

# **WIRELESS** *for the* **WARRIOR**

**Pamphlet Series**

**No. 1 The 'Goldstone' paper**

Cover and layout: Louis Meulstee.

Cover illustration: Limber part of Mk.I W/T Wagon Set. Note a Marconi Multiple Tuner on the operator's table in the centre right. (1910-1913).

The cover artwork and layout of this publication was prepared in Serif Pageplus X8 using Times New Roman, Arial and Poppl-Laudatio fonts. The scanned illustrations and photos were enhanced and prepared with the use of Adobe Photoshop. The finished publication was directly converted into PDF format.

First published as an Internet download. June 2013.

Second publication in the Pamphlet Series. April 2019.

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### **About this publication.**

This primary documentation and historical account (with some mild criticism) on the running of the Signals Research and Development Establishment\* was written in early 1945 on request by Col G.W.Raby (SRDE Chief Superintendent from 1944 to 1947), by Mr F. Goldstone who was employed at SRDE from the very beginning of its existence. This document was published with permission of the Royal Signals Museum, Blandford, U.K. The text of the original report was retyped exactly as it appeared in the original, with the addition of later found photographs of Mr F. Goldstone. The original of this typed document, which is unfortunately missing its final page, is kept in the Archives of the Royal Signals Museum, Blandford Forum, UK.

\*) Created in 1907 as Experimental Wireless Telegraphy Section within the 1st Wireless Telegraph Company, renamed into Signals Experimental Establishment (S.E.E.) in 1916. It became SRDE in 1942 and lost its identity with its move to Malvern in 1980 when it was amalgamated with the Royal Radar Establishment and Services Electronics Research

### **The Pamphlet Series.**

This new series of publications replaced the 'Goldstone' and 'Overview' papers. The Pamphlet Series was created to accommodate a future range of reprints and articles of historical importance, hitherto not published documents, and reports on Army signalling. These can be downloaded from [www.wftw.nl](http://www.wftw.nl), freely copied and distributed, but only in their current form.

Note that the page layout of the Pamphlet Series was setup with mirrored pages, primarily intended for double sided (colour) printing, preferably on good quality class A paper.

Any additions and comments to this document are appreciated. louis@wftw.nl



April 2019

Sir,

You suggested that it might be helpful if I place on record to you my personal opinion of the present structure and build-up of this Establishment as it appears to me today. I thank you for considering that such an opinion might be worthwhile and, on the assumption that you appreciate that I have at heart, the welfare of this Establishment, I willingly comply with your request.

There have been periods of depression during the present war when I have said that it took one World War to put the S.E.E. on its feet and that it required a second Great War to topple it over. Before considering anything in detail, I say that I am not now quite so sure. You will understand better my point if I say that your present position, not necessarily as Chief supt., but as Head of this Establishment has been held by 14 different officers between the years 1912-1945. Some, especially in the early days when they were always senior R.E. officers, strengthened the place and added to the structure built by their predecessors; others who came later did much to weaken the structure. Always however, have we survived the bad periods, and reacted strongly when the right type took over. What will be the result of your term of office? I say with all sincerity that the success of an establishment such as this depends 95% upon the attitude and approach of the ruling heads. Good material can be mishandled, natural tendencies can be repressed until who is naturally a creator, become just part of a machine.

Before I criticize the present layout, I think it would be as well to give you a picture of the past internal history of the establishment. This will help you to understand my view point, which is I imagine, very largely controlled by past history, I joined the Royal Engineers in 1908, after serving 5 years of a 7 years apprenticeship with Messrs Marconi Co and fate took me to Aldershot early in 1909 just at a period when wireless telegraphy was being looked upon as a possibility for Army communications, by the more advanced school of thought. Experimental work of a kind had been carried out at Chatham between 1897 - 1907 but real development had been done before the 1st Wireless Telegraph Co. was created in 1907 - 1908. I joined this company and was the only mechanic in R.E. at that time who had any knowledge of wireless. The experimental Wireless Telegraphy Section became a recognised official unit at this time and its activities (expenditure etc.) were controlled by the R.E. Committee, War Office.

