mazda were satisfactory. It was found advisable to limit the H.T. voltage on the MH4 to 200v. and the valve then passed about 10mas. It was, of course, necessary to allow the heater to warm up for a few minutes and, in fact, to leave the oscillator running with H.T. applied until the oscillations became steady. It

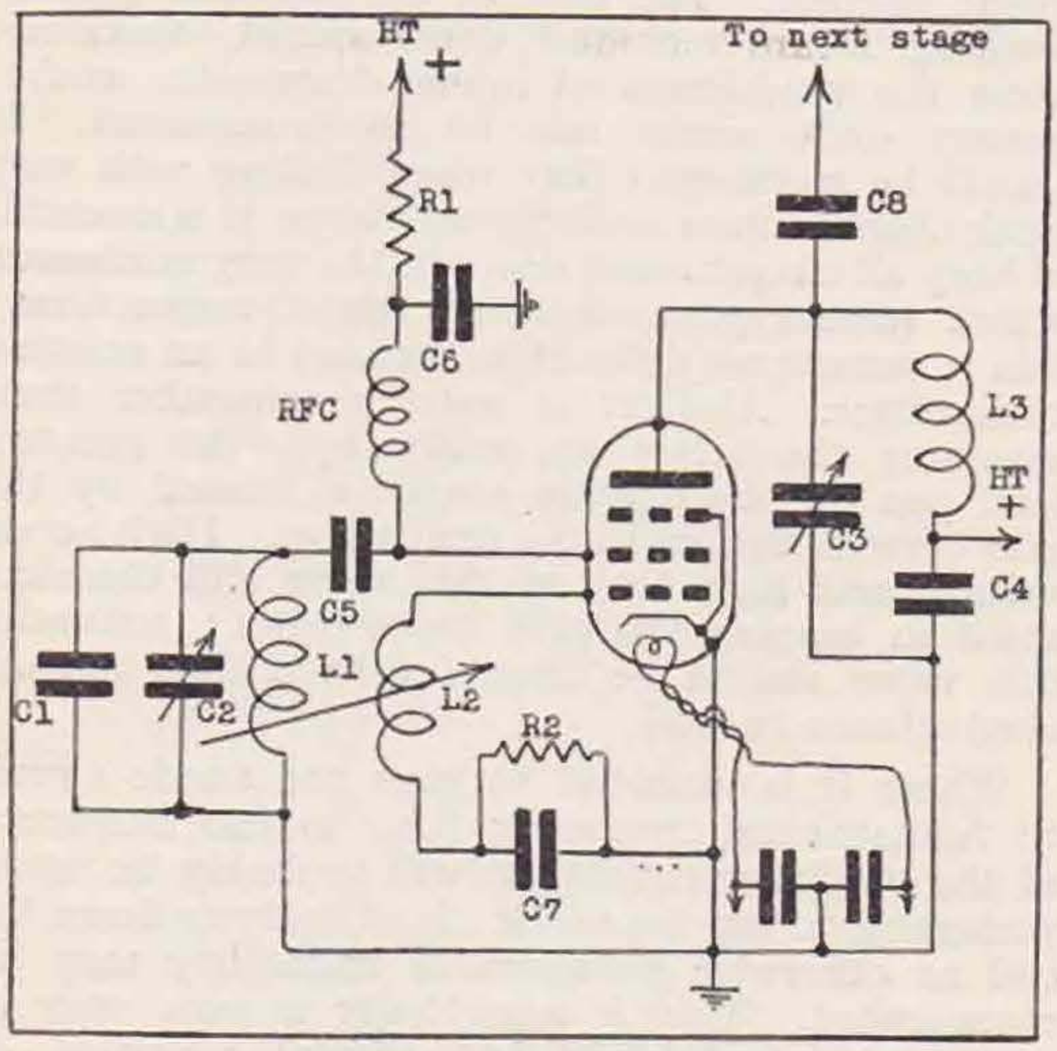


Fig. 4.

An Oscillator-Doubler Circuit for use with an indirectly heated pentode, MPT4 (Catkin).

C_1	*.0003 mfd.*	C_6	*.5 mfd.*
C_2	*.0005 mfd.*	C_7	*.001 mfd.*
C_3	*.0001 mfd.*	C_8	*.0003 mfd.*
C_4	*.005 mfd.*	R_1	*100,000 ohms*
C_5	*.0001 mfd.*	R_2	*20,000 ohms*

For coils L_1 and L_2, see Fig. 3. Coil L_3 may be of the usual construction and size for the frequency band required.

will be apparent that such a valve running at 200v., 10mas., is not being operated within conservative limits, which was a point stressed earlier. The measured frequency drift was too great during actual operation, as drifts of the order of 2kcs. on 3,500 kcs. were obtained. This does not compare favourably with crystal oscillators at such a low anode voltage, though for an anode voltage of 200 the R.F. output was definitely good.

The Catkin Oscillator

In searching for an indirectly heated valve which would withstand higher anode dissipation without showing the results of heating, it appeared that the "Catkin" type of valve would be very suitable. Accordingly an Osram MH4 (Catkin) was given a trial with greatly improved results. An anode voltage of 300 was used with an anode current of about 15mas. The frequency drift was now so small as to be unworthy of further attention.

The construction of the Catkin is of interest from the transmitting point of view. The anode is large and blackened to assist in heat dissipation, and there is very liberal spacing between the anode and other electrodes. The anode connection is not taken through a glass pinch in the usual valve construction method; instead, a wire connects the outer surface of the anode with the proper pin in the base. Should it be deemed advisable, this connection may be broken and a soldered connection made to the top of the anode. The cathode is quite safe for well over the 15mas. quoted above. It will be appreciated that owing to the size of the anode, considerable time will be required for the valve to warm to working temperature after first switching on. It is suggested that at least five minutes will be necessary before steady oscillations are obtained, though between transmissions the heater will suffice to keep the valve warm. There is obviously no need to employ a canistered valve.

The final circuit used for such an oscillator is shown in Fig. 3. The use of shunt feed for the anode has two advantages:—(1) it allows one side of the tuning condenser to be at cathode potential; (2) C_3 is in series with the anode-cathode capacity of the valve and therefore slightly reduces capacity changes across the tuned circuit caused by valve heating. The H.F. choke is a slotted one built for the purpose; for frequencies up to 4,000kcs. it is unnecessary to use single layer chokes, and those wound in slotted formers of small diameter are very satisfactory. The grid leak should be wire-wound. Further remarks concerning Figs. 1 and 2, especially as to best quality components, apply equally here.

The power output from such an oscillator was considerably greater than at first expected, and was in excess of that previously obtained from a crystal oscillator with 350v. on the anode.

Oscillator-Doubler Circuits

Much has appeared in the pages of journals devoted to Amateur Radio on oscillator-doubler circuits employing the E.C. oscillator principle with multi-electrode valves.

It will be remembered that some years ago Mr. Simmonds, G2OD, used an oscillator-doubler circuit for his crystal stage with a triode valve. Although excellent in Mr. Simmonds' hands this circuit did not always work satisfactorily when tried out elsewhere, and as a result such dual purpose circuits have not received much attention until recently.

QST has produced the Tritet Oscillator employing an H.F. Pentode and successful production of harmonics up to the fourth is claimed. Mr. Gay, in the BULLETIN, described an E.C. Master Oscillator Drive Circuit using a screened grid valve and obtained workable harmonics up to the third. Mr. Chorley has also described his experiments with pentodes in a circuit very similar to that used by Mr. Simmonds. No new principle is therefore claimed with the oscillator-doubler described here, but it is felt that a little more publicity given to a very useful arrangement will assist other amateurs.

It is intended to describe the final arrangement first, and to follow that with mention of other experiments, both satisfactory and unsatisfactory.

The Use of a Pentode

The oscillator-doubler circuit in its final form at G5YK is shown in Fig. 4. The valve is an MPT4 (Catkin). This is an L.F. pentode rated at 250 v. anode, 32 mas., 200 v. screen, 8 mas. and fitted with an indirectly heated cathode for A.C. mains operation. The suppressor grid, nearest the anode, is connected internally to the cathode.

It will be seen from Fig. 4 that the arrangement is best considered as two circuits, an oscillator portion operating between cathode, control grid and auxiliary grid (the latter being treated as an anode), and, screened from this by the suppressor grid, a tuned anode circuit for obtaining the harmonic.

The construction of the oscillator follows, in general, the details given earlier for a triode oscillator, the exact values of the components being in the key below the circuit. The coil is constructed on ribbed former in the manner already described. The tuned anode circuit (L_3C_3) is built with good quality components as considerable voltages are applied to this circuit. It was not felt that any advantage would be gained from the use of shunt feed here and series feed is accordingly used.

No external screening has been used though in actual practice the stage following the oscillator-doubler (whether it be a buffer or a further doubler) is built into a screening box. As regards the valve, the external connection between the anode of the Catkin and the valve pin in the base of the valve was removed and a connection taken from the top of the anode direct to the tuned circuit. It was felt that, otherwise, the accidental coupling in the base of the valve might cause unnecessary feed-back. Furthermore, the insulation in the base was never intended to work under high H.F. potentials.

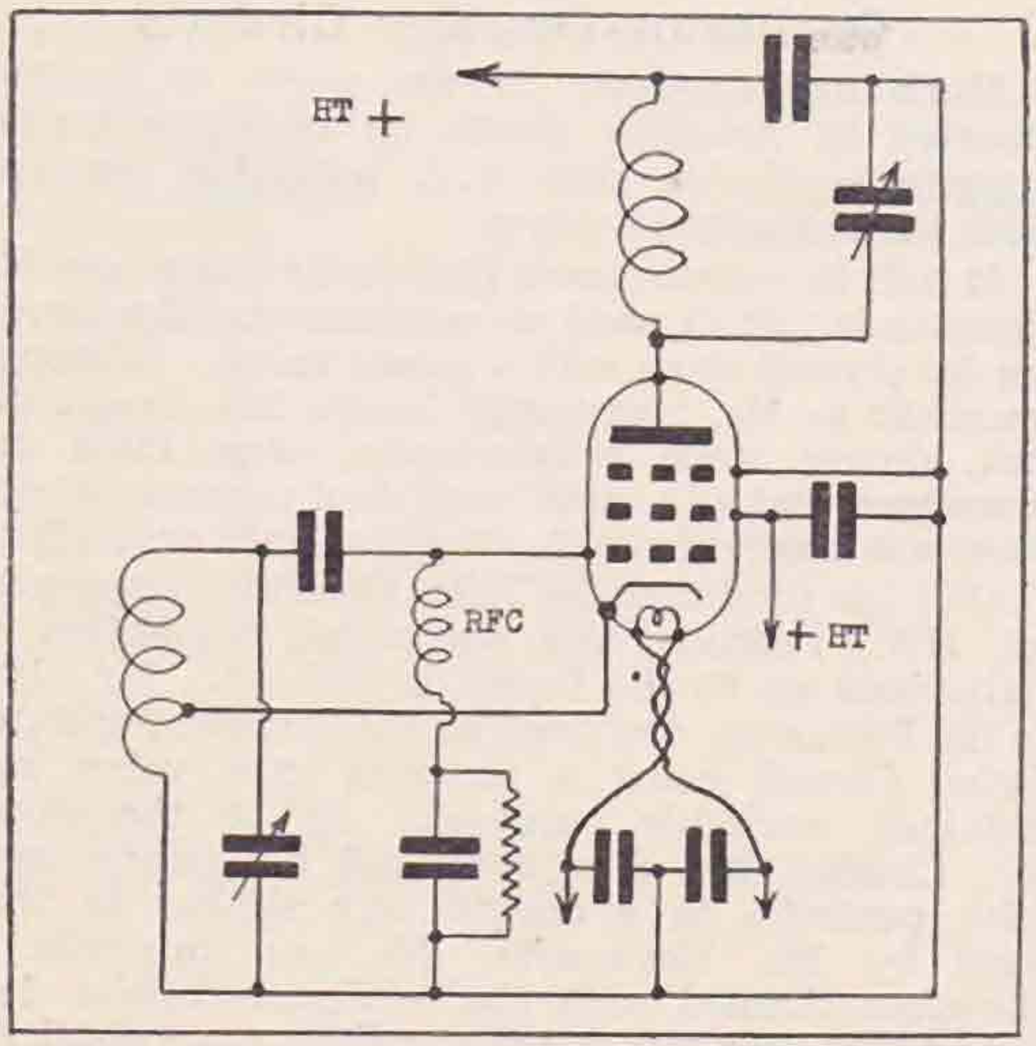


Fig. 5.

A useful Oscillator-Multiplier Circuit using an indirectly heated H.F. pentode (MSP4), in which the suppressor grid is brought out to a separate pin. Note the more usual type of E.C. oscillator circuit that can be used.

Harmonic Output

In operation harmonics up to four times the oscillator frequency have been obtained at fairly good strength, though the third and fourth harmonics were much weaker than the second. Harmonics higher than the second have not been utilised for transmission purposes, partly because to suit the other apparatus at G5YK the third and fourth harmonics would have required immediate amplification. It was therefore found more desirable to aim at a very strong second harmonic employ interchangeable coils for both parts of the circuit and use further doubling stages where necessary. By working the valve at high efficiency it ran cooler with, consequently, less frequency drift. The production of third and fourth harmonics caused high anode dissipation with consequent heating. The case of an oscillator-doubler working from a crystal drive might, therefore, allow the production of higher harmonics as frequency drift would not be so pronounced. It should be mentioned that when dealing with very weak outputs from multiplying stages, it is essential to keep all circuit losses down to the very minimum, which means primarily very short connections; this is sometimes difficult to arrange in an existing transmitter. Also, it is well to remember that, assuming the losses are really low, the greatest load put on the driving circuit is caused by the grid current flowing in the next valve. High anode voltage and high bias on this valve will therefore assist in keeping the grid losses down; naturally this valve should be chosen with a high mutual conductance as well.

Where it is intended to tune the anode circuit to fundamental frequency (i.e., to the frequency of the oscillator circuit), it will probably be found preferable to tap the anode about halfway down the coil as otherwise considerable instability may be experienced. This is admittedly a poor way of overcoming instability and careful screening or neutralising is definitely preferable. As, however, there is no point in using a pentode in such a circuit for fundamental control, this condition of operation would probably only be required in emergencies, and under such circumstances the cure mentioned above is permissible.

At G5YK the oscillator-doubler and any further buffer or frequency doubling stages are operated from a 500v. supply. This voltage is applied to the anode circuit of the MPT4, the voltage for the auxiliary grid (anode of the oscillator circuit) being obtained from the same supply through a 100,000 ohm resistance. This grid then draws about 3 mas. and the anode about 20 mas. Although considerably overrun as regards anode voltage it will be seen that the milliamps are kept well down. The power to the auxiliary grid should be kept as low as possible so that there will be less tendency for frequency drift in the associated circuit. The remarks about the construction of the MH4 (Catkin) as a transmitting valve apply equally well here.

Variations of the Original Circuit

The use of the usual form of E.C. oscillator with a single tuned coil operating between control grid, cathode and earth as shown in Fig. 5 is unsuitable when using the MPT4 (Catkin) as the suppressor grid, being connected internally to the cathode, is

not at earth potential and therefore is useless as a screen. The efficiency of the *oscillator* circuit as shown in Fig. 4 is quite as good as that in Fig. 5, the only disadvantage of the former being that slightly more complicated coil construction is required.

