R. R. S. Newsletter

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

No. 44

December, 1964

Once again with the arrival of Christmas we naturally pause to think what we have done during the year that is coming to an end. It has not been without success. The equipment installed in Spur A has been put to work and has provided a valuable service to those who have experiments in the satellite Ariel II; with staff numbers which are now adequate, Winkfield has achieved an output as great as any Station in the Minitrack system; the one-hundredth Skylark rocket, launched from Woomera, carried two of our experiments very successfully and they have provided most interesting results; analyses of the topside records from Alouette and the new satellite Topsi continue to provide new knowledge; from the theorists we have had several important contributions, including additions to our knowledge of the D-region and of the behaviour of plasmas; the long spell of good weather was put to very good use by those who work at Cardington on the tropospheric experiments and they brought back some interesting results. These are only some of the highlights; most of our other projects are progressing well and the list could be considerably extended.

The success of the Station's work is reflected in the unusually large number of promotions. One to C.E.O., two to P.S.O., two to S.S.O., one to S.E.O. and six to E.O. Mr. Ashwell's promotion to C.E.O. has given us all especial pleasure and emphasizes the tremendous importance to the Station of those skilled in the art and science of Electronics.

The Open Days in June seemed to be appreciated by our guests and showed all of us and our families something of the Station's work.

With this Christmas number of the Newsletter I wish to send my best wishes to all members of the Station and particularly to members of the Outstations for their continued success and happiness and I hope that their work will continue to prosper as well as it has done during the last year.

A Happy Christmas and a successful and prosperous New Year to all.

J. A. Ratcliffe

THE END OF ACTION AT A DISTANCE

One hundred years ago on the 8th December, 1864, the paper 'A Dynamical Theory of the Electromagnetic Field' was presented to the Royal Society by James Clerk Maxwell. Jeans later referred to this as 'probably the most important and far reaching paper (Maxwell) ever wrote'. It is true that, in the years that followed, the theory was enlarged to form part of the great Treatise on Electricity and Magnetism published in 1873, but the paper of 1864 can be looked upon as the culmination of a series of investigations made by Maxwell during the previous decade, which in turn refined and clarified earlier work of Faraday and Kelvin.

The theory as advocated by Maxwell did not appear as a sudden enlightenment. Many continental workers regarded as retrograde the steps taken by this group of British physicists ever since Faraday's discovery of induction in 1831. In the seventeenth century, Newton proved the validity of his inverse square law for dealing with gravitational forces. He never claimed to know how the forces were transmitted The doctrine of Action at a Distance, specifically rejected by him, was enunciated by Cotes, in the preface to the second edition of Principia in 1713 and became associated with the triumphant progress of Newtonian Mechanics. The basis of this idea was that the gravitational force of one body acted upon another body, at a distance, instantaneously, and without affecting the space in between.

In 1785 Coulomb showed that electric and magnetic forces obeyed the inverse square law. This fact and the action at a distance concept, were powerful tools in the hands of such men as Laplace, Poisson and Ampere in their work on electric and magnetic forces. In 1828 Green showed that Lagrange's idea of potential, as developed by Laplace and Poisson, was applicable to electric and magnetic theory.

The discovery of electromagnetic induction in 1831 was a major blow to the distant action theory and Faraday realised it. Space near a magnet was evidently radically altered in some way. He dealt with the problem by introducing the idea of lines or tubes of force and spoke of space transversed by such lines as being in an electrotonic state. Early in 1832 he considered it possible that electromagnetic forces were propagated in a measurable time and by a vibratory mechanism. These thoughts he confided to a sealed letter left with the Royal Society and not opened until long after his death.

Kelvin first contributed to the subject in 1842 when he showed that distribution of electric forces were analogous to thermal flux. Three years later, Faraday was able to show the rotation of the plane of polarization of light by a magnetic field, and in 1846 published 'Thoughts on Ray Vibrations'. In this work he considers 'radiation as a high species of vibration in the lines of force' and suggests that only lateral vibrations can explain polarization. These ideas were further developed in a paper 'On the Physical Character of Lines of Magnetic Force' written in 1852. Prior to this Kelvin

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had prepared a paper showing that the strain propagated in an elastic solid was an analogy for electric and magnetic force, and in a covering letter to Faraday in 1847 suggests that if it could be the basis of a physical theory, together with a wave theory of light it might explain magneto optical effects.