I automatically gravitated to this group, and it is to my opinion that the work done by this small section of about 3 officers and 10 men between the years 1907 - 1911 forced the authorities of that time to recognise the importance of maintaining, under their own control, a

permanent section whose terms of reference were to develop and produce working models of apparatus required for military use in the field. (To my mind this is essentially still our main reason for existence. This point has, it seemed to me, to be rather lost sight of at certain periods during this war, but this is by the way.)

The enthusiasm of this Group was tremendous, everyone, from the Senior Officer down to the lowest rank (myself) worked only to create something new. Normal working hours were unknown; on many an occasion the sounding of reveille notified us that another night's sleep had been missed. I realise now the tremendous disadvantages under which we worked. At that time everyone in the group was in the service and the only expenditure was for materials and certain components. I believe Capt. Evans was allowed to spend £250 in the year 1907 - 1908 but any expenditure of over £5 had to be referred back to the R.E.C. for approval and this did not always come easily. In fact, it was well known that Capt. Evans paid many bills out of his own pocket when his enthusiasm forced him to act contrary the rules. Drawings were practically unknown and every item deemed for reproduction was reproduced from sample.

For this reason the samples just had to be perfect specimens. It was not allowable to tie on a label stating what was wrong, hoping that the corrections would be made in the drawings.

There were no drawings and for many items they never were produced. We had a very little machinery; three 3" treadle lathes (one screw cutting) and one treadle 5" screw cutting plus one forge and certain hand tools covered this equipment, yet we produced samples which I noted, were still sealed patterns in C.I.E.S.S. pattern room at the end of the last war. The handicaps under which we worked were, I think, a spur only to greater endeavour and resulted in the Group and the individuals becoming sufficient as well as self supporting. I left this Group in 1911 and returned in a civilian capacity in 1912.

It must be remembered that we were dealing only with spark transmission and crystal reception. The valve was then unknown but we did also have to deal with the air as well as the ground requirements. Members of the section flew in with Airship Beta in 1913 with a set which I very largely produced myself and we obtained two way signals for what was certainly the first time in this country and probably in the world, though we had previously made similar experiments from a Captive Balloon.

Our activities came to an abrupt end in August 1914 and I went overseas with the 1st Signal Squadron, 1st Cav. Division. With the B.E.F. went two wireless stations. Some other Marconi lorry stations followed some time later but at the beginning only these two stations existed, and it is pleasant to remember that

during the retreat from Mons the 1st Cav. Division had to rely on two wireless stations which were produced by the forerunner of this Establishment and I can say that these stations worked and never seriously let the O.C. down.

Still, the experimental bug would not sleep. Capt. Lefroy, who was in charge of the section at the outbreak of War was also in France and he convinced the authorities that they required an experimental section in the field. The result of this move was that I was recalled from the front line to the base where we carried on with spark set development.

Early in 1915 the valve as a practical proposition came into being and the few radio experts who then existed began to spin in small circles. I was recalled from France in October 1915 and was ordered to report to Woolwich Dockyard where a certain amount of experimental work was in progress, but it was very quickly seen that an Establishment must be created to efficiently deal with the possibilities opened up by the development of the valve. Colonel H.S. Bagnold, C.B.E. a very able Engineer Officer, was appointed as Chief Experimental Officer. Under his expert guidance the buildings were erected on Woolwich Common and the Signals Experimental Establishment was created and took possession in July 1916.

When I returned from France Capt. E.D. Carden was running the experimental section at the Dockyard. The section then consisted of Capt. Carden, 2 experimental officers (civilian), C.Q.M.S. Johnson, 5 instrument makers, 2 carpenters and 2 draughtsmen (note the inclusion of draughtsmen for the first time), 6 boys and myself. By October 1916 the Establishment was 250 strong and by July 1918, 450 men strong. I think these figures should be noted in comparison with our growth during the present war. It is true that the Establishment is larger now than it was in 1918, but in 1939 the Establishment was some hundreds strong, whereas in 1914 the total number was 16 and some of these never joined us at Woolwich.

Yet it cannot be denied that the S.E.E. during the last war in spite of its late start, mushroom growth and mixed assembly did produce far more new equipment for use in the Army and Royal Flying Corps than the S.R.D.E. has produced or is likely to produce even should the war be prolonged for another 5 years. Why is this? There are a number of factors which must be explained to give the complete answer.