The H.F. Pentode, Osram MSP4, is so constructed that the suppressor grid is brought out to a separate

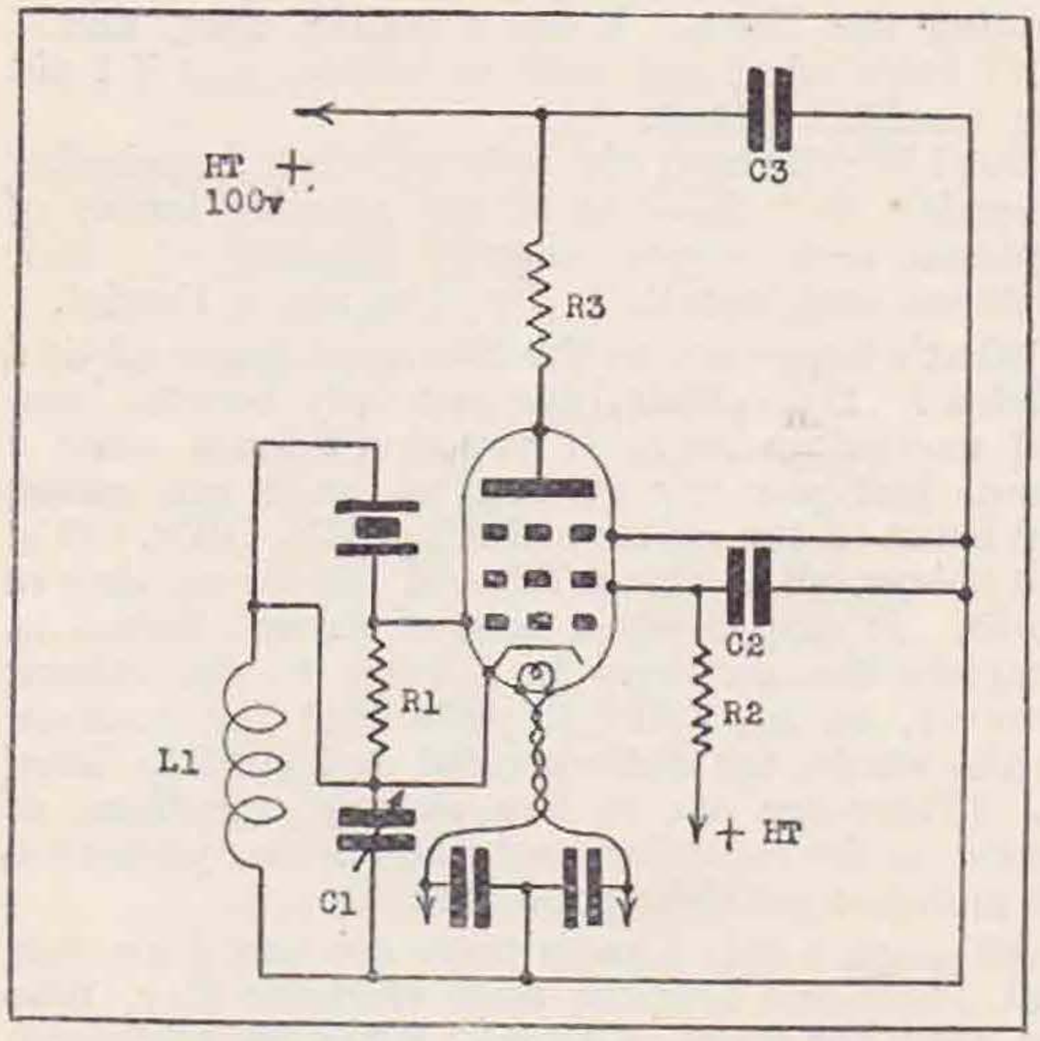


Fig. 6.

A modification of Fig. 5 especially applicable to crystal frequency standards, using 100 kc. bars. L_1 C_1 is to tune to the frequency of the crystal. The leak, R_1, may be 2 megohms, or be omitted. Resistances R_2 R_3, 50,000 ohms each. Condensers C_2 C_3 .01 mfd. each.

pin. Made for use in E.C. oscillator circuits in super-heterodyne receivers, this valve would appear to offer possibilities for oscillator-doubler E.C. circuits. A number of tests were made with such a valve in the circuit shown in Fig. 5, and the power in the higher harmonics, in relation to that in the second was better than obtained with the MPT4. It was not, however, deemed safe to operate the valve at such high powers as the Catkin was run at, as severe heating took place with the inevitable frequency drift at anode voltages much in excess of the makers' rating. For a lower power oscillator, however, where the oscillator is crystal controlled, or where the power taken by the valve is well within its limits, the MSP4 will be found very suitable for the production of high harmonics.

The MSP4 operating with a 100 kc. bar as frequency standard in the circuit shown in Fig. 6 will be found admirable and able to produce, literally, a flood of harmonics at every 100 kc. well up to 15,000 kc. when sought for in a short wave receiver. As this article is not intended to deal with frequency standards, it is not possible to go into greater detail.

Having discussed the merits of two types of Catkin valves in oscillator circuits, there remains to draw attention to the MH4 (Catkin) as a frequency doubler. With anode voltages up to 400 and suitable leak, or bias and leak, this valve showed great promise as a doubler. The available emission of the cathode appeared suitable for operation at 20-25 mas. and no evidence of deterioration was noticed after many hours' use, though an actual life test was not carried out.

The authors hope that the details of their experiments will be helpful to others pursuing a similar line of study. It has only been possible to touch on the design of stable valve oscillators and oscillator-doubler circuits, and there is no doubt that considerable work remains to be done. The authors look forward to reading in the BULLETIN the results of work by other amateurs on similar lines, and they anticipate that those stations equipped with frequency measuring apparatus will not fail to appreciate the advantages of variable frequency drive to transmitters especially on the low frequency bands.

Helpful Hints (*Continued from* 430)

output peaks if the excitation swings very far into the saturation curvature region.

Some amateurs believe that it is worth while extracting the last ounce of power from the amplifiers by overexciting and driving well beyond the limit F into the downward drooping portion of the characteristic. The diagram shows the fact that no great increase in power can possibly come about, in spite of the " straightening " out effect of a good tank circuit, which tends to smooth out the dip in the output peaks, so brought about. There is another point shown by the operation of Class " C " amplifiers. If the tank circuit is of good design and low loss, the efficiency of the valve can be raised to tremendously high figures by biassing still further back than point C and by increasing still more the excitation to account for the longer grid base which is automatically formed. However, the overall amplification ratio falls correspondingly, and the nett result is probably a compromise only since so much more power is naturally needed in the driver stage. The visible effect of driving into the positive regions of grid current is increased loss at the driver anode, and it is again rather a question of robbing Peter to pay Paul! The features of Class " C " are high efficiency and output but low amplification.

General Notes.

A rough guide as to how bias values should be selected may be useful. For Class " A " the bias value must be between zero grid volts and the commencement of the bottom bend curavature—half way precisely. For Class " B," bias is approximately cut-off value. This is found experimentally for the chosen working anode voltage or calculated by dividing the working anode voltage by the amplification factor of the valve. For Class " C," the working bias is generally twice cut-off or more, but scarcely ever less.

The exciting voltages needed must be guessed from the curves in accordance with the rough guide shown in the diagram.

A. E. L.

SOLILOQUIES FROM THE SHACK.

By Uncle Tom.

(*Ruminating on the day, 84 years ago, when* he *was twenty-one, the old man pulls a sad face—and* what *a face !*)

WELL, well ! So we've grown up at last ! Twenty-one years of age is no mean span in these days of come-and-go societies, and organisations of all kinds that die a premature death.

We all knew that the dear old R.S.G.B. would not be one of them—but, then, you can't really begin to talk big and reminisce until you're past that fatal twenty-one mark.

Now we've got the key of the door (never been twenty-one before !)—let us all sing the Refrigerator Song. You know, *Freeze* a jolly good fellow, *freeze* a jolly good fellow, and so on. *And* so say all of us, *and* how.

Now then, all you young squirts. The R.S.G.B. has Grown Up. What a grand and glorious idea it would be if some of her members would grow up, too. What a lot of irresponsible children some of them are—old and young alike. Your dear old Uncle is all in favour of keeping the unsophisticated, clean, child-like mind, and so forth, but what about the old behaviour, eh ?

What about dropping your idea of radio as a nice, jolly game, and getting down to it in earnest ? What about cutting out formula—QSO's, QSL-madness, DX-Itch, Spichitis and Contest-Mania ? For these are all childish diseases, like measles and whoopee (no, whoop*ing*) cough.

Will everyone that reads this (yes, both of you !) please put his hand face downwards on the opposite page, and swear this solemn swear with me ? (Come on Birmingham ; buck up, Yorkshire ; NOW THEN, South London, you need it most of all !) "I, Adolphus Clarence Oswald Pillworthy (hereinafter known as G. Ham) do solemnly swear (yes, your uncle's swearing, too) that henceforth I will endeavour to the best of my ability to put away childish things ; to act as a member of the Oldest Radio Society should ; to uphold the honour of the said society on the air and in the post ; to behave generally as a decent citizen ; and *never* to say *dear, dear ob ob* to anyone."

Got that ? Right ? And by all that's awful, including the Blitzenheimer and the Gugglespitz, my own instruments of torture, if I hear any more displays of childishness on the air I'll chase their originators to the ends of the earth and flay them alive.

Here's the Month's Great Thought. A reader of mine suggests that the publishers of the Call-Book should be asked to mark the calls of all those stations that don't QSL with an asterisk. My dear man, there simply aren't enough asterisks in the World. Every ham might be described as not QSL-ing, because generally the lapse is due to an oversight. Some poor simps make more oversights than others.

By the way, my Fan Mail is getting quite big. I wonder how that rumour that I'm a YL got round ? But please, please, don't write and tell me that this is the first page to which you turn on opening the Bull. I don't believe that, and I don't know what you want to borrow, and if I did you wouldn't get it.

But I like the man who tells me, when I am feeling miserable, to "think of all my growing family of nephews and nieces, eagerly lapping up their medicine each month." No, I'm not a Fascist.

What's happened to the European hams all of a sudden ? Have their beds suddenly become hard and uncomfortable ? If you don't know what I mean, just *you* try getting up at 6 ack emma and listen to the welter of PA's, OH's, OK's, ON's, and things, all working W6 and K6 for all they're worth. It only needs a spot of French Spitch to complete the picture. In fairness to the others, however, let me make it plain that the stations, on the whole, are well-operated and good to listen to. (There are one or two glaring exceptions, of course, as the comedian said when he complimented his audience on their good looks.)

Although I didn't know there *was* one, I am told that There was a young Ham of Herne Bay, Who slid down the stairs on a tray ; When he went down with mumps, He had *two* lots of bumps, And they say that he's funny that way.

Then, of course, quite a long time ago, There *was* a transmitter in Gloucester, Who went out with his YL and loucester ; He came back all alone, And exclaimed with a groan, Now what the dickens d'you make of that one ?

But enough of these foolish rhymes. I must remember that I'm no longer addressing an audience of children. Let us talk of more serious things. For instance, South London, once more. Why the ???? couldn't South London muster up enough active hams to run a station on N.F.D. ?

Heaven knows it wasn't the D.R.'s fault. He had only one offer of support, and for a busy man that simply ain't good enough. Of course, *thousands* of hams would ooze along on the day and operate the transmitter for him, so long as he did all the donkey-work of building it.

South London, you're the sticky limit, you are really. Goodness knows what we're going to do about you. A fusion with East London wouldn't be a bad idea—ask G6UT about that ! !

Speaking as one who has been closely connected with radio for eighty-four years, I can truthfully say that I have never yet met such a durned lazy crowd of 'erbs.

I understand that R.E.S. has kicked off well. Let's hope that none of the childish brigade will start spoiling *this* show. How many times have I heard of Letter Budgets being ruined by people who either held them up or didn't contribute to them ?

Anyway, here's good luck, R.E.S. ! Starting in the 21st year of the Society, may you be still flourishing when the 42nd comes round.

BOOK REVIEWS.

RADIO ENGINEERING. By Frederick Emmons Terman, Sc.D., Associate Professor of Electrical Engineering, Stanford University. 688 pages and 418 illustrations. Price 30s. net. Published by McGraw-Hill Publishing Co., Ltd., London.

This is very definitely a book of outstanding merit in both material and treatment. It contains much original work which is now published for the first time. In this respect may be mentioned the universal resonance curve, from which the exact ratio of actual current to current at resonance, as well as exact phase angle, can be determined for any series circuit in terms of the fractional deviation of the actual frequency from resonance. The same curve can be used to determine the ratio of actual impedance to impedance at resonance for parallel circuits.

Other original work includes Class A power amplifier formulæ, analysis of Class B, analysis of regeneration in amplifiers, analysis of input admittance of amplifiers, treatment of voltage and current relations in screened-grid valves, and an approximate analysis of rectifier-filter systems having a shunt condenser across the filter input.

The book deals in the early chapters with the theory of tuned circuits, and the fundamental properties of valves and their applications. It is assumed that the reader has a knowledge of the fundamentals of alternating currents and little space is devoted to introductory matter.

A justifiably long section deals with high and low frequency amplifiers of every kind, the treatment being thorough and concerned in detail with the performance and design. Outstanding items in this section are Class A, Class B and Class C, and also push-pull arrangements.

Another very useful section deals with oscillators and here, as throughout the book, the treatment is from an engineering standpoint, and concerned mainly with the design and characteristics of various types. Particular attention is paid to practical circuits of high frequency stability, and circuit proportions are given for all types which will ensure that the generated frequency is practically independent of the valve constants. Crystal control, the multivibrator and Barkhausen oscillations are also covered in this section.

Amateur experimenters will find much of interest and immediate value in the chapters dealing with aerials and propagation. In the former the reader will find data on the directional characteristics of both vertical and horizontal aerials of the type in general amateur use. In particular, the directional characteristics of horizontal aerials at various heights above the ground are sure to interest the amateur.

Other sections deal in considerable detail with detectors, power sources and filters, receivers, transmitters, modulation, directional work, radio measurements and sound equipment.

The treatment throughout is up to date and historical matter is entirely absent. Mathematical manipulations are reduced to a minimum. Unnecessary equations are avoided, so as to prevent confusion and to emphasise the important mathematical relations by virtue of their standing nearly alone. The result is a book which will have an instant appeal to engineers, amateur or professional, and the reader who wishes to delve deeper into any section of the subject is provided with multitudinous references in the form of footnotes.

It is rarely that a book of such merit appears, and the reviewer would be failing in his duty to readers if he did not emphasise very decidedly its practical value to radio experimenters.

T. P. A.

ELECTROMAGNETIC WAVES. By F. W. G. White, M.Sc., Ph.D. 105 pages, 26 diagrams. Published by Methuen. Price 3s.

This little book is a welcome addition to the series of "Monographs on Physical Subjects," and should be of particular interest to members of R.E.S. and others concerned with propagation of wireless waves problems, a concise account of mathematical methods involved in the study of an ionised medium having been long overdue.

The classical electromagnetic equations are clearly developed from first principles, leading up to the Lorentz theory of dispersion by charged particles, reference being made to the optical properties of metals and diffraction of X-rays; dispersion theory is extended to take account of the effect of a magnetic field on the charged particles.

A final chapter dealing with wireless waves in the earth's atmosphere is of course, of especial interest, a concise summary of the nature of the ionosphere, methods for determination of equivalent height, polarisation effects, etc., being given.

The book is intended for "readers of average scientific attainment," knowledge of vector analysis being assumed; of outstanding use is the large bibliography of references to original papers dealing with the ionosphere, the price of 3s. is surely a very modest one.

A. T. M.

DER KURZWELLENSENDER. (The Short-Wave Transmitter.) By Dipl.-Ing. F. W. Behn. 148 pages, with 130 illustrations. Rothgiesser and Diesing A.G., Berlin, N.24., Linienstrasse 139/140. Price R.M. 6.80.

This book, which is in German, deals exhaustively with the short-wave transmitter and was written as the result of actual experiences on the part of the author.

The first two chapters are devoted, respectively, to some of the fundamentals of electricity and the theory of the valve. After that the author plunges straight into his subject and reviews it from almost every aspect that concerns the amateur transmitter. Other chapters worthy of note are those dealing with the screened-grid valve in the transmitter, neutralisation and crystal control.

Although the book appears to contain little that is outstandingly new, it should prove to be of considerable interest to anybody who is desirous of acquiring a knowledge of the fundamentals underlying short-wave transmission.

Appended to the book is a list of Telefunken transmitting valves and their characteristics.