By the 1850's Faraday and Kelvin were the main opponents of the action at a distance theory which had endured for one hundred and fifty years, and was supported by nearly all the leading European physicists. In fairness it should be added that Weber and Neumann had managed to interpret inductive problems using the old method, and that in 1867 Ludwig Lorentz derived equations essentially similar to Maxwell's using a logical development of the Gauss-Weber-Neumann school.

Maxwell's first contribution was made in 1855; it was 'On Faraday's Lines of Force'(7) and showed that the new principle could lead to the same results as action at a distance. Despite this, most people felt as did Airy, the Astronomer Royal, who found lines of force 'vague and varying' as opposed to the 'simple and direct' method of the old school. A striking comment appears in a letter from Faraday to Maxwell in 1857. In it he says that he hopes to experiment on the 'time required for the assumption of the electrotonic state .... (which) must probably be short as the time of light; but the greatness of the result, if affirmative makes me not despair'.

It is not until after Maxwell's appointment to the Chair of Natural Philosophy at King's College, London, that his next paper on Faraday's concepts appears. This was the paper of 1860 'On Physical Lines of Force' in which a mechanical analogue was proposed showing the interaction between electric and magnetic forces in terms of motion of rotation and translation of 'idler' bearings (electric particles) which enabled adjacent cylinders (magnetic forces) to rotate in the same direction. This concept could demonstrate induction phenomena, but the most striking inference was that a change in electric force produced a magnetic force.

He considered the instant of polarization of a dielectric in a condenser. At the moment of charging there would be a change in electric force, which, it seemed, must bring into being a magnetic force (the equivalent of a current flowing) during the act of displacement of electricity in the dielectric between the condenser plates - even if that were a vacuum. In Maxwell's own words 'though electricity does not flow through (insulators) the electrical effects are propagated through them'.

Examination of the force required to produce a given displacement led to the derivation of the ratio between static and dynamic measures of electricity and to the fact that the electrical effects could be treated as if propagated in the form of vibrations in an elastic medium, with a velocity very close to that of light. To quote again 'we can scarcely avoid the inference that light consists in the transverse undulations of the same medium which is the cause of the electric and magnetic phenomena'.

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The paper of 1864 refines and developes these themes and is the culmination of this phase of Maxwell's work. The term 'electromagnetic field' appears; as does 'dynamical theory' 'because it assumes that in space there is matter in motion by which the observed electromagnetic phenomena are produced' . The useful mechanical model was dispensed with, having done its work. One aspect of Maxwell's genius was his ability to avoid being dominated by particular concepts once they had served his purpose.

Electromagnetic field properties are described in a series of equations from which follow the theory of light, and generous acknowledgement is given to other workers - particularly to Faraday and his Thoughts on Ray Vibrations. For a group of British physicists the doctrine of action at a distance was demonstrably dead.

For many however the electromagnetic theory remained an undesirable curiosity. The requirements of an elastic medium smacked of Cartesian, if not Aristotelian antiquity and it was not until after the work of Hertz that it became generally accepted. By this time Maxwell was dead. At the end of the century, phenomena were observed which defied his theory and required the creation of a physics of discrete particles; nevertheless the dynamical theory of the electromagnetic field 'must remain for all time one of the greatest triumphs of intellectual endeavour' - Thus spoke Max Planck.

Vacuum

Experiments of several groups at R.R.S. are using vacuum techniques, and as these techniques never fail to arouse interest in bystanders and onlookers it seems that a few words about the nature of vacuum and the methods used to obtain them could be of general interest.

I do not think the approach: "vacuum - there's nothing in it" followed by a blank page would be worthy of the newsletter. I also wish to avoid the tendency to degenerate to "this month's useless facts" level (for example in every cubic centimetre of air we breathe there are 26,872,435,287,310,696,767 molecules, which is much more than all the people ever born even if laid head to tail from here to Mars).