Firstly, on the outbreak of war 1914 there was only one firm of note in this country interested in the manufacture of radio equipment. Messrs' Marconi produced a small number of wireless sets for the British and Continental Powers and had some idea of the requirements, but they had not the capacity to meet more than the fringe of our demands. Messrs' Siemens had staged a demonstration of Telefunken Field equipment in 1912 but they had not considered

production over here chiefly because it takes a war to create a worthwhile demand and although Messrs' Marconi, Siemens, Standard Telephone, Ferranti and others did produce sets, the demand still exceeded the supply. This forced the Ministry of Munitions as it then was known, to create their own factories. These factories were all controlled by the Ministry of Munitions usually a military officer was put in charge. Arising out of this condition of affairs, we had a set-up which we exploited to the full, in the following manner. The Raynes Park Factory produced small parts and components; the Teddington and Soho Factories produced finished sets calling on Raynes Park for small parts, and on the Kilburn Factory for meters. S.E.E. would receive instructions to produce a set to fulfil certain conditions. I was at that time running the shops under a Workshops Officer, Major Spittle and I very largely controlled the mechanical design.

The experimental Officers expected this service from what they considered to be the practical or engineering side of the Establishment. I would point out here that, at that time, (from 1916 to late 1918) all senior officers were men of mature years and of some scientific standing. Their only desire was to assist in every way possible while we were at war and to return to their various interests when it was won. The student class did not begin to join us until late 1918.) The officer to whom the new requirement was passed would at the appropriate moment discuss details with the shops and a model would be produced. We maintained very close liaison with the factories mentioned above and as soon as the model was complete, a meeting was called on which every factory was represented. I would note here that the chief of each factory was appointed owing to his pre-war knowledge and experience on the type of work on which his factory now was engaged, and it became a fixed rule that this officer personally attended what we termed Design Meetings. I have known these meetings to start before lunch and to carry on late into the night. But at the end a true representation of the requirement was formulated and it was agreed how many would be produced to model and which factory would produce the various items, and when initial deliveries would be made. In these modern times this procedure may appear very crude. Yet it is on record that the first Aircraft Tuner Mk.I was conceived on Monday in June 1916 and that the first model was tested in the air 9 days later and that 150 were produced and issued by August 1916. It may be quite rightly said that the sets of those days were very simple.

This is correct, but it must be remembered that every part, valve holders, condensers, resistances etc. had to be produced by the manufacturer concerned; there were no component manufacturers.

A second notable example was the production of what became of the Blandy Field Set. Colonel Blandy, then C.E.O., S.E.E., put in hand the design of a 30 watt spark transmitter and a 3 valve LF receiver which was to function in the forward area and be transported as a man pack portable set. The design was first discussed early in May 1918; 250 sets were in the field in August 1918.

Speedy development followed by quick production was then one of the reasons why S.E.E. produced far more complete equipment than S.R.D.E. A second quite obvious point is, as I have already stated, the British Army had practically no wireless sets at the outbreak of the war. The valve made possible the development of small portable equipment of worthwhile power and range, both for forward units and for the air. So although the S.E.E. worked 7 days a week and a 12 hour day, coupled to unlimited keenness and enthusiasm, the demand for new designs always beat their ability to supply. After the last war a list was made of complete items (as distinct from components) developed and produced between 1915-1918. 198 separate items were developed, 185 were reproduced; the percentage of throw-cuts was very small. On the other hand, the total production of many of the items did not exceed 500.

There is a third point which should be remembered. During the last war, except for certain specialist designs produced by Marconi, all the design work was carried out by S.E.E. There was no arguing, no alternative design produced by some other body. The issue was always clean cut. War Office would state a requirement, R.E.B. would instruct S.E.E. to proceed with the project and stage a demonstration on a certain date, covering as many points in the requirement as possible within the time. R.E.B. with War Office would witness the demonstration and it would be agreed there and then either to accept the results as they stood, or to allow X days for further investigation or to issue the model for immediate reproduction and proceed immediately with Mk.II. Whatever the decision arrived at, the S.E.E. was given a clean cut mandate and we know exactly where we stood. Extended field trials were not carried out during the war.