M. W. P.

STATION DESCRIPTION No. 41

G2DQ

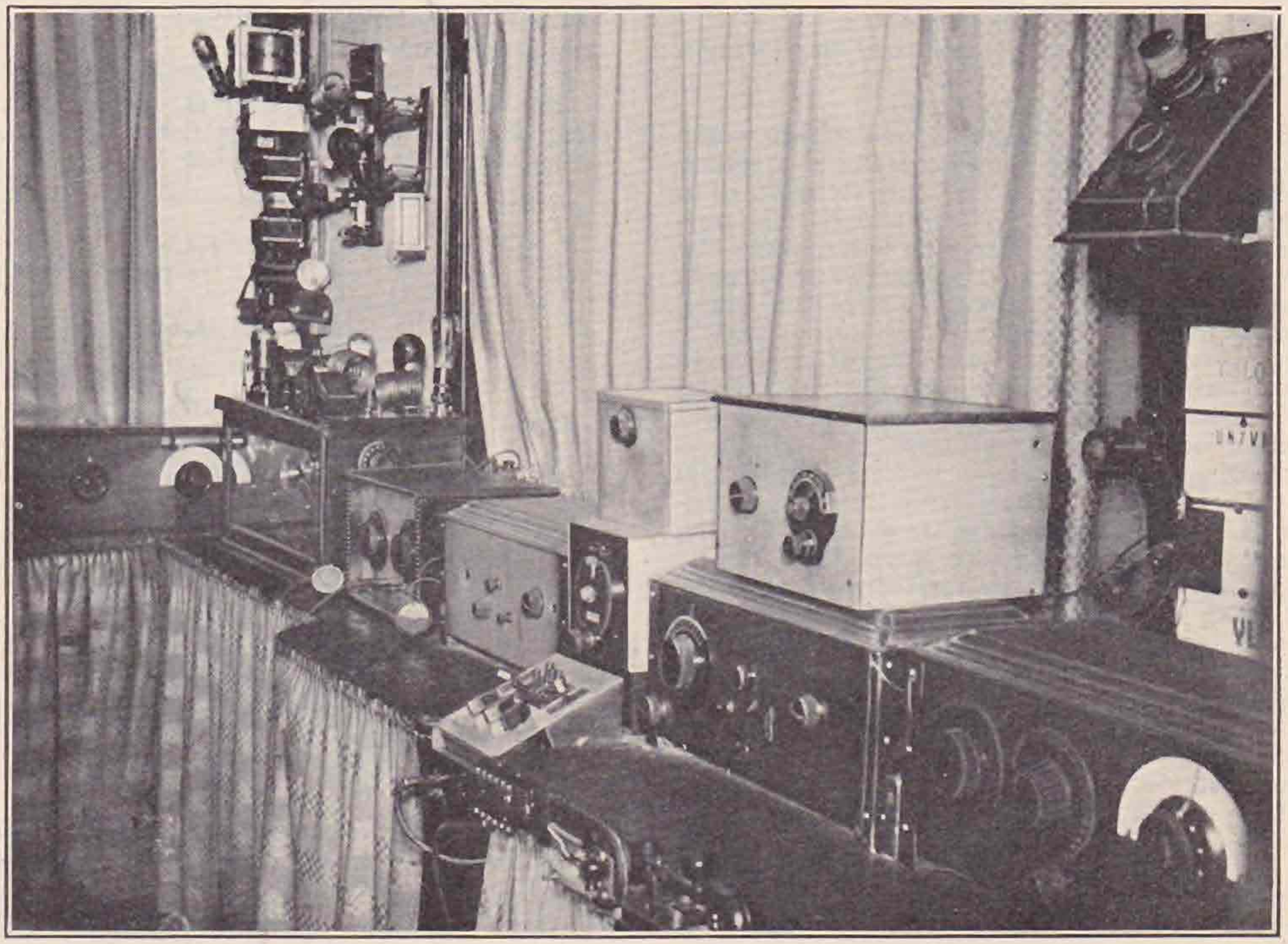
By G2YI.

G2DQ commenced his radio career as far back as 1920 when a crystal set was constructed for the reception of Eiffel Tower transmissions. With this he obtained one great thrill, for it was on this set he heard Dame Nellie Melba singing from Chelmsford, about ten miles away. Up to that time he had been under the impression that a crystal set would not receive telephony!! In 1924 with his Morse code test passed, he obtained his first experience on the air as operator of G2FV; in those days a Marconi T15 valve was used, and high tension derived from two Ford coils with 30 volts on the primaries.

In 1926 this gear was sold and the operator took unto himself a YF, but the ratio "bug" began to bite again and three years later G2DQ was born.

The present station is housed in a special room ideally arranged for amateur work, having plenty of light and a high elevation. The outstanding features noticed are the number of ingenious devices used in order to facilitate rapid operating. The whole of the transmitting equipment is controlled by a series of relays, whilst remote control switches enable the operator to put the station into operation from various parts of the house.

The 1.7, 3.5 and 7 mc. bands are all in use and, as is well known, considerable success has been achieved. The various stages forming the transmitters are constructed in separate metal boxes, and these include speech amplifiers, power amplifiers, crystal oscillators, monitor, etc. An electron coupled oscillator has been recently put into use with great success.



G2DQ—WICKFORD, ESSEX.
Leading Station in 1.7 and 3.5 mc. Contests during 1934.
Electron coupled oscillator is contained in cabinet on extreme left. Note paper scales on tuning dials of receivers

Mr. Collin is a great home constructor and many of his ingenious gadgets are undoubtedly responsible for the successes he has obtained in Contests. An endless tape running over a rotating drum is employed for sending test calls, this is operated at varying speeds by sewing-machine motor.

The receiving equipment consists of a 7-valve super het. and a 3-valve straight receiver, which are

(*Continued on page* 446.)

HELPFUL HINTS.—No. 7.

THE THREE CLASSES OF AMPLIFICATION.

IN modern radio practice, whether amateur or commercial, there are three distinct methods by which valve amplification can be brought about, and they have been termed Classes A, B and C by the Institute of Radio Engineers.

It is not essential that every amateur should know them by these names, but it will be useful to remember them when reading technical matter in which the nomenclature appears.

Most amateurs DO know the meaning of the terms, but the material below and the diagram will be helpful in refreshing the memory of those who wish fully to understand the meanings.

Let us deal with the three classes of amplification in their rotation.

Class " A " Working.

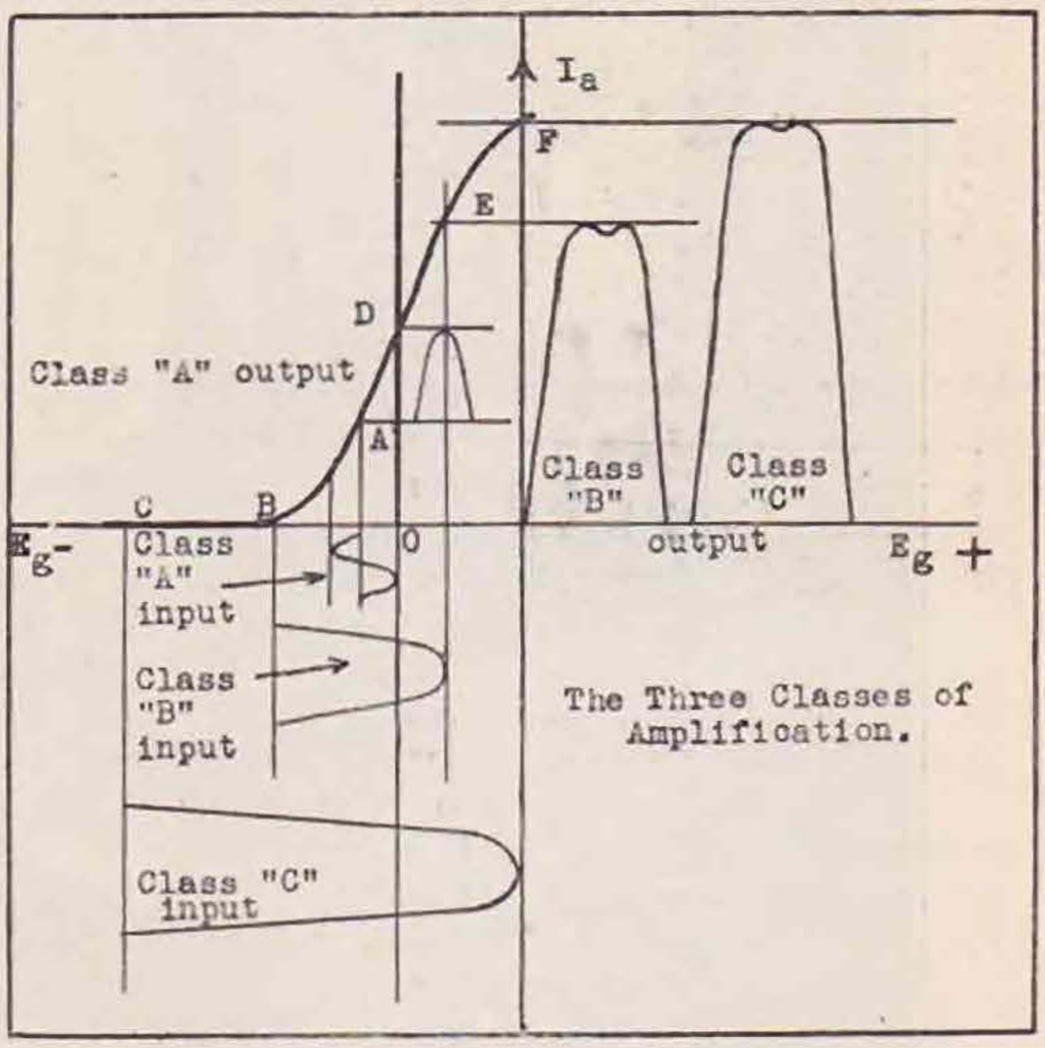
The Class " A " amplifier is one which works alone and serves the purpose generally of a speech magnifier or modulator. The output valve of a broadcast set is a Class " A " amplifier. The output is approximately a pure sine wave, when the input is pure, That is to say that the amplifier is " linear." Examining the curve CF of the figure, we notice that the amplifier is only approximately linear between B and E. If we allow the input wave shape to swing the grid of the valve between B and E, it will allow positive grid current to flow—and distortion occurs. So that Class " A " amplifiers cannot swing further than E_g = zero. Also the bottom bend curve of the characteristic introduces distortion and the grid must not be allowed to swing so far negative as to encroach upon this. Hence, all Class " A " amplifiers are limited roughly to the input wave amplitude shown on the figure. The bias on the grid is fixed on the line through the point A. The projections from A and D give the limits for the peak amplitudes of the output. The especial features of the Class " A " amplifiers are constant anode current, high ratio of power amplification but low efficiency on account of the fact that the positive region of the grid base cannot be used.

Class " B " Working.

The Class " B " amplifier may work alone or in push-pull. Alone, it is a linear Radio Frequency amplifier following a modulated amplifier. In push-pull it can be effectually employed for the same purpose or for a speech magnifier such as the output stage of a receiver or alternatively as a modulator. Correctly employed it is virtually linear. It operates between cut-off point B on the characteristic curve and E, the commencement of the upper curvature. However, it differs essentially from Class " A " by having its bias set at point B such that one half-cycle of the exciting voltage does nothing to alter the anode current and merely swings uselessly into the negative cut-off region. This causes the anode current of the amplifier to fall to zero over the period of alternate half-cycles and also when the excitation is entirely removed, and the power in the anode circuit to vary directly with the exciting amplitude. When valves are used in push-pull the other half-cycle of the excitation is employed to swing the opposite valve. It is seen that the output is much greater than that obtained from Class " A," but that the input is also much greater. The efficiency is clearly improved for two reasons: (*a*) when the valve is used as a linear R.F. amplifier excitation is only needed on alternate half-cycles and use is made of the energy remaining in the tank circuit for the remaining half-cycle of the output wave shape: (*b*) use is made of the whole linear range of the curve with naturally much higher output. The especial features are medium efficiency—on account of the higher excitation needed—considerable relative output power, a low relative power amplification.

Class " C " Working.

The Class " C " amplifier is essentially a radio frequencey power amplifier generally used for telegraph transmitters. It is not linear as it works



between cut-off and upwards nearly to the filament saturation limit. Its bias is generally double that of Class " B " and the excitation is proportionally greater—swinging right from C to F in the curve shown.

The object accomplished is the development of full power only during the passage of quite a small part of the exciting voltage and only during alternate half-cycles. Hence, the output wave is considerably distorted, not free from harmonics, but is essentially sinusoidal and therefore can be modulated. It would not be used, however, as an amplifier following a modulated stage. Class " C " amplifiers may be used in push-pull for C.W. or for telephony when they themselves are directly modulated.

The bias is set at the position C as shown and it is seen that the excitation needed is very large compared to Class " B." The output, however, is greater, although there is a little flattening of the

(*Continued on page* 425.)

RESEARCH AND EXPERIMENTAL SECTION

MANAGER :

H. C. Page (G6PA), Plumford Farm, Ospringe, near Faversham, Kent.

GROUP MANAGERS :

No. 1 : 1.7 and 3.5 MC. WORK
J. B. Hum (G5UM), 68, Bridge Road East, Welwyn Garden City, Herts.

No. 2 : 56 MC. WORK
E. A. Dedman (G2NH), 63a, Kingston Road, New Malden, Surrey.

No. 3 : ARTIFICIAL AERIALS
J. K. Todd (G2KV), 12, St. John's Road, Cambridge ; and Orchard Place, Wannock, Polegate, Sussex.

No. 4 : ATMOSPHERE AND FADING
J. C. Elmer (G2GD), Aethelmar, Seabrook Road, Hythe, Kent.

No. 5 : TELEVISION
C. W. Sands (G5JZ), Springfield, Heathfield, Sussex.

No. 6 : CONTEMPORARY LITERATURE
R. A. Fereday (PAOFY), Reinkenstr, 40, The Hague, Holland.

No. 7 : RECEIVER DESIGN
E. N. Adcock (G2DV), 31, Churchill Road, Little Bromwich, Birmingham.

No. 8 : TRANSMITTER DESIGN
A. E. Livesey (G6LI), Stourton Hall, Horncastle, Lincs.

No. 9 : AERIAL DESIGN
F. Charman (G6CJ), The Cottage, Park Way, Hillingdon, Middlesex

No. 10 : VALVE RESEARCH
D. N. Corfield (G5CD), 10, Holders Hill Gardens, Hendon, N.W.4.

No. 11 : 28 MC. WORK
(Manager to be appointed.)

H. C. Page (G6PA). Manager, Research and Experimental Section.

ONCE again I have to report steady progress in the organisation of the Section. This type of work takes a great deal of time and energy, and you must bear with me and my Group Managers if things do not seem to be going along as fast as you expected. The Group Managers now have lists of nearly all those who have entered their names for work in various groups, and in nearly every case the G.M. concerned has sent a personal or circular letter to everyone on the list I have given him. It is rather disappointing to learn from some of the G.M.'s that their circular letters have not been replied to. If some of you cannot even take the trouble to help the G.M. to place you in a suitable group, goodness only knows what sort of work you are going to turn in each month, and remember, after three months' failure to report, you will be struck off the lists. (Rule 18.)

Now a word or two to the individual members, who, I am afraid, have had rather a dull time so far. A list is shortly to be prepared showing the subjects you are interested in, and each I.M. will receive a copy. This will enable members to get in touch if they so wish. The production of such a list takes time, however, and time has been rather scarce here just lately, so once again I must call upon you to exercise patience.

The next matter concerns our Colonial members, and those some way away from this country. Owing to the fact that the group system almost entirely depends for its success on the quick circulation of a letter budget each month, and that this budget has to go around six members during that time, it has been decided that all Colonial members must join R.E.S. as Individual members. Those of us who are responsible for the organisation of R.E.S. have given this point full consideration, but have not been able to find any better solution, and it is with extreme reluctance that we make this rule. The only exceptions are those foreign members who reside in the near Continental countries.

A few words to those who are joining a group, or groups. You are expected to send your G.C. a report each month without fail. Now we all know that no one is able to turn out brain waves each month to order, and therefore some months you will have very little of real interest to report. That being the case, do not be upset, annoyed or disheartened because your name does not appear in the notes that month. The notes are only intended to record the points of interest each month, not your every-day work. I mention this as it is already apparent to me that kind-hearted Group Managers are trying to please all, and make " bricks without straw," and to me as Manager falls the unpleasant task of casting forth such material, a process which pleases nobody concerned.

There is just one other point which I think it will be well to mention. On going through the application forms already received, I notice that quite a number of members have put themselves down for more than one section of R.E.S., in fact, in some cases as many as five sections have been named. Now some of us have more spare time than others, and others are better qualified to undertake extra work, but I would like to suggest that it is better to do a little well than rush at several subjects, and achieve little. Please do not think for one moment that I am trying to discourage anyone, but I do feel that if a member is going to take part in four or five letter budgets each month, and honestly try to absorb their contents, he will have his time fully occupied. Just look at rule 13 and realise what that means ! Anyway, if you are not yet a member of R.E.S., and are thinking of joining, please give the above comments your earnest consideration.

1.75 and 3.5 MC. Group (No. 1).

Group 1A.—Aerial problems on 1.75 mc. are still the major source of interest in this group. G5FI has been making successful attempts to obtain omni-directional radiation with a quarter-wave

antenna. The addition of a counterpoise is expected to increase directional effects, so a new feeding system is being evolved to counteract them.