Before one can talk about vacua one must specify the units to be used. I will use the "millimetre of mercury" since this is in general use. 760 mm Hg is of course Atmospheric Pressure and roughly one Bar; or if one is a meteorologist, 1,000 milli Bars, or again, if one works at N.P.L., a million Baryes perhaps. In France they use Pascals. This cannot be attributed entirely to nationalistic fervour since a Pascal is a Newton per square metre and Newton was not French. Italians and many others, use the Torr to avoid confusion (Sic). This is equivalent to the mm Hg if the mercury is being used at $0^{\circ}C$ (e.g. during a heating failure).

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Like much of the physics one learnt at school the "law" that "nature abhors a vacuum" is largely a fallacy except where weak-walled vacuum vessels are concerned. At altitudes only 500 miles above the earth's surface the gas pressure has fallen to 10^{-9}mm Hg, which is a pretty respectable vacuum by laboratory standards. In interplanetary space there are only about 100 particles per c.c. This corresponds to the lowest pressure ever claimed under laboratory conditions. Such claims are not yet acceptable because at pressures below 10^{-9}mm Hg the problem of producing the vacuum is surpassed by the difficulty in measuring it. The "law" taught at school should be that "nature abhors attempts to measure a vacuum".

For the benefit of readers with an historical bent I will remind you (for you must have known it at some time, if you have an historical bent), that Von Guericeke in about 1650 demonstrated at Magdeburg that wild horses would not pull a vacuum. He pulled his vacuum with a simple piston pump, like a bicycle pump in reverse. Zorvicelli's method had previously produced a vacuum above a 760 mm column of mercury in a sealed tube, and much later Zoepler and Geissler made a pump which laboriously evacuated two glass spheres alternately by forcing mercury up and down in them. However Von Guericke's pump was the only practical pumping principle in use from 1650 to 1905 when Gaede produced the first of his remarkable series of inventions. The first was a rotary pump like a water wheel, using mercury as the pump fluid. This was followed by a rotary pump using oil as the fluid, and with an eccentric rotor. This is the basis of the fore-pumps in general use today. Its principle of operation is not unlike that of the Wankel engine, used in some new small German cars (If you try to find out the principle of operation of the Wankel engine they will tell you that it is not unlike a rotary vacuum pump...).

Gaede also invented the "molecular" pump which used a dry, high speed rotor to knock the molecules up a pressure gradient. This was an expensive precision instrument which could achieve 10^{-6}mm Hg but was not applied commercially.

Gaede's final, and most important invention however, was the diffusion pump. A jet of heavy vapour from boiling mercury or oil is directed against the pressure gradient, and gas molecules colliding with the jet are driven to the high pressure region from where they can be pumped away mechanically. Pressures down to 10^{-9}mm Hg can be obtained with diffusion pumps, provided that the backstreaming vapour from the pump is condensed before it reaches the vacuum system.

Since Gaede, the only new pumping principle to be invented is the ion pump. In this the gas is ionized by an electron beam, and the ions are firmly thumped into the wall, where they stick. They may then be buried in a layer of titanium deposited by firing a "getter". In this way exceedingly low pressures can be achieved in the 10^{-12}mm Hg range.

When dealing with vacuum equipment one is always conscious of the amount of work needed to achieve good vacua. This is measurable in man-hours

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perhaps, but a more physically significant form of work is "force X distance", and hence pressure X volume for the vessel concerned. When one looks at the numbers one finds that the large vacuum tank is Spur D, for example, when under vacuum, has enough energy stored up to shoot it and its pumps 80 feet vertically upwards. (This does not allow for work done in making a hole in the ceiling on the way out!) I hasten to add that the vacuum tank was built to B.S.I. standards, so that the chances of spectacular levitations in Spur D are remote unless someone goes berserk with a sledge hammer near a viewing port.

Unfortunately space does not permit me to enlarge for example, on measurement of pressures, experimental methods etc. etc. In fact this article must be quite remarkable for the amount of information left out. Perhaps an opportunity will occur again before long for a discussion of these topics. This must be judged by the effect which this article has had on the state of knowledge, or interest shown by the bystanders and onlookers who will doubtless continue to stand by and look on.