It will be noted that I have said very little about the drawing office and its activities. We had, in fact, a very efficient drawing office but the numbers were too small to meet the demand. Equipment produced during the war was still being drawn some years after, so much detail had to be included. Even blocking condensers had to be drawn in detail, the number and thickness of the mica plates being quoted etc.

Also the trade was still quite accustomed to working from model and quite complicated P.O. equipment, such as the Wheatstone Automatic, was at the time still being produced in this way by some firms.

The complete swing over to production from drawings in lieu of sample did not take place till the early twenties.

I will only touch briefly on the immediate post war period. Shortly after the cessation of hostilities, most of our senior E.O.s left the Establishment and returned to their various pre-war duties. One quite brilliant young officer, Capt. Bryden remained with us and eventually became Director.

There was, at this period, a very strong call for reduction of expenditure and it seemed for a time that the Establishment would be closed altogether. However, a number of projects were put in hand (some quite unofficially) which caused so much interest not only in the War Office, but also certain large Communication Companies, that the question of closing down was shelved indefinitely. In the early twenties, the equipping of armoured vehicles with some system of communication became a major requirement and has remained so to this day. This is, I think, the only type of development in which we have not at some time or another, been called upon to compete with the Trade.

I will pass over the period from the early twenties to the mid-thirties without much comment. Money was very tight, a number of sets were designed but production was always very small. If an initial order for 100 was placed, C.I.E.E.S. thought we were doing very well, but during this rather long period, a scientific staff was built up which was second to none

There was one weakness only which has persisted all through the later history of the establishment. It was considered that a University trained man was all that was required, whereas I always contended and still contend, that one practical engineer who had had commercial experience to every six S.O.s would create a balance and ensure a design which could be passed without fear of adverse comment, to the Trade. The type I refer to are now unobtainable but they could have been here before the war had authorities been willing to pay for experience at the same rate as they pay for scientific education. In spite of this statement, we did have, just prior to this war a very efficient staff who could produce practical working models which could be reproduced by the Trade in bulk. Possible the designs, though not having the practical engineer behind him, called for more manufacturing operations than need be, but in the main, the trade could not find much to criticize, and had that staff remained at our disposal during our rapid growth to meet the present war emergency, I think all would have been well. But 'Radar' came into prominence and our Establishment, with others, had to foot the bill.

We acknowledge the justice of this demand and we gave of our best but we were all too small to stand a reduction of such a large percentage of those who must have become essential key men. What actually happened?

New blood began to pour into the Establishment, few had previous training, and required supervision. Prior to this influx the E.O.s (Experimental Officers) we had were all doing a job of work and producing results by their own efforts, but the time soon came when they had to supervise and control others. The net result was a big increase of staff and a big reduction in output. The larger the staff became the less we appeared to do. The situation was, in fact, ludicrous, had one the perverted sense of humour to see it in that way.

One would have thought than any intelligent person would have known that the fact that you dress up eleven men in say, football clothes does not make a football team. Much careful training is required with frequent changes of personnel before goals can be scored and with the training must come sympathy and understanding. Neither of these latter virtues was shown towards this Establishment during the first years of this war. I myself heard members of the headquarters staff sneer at the efforts and make remarks belittling the opinion of members of this Establishment to outside contractors. This naturally came to the knowledge of the staff and what could be the result be except to break-up the old spirit of co-operation and desire to do our best, to be replaced by a feeling of frustration, and men who, prior to this period, had been capable of meeting any demand, developed an inferiority complex which has persisted, in certain instances, to this day.

I have kept, as far as possible, my own activities out of this story and endeavoured to give you a clear picture in as few words as possible of the history of this Establishment. I would like to state, however, that I believe my own break away from this Establishment, first to assist in the development of GL Mk.II at HMV and then Elsie at Murphy, covering a period of six months, was definitely harmful to S.E.E. Prior to this I had charge of the development section and with Mr Tweedale, Warland and a few others we had formed a sound team of practical men who had acquired a very complete knowledge of military equipment, an eye to standardisation, could give a sound criticism on detail of design, and could and did produce complete station inventories which eventually turned into lists by Major Johnson at E.S.2.

