For the use of R.R.S. Staff only

R.R.S. Newsletter No.5 — 15th September 1961

This month Mr. Naismith will be retiring from the Station. His interesting article below describes the Station when he first joined it 36 years ago. On page 3 Mr. Wilkins gives an appreciation of Mr. Naismith's work here. The Station will give him an official "farewell" at 3.0 p.m. on 20th September.

EARLY DAYS AT DITTON PARK

In the early days at Ditton Park the programme of work comprised two sections - one engaged on radio direction-finding and the other on field-strength measurements. Dr. R. H. Barfield, who had been appointed shortly after the Radio Research Board was founded in 1920, was in charge of the first section with two assistants, Captain S. R. Chapman and Mr. A. H. Free, while I worked with Professor J. Hollingworth in the second section. The field-strength measurements were also made simultaneously in Manchester, Glasgow and Aberdeen and sent to Slough for co-ordination and study.

A major part of the field-strength work during 1925 was concerned with measurements of the field from a long wave station (St. Assisse λ = 14.350 metres) at many places; westwards to Penzance, south to Bexhill and north to Aberdeen. The field-strengths showed a maximum to the south, a minimum in Yorkshire and the next maximum near Aberdeen. This was interpreted as an interference pattern between a reflected and a direct ray and the height of reflection was computed to be 75 km. The need for proof of this kind was illustrated during the I.E.E. discussion which followed when a well-known engineer described the idea of an ionosphere as an "academical myth".

The Radio Research Board controlled the work on similar lines to the present but the greatest difference lay in the personal relationships between members of the Board and members of the staff. These were only possible because there were so few of the latter. Two examples illustrate this point.

The Chairman for the first ten years was Admiral of the Fleet Sir Henry Jackson and he gave his personal attention to each paper that was published by members of the staff. His personal interest was extended to others engaged on R.R.B. work and it has been estimated that he dealt with over 100 papers during his term of office.

The second example occurred when plans for the second International Polar Year were being discussed. Sir George Simpson, who had been with Scott on his famous Antarctic expedition, said "A Scot who has matured in Canada for five years is the right man for this expedition". I don't know his source of information but it illustrates his personal knowledge which caused me to spend an interesting and happy year at Tromsö.

The accommodation available at R.R.S. was limited to one hut for the field-strength measurements and three huts for the D.F. measurements. There was, in addition, a small tower used for wave tilt measurements and a large workshop hut for common use. The Admiralty Compass Observatory assisted with transport and other ancillary services and we lunched in the Officers mess which, being up to the standard of a Naval Establishment, was much appreciated.

During the early days a few N.P.L. staff also working on the R.R.B. programme visited the station. However, cars were less plentiful in those days and the time-consuming journey by train kept these visits to a minimum.

An event, which later had a considerable impact on the station was the arrival in the North Park of a caravan containing the Aldershot Wireless Station of the Meteorological Office. This had been taken over from Air Ministry and equipped for research on atmospherics under R.R.B. There was also some living accommodation which was set up on the south-east corner of the Park and is now in process of demolition to make way for the M4 motorway.

At this period we had little in common with the North Parkers, beyond our allegiance to the R.R.B. They were still comparative strangers when I 'phoned in

December 1927 to tell them their building was on fire. After 'phoning the A.C.O. and Datchet Fire Brigades I went over to the scene, overtaking the A.C.O. party who were trying to raise steam for their water pump and transport it at the same time. This proved too difficult an operation and had to be abandoned when the complete fire basket fell out. We then laid out the hose for connection to the Datchet brigade which arrived shortly afterwards, only to find the hose differed in size and this too was abandoned. Fire extinguishers prevented the flames from spreading. The most spectacular part of the blaze was the 90 ft. climbable tower as it settled more and more deeply into the pyre, prevented from falling by its stays. The next year a new building containing laboratory, workshop and office accommodation and a garage for a newly acquired Morris Van was built.

The following year (1929) Sir Edward Appleton moved his frequency-change measuring equipment from Dogsthorpe to Slough and I was transferred to look after this new section of the work at R.R.S. At that time transmissions were made from the "Wireless Hut" at N.P.L. adjoining the Director's house and the associated frequency calibration was arranged by another group. At N.P.L. Sir Edward was a frequent visitor to the station and took part in long series of observations at times. One Sunday evening in chasing critical frequencies we accidentally strayed on to the B.B.C. programme to which the Director of N.P.L. was listening! This hastened our search for a local site for the transmitter.