P. G. Dickinson

Summer Vacations

That first summer was really tame - just a quiet job in a backwater on the Kent coast. In the guest house where I was working the hours were somewhat unusual. We rose early and were hard at work cleaning common rooms, entrances and the dining room before breakfast. There were the last few things to be set on the tables and the sandwiches to prepare for the day's packed lunches. Soon the sleepy headed guests appeared for their meal and we chased hither and thither with cereals, toast and bacon and eggs, not to mention pots of tea and coffee. When the walk started early they were all gone for the day before we had even finished the washing up and we could begin on the real work - cleaning up the chaos of the bedrooms. It is really unbelievable how much mess a family of hikers can leave behind in the morning - not only unmade beds, dirty clothes and cigarette ash, but spilt cosmetics and the remains of yesterday's packed lunches were also to be found on some floors. With a short break mid-morning to revive us, we persevered until lunch, by which time we had generally completed the major tasks.

Usually, only the staff were in for lunch so this was a simple meal with not too much cleaning up. Then, except for the poor soul on "orderly duty", who stayed and made butter balls or packed cakes, and answered the 'phone, we departed for the great world outside. We were free to sleep, stroll in the sun, or swim in the enormous breakers that crashed on to the shingle beach over the road. Back on duty again in time to prepare for dinner, and then we were free to join in the hectic evening of guest activities as soon as the washing up was

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done. This could mean anything from the weekly concert - sketches, musical items and monologues - to country dancing - covering everything from the Valeta to Strip the Willow. It was not surprising that we all slept very well when at last our heads touched pillow.

All the staff had a day off each week. If we wished we could then join the guests and roam the countryside, or spend a lazier day in a nearby town attempting to replace lost energies. I generally chose to accompany the guests into the beautiful Kent countryside, and managed during my stay to visit such diverse parts as the Pilgrim's Way, Dungeness, and the white cliffs of Dover. All too soon I had to depart as the new term was about to commence. By way of relaxation I opted to cycle back to Manchester (my home is in Southampton a mere 200 miles away). My friends all thought I was mad - perhaps they were right - but I enjoyed the journey across the Wiltshire plain, touching the Cotswolds, and so into the rolling Midland farmland.

I took this opportunity to visit distant relations, and also stayed in Youth Hostels - most of which were practically empty by then. The new Cathedral at Coventry was a place I had wanted to visit all summer. At first I did not like it all, but having returned several times since, I find it grows on me. The shopping precinct too was the first I had seen of the kind - an admirable idea. I only wish there were more. Contrasting sharply with the collieries and slag heaps was the beautiful city of Lichfield with its wonderful Cathedral. Not so far away I was back in the filth and grime and choking atmosphere of industrial midlands. I had reached the pottery towns. The traffic, the smoke, the filth and the wind that blows it all towards you wherever you may be, has to be experienced to be believed.

Eventually, however, I did manage to escape and spent one last night in a Hostel far out in the Derbyshire Hills. Here it was wild, beautiful, clean and fresh. My short stay was soon over and I sailed down, down, down into Macclesfield and then home.

Next year was a far more adventurous one. First a long weekend in Surrey with time to roam up hill and down dale, through woodlands and over downs. Up with the lark and to bed again when the stars set. We had no ties or clocks to bind us - only the shadows in the garden told us when the day was fast waning. Meals were eaten at most odd times - when 'decent' folk were sitting down to Sunday lunch our tousled heads would emerge from sleeping bags and demand eggs and bacon. Much later that day - or was it early the next - roast chicken was ravenously devoured by starlight.

This was just a taste of what was to follow - ten days of frantic conference, where all the students who took part were hard at it, talking, reading, listening and thinking for twenty hours out of the twenty-four. It was here that we heard about the West Indies, about Rhodesia, about South Africa. We discussed Nationalism, Neutralism, and Neo-colonialism. Many became strong supporters of Anti-Apartheid, and still more vowed to learn more about fellow students in other lands and their political difficulties. Recruits for service

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overseas were many - if we lacked all else we did have enthusiasm. Even now, well after the event, I can look back on that conference as one of the most memorable of my life.