This section was never reformed when I returned to S.E.E. At Warnham there was far too much mechanical work for me to deal with personally and eventually Mr. Knight was adopted from S.T.&C. to lend a hand. But we never recovered our original position on questions of design. The Trade, backed by our own headquarters, had got the bit between their teeth and when we eventually expose a fault, it was always either too late to alter, or some messy compromise had to be put on hand, and as the modification was messy and due to S.R.D.E., it reacted against us and not the originator.

## Scientific Staff

What is wrong with the Establishment as it stands today? Destructive criticism is very easy. Before the war we periodically held Design Meetings at which new developments were shown and criticized. At these meetings W.O. and C.I.E.S.S. would have the models for some days before the meeting to examine and would bring their comments with them. Adverse comments would usually be made, but seldom did we receive a worthwhile constructive criticism. The result was that much time was wasted discussing faults which were either without foundation, or which could not be improved on.

As a matter of fact there is not much wrong with the Establishment: time will improve many of the existing faults and a careful appreciation as to how the individual can assist is perhaps worthwhile.

Bearing in mind that we have a very mixed staff, some are very unsettled and even unhappy in their domestic life, some have been moved from pillar to post during the war years, having been subjected to bombing and have lost part or all of their homes; some see no future for themselves in this Establishment, others have been directed here against their will and look forward only to the time when they can leave. With a background such as this, how can a staff be so nursed that it will automatically give of its best, work together as a team, and become so interested in its job that they forget their troubles, imagined and real, and the clock.

We have, I think, a very immature scientific staff and it appears to me that there is something of the more practical side missing in their training. During the last war, even the junior officers were practical in their outlook. It may be because even the Colleges in those days could not buy equipment and the students had to produce their own, or it may be so that the scientific training has become so much more complicated and involved that there is no time to deal with allocation. Whatever the reason, the fact remains that although the senior officers such as Dr. L.B. Turner, Prof. Townsend, Dr. Hodson, Prof. Whiddington, Mr. Mathieu etc. etc. each had a number of officers working under them, they were themselves practical and creative.

It was seldom you saw any of them writing. The net result of this team work was that their knowledge and technique was passed on and all gained the benefit of their experience. There was always a cordial and healthy exchange of ideas between the various sections. As I see the picture now, the Group Leaders and even the section leaders are usually so busy either writing, or attending some meeting that you seldom catch them in the laboratory. This seems to me of locking up our available talent with a vengeance.

Unless the knowledge previously acquitted by a leader can be passed on to his understudies, he would be

more useful to the immediate future doing an individual job himself. I feel that many of our younger members are receptive and would respond to any practical example, but something in their training prevents them from asking for advice.

I visited one of the labs the other day and asked a small question of one of the E.O.s who I knew was engaged on the job to which the question referred. He replied that I better ask the Boss, if I could find him. This stuck me as being all wrong. Surely a Section Leader controlling a group of educated men should be their mentor and friend, not Boss. What condition caused this remark? I feel that we shall not get very far until every member of staff feels that he is an essential unit and that his job is something for which he is responsible. Nothing gives a man more stability and balance than the knowledge that his work is of importance and that he is being depended on. The leader should always be available to give advice and it should be fully understood that a cordial and friendly spirit does not necessarily mean lack of discipline.

I think also that the Chief Supt., Supt. and D/Supt. should make it their business to visit every laboratory frequently. The visits should be separate and casual. Nothing tends to make an employee feel he belongs than an informal talk with the Heads. As soon as a man begins to feel that he is something more than a unit, his production value rises. Any fault which might be found with the conditions in the lab, should be ignored on these occasions or remarked lightly in the first instance. More harm than good would be done if the visits were regimental in their character.

I do not think there is very much wrong with the present Grouping system, but it seems to me that there is a great tendency to procrastinate, especially when the actual work is being carried out by a contractor. During the last war all requirements were issued, together with a date for completion. Often it was not possible to cover the full requirement in the time allowed, but some working model was always shown at the date specified and the job was kept alive. My experience has been that once a job started to drift it loses its position in the scheme and probably finishes up as something entirely different from what was originally intended. Certain it is that the authorities' eventual loose interest, an insidious complaint which quickly spreads through the staff concerned.