As promised earlier, we give a description of the all-band aerial used by G5RX. Our diagram shows

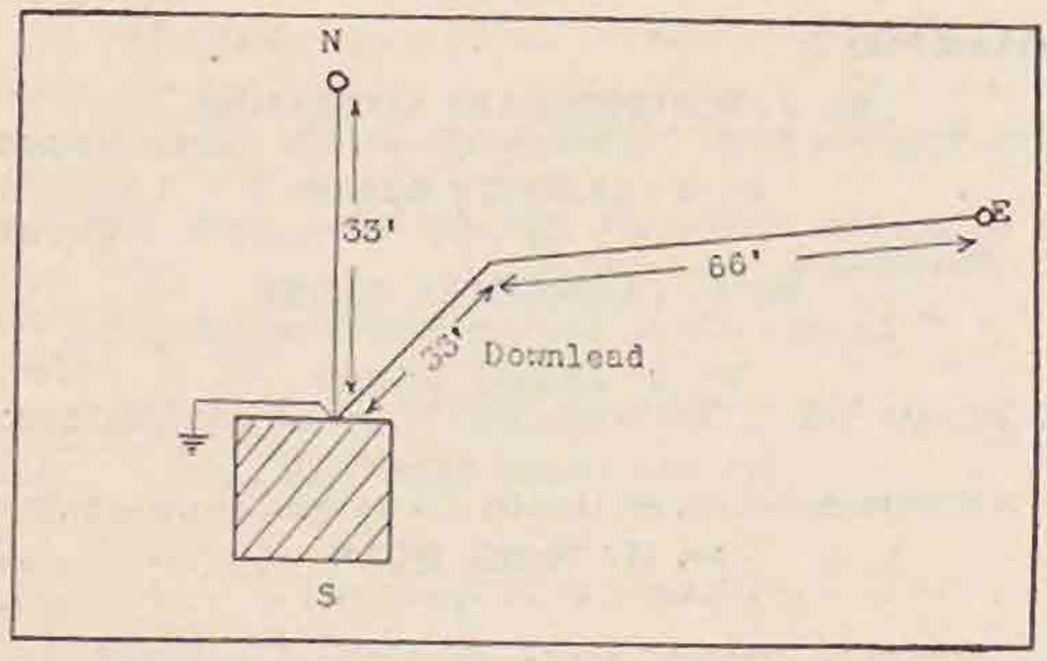


Fig. 1.
Aerial system used by G5RX.

the orientation and its shape. On 14 mc. the aerial portion alone is used as A.O.G. and is tapped straight on to the tank coil. On 7 mc. loose coupling is used, and a 33-foot counterpoise added, with a .0005 mfd. condenser in series. The counterpoise is attached to the end of the coupling coil remote from the tank. The coil has four turns. On 3.5 mc. the aerial portion is used and an earth is added, *i.e.*, the system functions as a Marconi. For 1.7 mc. work, it is used as on 3.5 mc., thus on 7 mc. only is a counterpoise employed.

Results : On 14 mc. VK and U.S.A. stations can be worked whenever heard ; on 7 mc. results are as goods as or better than with a Zepp aerial, European DX is obtainable on 3.5 mc., while on 1.7 mc. all Scandinavia and several other European countries have been worked.

Note : G5RX is a *genuine* 10-watt station on all bands.

Group 1*B* has been formed under G6FO, of Bristol. Members who have agreed to belong to the group are G2SX (North London), G5PX (Ashton-under-Lyne), BRS1211 (Prestatyn), G6AI (Broadstairs), while it is hoped that G2CI, who has joined the No. 1 R.E.S. section, will make up the sixth.

Group 1*C* is flourishing under 2AQW. The G.C. has been testing with A.V.C. and duo-diode-triodes. G2CF on 1.75 mc. uses matched impedance network with a 257-ft. top, but owing to mechanical difficulties results have been no better than with a Marconi system 133 ft. long. (The fundamental of each is the same, so how about comparing field strengths ?—G.M.) BRS207 (East London) is co-operating with BRS1173 in weather observations. He reports conditions deteriorating on 3.5 mc., local interference up to 00.15 B.S.T. making observation difficult. Aerial tests are in progress at 2 AZX, and a G2BI running south to north has been found the most efficient for reception. Experiments have also been made with a copper rod aerial in series, with a filter circuit consisting of a coil and condenser. Although the rod is quite short, it is claimed to be equally efficient as an outdoor system provided correct ratios of L and C are chosen. Signal strength is expected to show no diminution, while mush level is down. More details are promised later.

Group 1*D* is under G6BS, 39, Owlstone Road, Newnham, Cambridge, who has commenced a notebook letter budget. Members are G5GF and G2ND, of South London, G5QU, of Redcar, G2JL of Newport, and G6MF, of Edinburgh. The G.C. keeps regular schedules with other Cambridge amateurs at 23.00 on Saturdays and 22.40 on Sundays on 1.75 mc.

56 MC. Group (No. 2)

The 56 mc. groups have attracted the largest membership of any section of R.E.S., and no less than seven groups have been formed. The work involved has occupied most of the last month and there has been little time left to get the letter budgets in full swing. Five budgets went out this month however, and it is hoped that all the groups will be in full operation by next month.

As is natural, most of the first letters contain descriptions of the gear used by the members, and particulars of the results obtained to date.

BRS877, 2IC, 2OI, BRS1300, 6MF, with 6TK as G.C., form Group 2A, and the first letter budget contains contributions from 6TK, BRS877 and 1300. BRS877 contributes an interesting letter on field strength measurement, and suggests relative measurement, rather than absolute measurement in micro volts per meter. For our purpose, the rectified current meter, using a low reading milliameter in the positive H.T. lead to the detector valve of the receiver, should prove very suitable. The steady anode current is balanced out by means of

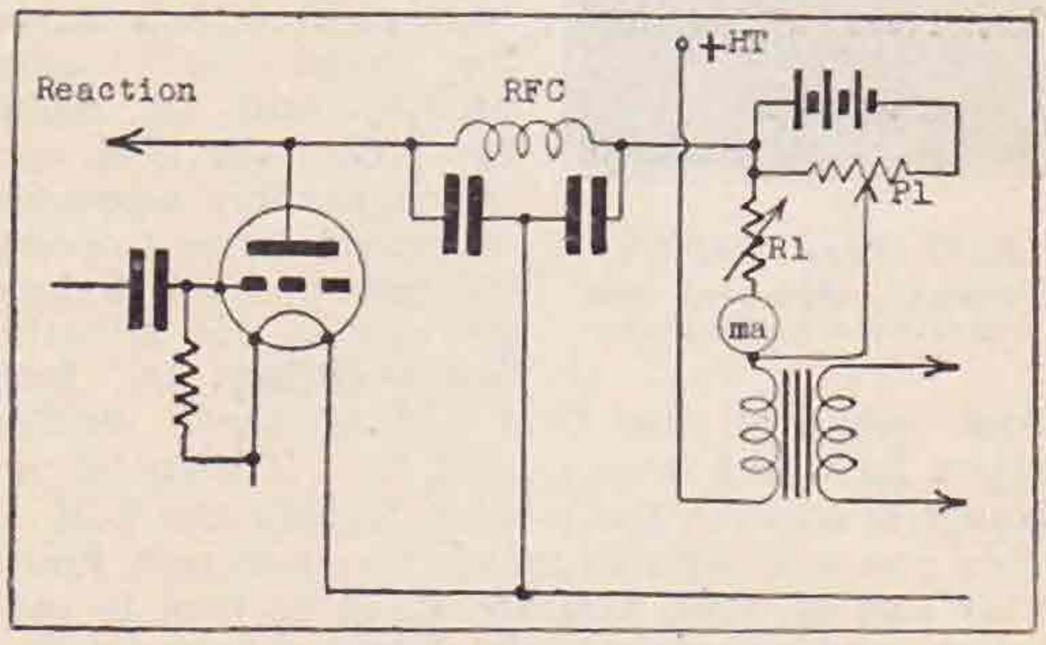


Fig. 2.
Field strength measurement device suggested by BRS877.

an auxiliary battery, as shown in Fig. 2. The potentiometer should be of such a value that it passes substantially more than the steady anode current of the detector valve and the resistance R1 should be adjusted to approximately one-tenth of the resistance value of the potentiometer. The change in anode current shown on the meter, is proportional to the square of the applied signal voltage. When taking readings it is essential to disconnect any super regeneration circuit that is in use. BRS877 continues with a brief outline of a method of absolute measurement, originally described by Colebrook. (*Wireless World*, October 14, 1931.) BRS1300 requires particulars of published data on 56 mc. superhet. design.

In Group 2B's letter budget 2VV describes the transceiver in use at his station and emphasises the benefit to be obtained by tuning the aerial coil. 2BAW, the G.C., gives details of his transceiver (BULLETIN, March, 1934), and mentions the directional effect observed when the arms of the di-pole aerial are at 60 degrees to the horizontal, with minimum signal strength when the plane of the aerial is at right-angles to the distant transmitter. BRS1211 describes his results to date. 2BQP, G5MG, BRS1274 are the other members of Group 2B.

6TK describes his plans for an Ireland to Scotland 56 mc. relay and enquires for experience of pentodes as 56 mc. oscillators.

Group 2C consists of G6AI (G.C.), 2JX, 2APS, 2AZX, BRS1333 and BRS193. No letter budget has been issued this month.

Group 2D consists of G6JQ (G.C.), BRS1047, 5VY, 2AVN, 5AW and ex SU1MM. In the letter budget 2AVN mentions the superiority of the LP2 valve in the oscillator position of his transceiver. It is interesting to note that this fact is mentioned by several contributors to other budgets. He suggests the use of legs from telescopic camera tripods as aerials for portable work. 5VY is experimenting with frequency stabilisation, using an electron-coupled oscillator on 15 metres as the drive, but results so far are disappointing. BRS1047 is rebuilding and has little to report.

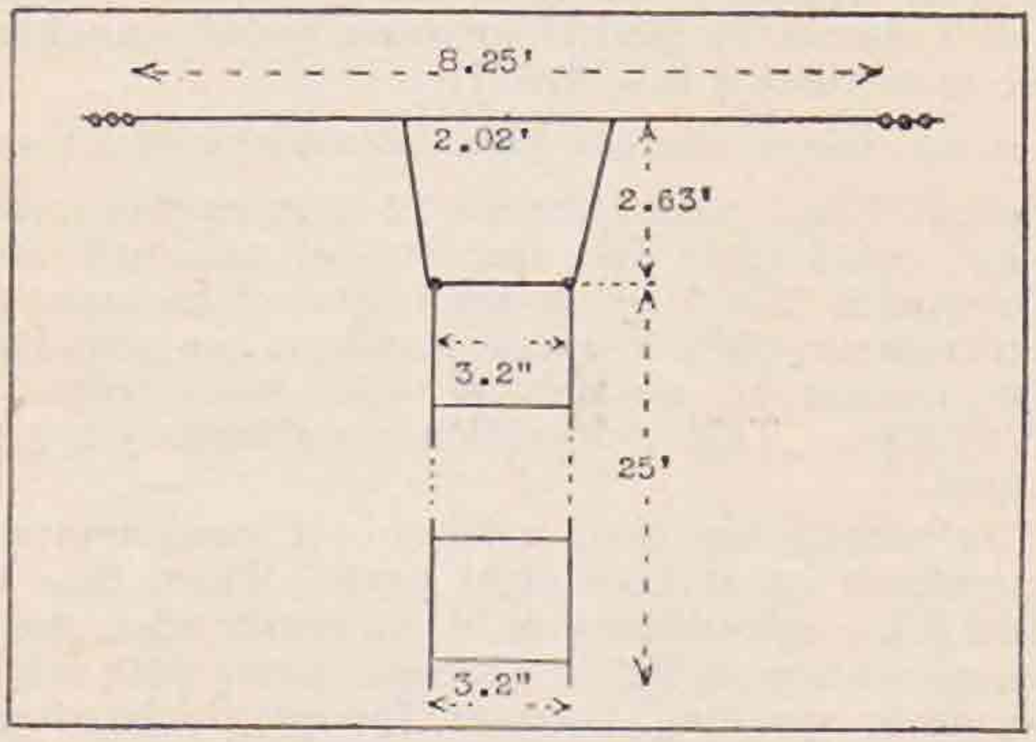


Fig. 3.
Matched impedance aerial used by G6JQ.

6JQ gives details of a matched impedance aerial that he has found gives good results. Dimensions are given in Fig. 3. There are no other letters.

Group 2E budget contains station descriptions from G5FI (G.C.), 6QB and 2BIW. BRS1209 and 2BWP are the other members of this group, but do not contribute.

Group 2F consists of G6WJ (G.C.), 5UK, VU2FP, 2BPG, 2BJY and BRS1343. No letter budget has been issued this month.

Group 2G budget contains a letter from G6CY, the G.C., in which he suggests the need for research on the frequency stabilisation and easy and accurate frequency measurement problems. The letter concludes with a description of his gear and an interesting theory to account for the bending of 56 mc. waves. No other contributions were received from the other members of the group, who are 2RM, 2AVC, 5YD and 6LK.

Plans are in hand for the organisation of a National 56 mc. Field Day. See Headquarter's notice.

Artificial Aerial Group (No. 3)

The first budget has been completed and preliminary details of AA's have appeared, the most popular being a capacity of about 200 mmfd, a suitable inductance and a resistance of either about 10 ohms (which seems rather small) or a 3.5 volt flash lamp bulb, all in series and coupled to the output circuit either inductively or directly. H.F. measurement is either by H.W. series ammeter or by diode.

For the first budget, details are necessarily vague, but when a few more facts have appeared, it is proposed to produce an article which might help in A.A. experiments.

All Group 3A report, but only 2BVH and G2LR from Group 3B have shown activity. Group 3A is now completed with 2BXC and BRS1427, G5SO joins 3B.

Atmosphere and Fading Group (No. 4)

The organisation of this group is now complete. It is divided into six sub-groups, and the programme of research is as follows :—

4*A*.—Effect of " Fronts " on signal strength.

4*B*.—Reports from BERU members.

4*C*.—Connection between electric potential in the troposphere and thunder storms with signal strength.

4*D*.—Isobar theory and the tidal effect of the moon on H.L.

4*E*.—Connection between sunspots and signal strength.

4*F*.—Atmospherics.

During the transition months from CB to RES, routine observations have been maintained by 4A and 4D. The G.C.'s L.B. has contained a large amount of matter of a speculative nature, all of which is necessary for the internal direction of the group.

G5AM contributes the essence from two letters in *Nature*. The first, dated February 3, gives an account of observations made last year, July and August, at Murmansk, U.S.S.R., lat. 68° 56′ N., long. 33° 5′ E., by M. A. Boutch-Bruewitch, of echoes from H.L. Here are some of the points :—

During summer solstice both E and F layers were found to exist.

E layer is less active than in temperate regions, and seldom capable of screening F. (Surely this depends on frequency ?—G5AM.)

E layer mostly in evidence for 75 mcs. and 110 ms. around midnight.

Daylight variations of ionisation sometimes similar to temperate latitude, sometimes opposite character.

Pictures of echoes at noon and midnight nearly always alike, but different at intermediate times.

Rapid motion found to exist in E layer, which dropped sometimes to abnormally low height of 64 kms. No increase of shielding noted, which suggests that low level was due to decrease in pressure rather than low penetration.

Periods of complete cessation of echo were noted, suggesting some other absorbing layer below E. Correlation between this and magnetic activity was found.

The second letter, from D. F. Martyn, gives an account of observations made at Melbourne and Sydney in November-December, 1931, and March-April, 1932, of average night intensity of 3AR (610 kc.), sky-wave at a distance of 90 kms., and during October, 1932, the actual ion density in E was measured.

Here are the points :—

A close correlation between night ionisation and barometric pressure at ground level 12 *to* 36 *hours after* the ionisation was found.

Strong ionisation was invariably followed by rising barometer, more often 12 hours time lag, but this depended on speed of disturbance.

Martyn suggests that the increase in signal was due to decrease in the intensity of ionisation in the absorbing part of E.

G5AM points out : " Were pressure to decrease one would surely expect ion density to be greater, as the rate of recombination of ions would be less. The more obvious explanation would seem to be that a decrease of pressure in the lower part of the layer lessens collisional friction and therefore absorption is less."

G5AM refers also to recent work by Ratcliffe and White, which has established the existence of four layers, the F, an intermediate, E, and e or nocturnal E. It is suggested that the first three are due to ultra violet ionisation, and the fourth to abnormal causes, such as corpuscular bombardment or thunderstorms.

Contemporary Literature Group contributes two papers, one giving an account of a lecture given to the annual meeting of the Heinrich Hertz Company last year, at which a film was shown demonstrating the existence of echoes from H.L. The other is an extract from *Nature*, April 7, on work by Messrs. Mitra, Syam and Ghose, which suggests that meteoric showers may cause abnormal ionisation.