All summer I had yearned to go abroad. All summer too I had wanted to do something constructive in my vacation, something that was beneficial not solely to myself. So it came about that I went to Germany to work in work camps. Arriving at Wörrstadt, a little town near Mainz, late on Sunday evening, I was greeted by a deserted building site with (I thought) not a hope of finding any humans until the morrow. My total German vocabulary being 'nein' and 'ja'. I hardly felt competent to ask the old man who was passing where I might find the students. As I neared the first house however a figure emerged and spoke to me in English, much to my relief. I learnt that the girls slept in one house and the boys in another, and that we were working on the adjacent, partly finished buildings. This was to be a settlement for refugees. Each refugee was obliged to put in at least 1000 hours on the site and voluntary aid (us) counted for a good deal more.

For three weeks we dug foundations and filled them in again - with rare sessions of carting concrete and brick laying thrown in for good measure. The work was hard and boring but it was worthwhile because we were helping those in need. Also it was a marvellous opportunity to meet and live and work with people of other nations. We had Americans, English, French and Germans at 1' camp - plenty of contrasting temperaments. Many impressions were exchanged and we all learnt a good deal about the lives and attitudes of those we met.

We will all remember the visit to the Rhine, to the local Rathaus for a celebration with the council, and to the Bachfischefeste in Worms. This wine and fish festival is also a teenage festival with plenty of amusements, lots of fish, and above all vast quantities of local wine.

It was with great reluctance that we parted and went our separate ways the next day. I travelled northwards to the lakes and forest near Kassel. The camp there was endeavouring to build a youth centre way up on the hillside above a lake. We lived in tents and had the luxury of running water only occasionally. Sadly my stay was short - 'volunteers wanted to make up the numbers at a camp between Hanover and Hamburg' came the urgent message from Headquarters, so off I went again, passing a few happy hours with friends in Einbeck on the way.

Oerbke bei Fallingbostel is a small village close to the Autobahn, best known I suspect because of the N.A.T.O. camp on its outskirts. We were camping close to the N.A.T.O. barracks, and their canteens supplied our food - less work for us but dreary food. The objective now was a wall round a Russian war cemetery. Deep in the woodland about a mile from the tents was a memorial to soldiers who died in the last war. It had been decided to preserve the area from devastation by passing tanks by erecting a wall around the edge and planting grass inside it.

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The daily trek from the tents to the ground through boggy fields was the most exhausting part of the work as my arms had gathered strength after shovelling clay for three weeks previously. It was a most horrible place to work - one was always conscious of the fact that it was a cemetery and we found nearby the graves of several Polish children. The army used this land on the verge of the Lüneberger heath for its autumn manouvres, which began while we were there. Day and night the tanks came thundering down the roads and we lived in constant expectation of a surprise attack from soldiers hidden in the trees. We had first become conscious of the American army in the Rhine Valley, and now, being so near a large N.A.T.O. camp on exercises, we just could not miss the soldiers. The effect was heightened by visits to Belsen, a cold bleak place where no birds ever sing, and to the border at Lübeck. How anyone who has ever seen that border can ever forget it I do not understand. It certainly remains indelibly imprinted on my memory.

The camp was small, twelve in number where my first had been twenty-two. Yet we came from nine different nations - Norway, Germany, England, France, Algeria, New Zealand, Denmark, Holland and Jugoslavia were all represented. Language was an amusing problem. A pidgin version of English, French and German soon became standard and we all had great fun laughing at each other's misunderstandings. Our diversity was binding. We had so much to share with each other that six months would hardly have been long enough. It is surprising too how much one learns about oneself when attempting to translate and explain to a foreigner.

This year I ventured even further afield. A student charter flight took from London to Athens via Amsterdam. In Athens I met up with a friend who had just attended a radio-astronomy conference there. A few days in the sweletering heat of Athens, living in the Youth Hostel Annex - a building absolutely indescribable - it must be experienced to be believed - were my first taste of the Mediterranean. At the week-end we set sail for Haifa - deck class of course. We soon made friends with the other students and young teachers on board, and spent many happy sessions together folksinging to guitars. The Mediterranean was bluer than I had believed possible and the stars at night so bright that they seemed about to fall upon us. We were able to go ashore at Rhodes and wander through the old town. The short narrow streets were delightfully cool after the scorching sun on the beach, and it was here that we really began to see how the Greeks lived - Athens is far too cosmopolitan.