In this process an ex-prisoner of war camp on Ascot Heath was visited and, in trying to find the owner, a (fortunately) unsuccessful attempt was made to open a door behind which was a cage of lions belonging to Billy Smarts Circus. Accommodation was eventually obtained in the Clock Tower of the Prince Albert Workshops in Windsor Great Park, "providing we hid the aerials in the adjoining trees". A more flexible measuring arrangement was devised which permitted a sequence of operations to be performed at the unattended transmitter. By measuring the frequency change at the receiver, the height of reflection could be measured at noon on a limited number of frequencies. This flexibility enabled a regular series of measurements to be started. It was emphasized that these were for experimental purposes since it was not considered proper for a Radio Research Station to operate an observatory. However, as time went on it was difficult to distinguish between the two and the measurements from the Windsor transmitter gradually "grew" until the Ionospheric Observatory was an accepted part of the programme. The year 1930 was therefore an historic one in marking the beginning of the first of this new type of Observatory which has increased in importance over the years.

The first experiments in this country using the pulse method of layer height measurement were begun at R.R.S. in 1930. In the first instance they were obtained from a transmitter which was made to "squegg". This was replaced shortly afterwards by a method of pulse modulation developed by Ratcliffe and White at Cambridge. (This was probably our Director's first contribution to the work at R.R.S).

A major difficulty at this time concerned the recording of the pulses. The cathode ray tube with its attendant power supplies, timebases and photographic attachments had not been sufficiently developed. The tubes were "soft" and had only a few hundred hours of life. The H.T. supply of 800-1000 volts was obtained from stacks of dry batteries.

A mechanical oscilloscope was used until work on the equipment for the second International Polar Year was started and a suitable C.R. oscilloscope and auxiliary equipment had been developed. The transmitter was built around the Naval Type NT 47 valves and, after its return from Tromsö, was taken over to Bawdsey when the Radar programme started. It was during my stay at Tromsö (1933) that I learned of the union of R.R.S. and part of the Radio Division N.P.L. under the Superintendent of the former.

Referring again to the staff mentioned in the beginning of this note, Captain Chapman left in 1934 to work with the late Mr. H. L. Kirke on the staff of the B.B.C. Mr. Free died in 1946. Dr. R. H. Barfield resigned in 1946 and it was recorded that he was acknowledged as a leading expert in D.F. work and was largely responsible for the lead in this field which this country held at the outbreak of World War II. Prof. J. Hollingworth resigned in 1932 on his appointment as Professor of Electrical Engineering at Manchester School of Technology. On retirement he became Emeritus Professor and is now a working Director with Fielden Laboratories.

R.N.

Robert Naismith

On 30th September Mr. Naismith will be retiring after 36 years service at this Station. Although he first came to Ditton Park in 1925 he had been associated with the work of the Station while at Glasgow University, and helped in the experiments(which he describes on page 1 of this issue) that provided Hollingworth with early evidence of the existence of the ionosphere.

When Naismith joined the staff he found no beautiful laboratories to work in; even the "Old Building" was not yet built, and everyone had to work in small huts spread about the field. He continued as an assistant to Dr. Hollingworth, working firstly on long waves and later, when the potentialities of short waves for long distance communications began to be apparent, on the study of H.F. propagation. During this period he helped to develop a field strength measuring set which worked very well despite its very unorthodox circuit.

In about 1930 Naismith first turned his attention to the vertical incidence sounding of the ionosphere, a subject which has held his keen interest ever since. 1931 found him using the Appleton-Barnett frequency-change method in a decrepit hut in the centre of West Park; the interference fringes were displayed on a Duddell oscillograph because cathode ray tubes then cost sixpence a minute to operate. Naismith did all this early work in close collaboration with Sir Edward Appleton, who was then Professor of Physics at King's College, London. The progress they made in those years will be evident to all who have read any of the numerous Appleton and Naismith joint papers which resulted from this collaboration.