Aerial Design Group (No. 9)

This group has been fairly well supported, as 20 members have enrolled so far. There do not appear to be any of the old No. 12 group rejoined ; please correct me if I am wrong, or if any of you do wish to continue, remember it is necessary to rejoin. With 20 members several sub-groups can be formed, but it will take a little time to get them arranged in a rational manner. I am in touch with all members on my list, with this in view, but if any new ones have not heard from me, will they please let me know at once the general nature of their interests in aerial design.

I have a report from G2OA who is using a half-wave vertical receiving aerial with great success on 14 mc.

It will be found good for sending, too, and I welcome interest in vertical aerials. There is another report concerning the " Fuchs " aerial, and I should be glad if someone would enlighten me as to what it is.—(G6CJ).

AROUND THE EMPIRE.

(*Continued from page* 403.)

56 mc.—Considerable interest in this band has been aroused by the publication of results achieved in Europe and America. Unfortunately it has not yet obtained the popularity it deserves. More organised investigation is sadly needed.

As is generally the case throughout the British Empire, the control of the communications system in this country is a Government monopoly ; amateur transmissions are therefore confined to messages concerning the experiments in hand. An interesting development, however, is the Emergency Communication Scheme under which a number of picked stations, all members of the S.A.R.R.L., are handling traffic connected with the administration of the League and its Divisions. This system is sponsored by the Department of Defence and already a traffic network is in existence which can at a moment's notice be placed at the disposal of the authorities in time of stress or a national disaster. So reliable has this network become that gradually all correspondence connected with the administration of the S.A.R.R.L. has been diverted to it from the postal system, special permission for this having been granted by the Postmaster-General.

South African amateurs have reason to congratulate themselves on the attitude adopted by the Postmaster-General, who has, on many occasions, shown himself as sympathetically disposed towards amateur operations. None of the bands laid down at Washington have been curtailed, except in the case of 7 mc., where the use of telephony is somewhat restricted. The Department of Posts and Telegraphs has taken a keen interest in amateur experiments and on several occasions has consulted the League in connection with local technical difficulties. This co-operation is particularly appreciated.

Telephony has been a feature of local amateur operations for at least eight years. From time to time it has achieved waves of popularity when every second station on the air was modulating with voice. Generally speaking, however, the quality has been of a low standard and it is not surprising to find that C.W. is still the only reliable means of maintaining contact (over long distances).

In conclusion, nothing gives us greater pleasure than to have the opportunity of meeting and entertaining brother amateurs from other shores; we sincerely trust that those who contemplate visiting this country will not omit to advise us of the fact in order that we may " kill the fatted calf," and " get the beer on ice."

Vy. 73, R.S.G.B., and many happy returns.

* * * *

Stray.

Mr. F. Cole, BERS175, of Nairobi, Kenya, has now been issued with the call VQ4CRR. Mr. Cole has arrived in England on leave and his address is High Street, Lydd, Kent.

Mr. M. Goodinson, ex-YI5KM, is now operating from Wireless Section, Station Headquarters, R.A.F., Heliopolis, Egypt, under the call SU5KM.

HIC ET UBIQUE.

Convention—56 mc. Field Day—International 28 mc. Contest—Transatlantic Flight—Slow Morse—Sectional Activities.

Convention, 1934

After careful consideration it has been decided to hold our Ninth Annual Convention in London during the period August 24 and 25. These dates coincide with the R.M.A. Exhibition at Olympia, which opens on August 16 and closes on August 25. In selecting Convention dates during the Exhibition period we have endeavoured to meet the wishes of our many Provincial visitors who desire to attend both events.

A full and interesting programme will be arranged, and it is hoped that as many as possible of our members will make an endeavour to be present.

Provincial members desiring accommodation, and London members who can entertain provincials, are asked to communicate with Mr. T. A. St. Johnston, G6UT, 28, Douglas Road, Chingford, without delay.

The 3.5 MC. Band.

Members holding 3.5 mc. permits are reminded that during the summer months transmissions on this band are only permitted at week-ends.

A 56 MC. National Field Day.

Tentative arrangements are in hand for holding a 56 mc. National Field Day on Convention Sunday, August 26. It is believed that such a project would have an appeal to the many provincials who will be in London on that day as they will thus have an opportunity of taking part in the tests as well as visiting local stations.

The preparation of Rules and the general organisation of the event will be undertaken by Mr. E. A. Dedman, G2NH, Manager 56 mc. R.E.S. Groups.

All members willing to run a station during this event should communicate with Mr. Dedman at once.

Index Volume 9.

The index for the current volume will appear as a supplement in the July issue.

R.S.G.B. Reception Tests.

At the conclusion of the present series, Reception Tests will be discontinued until the autumn. An announcement will be made in the September issue of the BULLETIN, when dates and periods for Series 29 will be published.

First International 28 MC. Contest.

To meet the wishes of 28 mc. enthusiasts in all parts of the world, the Radio Society of Great Britain have pleasure in announcing details of the first International Contest to be organised on this band.

It will generally be appreciated that no useful purpose would be served in running a short period contest, for the reason that conditions during any specific month vary considerably from year to year. *This contest, therefore, will extend for a period of* 12 *months, commencing October* 1, 1934, *and will be open to every licensed amateur in the world.*

The R.S.G.B. in announcing the rules request all amateur organisations to give them the fullest possible publicity both now and during the contest period.

The winner will be awarded the R.S.G.B. International 28 mc. Contest Trophy, which will be held in perpetuity. It is hoped that other amateur organisations will encourage their local amateurs to compete by awarding smaller trophies to the leading stations in their various countries.

Certificates of merit will be issued by the R.S.G.B. to the first ten stations in the final list.

From an examination of Rule 7 it will be noticed that a unique method of scoring has been evolved. It is hoped that by allowing points to be scored for monthly contacts with the same stations, amateurs will be encouraged to work consistently on the 28 mc. band throughout the duration of the contest.

CONTEST RULES.

1. *The Contest is open to all licensed radio amateurs.*
2. *The Contest will commence at* 00.01 *G.M.T. October* 1, 1934, *and will conclude at* 24.00 *G.M.T. September* 30, 1935.
3. *Licensed power must not be exceeded.*
4. *Contacts may be established at any hour and on any day during the contest period.*
5. *One point will be scored for each completed* 100 *miles of contact, with a specific station* (e.g., *contact with a station* 99 *miles away scores no points, contact with a station* 658 *miles away scores* 6 *points*). *All distances will be measured by a Great Circle line between stations.*
6. *A minimum signal strength of QSA* 3 *must be recorded before a contact counts for points.*
7. *In computing his final score a competitor may claim points for each different station worked once during each calendar month.*
8. *Proof of contact in writing may be required by the Contest Committee.*
9. *The decision of the President of the R.S.G.B. will be final in all cases of dispute.*
10. *Entries must reach the Secretary, R.S.G.B.,* 53, *Victoria Street, London, S.W.*1, *not later than November* 15, 1935.

A Coming Transatlantic Flight.

We have been invited by Mr. John Grierson to assist him during a projected Transatlantic flight he is planning during July. A short-wave transmitter working in the neighbourhood of our 7 and 14 mc. bands will be installed in the plane, and position reports will be sent at half-hourly intervals at a speed of about 6 words per minute.

It is requested that reports be telephoned or telegraphed to the Air Ministry, so that a record of Mr. Grierson's progress may be kept.

All members who are willing to co-operate in this important work are asked to communicate with Headquarters, so that they may be advised of the plane's departure, call sign and frequencies. The flight will be from London to Ottawa, via Londonderry, Reykjavik, Godthab, Boungnetuk (Hudson Bay) and Eastman.

Slow Morse Practices.

Below will be found a further list of slow Morse practice times, together with frequencies and stations operating. Test matter will be taken from the recent issues of The T. & R. Bulletin, the page number and month of issue will be given at the end of each test. Reports will be appreciated, and are desired, to enable scope of transmissions to be known. Will transmitting stations willing to assist communicate with Mr. T. A. St. Johnston (G6WT), 28, Douglas Road, Chingford, E.4. Station G6FJ hopes to resume next month.

Schedule of Slow Morse Transmissions.

Date, 1934.		B.S.T.	Frequency kc.'s.	Station.
June 24	Sun.	00.30	1,820	G2OI
,, 24	Sun.	10.00	1,828.3	G2II
July 1	Sun.	00.30	1,820	G2OI
,, 1	Sun.	10.00	1,828.3	G2II
,, 8	Sun.	00.30	1,820	G2OI
,, 8	Sun.	10.00	1,828.3	G2II
,, 15	Sun.	00.30	1,820	G2OI
,, 15	Sun.	10.00	1,828.3	G2II

Radio and Electrical Club.

We have pleasure in announcing that the Radio and Electrical Club of Calgary, Alberta, Canada, has been granted Honorary affiliation with the B.E.R.U.

This is the fifth local Canadian Society to become affiliated.

New Prefix for Straits Settlements.

Mr. R. E. Earle advises us that amateurs in the Strait Settlements will operate under the call VS8 instead of VS1. As far as he is aware this change does not apply to amateurs located in the Federated and Unfederated Malay States.

* * *

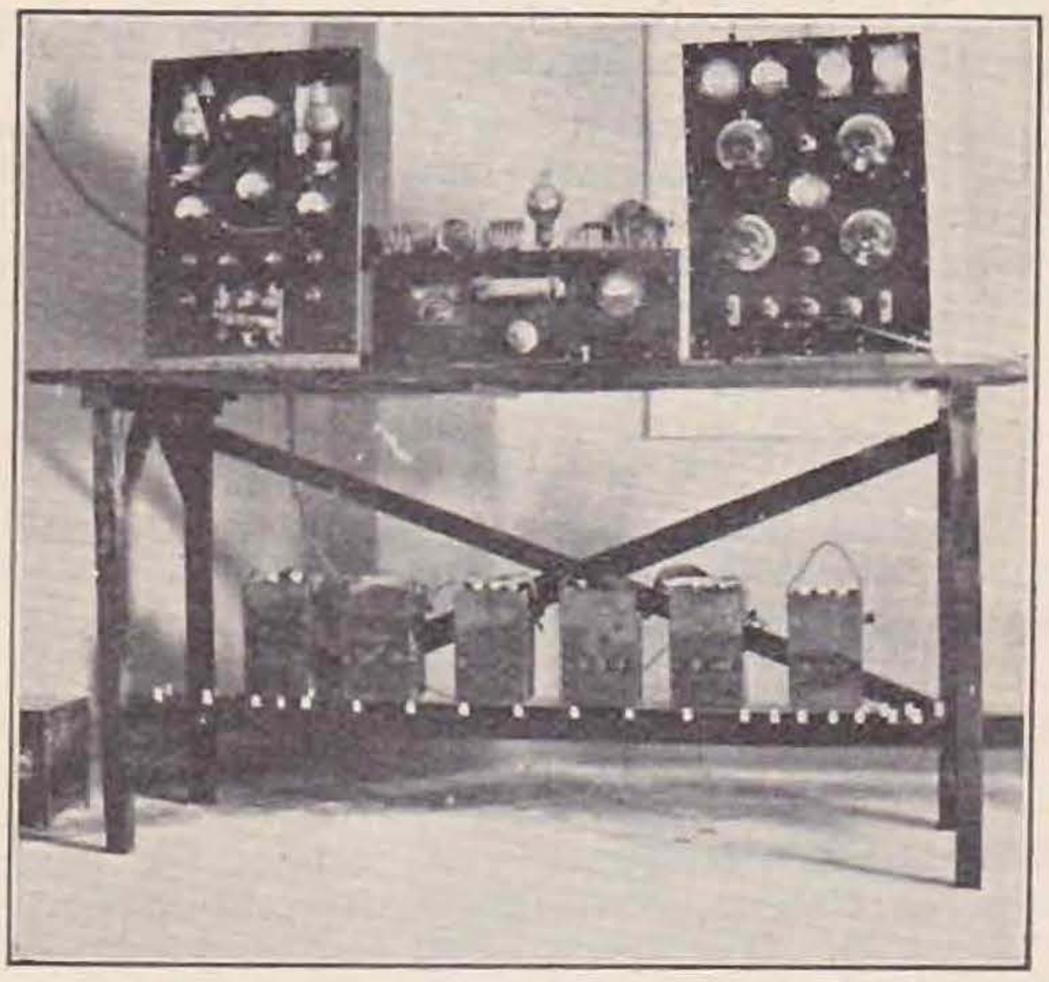
Mr. R. W. Peel (G2CT), 6, Fishpond Drive, The Park, Nottingham, is anxious to obtain details of radio apparatus for detecting the presence of metals under water or under ground, such as is used in prospecting and in a modified form on certain ships for determining the depths of the sea where other methods are impracticable.

A DX Achievement by SU6HL—ST2D.

Congratulations are extended to Mr. I. E. Hill, SU6HL, who has qualified for the following certificates :—

W.B.E. Telephony as SU6HL (awarded in September, 1933).
W.B.E. C.W. as SU6HL.
W.A.C. Telephony as SU6HL.
W.A.C. C.W. as SU6HL.
W.B.E. C.W. as ST2D.
W.A.C. C.W. as ST2D.

Mr. Hill worked the last station for his W.B.E. Telephony award on May 20, 1933, and for his W.A.C. Telephony award on May 31, 1933, but was unable to obtain the confirming card for the latter until April 25, 1934. It will be remembered that the first Quadruple Blue Riband was won by Mr. Frank Neill, GI5NJ, last November, his final contact for the awards being with ZD2A on October 8, 1933.



SU6HL Transmitting Positions.

Can You Help?

Mr. H. Mathews, W9JRM, of Silverton, Colorado, will be pleased to exchange the Denver-Colorado *Sunday Post* for leading London Sunday newspapers. He is also desirous of corresponding with members connected with the power and telephone industry, being himself District Superintendent of the Western Colorado Power Company.

QSL Section.

Manager : J. D. Chisholm (G2CX).

The keynote of a twenty-first birthday is, I suppose, a mixture of review of the past and hope for the future, and it was with this in mind that the notes which appear in these columns month by month were re-read. One thing that seemed painfully obvious from this process was the perpetual note of exhortation and rebuke which seemed to

run through the notes, and when the point was considered, it led to the conclusion that the publication of the rules of the section once annually was not sufficient to prevent mistakes occurring from ignorance of the regulations. The newer members are naturally those who are most likely to err in this respect, and if they happen to join the Society a month after the publication of the rules, they can hardly be blamed for causing trouble until the next time the rules are printed.

The best solution of this problem seems to be in the provision of a permanent record of these rules, so that all new members can be sent a copy with their membership certificates. Subject to the approval of Council (and the Treasurer), it is proposed to have a supply of these set up, and if any present members are not certain of their ground, they may obtain copies by enclosing a stamped-addressed envelope. Suggestions for improving the working or facilities of the Section will be very welcome, and be given every consideration.

QRA Section.

Manager: M. W. Pilpel (G6PP).

NEW QRA's.