Cyprus was in a state of unrest at the time of our arrival and so we could only stare at the dry hillsides from the safety of the deck. We put in for a short while to unload a car and then beat a hasty retreat watched carefully by the U.N. guards.

Next morning found us in Haifa, another big modern port and city of the type we tried to avoid. Off we set for Nazareth and Galilee. The green

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farms and kibbutzim on the shores contrasted almost miraculously with the rocky slopes above. All was so peaceful there on the shores of that vast lake that one could imagine it 2000 years ago much as it is today. Of course there are temples and shrines and churches all over the place, but even these do not dominate except perhaps in Nazareth. The fertile hills round Zaphet too have much scenic beauty.

Jerusalem is a large sprawling modern city. Most of the old buildings lie in Jordan, so we were unable to visit them. Only the Mea Shearim, the orthodox quarter, remains on the Israeli side. One is likely to meet with stony stares here if wearing unsuitable clothes as the inhabitants have very strict ideas on the dress and place of women.

South again to Beersheba on the edge of the Negev. A Bedouin cattle market takes place here every Thursday at about 3.00 a.m., and this is the time to see the Bedouins en masse with goats and sheep and camels. In the desert their little black huddle of tents can be seen for some distance.

Wavering but a little in the heat we decided Eilat was a must. The coach across the desert takes about five hours and passes through some of the most fantastic scenery I have ever seen. The wind has eroded the rocks and mountains and blown the sand into weird and frightening but wonderful shapes. Even in the township of Eilat one can still sense the power and the might of the desert. Further south than Cairo, looking at corals on the floor of the Red Sea from a glass bottomed boat - that is how we spent our day in that remote spot. The sun is so hot and the wind so dry that one wants to drink all the time. The only alternative we could find was to get in the water and stay there. A few miles away on the other side of the border shone the lights of Acaba and yet it might as well have been the other side of the earth.

We were always conscious of the border in Israel. Down in Eilat where one could see it, in Jerusalem where there is a wall dividing the two halves of the city, and further north where there is frequent trouble with the Syrians. The Israeli's are militant as a people. Perhaps this is the result of National Service for everyone, or of their fight for their land. Somehow we were offended to find such a military manner in a country famous for its kibbutzim - large cooperative farms where all is shared, work, profits, housing and entertainments. We were only able to visit a kibbutz for a few hours in our short stay. Although we talked much about them with people we met, we regretted not having had the first hand experience of living and working in one. Even had we found, as some do, that our desire for private property and privacy itself overcame our community feelings I am sure it would have been a worthwhile and enlightening experience.

The homeward trip was necessarily rapid. From Israel back to Greece where we stayed again for two days. Patras to Brindisi on yet another Greek boat and then up the east coast of Italy to the plain of Lombardy, Milan, Como and Switzerland. Barely twenty-four hours to drink in the superb Swiss scenery and off through Germany and Belgium back to Dover. It was only the smell of British Railways and fish-and- chips that really convinced me I had arrived safely home again.

V. M. Lovell

STAFF NEWS

Congratulations to:-

Mr. and Mrs. Derek Rees on the birth of their son, David Lewis, in Singapore, on 10th November 1964.

Derek Thorpe on his marriage to Miss Mary Herbert, at St. George's Church, Hedstone, on 21st November .

Chris Comer on his marriage to Miss Nora Biggs on 14th November at Port Stanley.

John Reed and Kathy Rice on their engagement.

Mr. G. E. Ashwell on his promotion to C.E.O.

New Staff

Welcome to:-

Mr. B. E. Leadlay	T/S.A.
Mr. M. R. Bowman	T/S.S.O.

Resignations

Mr. M. G. Everitt	T/S.A.
Mrs. F. Richards	Part-time Typist II
Mr. A. G. Golding	T/A.E.O.

SPORTS AND SOCIAL CLUB

Smith-Rose Competition

Two important events coming up soon. The Bridge and Table Tennis tournaments will be held shortly after Christmas, being organised by Mrs. Fooks and Chris Lovett respectively. Please watch the notice board for further information.