After the use of pulses had become established as the normal method of sounding the ionosphere, and reliable and cheap cathode ray tubes had appeared, attention was turned to the development of automatic sounders, and in this work Naismith played a leading part. By 1945 his recorder was working with such efficiency that he regarded it as nothing short of catastrophic if as little as 1% of all possible records were missed during a month. We also have the authority of Sir Edward Appleton for saying that the ionograms produced by Naismith's recorders were the best in the world.

During the war, as well as performing his duties as officer-in-charge of the Station and in developing ionosondes, he played an important part in starting up a service for predicting the state of the ionosphere some time ahead, thus allowing the highest frequency useful for communicating between two points on the earth's surface to be estimated. The uses of such predictions during the war is still shrouded in secrecy but Naismith has left us in no doubt that Wavell's victory in Abysinia owed much to some early products of the Bureau.

Since the war he has applied himself indefatigably to improving and elaborating his predictions and to compiling the well-known Bulletin A which is highly regarded by communication engineers. Mention should also be made of his officient running of the Observatory and Bureau.

All his activities have given rise to numerous by-products and, in recent years, he has published on such diverse subjects as meteoric sporadic-E, the Giacobinid meteor showers, the effect of the ionosphere on the accuracy of Loran, and a long term variation with solar activity of certain characteristics of the ionosphere.

Naismith's service with the Station has covered nearly the whole lifetime of ionospheric physics, to which subject he has made important contributions. Even after retirement he proposes to continue his researches and in this endeavour, in his astronomical pursuits, in his motoring and in whatever else he undertakes we wish him well and trust that he will enjoy many years of happy retirement.

A.F.W.

THE BRIT. I.R.E. SPACE CONVENTION

During the first part of July a four day convention on Radio Techniques and Space Research was held at Christ Church, Oxford, by the Brit. I.R.E. Dr. Pressey, Mr. Golton and Mr. Hall attended.

The convention was divided into seven sessions, five of which were attended by our representatives. These sessions included papers under the general headings of Satellite Engineering, Extra-terrestrial measurements, and Techniques of Radio Astronomy. A total of about 40 papers were presented including a contribution by Dr. B. G. Pressey entitled "Radio Tracking of Satellites".

The convention attracted about 250 delegates including quite a large number from overseas. In fact many of the most important papers, particularly those giving new results, were presented by U.S. delegates. The U.S.S.R. was also represented; K. I. Gringanz gave some results of Soviet rocket and satellite experiments, and some new radar measurements on the planet Venus were described by V. A. Kotelnikov.

In general the British contributors seemed to be rather short of results and mainly contented themselves by describing their plans for future experiments. Several experiments to measure the U.V. and X-radiation from the sun and from stars are being developed and an interesting Radio Astronomy experiment is to be flown in a Scout satellite.

The convention, on the whole, was well organised but it was a mistake to arrange such a large number of papers. Because there were so many, few speakers were allowed more than ten minutes and the discussions, which should be the most important parts of such meetings, were not nearly long enough. In fact, few useful contributions were made from the floor although the papers themselves were often very interesting.

The full proceedings of the convention are to be published shortly in the Journal of the Brit. I.R.E.

J. E. H.

The following is an extract from the "Good Morning" sheet issued on board the "Stratheden":

"SATELLITE TRACKING STATION

In yesterday's Good Morning sheet, an article told you about the meaning and use of Radar Equipment. You may be interested to know that on board, there are four passengers who work at the place where Radar was originally invented.

Mr. Greenan, Mr, and Mrs. Hale, and Mr. Purvis are members of the department of Scientific and Industrial Research, and have been working for the past 2-3 years on various research projects concerning radio at the Radio Research Station at Slough, Bucks. They are now travelling to Singapore to establish an artificial Earth Satellite Tracking Station. This Station will be one of many scattered throughout the world and will record the Radio signals transmitted from earth satellites launched by the United States of America. Much of this work is covered by the Official Secrets Act, and therefore, they are unable to give as much detailed information as they would like.

Of general interest earth satellites, which have a nearly circular orbit take about 89-120 mins. to make one revolution of the earth, and it was in a satellite with a period of about 89 mins., that the Russian Major Titov was launched on August 6th. Owing to the speed at which the satellite circled the earth, Major Titov saw 17 sunrises and sunsets in 25 hours.