G2BL.—P. D. Burnett, 77, Woodland Road, Bristol, Somerset.
G2DR.—S. R. Wright, 7, Borth Avenue, Mile End, Stockport.
G2FC.—S. C. Clark, 94, Sutherland Avenue, Maida Vale, London, W.9.
G2GU.—A. E. Richardson, 41, Ray Street, Heanor, Nottingham.
G2HI.—E. Williams, 4, Beresford Avenue, Tolworth, Surrey.
G2KY.—G. Curran, 4, Freckleton Avenue, Chorlton-cum-Hardy, Manchester.
G2ML.—D. H. Preist, 32, Cromwell Avenue, Bromley, Kent.
G2NJ.—W. Carter, 1, Gladstone Street, Peterborough, Northampton.
G2OO.—A. C. Hoile, 62, Bower Street, Maidstone, Kent.
G2OU.—G. White, 55, Clarence Street, Derby.
G2RR.—R. C. Richards, Benton School Lodge, Benton Road East, Seven Kings, Essex.
G2UR.—J. G. Le Cornu, 1, Les Vaux Villas, St. Helier, Jersey, Channel Islands.
G2VP.—V. Percy, 2, Orchard Drive, Hale, Cheshire.
GI5AJ.—J. M. Adams, 24, Northfield, Donaghadee, Co. Down, N. Ireland.
G5FM.—F. T. May, 24, Russell Road, London, N.W.9.
G5FU.—E. G. Foulkes, 19, Kinnaird Drive, Rhyl, Flintshire.
GI5JN.—J. Milliken, 3, Somerton Road, Belfast, Northern Ireland.
G5KU.—R. Pollock, 108, The Fairway, North Wembley, Middlesex.
G5NX.—L. L. Neaverson, 255, Park Road, Peterborough, Northampton.
G5OL.—B. C. Okell, " Birchleigh," Prescot Road, Hale, Cheshire.
G5OW.—W. O. Wigg, 56, Kimbolton Avenue, Lenton Sands, Nottingham.
G5RY.—R. W. Wright, 37, Cedar Road, Aintree, Liverpool.
G5SF.—J. K. Wilkie, 659, Royal Liver Building, Liverpool.
G5YJ.—Major W. H. Oates, " Beverley," Woodlands Avenue, Coombe Lane, Kingston, Surrey.
G6AB.—A. P. Kerford-Byrnes, Kenya, Holland-on-Sea, Essex.
G6AM.—E. A. Mackay, 51, Mardale Crescent, Edinburgh, Scotland.
G6AW.—E. J. Jarvis, 48, Esplanade Road, Scarborough, Yorkshire.
G6CA.—C. A. Allen, 188, St. Anne's Road East, St. Anne's-on-Sea, Lancashire.
G6HB.—F. H. Beaumont, Rushey Ford, Kempston, Bedford.
G6HH.—Hastings and St. Leonards Radio Society (C. S. Bradley and H. M. Fuller), Golden Cross Hotel, Havelock Road, Hastings, Sussex.
G6KD.—K. Dunsford, West Winds, West Street, Reigate, Surrey.
G6MI.—R. Maynard, 307, South Promenade, Blackpool, Lancashire.
G6PW.—W. B. G. Collis, 480, Manchester Road, Sheffield, Yorkshire.
G6VA.—E. J. Pickard, 65, Norbury Avenue, Thornton Heath, Surrey.
G6WY.—H. A. Maxwell Whyte, 9, The Mead, Beckenham, Kent.
2AMK.—A. N. Harris, 695, Green Lane, Dagenham, Essex.
2AXW.—C. A. Butler, 4, Hemdean Rise, Caversham, Reading, Berkshire.
2BVQ.—J. Quinn, 3, Mayfair Road, West Jesmond, Newcastle-on-Tyne.
2BWS.—G. H. Billison, The Hollies, High Street, Hampton-on-Thames.
2BXW.—W. H. Segrott, 61, Co-operative Street, Derby.

The following are cancelled:—G2IH, G2LF, G6BB, 2AKD, 2AKT, 2AJT, 2AQQ, 2AVC, 2AWV, 2AYK, 2BGH, 2BHA, 2BHA, 2BOW, 2BPI, 2BXI.

NEW MEMBERS.

HOME CORPORATES.

J. W. Ostens, jun. (G2OS), 41, Sandringham Gardens, North Shields, Northumberland.
F. Warrington-Strong, R.N. (G5WS), 7, Melville Road, Barnes, S.W.13.
W. Gledhill (G5ZL), 3, Redbrook Estate, Huddersfield Road, Gawber, Barnsley.
G. Hornsby (G6IR), Traighmore, 7, Park Avenue, Gosforth, Newcastle-on-Tyne.
T. F. Crowther (2AKY), 128, South Drive, St. Annes-on-Sea, Lancs.
W. M. Vendy (2AWZ), 9, Cecilia Road, Leicester.
E. Paget (2BBP), 95, Montague Road, Leicester.
R. E. T. Dabbs (2BUS), 4, Nutfield Road, Thornton Heath, Surrey.
Capt. W. R. Dainty (BRS1430), Hove Villa, Dyke Road, Brighton.
M. Geddes (BRS1431), 44, Lindisfarne Avenue, Leigh-on-Sea, Essex.
G. G. Bath (BRS1432), 133, Bishopsworth Road, Bristol 3.
S. L. Clarke (BRS1433), 15, Hamilton Road, Southville, Bristol 3.
W. Atkinson (BRS1434), 160, Trewhitt Road, Heaton, Newcastle-on-Tyne.
W. S. Tearle (BRS1435), Mountsorrel Granite Co., Ltd., Welford House, Welford Place, Leicester.
J. W. Mowbray (BRS1436), 67, Forest Road, London, E.11.
J. M. Knott (BRS1437), 5, Pekin Street, Ashton-under-Lyne, Lancs.
R. C. Lawes (BRS1438), 32, Waverley Road, Exmouth, Devon.
G. H. Walker (BRS1439), 11, Bolton Road, Harlesden, N.W.10
F. G. Spragg (BRS1440), 432, Leagrave Road, Luton, Beds.
W. H. Allen (BRS1441), 32, Earls Road, Tunbridge Wells, Kent.
A. M. Barber (BRS1442), " Rosemary," 19, Ash Grove, Guildford, Surrey.
H. Barnes (BRS1443), 4, Rossall Road, Cleveleys, near Blackpool, Lancs.
J. Hosmer (BRS1444), 110, Dover Road, Folkestone, Kent.
T. G. King (BRS1445), Morton-on-Swale, Northallerton, Yorks.
L. B. Fisher (BRS1446), 32, Brisbane Street, Greenock, Scotland.
J. P. Tourle (BRS1447), St. Ives, Leicester Road, Laindon, Essex.
E. L. Wills (BRS1448), 15, Monkswell Road, Exeter, Devon.
T. Court (BRS1449), Dawley Dock, Hayes, Middlesex.
N. G. Hyde (BRS1450), Fernholme, Knebworth Road, Bexhill-on-Sea, Sussex.
J. I. Mackereth (BRS1451), 126, Wenham Drive, Westcliff-on-Sea, Essex.
W. H. Boothman (BRS1452), 6, Ogilvie Road, High Wycombe, Bucks.
W. A. Younger (BRS1453), Auchen Castle, Moffat, Scotland.
J. L. Pinkerton (BRS1454), Secon, Ballymoney, Co. Antrim, N.I.
F. A. Milne (BRS1455), 38, Edgehill Road, Broomhill, Glasgow.
W. Sullivan (BRS1456), 36, Waverley Drive, Bangor, Co. Down, N.I.
R. Sneddon (BRS1457), 24, Crusader Avenue, Knightswood Glasgow.
G. D. Forbes (BRS1458), 363, Paisley Road, Glasgow, C.5.
G. H. Gower (A), 55, Victoria Street, Maidstone, Kent.

DOMINION AND FOREIGN.

D. W. Willis (YI7NN), 203, Squadron, R.A.F., Basrah, Iraq.
G. W. Reid (VK2FZ), Box 27, Temora, N.S.W., Australia.
W. T. Wishart (VK4WT), Corner Long and Dan Street, Graceville, Brisbane, Australia.
C. R. Emary (VS6AX), Royal Signals (P.O. Box 391), Kowloon, Hong Kong.
J. L. Archbold (VU2JA), W.O.'s and Sergeants' Mess, Royal Corps of Signals, Rawalpindi, India.
H. J. Siegel (W3EDP), 417, Sanhican Drive, Trenton, N.J., U.S.A.
W. G. Turnbull (ZL2CA), 112, Tinakori Road, Wellington, New Zealand.
W. T. Chappel (BERS229), Box 21, Nairobi, Kenya Colony. Temporary address: 19, Trelawny Road, Tavistock, Devon.
K. O. Duff (BERS230), 14, Dames Road, Kingston, Jamaica, B.W.I.
J. Mackenzie (BERS231), No. 1 Squadron, I.A.F. Aircraft Depot, Drigh Road, Sind, India.
R. Stride (BERS232), No. 1 Bungalow, I.A.D., Hinaidi, Iraq.
Lieut. R. F. Galea (BERS233), 20 Str. Collegiata, Birchircara, Malta.
T. Rifaat, Supervisor Wireless Receiving Station, Baghdad Airport, Baghdad, Iraq.
M. Tama, Barcelona, 65 ,Avenida Del Tibidabo, Spain.
Bedi E. Zeki, Wireless Transmitting Station, Baghdad, Iraq.

NOTES and NEWS from the BRITISH ISLES

DISTRICT REPRESENTATIVES.

DISTRICT 1 (North-Western).
(Cumberland, Westmorland, Cheshire, Lancashire.)
MR. J. NODEN (G6TW), Fern Villa, Coppice Road, Willaston, near Nantwich, Cheshire.

DISTRICT 2 (North-Eastern).
Yorkshire (West Riding, and part of North Riding), Durham, and Northumberland (Middlesborough is in this district.)
MR. L. W. PARRY (G6PY), 13, Huddersfield Road, Barnsley, Yorks.

DISTRICT 3 (West Midlands).
(Warwick, Worcester, Staffordshire, Shropshire.)
MR. V. M. DESMOND (G5VM), 199, Russell Road, Moseley, Birmingham.

DISTRICT 4 (East Midlands).
(Derby, Leicester, Northants, Notts.)
MR. W. W. STORER (G6JQ), 28, Blanklyn Avenue, Leicester.

DISTRICT 5 (Western).
(Hereford, Oxford, Wiltshire, Gloucester.)
MR. W. B. WEBER (G6QW), 2, Balmoral Road, St. Andrews Bristol.

DISTRICT 6 (South-Western).
(Cornwall, Devon, Dorset, Somerset.)
MR. W. B. SYDENHAM (G5SY), "Sherrington," Cleveland Road Torquay.

DISTRICT 7 (Southern).
(Berkshire, Hampshire, Surrey.)
MR. E. A. DEDMAN (G2NH), 63a, Kingston Rd., New Malden, Surrey.

DISTRICT 8 (Home Counties).
(Beds., Bucks., Cambs., Herts. and Hunts.)
MR. G. FEATHERBY (G5FB), 30 Lindsey Road, Bishops Stortford Herts.

DISTRICT 9 (East Anglia).
(Norfolk and Suffolk.)
MR. H. W. SADLER (G2XS), Redways, Wootton Road, Gaywood, King's Lynn, Norfolk.

DISTRICT 10 (South Wales and Monmouth).
MR. D. Low (G5WU), "Nantissa," Westbourne Road, Penarth, Glamorgan.

DISTRICT 11 (North Wales).
(Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire.)
MR. T. Vaughan Williams (G6IW), "Malincourt," Grosvenor Ave., Rhyl, Flintshire.

DISTRICT 12 (London North).
MR. S. BUCKINGHAM (G5QF), 19, Oakleigh Road, Whetstone, N.20.

DISTRICT 13 (London South).
MR. H. D. PRICE (G6HP) 12, Hillcrest Road, Sydenbam, S.E.26

DISTRICT 14 (Eas'ern)
(East London and Essex.)
MR. T. A. ST. JOHNSTON (G6UT), 28, Douglas Road, Chingford, E.4.

DISTRICT 15 (London West and Middlesex).
MR. H. V. WILKINS (G6WN), 81, Studland Road, Hanwell, W.7.

DISTRICT 16 (South-Eastern).
(Kent and Sussex).
MR. A. O. MILNE (G2MI), "Southcot," Larkfield, Kent.

DISTRICT 17 (Mid East).
(Lincolnshire and Rutland.)
MR. A. E. LIVESEY (G6LI), Stourton Hall, Horncastle, Lincs.

DISTRICT 18 (East Yorkshire).
(East Riding and part of North Riding.)
MR. T. WOODCOCK (G6OO), 8, George Street, Bridlington.

SCOTLAND.
MR. J. WYLLIE (G5YG), 31, Lubnaig Road, Newlands, Glasgow.

NORTHERN IRELAND.
MR. W. GRAHAM (GI5GV), 5 Ratcliffe Street, Donegal Pass, Belfast

DISTRICT 1 (North-Western)

J. Noden, G6TW. Representative No. 1 District.

THIRTY - ONE members were present at the last Manchester meeting, when G6TW delivered a talk on high frequency work. At the same meeting G6QA described his recent work in connection with various types of microphones, including the ribbon type. This opportunity is taken of recording a very hearty vote of thanks to G6QA for a most interesting lecture.

By the time these notes are published N.F.D. and Conventionette will be over, and G2OI wishes to thank all those who co-operated in making these events a success and extends grateful thanks to Mr. Brown, Sen., father of G2WQ, for a very generous donation towards Field Day expenses.

The following stations report active: G2BK, 2DH, 2DF, 2HL, 2HM, 2JC, 2OI, 2RA, 2WQ, 5MB, 5OZ, 5VN, 5WR, 5XJ, 5XM, 5YD, 5ZT, 5PX, 6AX, 6GV, 6QA, 6ZS, 6ZU, 6UQ, 6TW, 2AZT, 2BZY, 2BGK, 2ACP, BRS770, BRS1114, BRS1212, BRS1360, BRS1389.

The Liverpool meeting was chiefly occupied in discussing NFD arrangements and allocating operating duties to the various members. A complete schedule of duties was prepared and it is hoped that by the time these notes appear in print the operators will have put up a record performance!

After disposing of N.F.D. business, G6OM gave a short, but excellent, talk on "Link-Coupled Neutralised Power Amplifiers." The C.R. hopes to be able to arrange a series of interesting talks

during the forthcoming season and will be pleased to hear from any member who is willing to oblige in this direction.

The C.R. was able to obtain from the members present, particulars of the bands upon which each member was principally active, and the result shows that there is a welcome increase in activity on the 1.7 mc. band. Eight stations are active on the 1.7 mc. band, one on the 3.5 mc. band, four on the 7 mc. band and six on the 56 mc. band. The active stations on the various bands are as follows :— 1.7 mc. : G2FD, 5RY, 6CX, 6GL, 6OM, 2BFA, 2BPU, BRS1293 ; 3.5 mc. : G6OM ; 7 mc. : G2FD, 2RF, 5RY, BRS1395 ; 14 mc. : G2KZ, 2OA, 2RF, 6OM, 6TT, 2BPU, BRS1274 BRS 1395 ; 56 mc. : G6GL, 6OM, 2BFA, 2BPU, BRS1274, BRS1395.

The D.R. wishes to record his thanks to the Manchester group for the cordial welcome they extended to him on the occasion of his recent visit. He was very gratified to see so much enthusiasm shown and trusts that the same keenness exists in the Liverpool Area. In the next issue it is hoped to report in detail on the Conventionette and N.F.D.

DISTRICT 2 (North-Eastern).

The Middlesbrough and South Durham group recently carried out some interesting 56 mc. tests from the Transporter bridge crossing the Tees. On the Durham side, R9 telephony was heard at the top of this steel structure, using 80 volts at the Middlesbrough transmitter.

From Bradford G6KU reports that 6PL received 6BX on 56 mc. at eight miles during a thunderstorm. 6KU has qualified for W.B.E. ; BRS1151, 1298, G2VO and 5YV report active. Mr. Heavyside (2BGU) awaits his full call after a very short amateur career. (Congrats om.—D.R.)

DISTRICT 4 (East Midlands).

Outings and field days appear to have been the order during the past month. The Derby Society visited the B.B.C. short-wave transmitters at Daventry, and the Leicester Amateur Radio Society visited the G.P.O. station at Rugby. Both events were very well attended, and enjoyed by all.

The " Notting-Hams " held a 28-mc. field day during the month, but although being only supported by members, was a great success. The push-pull transmitter operated by G5YP used only 10 watts, and was fone modulated. Super-regenerative receivers triumphed, signals being heard up to three miles in moving cars. Signals were also received by G5KG at Mansfield, six miles distant.

The most outstanding piece of work this month goes to the credit of G2SD, Derby, who was QSO, with K4SA, Porto Rico, using only 8 watts to his final stage. He received an R7 report on his telephony. His aerial coupling arrangement appears to be the secret of his success, and I hope he will publish the details in The Bulletin at an early date. He also points out that all members in Derbyshire hold either full or A.A. licences. (Congrats., OM's.—D.R.)

G5YF reports that the Kettering Society have recently acquired their own club room, and at present are building a transmitter. G2NJ and 5NX, who have recently secured their calls are both active in Peterborough.

G5YF has been carrying out experiments with a pentode harmonic oscillator, with great success. Recently had a visit from VU2FP, who called completely equipped with a very fine portable transmitter and receiver.

G6JQ has been experimenting with the " 2BI " aerial, but results so far show that it is very directional. His signals appear to be showing up well in the land of depressions. Who said Iceland ?

DISTRICT 5 (Western).

The Seventh Annual Conventionette was held at Bristol on Sunday, May 6, when the gathering numbered over 70. Members assembled at noon for lunch at 1 p.m., and were honoured by our Vice-President, E. Dawson Ostermeyer, Esq., being present, also our Secretary, " Clarry," five D.R.s, five C.R.s, VQ4CRH, of Kenya, and many members from other districts.

The D.R. presided at lunch and introduced the members at the head talk to the gathering, all members so introduced addressing the gathering.

At the business meeting following lunch, " Clarry," who was greeted with overwhelming enthusiasm, addressed the meeting, outlining the

recent activities of the Society. Various subjects were explained and discussed, and the many points raised during question time were all fully answered by the Secretary.