A. B. Lowe

Bridge Club

Club evenings were held on 13th and 27th November and the next will be on Monday, 14th December. The first matches in the N.P.L. Inter-Divisional League were played on 10th November when the R.R.S. team, Dr. Dickinson and Mr. Zavody and Mr. and Mrs. Gordon-Smith, were placed fifth. The next matches will be played on 15th December.

R.R.S. played against the Road Research Laboratory on 30th November at Harmondsworth and won by 2150 points. The team was

Dr. Dickinson and Mr. Zavody
Dr. and Mrs. Fooks
Mr. and Mrs. Gordon-Smith
Mr. and Mrs. Venables

The first club evening after Christmas has been provisionally fixed for Friday, 8th January.

Jean Fooks

Scotch Porridge (Scottish Dancing) Beats the Cold

(7 p.m. alternate Mondays, 4, 18 Jan.)

Hark when the night is calling,
Hear, hear the pipes a-calling,
Loudly and proudly calling,
Down through the glen,
There where the hills are sleeping,
I'll feel the blood a-leaping,
High as the spirit of the old Highland men,
Bowing in gallant fame
Scotland my mountain hame
High may and proud,
But as beautifully wain.
Land of my high endeavour,
Land of the shining river,
Land of my heart forever,
Scotland the Brave.

(or Jimmy Shand and his Band)
(Canteen)
(You'll need to sleep)
(high pressure)
(no spirits, just tea)
(curtsying actually)
(home for premier)
(very good we are)
(our gallant set will never give in)
(we try very hard)
(try Daze on the Clyde)
(mine's in its right place).

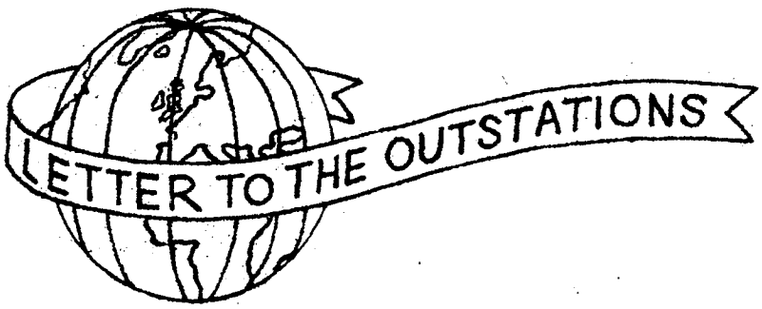
High in the misty Highlands,
Out by the purple islands,
Brave are the hearts that beat
Beneath Scottish skies.
Wild are the winds that greet you,
Kind are the friends who will greet you
Kind as the light that shines,
In fair maidens' eyes.
Bowing in gallant fame
Scotland my mountain hame,
Start off the day with piping
Scotch porridge oats.

(no smoking please)
(you will not be cold after this)
(O. K. so who's a coward)
(no comment)
(Jolly Old Pals)

(poetry, sheer poetry)
(notoriety more like)
(England forever)

(can you come please)

R. Street



Dear Colleagues,

I had thought to begin this letter with the unoriginal comment that it is only so many shopping days to Christmas. (Come to think of it this seems to be what I have done). This shopping information, useless at any time, must be doubly so to our farthest flung members who may not receive their Newsletter until next year.

Anyhow, the Season is moving in upon us. This Saturday sees the Annual Dance and though it will not be fraught with such feelings of chance and change as was the Duchess of Richmond's revelry some years ago, it will almost certainly be the last such festivity we shall hold under the regime of D.S.I.R.

Plus ça change ... etc. This sentiment has often brought comfort to Civil Servants faced by impending change; but this time, we feel, things will not be just the same. For good or ill Trend appears to have triumphed. We shall, at any rate, be presented with a splendid opportunity to say 'it couldn't have happened under the Old Regime', when some administrative anomaly is discerned. This is a good thing - it lets off steam and makes us more ready to bear with the cause of our complaint.

So, then, D.S.I.R. is passing. Given luck it will undergo the apotheosis appropriate to any well intentioned institution. It will be one with Periclean Athens and the Bedford Music Hall. A faint golden glow is even now creeping over the title, and in this aura it seems opportune to wish you all a Merry Christmas and a Happy New Year from,

Yours sincerely,

The Editor