Due to the high cost of launching such satellites around the world, (approx. a quarter of a million pounds), reception must be maintained, and it is for this reason that a Receiving Station is being installed at Singapore."

THE ANNUAL REVIEW

Each year, near Christmas, a small wave of excitement breaks over the Station and the magic word 'Promotion' is frequently heard. The recent appearance of Annual Confidential Reports (ACR) is the very first harbinger of this annual event. It may therefore be of interest at this time, especially for newly joined staff, to outline the procedure which leads to the list of successful names which, to most of us, always seems far too short. The details given here apply only to the scientific, experimental and assistant classes and, even amongst these classes, do not apply to promotions above P.S.O. and S.E.O.

The broad outline of the procedure, commonly called the Annual Review, has been evolved over many years and is the result of much discussion and agreement between the Staff and Official Sides of the Departmental Whitley Council. The very first stage in the proceedings takes place early in August when the ACR's are circulated to staff so that they may check the personal information which has been previously entered on the front page of the form by Establishment Office.

The ACR is then passed to the Reporting Officer who is normally the immediate senior of the person concerned. A comprehensive report is made on all aspects of the Officer's work and behaviour and an indication must be made as to whether promotion is merited.

The next stage is with the Countersigning Officer. Here the remarks of the Reporting Officer are scrutinized and any differences between them and the opinions of the Countersigning Officer are recorded. At this stage, too, any recommendation for promotion may be endorsed.

At the third stage, the ACR is examined and commented on by the Station's Director who may also make his recommendation for promotion. It is the responsibility of both the Countersigning Officer and the Director to counteract any large discrepancies which may have occurred in the standard of reporting.

This completes the exercise at Station level. From here on all ACR's and recommendations for promotion are considered at H.Q. by three Panels which advise the Secretary of the Department. Panel A deals with all promotions within and to the Scientific Class; Panel B with promotion from E.O. to S.E.O., and Panel C with all other promotions. Each Panel consists of a number of senior officers from various Stations with a senior member of the Headquarters Establishment Division as chairman.

It usually takes each Panel four or five days of intensive work to consider all recommendations and reports from every Station. Headquarters records are scrutinized and the Station concerned is consulted if further information is required. Quite often individuals are interviewed personally by the Panel. The prime concern of the Panels is to ensure that fair and uniform standards are being applied throughout the Department. It may be noted that the careful scrutiny of each case by the Panels occasionally results in the promotion of officers not originally recommended by their Stations.

Finally, the conclusions of the Panels are notified to the Directors of Stations who may, at this stage, appeal against the findings. The final list of promotions, which are effective from 1st January, are normally announced a few days before the Christmas holiday.

It can be seen that quite elaborate precautions are taken at every stage in the procedure to ensure that every case is treated as fairly as possible. Even so, as in all human decisions, errors of judgment may arise and, as a final safeguard against this, a mechanism exists whereby an officer may, if he considers it justified, make a personal appeal against his non-promotion. His case is submitted to an Appeals Panel set up by the Secretary of the Department who gives a final ruling.

Although, naturally enough, promotion is always considered as the most important end product of the Annual Review, it should be borne in mind that a no less important aspect is the continual scrutiny of the development of each

/officer

officer in his career. This enables the possible transfer of an officer to a different type of work for which he may be better suited or providesan indication of the fields in which he may need to improve his efforts. In short the Annual Review should result in a happier and more efficient officer.

G.B.

EXAMINATION RESULTS

Congratulations to the following on their successful examination results:

Graduateship Examination of the I.E.E. - Mr. J. E. Goodyer

Graduateship Examination of the Brit. I.R.E. - Mr. J. E. Goodyer

Higher National Certificates awarded:-

Mrs. E. M. Adams (Applied Physics)
Mr. C. Hale (Elect. Eng.)
Mr. J. A. Maris (Elect. Eng.)
Mr. M. A. Tracey (Elect. Eng.)

Ordinary National Certificates awarded:-

Mr. A. Baber (Elect. Eng.)
Mr. D. L. Brown (Elect. Eng.)
Mr. J. F. Gaynor (Elect. Eng.)
Mr. K. Slater (Elect. Eng.)
Mr. R. J. Weston (Elect. Eng.)