A hearty vote of thanks was passed to " Clarry " for all he has done and is doing towards the excellent progress made by our Society, and the wish was expressed that he will remain our permanent Secretary for many years to come.

Following tea a group photograph was taken, copies of which may be obtained from Mr. A. N.

Porter, G2ZX, 29, Fernbank Road, Bristol, or from the D.R.

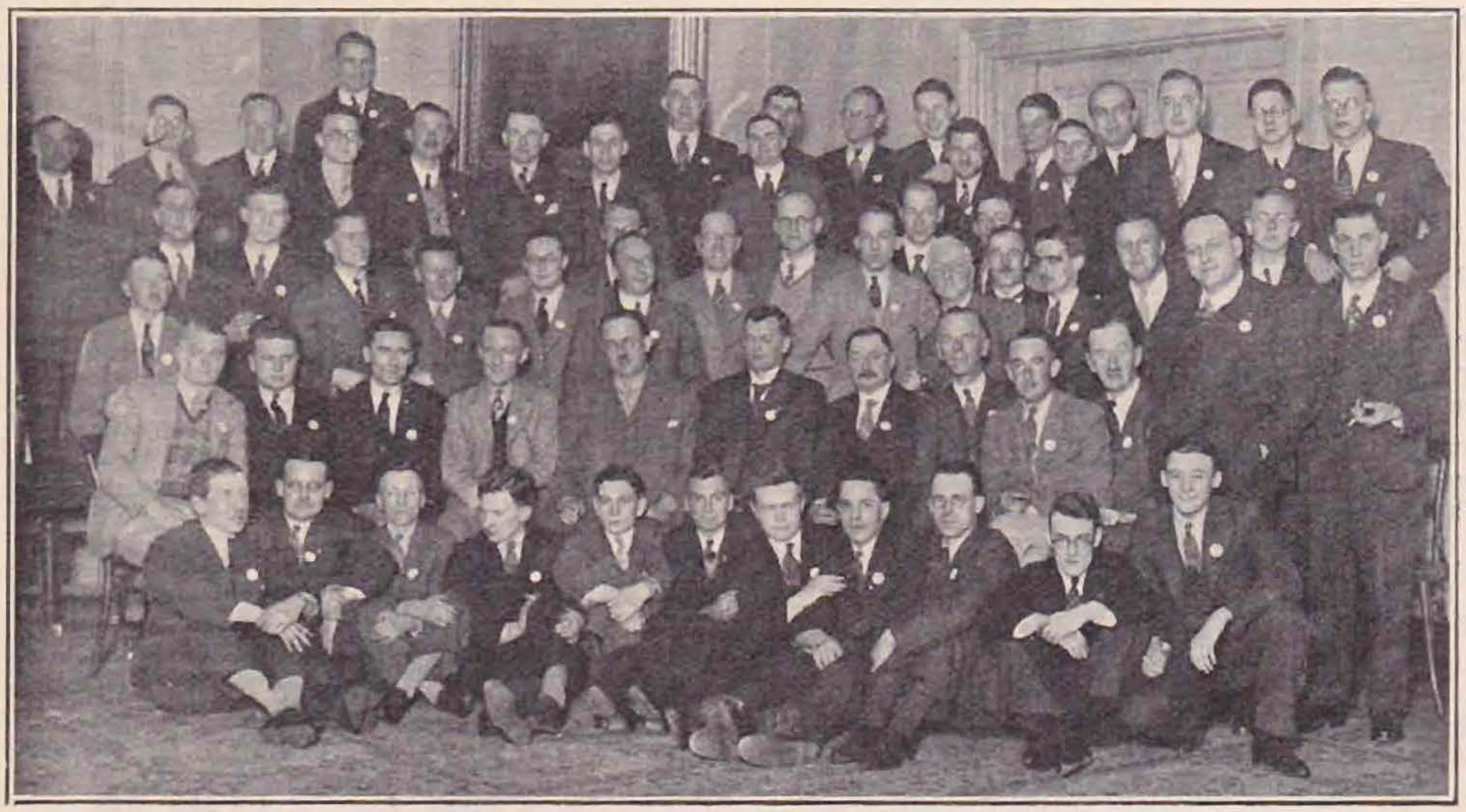
The D.R. takes this opportunity of thanking everybody for the manner in which they supported the Conventionette, and in particular to the many visitors from other districts who travelled so far to support us. Many thanks O.M.s

The May monthly meeting of the Bristol Section was, as usual, well-attended, and an interesting lecture was given by the Mulard Wireless Service Co., Ltd., on the "Operating of Transmitting Valves."

The Wiltshire letter budget still goes strongly, and most members report active. The Oxfordshire members all report active, 56 mc. claiming most attention. Signals up to 14 miles from portable and fixed stations having been received.

The whole District is very active and all members await the results of the N.F.D. with great interest.

appear to be turning to the less used and more experimental bands, particularly 3.5 mc. and 56 mc. In the case of the latter there seems to be a considerable increase in interest and activity, and several attempts at long-distance work have been attempted. The D.R. suggests, however, that it would be better if more time were spent on contacts with nearby members with a view to improving gear. G5GD and 5SY, living about a mile apart, but badly screened from each other, have recently spent a considerable time in getting signals up from R2 to R9 each way. Finally, they managed to work duplex with a wave difference of 0.2 metre; first with very short receiving aerials, but later with quite long ones. The D.R. has of late been using the 67-ft. Windom on the TX, and for the RX used a 30-ft. line parallel with the Windom and immediately below it. He is now trying to get signals over to Portland! Those who are just



DISTRICT 5 CONVENTIONETTE.
Bristol, May 6, 1934.
Seated, G5ML, 6PY, 5QF, 5VM, 6CL, 6QW, 5AR, 5WU, VQ4CRH, G6NJ.

DISTRICT 6 (South-Western).

W. B. Sydenham (G5SY).
Representative, No. 6 District.

Chief interest in the district during the past month was centred on National Field Day, and by the time these notes are in print that will be an event of the past. There is therefore no need to dwell on the subject except to say that the D.R. hopes the South-West has done well enough to show that it is not a back number.

Apart from this there does not seem to be a great deal of importance to report. Members taking up this band would be well advised to proceed more or less in this way. (Here's some data for R.E.S. groups.—Ed.)

The new budget scheme has been started, but does not yet seem to be working very smoothly. One of the reasons for this is that the C.R. for Devon has broken down more badly than was at first supposed and was ordered away posthaste to Yorkshire for three months. We all sincerely hope that when he returns he will be fully recovered and quite able to take up his duties again. In the meantime the D.R. will carry on his job, so will all Devon members please take note that on county matters, for the present, they must write to the D.R.? The other C.R.s have signified their willingness to try to arrange local meetings, so it is hoped that members will support them.

It is very gratifying to note that there is now a definite tendency for membership to increase in the district.

Shortly after the issue of this BULLETIN the R.S.G.B. will be celebrating its twenty-first birthday, so District No. 6 takes this opportunity of wishing the Society many Happy Returns.

DISTRICT 7 (Southern).

This is the last notice that can be given of our Conventionette. Remember the date—June 24—at the Hand and Spear Hotel, Weybridge, Surrey; meet at 12.30, lunch at 1.15, followed by the business meeting in the afternoon and discussion

DISTRICT CALENDAR

June/July, 1934.

June 17. District 14. Conventionette at Palace Hotel, Southend-on-Sea. Tickets: Luncheon, 4s. 6d.; Tea, 1s. Assemble 1 p.m. Luncheon, 1.30 p.m. Business meeting, 3 p.m.

June 24. District 7. Conventionette at Hand and Spear Hotel, Weybridge. Assemble at 12.30 p.m. Luncheon at 1.15 p.m.

June 26. District 14. East London Section, at G6UT, 28 Douglas Road, Chingford, at 7.30 p.m.

July 1. District 2. Conventionette, at The Guildford Hotel, The Headrow, Leeds. Assemble 2 p.m. High tea 5.30 p.m. Tickets 4s.

July 3. District 12. At the Ark Café, Temple Fortune, at 7.30 p.m.

July 4. District 1. Manchester Section, at Brookes Café, 1, Hilton Street, Manchester, at 7 p.m. Lecture by G5YD on Cathode Ray Tubes.

July 8. Districts 8 and 12. Conventionette. Assemble at Four Horseshoes (two miles on bus route from St. Albans on the Hatfield Road) at 3 p.m. for visit to P.O. Radio Station. Tea and meeting at the Mecca Café, St. Albans, at 6 p.m.

and station visits later. All are welcome, but please advise the D.R. as soon as possible.

Two district meetings were held last month, the first at Weybridge, when 36 members were present; the second was a combined social and 56 mc. field day, held in the Isle of Wight. Thanks are due to G5TZ and his staff for their generous hospitality in entertaining us for the day, including the transport of over 30 members from Ryde to his " country station " on the downs near Newport. Many members brought portable 56 mc. apparatus, and we succeeded in putting an R9 signal in to the Island from a portable on the boat.

In view of the fact that there is only a week from the Conventionette to the normal July meeting, the meeting will be held later in the month. Full details will be announced at the Conventionette.

At least 50 per cent. of the stations in the district are active on 56 mc. and a district field day on this band has been held practically every week-end, resulting in some most interesting QSO's. A 56 mc. network has been put into operation, and we now cover the whole of the south-eastern section of England from our various vantage points. Co-operation with other southern districts is welcomed, and full particulars of future fixtures can be obtained from G2NH.

DISTRICT 8 (Home Counties).

It is hoped that a good show will have been put up by the Herts. N.F.D. transmitter in spite of appalling lack of support. This shortage was due partly to the presence in our midst of three transmitters from other districts which attract the attention of some of our own members. The D.R. hopes that this state of affairs can be remedied before 1935.

Visits have been made by the D.R. to different areas including a meeting at 2AZD on May 30, when G5RD, 2HJ and 2TH were present.

Letter budget and district meetings have been suspended until September when it is hoped they will be continued with the renewed enthusiasm one expects after Convention.

Activities in the district include 56 mc. work and the Cambridge group are all very busy on 1.7 mc.

Don't forget July 8 all of you.

DISTRICT 9 (East Anglia)

It is proposed to hold a meeting in Norwich during a week-end in July. Members in that area are invited to suggest a date to the C.R.

H. W. Sadler (G2XS). Representative, No. 9 District.

Interest in 1.7 mc. work is increasing, and all No. 9 members are asked to make use of this band for local contacts during week-ends. BRS's are asked to report on the strength of local transmitters working on these frequencies.

Congratulations are offered to Mr. Wood (ex-2BRQ), who is now G6TI, but what has happened to G5MI and the other Suffolk members? Personal items are as follows:—G6ZJ has rejoined the Society; G2MN is doing some good ultra QRP work; G5UF has obtained W.B.E. and W.A.C.; G2JS has a 56 mc. transceiver (his address, by the way, is Tower Street, King's Lynn, and not down a coalmine, as stated in old call books!). BRS785, 1366 and 1401 report, although away from home; BRS1291 has a new receiver; BRS1411 assisted in N.F.D. and is searching for new members.

DISTRICT 10 (South Wales and Monmouth).

D. Low, G5WU, Representative No. 10 District.

Our meeting on May 16 was well attended, and it is hoped this excellent support will continue throughout the summer months. No outstanding item of importance appeared on the Agenda, but the general discussion and exchange of ideas made the meeting extremely interesting.

Reports to hand indicate that all members in the Monmouth, Cardiff and Brecon areas are active. Reports are scarce from the Swansea district and it would be appreciated if members would report regularly to the C.R., G2SN, by the 15th of each month. Congratulations are extended to 2AWN, who, at the time of writing, is awaiting a Morse Test to complete his application for a two letter call-sign. We also have the pleasure of extending a welcome to a new member, Mr. G. R. Hirst, of Bargoed.

G6YJ, using 10 watts, has been active on 7 and 14 mc. recently and had R6 and R7 reports on his Fone signals from Cairo and Tunis respectively, he was also successful in relaying E.L.S. message from SU1EC.

G2JL has had VK confirmation that his 10 watt 14 mc. signals were heard R.3.

DISTRICT 12 (London North).

Members in the North London District are appreciative of the fact that the Society was originally formed within the confines of their district, and join in wishing the Society "many happy returns of July 5."

If this notice should meet the eye of any of the original members, we should like them to know that a cordial welcome awaits them at our local meetings, the next of which will take place at The Ark Café, Temple Fortune, on July 3, at 7.30 p.m.

At the May meeting, Mr. F. Charman (G6CJ) delivered a most informative talk on Matched Impedance Aerial Systems, and whilst space will not allow even a précis of his remarks to be published, we trust that he will shortly be able to prepare an article on the subject for this Journal.

Messrs. Corfield, Clarke, Brigden and Clarricoats joined in the discussion, when interesting views were given regarding other types of aerial systems in use.

G6CL has recently tested an A.O.G., only 9 ft. high at the free end, and 18 ft. at the shack end, with the free end due south. This arrangement has produced contacts with J, PY, W6 and W7. G5QF and 6WU are building for QRO, and by present indications No. 12 may yet appear on the DX map of the world! G5CD has constructed a "super" super-het which at the moment is "hush hush," but by the time these notes appear it will have made its bow to the public at the A station during N.F.D. G2SX, 5AM, 5BO, 5CW, 5DV and 6OT are active on the DX bands; 5VY and 5MG continue to probe 56 mc. mysteries as members of R.E.S.

The D.R. and operators of N.F.D. stations wish to thank all members who assisted in any way to make the event a success. They particularly thank Mr. Price, of Dugdale Hill Farm, Potters Bar, for allowing the B station to be operated from his property.

The letter budget for May was not to hand, as requested, by the 27th ult. Another prophecy thus came true!

District 12 will be supporting District 8 at their Conventionette, on July 8. Details in Calendar.

DISTRICT 14 (Eastern).

Congratulations to G2DQ on winning the 1.7 mc. contest and so bringing a second Trophy to the District. G6CT and 6WQ were placed 9th and 11th,

and the other entrants, G6KV, 6FJ, 5UK and 6QK, all finished well in the running. The May meeting arranged at G6KV had to be cancelled owing to the illness of Mr. Dellbridge, whom we are pleased to hear is now much better. 2AJT, of Holland-on-Sea, is now G6AB. The May meeting held at G6UT was poorly attended, G6MN was a visitor. G5UK has been in France on business. Details of Conventionette, and next meetings will be found under District Calendar.

DISTRICT 15 (London West, and Middlesex).

The final details of the National Field Day were discussed at the May meeting. The D.R. takes this opportunity of thanking those who came forward with financial help and thus enabled us to go ahead with plans for much better arrangements

H. V. Wilkins (G6WN). Representative, No. 15 District.

than last year. It is to be hoped that we shall have all had a most enjoyable week-end by the time these notes appear in print, and also displayed our skill by again winning the trophy.

It has been decided that the District meetings shall be discontinued until September. The date and time for the September meeting will be found under the District Calendar for that month.

DISTRICT 16 (South-Eastern).

Routine district notes will be held over until next month.

The outstanding feature of the month under review was the Conventionette at Larkfield, which was voted an unqualified success, 67 being present.

Lunch was followed by a business meeting, at which the D.R. and the two C.R.'s outlined the work of the district since they had taken office.

Then came a talk by G6CL, our secretary, which stimulated an interesting and constructive discussion on such matters as R.E.S., Contests, etc.

After tea, parties visited G2MI at Larkfield, and G5XB at Snodland.

A particularly gratifying feature was the splendid support from other districts, especially No. 14, which contributed some 15 visitors, G2DQ, G2LZ, G5AR and other well-known amateurs being present.

The D.R. would like to take this opportunity of thanking his two C.R.'s and all who contributed to the success of the day, including the clerk of the weather!

DISTRICT 17 (Mid-East).

A. E. Livesey (G6LI). Representative, No. 17 District

From Lincolnshire, G6AK sends the monthly reports, but he would appreciate more written material, especially from the Southern membership.

A meeting of Northern members was held at the Mason's Arms, Louth, on May 13 for Field Day arrangements, when 10 members appeared, and a most profitable afternoon ensued, during which all sorts of rash promises were easily made!

G6AK has been occupied with equipping a motor cruiser with short and long-wave radio apparatus in which three Grimsby men are shortly proposing to sail by easy stages to Australia. They hope to keep in touch all the way out, and much interest has been aroused locally in the project. It is good news to know that R.S.G.B. members are, as usual, playing a vital part in the scheme.

G5BD is operating with great efficiency and obtaining results which only the peculiar nature of the East Coast permits.

G6LI has been working many American all-telephone contacts on 7 mc., where astonishingly loud signals are now being heard. Some 20 odd different U.S. amateurs were worked in the first three attempts. A series of interesting quality, field strength and modulation tests were recently conducted with BRS1311 in a car with a portable receiver and no aerial.

DISTRICT 18 (East Yorkshire).

An enjoyable informal meeting was held at the Bellevue Hotel, Scarborough, on May 6, when 30 members were present. G6AW showed films loaned by the Hi-Vacuum Valve Company, and the Osram Company, whilst station visits followed. G6GS, of Guildford, was a welcome visitor with his transceiver. A photograph taken at this meeting will be published in the July issue of THE BULLETIN.

A crystal register has been completed and all members are asked to assist in keeping this up to date.

Mr. M. Shaw (G6OF) has taken up residence at 57, Balfour Road, Ilford, Essex, and looks forward to meeting many London members during his stay. (A hearty welcome awaits you at the monthly meetings at G6UT.—ED.).

G5FV has opened the 28 mc. season in good style by obtaining QSA 5 R6 T9 from OK1AW; he has also logged F3AR and FM8CR. 2ATK is now G5GC and has worked twelve countries; BRS. 1165 becomes 2AVR and is interested in ultra short work. 2ABK is engaged on television experiments; G5FV has constructed the Milne Automatic Morse sender; 5VO is experimenting with Mirror screw system television; 2APU is rebuilding his receiver; 6UJ is active on 1.7 and 3.5 and constructed an efficient station for N.F.D. with assistance from 6OO. G2TK has qualified for W.B.E. and built a transceiver for 56 mc. G5CU has completed field strength measurement apparatus. (We shall be glad to receive an article describing this apparatus.—ED.).

Other active stations are G2KM, 6AW, 6OS, 6OY, 2AMM and various B.R.S.

NORTHERN IRELAND.

R. A. D. Meharey (2BAB) has now received his full licence, and his call sign is 2OY; 5UR has reconstructed his transmitter, and has worked quite a lot of DX. He and 5AJ have been trying out the aerial impedance matching system recently described in QST, and report that the arrangement functions extremely well on 7 mc. BRS877 has been testing neon oscillators, and in the near future hopes to apply this method of generation instead of the usual quenching valve in super-regenerative receivers. 5HV has been ill, and has not been able to devote much time to radio, but we hope he will

be well again in the very near future. BRS1414 reports that he logged 131 G stations on 7 and 14 mc. in ten days. Everyone reports that conditions have greatly improved recently.

W. Graham, Gi5GV, Representative for Northern Ireland.

6YW has again been the victim of misfortune — his DET1 has acquired flat-feet, and he has to be content with about two watts from a F.D. stage.

N.F.D. will be over for another year by the time these notes appear in print, so we do not propose to discuss any matters preliminary to the event. We hope that Dame Fortune will deal us a better slice of luck than was our fortune in the last event, so here's hoping !

SCOTLAND

There seems to have been considerably more activity in May this year than is normal, a fact which may be largely credited to the poor weather conditions to which the month has treated us.

The outstanding item of news this month has relation to G6FN's transmissions on the 3.5 mc. band. He has received a report from a northern China station that on one particular evening his signals were consistently QSA5 R6 and that the observer followed *in toto* practically every contact G6FN had that night. This is a wonderful report and would seem to indicate enhanced prospects of the 3.5 mc. band as a DX band.

Several new stations were licensed during the month. G2MW has been allotted to Mr. C. S. Arthur, 6, Brantwood Avenue, Dundee. Mr. Arthur is the G.P.O. radio inspector of the Dundee District. G6AM is the call issued to 2BPI, Mr. E. A. Mackay, 51, Mardale Crescent, Edinburgh. BRS1391 has been granted a full "ticket" and awaits the issue of his call. 2BMP is now the "A.A." call of Mr. Leishman, of Old Polmont (BRS1349). 2BMY has been issued to BRS1397, Mr. R. M. Kerr, 224, Glencroft Road, Kings Park, Glasgow, while 2AQP has appeared in Berwick (*vide* May BULLETIN). 2BLN has lodged his application for full facilities with the G.P.O. and awaits results. Considerable movement for one month, and we wish these gentlemen every success.

"D" District has had its membership depleted this month by the departure of G2AZ to his home in Malta. Dr. Grech expects to continue his amateur activities from that Island.

G6JX, of Aberdeen, is reported as having achieved his W.A.C. Club membership, and G2DI of Newmains, his W.A.C. and W.B.E.

When these notes reach print the National Field Day will be a thing of the past, but at the time of writing all Districts appear to be making intense preparation and we are assured of a "bonnie fecht" (which, being translated for the benefit of our southern friends, means "one grandaddy of a scrap").

An effort is being made to bring the members of "A" and "D" Districts together in Glasgow for a final meeting for the winter season. This is to take the form of an informal dinner in "A" District's Clubroom. DO the membership respond ? They DO NOT. At the moment, although the closing date for indication of desire to attend is past, only four "D" District members and about 15 "A" District men have indicated their intention to be present. "A" District has 81 members and "D" District 27. 'Nuff said ! Lot of encouragement to organise a Scottish Conventionette ! ! Guess we do not have the "Conventionette" complex.

"C" District is shaping very well indeed in Mr. Allan's capable hands. He is keeping the members in close touch, by means of regular meetings. Further, a District outing has been arranged, which is to take the form of a motor trip to the B.B.C. station at Westerglen, and a large turnout is expected.

This month's funny story is to the effect that G6YG succeeded in working G6ZX (about 3 miles distant) on 56 mc. with his aerial system carefully (but accidentally) "earthed" and with an input of about 3 watts. Silly, isn't it ?

As is our summer custom, these notes will cease until September, or if they do appear, it will be in an abbreviated form sufficient to convey any news of general interest. This temporary suspension is, of course, brought about by the comparative cessation of radio work during the holiday season.

May we take the opportunity of wishing you all a very pleasant vacation when it comes along.

GREETINGS BY AMATEUR RADIO

Australia

FROM H. R. CARTER, VK2HC.

ON behalf of the Council and members of the W.I.A., I send hearty greetings and congratulations to the Society in the Mother country upon its coming of age. There have been some fine achievements in amateur radio between our two countries in the earliest days of radio communication. We in Australia fervently hope that the R.S.G.B. will continue to advance in a manner equal to its fine past, and on behalf of the oldest amateur organisation in the world, I ask you to accept these good wishes.—(*By amateur radio via* ZL4AO *and* G5YH.)

Egypt.

The Alexandria members of the B.E.R.U. send their hearty congratulations on the occasion of the 21st anniversary of the R.S.G.B., and wish to convey to the officers of the Society their sincere appreciation of the assistance afforded to B.E.R.U. members. Best wishes for success and prosperity.—*By amateur radio from SU1SG via G2UX and G5SR.*)

Empire B.E.R.U. News.

B.E.R.U. REPRESENTATIVES.

Australia.—H. R. Carter (VK2HC), Yarraman North Station, via Quirindi, N.S.W.

Bahamas, Bermuda and the Eastern Part of the West Indies.—P. H. B. Trasler, (VP4TA) No. 2 Mess, Pointe à Pierre, Trinidad, B.W.I.

Burma.—W. G. F. Wedderspoon (VU2JB), Government High School, Akyab, Burma.

Canada.—C. S. Taylor (VE1BV), Stewiacke, Nova Scotia; R. Prissick (VE2CX), 27, Bellevue Avenue, Westmount, Montreal, P.Q.; S. B. Trainer (VE3GT), 4, Shorncliffe Ave., Toronto, 5, Ont.; A. E. Howard (VE4CJ), 2401, 25th St. West, Calgary, Alberta; and A. L. Cusden, (VE5HJ), 1465, 17th Avenue, New Westminster, British Columbia.

Ceylon and South India.—G. H. Jolliffe (VS7GJ), Frocester, Govinna, Ceylon.

Channel Islands.—Capt. A. M. Houston Fergus (G2ZC), La Cotte, La Moye, St. Brelades, Jersey.

Egypt, Sudan and Transjordania.—Lt. E. S. Cole (SU1EC), Haking House, Abbassia, Cairo, Egypt.

Hong Kong.—A. P. Rosario (VS6AN), P.O. Box 391, Hong Kong.

Irish Free State.—Col. M. J. C. Dennis (E12B), Fortgranite, Baltinglass, Co. Wicklow.

Jamaica, British Honduras, Turks Island and Cayman Island.—C. M. Lyons, (VP5MK), P.O. Box 36, 12, Port Royal Street, Kingston.

Kenya, Uganda and Tanganyika.—R. O. Davidson (VQ4CRL), P.O. Box 31, Nairobi.

Malaya.—T. G. Laver (VS3AC), Government Electrical Power Station, Johore Bharu, Johore.

Malta.—H. G. Cunningham (BERS.161), H.M.S. "Royal Sovereign," c/o G.P.O., London.

Newfoundland.—E. S. Holden (VO8H), Box 650, St. John's, Newfoundland.

New Zealand.—C. W. Parton (ZL3CP), 69, Hackthorne Road, Cashmere Hills, Christchurch.

North and South Rhodesia.—J. W. Mavis (ZE1JE), P.O. Box 160, Umtali, South Rhodesia.

North India.—J. G. McIntosh (VU2LJ) Baghjan T. E. Doom Dooma P.O. Assam.

South Africa.—W. H. Heathcote (ZT6X), 3, North Avenue, Bezuidenhout Valley, Johannesburg.

Australia.

By VK3WL via ZL4AO and G2LZ.

I am pleased to report that Mr. Ray Carter (VK2HC) is making rapid recovery from his recent illness, and hopes to be in full health within a few weeks.

October, 1934, marks the Centenary of the foundation of Melbourne, and this important event is to be celebrated during the four week-ends of that month by Australian amateurs in the form of an International DX Contest.

Ceylon and South India.

By VS7GJ.

VU2FY reports that conditions on 7 and 14 mc. have been bad, due to violent QRM, to which statement VS7GJ concurs, although he has noticed that signals have been coming over well from the East and West, around 15.30 G.M.T., on 14 mc. On this band G and J has been worked.

Passing through for G, VS7GJ had the pleasure of meeting VK2NR in Colombo. Conditions were discussed, and a pleasant day spent.

Egypt.

By SU1EC via G5YH.

Conditions in SU during the month have been remarkably good; signals and countries which, in so far as amateur radio was concerned, did not exist, have been coming through well, and naturally many good contacts have been made. Had the keen SU cared to rise at 04.00 hours local time, W6 and W7 were there for the picking.

Interspaced with these rare districts were a few ZL's and VK's, all on 14 mc.; in short, an exceptionally good month for DX. Medium DX, "G," excellent from approximately 17.00 to 20.00 G.M.T.; and from 20.00 to 03.00 G.M.T. Eastern W. Districts fb.

These notes will be just too late for N.F.D., but I hope the two SU portables SU1A and SU1X will have given G portables a chance for good points.

The Cairo B.C. Station opened on June 1. Constructed by the Marconi Co., on very modern lines, it will radiate clean signals devoid of mouthwash and soap advertisements. Output, 20 kw., frequency 620 kcs. Hours of working, 10.00 to 12.30 G.M.T., and 16.00 to 21.30 G.M.T.

From ZC comes news that ZC6CN and ZC6FF are both active.

ZC6FF hopes for QRP 56 mc. tests with ZC6CN. Conditions in ZC approximate to SU.

SU1SG is very active, and has made many good contacts, he is now WBE. SU1SJ has been working on NFD QRP portable.

In Cairo SU1RO is a new station. The SU6HL-2NP-3AB and 3EH combination have now been augmented by SU1CH, all in a communal QRA. Their combined gear looks like a commercial station. SU1CH has dreams of 1 kw. SU1EC has had moderate results on fone, and is still awaiting VE for WBE fone. SU1AQ and SU1EG are active.

Malta.

By VP3A via G5GQ.

Malta stations are now officially licensed, and up to May 19 the following had been registered: VP3C becomes VP3A, VP3H is VP3B, ex G2AZ is now VP3C. The first two report active, and ex-VP3G is rebuilding for c.c. DX conditions in Malta have been very good on 14 mc., especially for western DX after 20.00 G.M.T. QRN has been bad on 7 mc.

Regarding the Editorial note in the last Bulletin, the 3.5 mc. band is not yet allocated for our use, but permission is being sought. The newly licensed VP3 stations are not yet permitted to use fone.

New Zealand.

By ZL1CK, via ZL1AR, ZL4AO, G5YH.

June is rather a quiet DX period in N.Z., though there is much activity on 14 mc. during our afternoons, when W and VE signals come through at excellent strength. Activities are kept up by reunions.

On June 2, a "hamfest" held in Auckland was attended by over a hundred amateurs from all over the Auckland province. Present also as our guest was R. H. Cunningham, VK3ML, who gave an interesting description of amateur activities and conditions in Australia.

Conditions on 3.5 mc. seem to be much better than during the past few years, and old-timers are hoping to QSO G's again in this band. A number of ZL's are working on 28 mc. on Sunday mornings between 10 a.m. and noon N.Z.M.T. No DX of any kind has been reported.

Northern India.

By VU2LJ.

Owing to my inability to give any address on arrival back from England, I am left to make this report single-handed.

Firstly, let me take this opportunity of thanking those fellow amateurs in G who very kindly showed me round their stations.

Efforts are being made to establish Group Centres in various parts of Northern India, where the size of the local membership will permit meetings.

I should like to hear from all members about the desirability of forming a Radio Society in our province, the benefit of which can immediately be perceived.

West Indies.

By VP4TA via OK2SI and G2LZ.

In Trinidad, VP4TB and 4TC are working fone on 14 mc., and QSO's have been effected with Europe. VP4TC has been invited by the Govern-

P. H. B. Trasler, VP4TA, and C. M. Lyons, VP5MK. B.E.R.U. Representatives for the British West Indies.

ment to arrange fone communication with the Leper Settlement on the Island about 12 miles distant. VP4TA has schedules with all parties forming his group. VP2RT, 2GR and 2BX have been promised licences, and should be on the air shortly.

STATION DESCRIPTION No. 41

(*Continued from page* 429.)

used together during Contests. Large cardboard discs are fitted to the front of the panels, and by using a band spread condenser with a knife-edged pointer, it is an easy matter to mark the positions of every station heard on the band in use. This method saves a good deal of time during Contests.

A further time-saver is the electron coupled oscillator; when a new station is heard signing off from a QSO, he is called by G2DQ on the same frequency as that used by the station the other man has just worked; this is made possible, of course, with the E.C.O.

A considerable amount of useful duplex work has been carried out, and as the writer well knows, this has proved of immense value when rapid comparisons are necessary. In conclusion, mention must again be made of the large amount of original and home-made apparatus in use. Although we are not all mechanics, it is felt that many of us could, with advantage, follow G2DQ's example, even though the cost of producing some of the items is slightly in excess of manufacturers' costs.

EXCHANGE AND MART.

RATES.

Private members' advertisements 1d. per word, minimum 1s. 6d. Trade advertisements 2d. per word, minimum 3s., cash wih order. First line, if desired, will be printed in capitals. Copy to reach 53, Victoria Street, or the Advertising Manager, Parrs, 121, Kingsway, W.C.2. not later than the 1st of the month preceding date of publication.

CRYSTALS.—1.7 and 3.5 mc. bands, 7s. 6d. Dustproof holders, 3s. 6d. Extension Rods cut and drilled to order, 2d. per inch. H.F. Chokes, Sub-amplifier Coils, etc., manufactured to order.—G6WQ, 10, Aberdour Road, Goodmayes, Essex.

F.B. HOLIDAYS. No QRM. Get that T9 feeling. Ideal situation, bathing golf, etc. Terms moderate. Why QRT when holidaying. Write CHRISTIAN (Radio G5SD) "Dhoon House," Promenade, Castletown, I.O.M.

G6DS For neat and snappy QSL Cards, Log Books and Pads. Send for samples. QRA, "Inglenook," Orlando Drive, Carlton, Nottingham.

G6VP—'PHONES, TRANSFORMERS RE-WOUND. Brown's "A" a speciality; any resistance; 24-hour service. Lowest terms in the trade.

OSRAM LS5, 12s. 6d., new; 2 Cyldon Transmitting Condensers (extension handles), .0002 double-spaced, 8s. each. Offers.—BRS525, Ennerdale, Rhiwbina, Cardiff.

PV625X VALVES, unused, 6 volt. Suitable. 300 volts oscillator, F.D. or P.A. slope 3.5 impedance 2000. Price 2s. 6d. post extra.—G5OJ, "Gedling," Forest Ridge, Keston, Kent.

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