Mr. D. L. Brown was awarded a Technical State Scholarship on the results of his O.N.C. examination, following which he is resigning to take up a course with the General Electric Company Limited.

General Certificate of Education, 'A' Level:-

Mr. G. M. Webb (Pure Mathematics)

The following are to be sponsored by D.S.I.R. for sandwich courses:-

Mr. A. Baber, Diploma in Technology, Electrical Engineering, at Brunel College of Technology

Mr. G. M. Webb, B.Sc. Special Physics degree at Chelsea College of Science and Technology.

LETTER TO OUTSTATIONS

R.R.S.,
Slough.

15th September 1961

Dear Colleagues,

This is the first of a regular series of letters in which I hope to give you news of the Station which you otherwise might not know about. One of the difficulties in editing the Newsletters is that it is easy to forget that what is obvious to the staff here may not be so to outstation staff.

The changes here that would most surprise you might be called "operation CAT". For months past giant bulldozers have been destroying buildings and uprooting trees on the edge of the Station grounds, in a sector roughly centred on the main entrance gate. The outlook from the Station in this direction has now changed from rows of trees to rows of houses. Following the bulldozers came the giant CATS. These are bright yellow articulated creatures designed to scrape surface material and pile it up in their bellies. Owing to some defect in their design they can only half-fill themselves under their own power; to fill themselves right up they need extra push. For this purpose tiny bulldozers gather round and push them from the rear, like a small boy helping his mum up the stairs.

After the CATS had stopped their scraping and left smooth hills of earth tidily on the horizon, a new monster started to dig a truly magnificent hole across our exit road. Those privileged to watch its progress from the administrative block could see this THING slowly disappearing into the earth. It has a vast underslung jaw with great gappy teeth and moves with a sort of awesome lethargy like a dinosaur on its thousandth sandwich. It has now disappeared, but whether it buried itself in the bowels of the earth or merely crept tiredly into the Contractors' sheds we shall never know, since a collection of mere men are now pouring concrete into the hole.

The object of all this activity is, of course, the making of a new road and the object of the hole - this hardly seems credible - is to make a bridge for us over a ditch. When some of you finally return here you will find that access to the Station is by a very devious route as a result of all this work, but no doubt perseverance combined with compasses, ordnance maps and other navigational aids will get you to the front door in time for lunch.

Your obedient Servant,

The Editor

STAFF NEWS

Congratulations to: Mr. E. Hammond on the birth of a daughter, Ruth Madeline, on 10th September at Upton Hospital
Mr. R. J. B. Champion on his promotion to Acting E.O.
Mr. G. Bazzard on his A.M.I.E.E.
Mr. F. Kift on the John Hopkinson award from the I.E.E.

Recent Arrivals: Welcome to: Mr. R. W. Appleton (T/S.O.)
Mr. J. B. Jones (A.E.O.)
Mr. R. Lindgren (S.O.)
Mr. R. J. Messias (T/A.E.O.)
Mr. J. K. Oatley (Exec. Officer)

Departures: Mr. J. R. Herd (T/Asst.(Sci.))
Mr. M. D. Oliver (T/Asst.(Sci.))

/Movements

Movements

The Director left for Japan on 31st August and is expected to return on 17th September.

Dr. Saxton left for a visiting professorship in the U.S.A. on 1st September. He will probably return in June 1962. Mr. Wilkins is acting as Deputy Director in his absence.

Mr. Dalziel attended discussions in Paris on 9th and 10th August.

Dr. Pressey was in Washington from 29th August to 3rd September.

Mr. Dickinson attended a Munich conference between 27th August and 1st September.

Mr. Gaynor left for duty in Singapore on 1st September.

Messrs. Brackstone and Aria have now arrived for duty at New Delhi.

Messrs. Champion and Pender are now at the Inverness Substation, from which Mr. Samuel has returned to Slough.

Mr. Harrison and Mr. Reader have now arrived home from Singapore.

Visitors

Drs. O. K. Garriott and K. Kreielsheimer have now left the Station.

Mr. Vickerstaff (F.I.D.S.) is under training at Inverness.

Mr. G. Bazzard (Room 37) has become Deputy Editor of the Newsletter.