## **Workshops**

Dealing with the question of workshop, I hold rather strong views on how an experimental workshop should be run and I feel that those views are somewhat at variance with the present control. I built up at Woolwich, after some years, a workshop staff which was second to none. The shop was a very happy one and the work turned out was excellent. It became a stock phrase with the various contractors when we

exhibit some item or set which had to be reproduced, 'Oh yes, you can make it, but look at the mechanics you've got'. Yet when those items were reproduced, they stood the test, and lived in use in the field for many years. I used to wonder how we held the gang together. The pay was not large, there were a number of other factories in walking distance to which they could have gone and earned more money.

I believe that the secret was that they were interested in their job and liked the type of work they were doing. As one of them said to me on one occasion, 'Another quid a week is no good to me if I have to spend it on beer to get the taste of the job out of my mouth.'

I contend that the most successful experimental shop is where you use the knowledge, experience and talent of the worker to the full. Whenever I had a mechanical problem to solve, I always discussed it with the instrument maker and of Bill didn't know the answer, Tom did. Somewhere at this time, at some workshop in the country, someone had seen something similar and we never stumped for a sound practical answer. I found it difficult to reconcile a production workshop technique to an experimental or maintenance shop. I understand that it is now the rule that a drawing must be supplied for every item to be produced. I agree that this is perhaps correct and proper where trainee or semi-skilled labour is involved, but I sincerely hope that it is a rule that is often disregarded where your experimental mechanics are concerned. Nothing is more soul destroying to your true experimental mechanic than to have to work always to drawings.

I agree also that an experimental shop should be up to date in its equipment, but here again much machinery should be used with discretion. How often in the past I have blown up when I have noted a mechanic going to the tool stone, drawing out a milling cutter and setting up the machine to mill up half a dozen of panels which as a craftsman he could have filed up in five minutes. To my way of thinking, the main workshop has two functions and the can be kept separate and distinct. The first is to produce an original model or models which can be produced from rough sketches and discussion. (The power to produce a satisfactory product without drawings denoted an ability, to meet which, the term experimental mechanic was coined, and pay a rate higher than the local trade rate for an instrument maker was agreed.) The second is to produce developed models from drawings which should have been produced in parallel, but with a slight time lag as the original model. There are, of course, always exceptions to the rule, certain items can with advantage be produced on the drawing board before the bench but this does not apply to set construction. It can, of course, be done, but the loss of time is great. I think that you can have too many supervisory staff in a small shop.

I remember that during the last war in 1918, myself, Mr. Matthews and Mr. Alwin run the shops containing about 175 men and woman. We had Flying Corps rank and file, R.E. disabled soldiers and civilians all working together. We never had any trouble; one of the three always settled any little point before it became serious. I had a letter of thanks from the workshop officer when he left in which he said that during the time he had been with us he had never had to settle a complaint or make one. I think that a small staff, providing they know their job, can always hold a crowd together than a big one. I mistrust the building up of big supervisory staffs. You reach the stage in the end where no one is really responsible and everybody shifts the onus to someone else, only the poor charge hand really carries the load.

### **Stores**

I quite frankly do not understand the stores position. I run the stores (among other duties) at Woolwich for some years and I know something of the subject. There is quite a reasonably store in the shop though I think the cards should be marked up with min. stock, but I notice odd stores in all sort of places.

I cannot understand how they are controlled. Does it not lead to unnecessary duplication, or does everybody know where everything is kept? Surely a central store is denoted though possibly if all the surplus was removed, the position would not look so bad to the casual observer.

### **M.E.S.**

Before the war, it was a custom to produce a small number of development models of new equipment which were sent to units for field trials. This was not in all respects satisfactory. Firstly, it took a long time, secondly, we were not always sure that the tests were carried out in an efficient manner, so much depended upon the attitude of the officers in control of the unit at the time. Eventually it was agreed that a Military Section should be posted at Woolwich. The terms of reference of this section were to carry out Field Trials of new equipment, under the supervision of the Superintendent, as and when it was produced. The scheme would have been quite sound if the troops had changed periodically, had received prior experience in the field and if we produce sufficient new equipment to warrant tying up a section. I do not know what is happening within the section at present, but I do know that some time ago they were developing experimental equipment themselves. This to my mind quite defeated the original object. Once a section such as this develop the experimental complex, you might as well let the E.O. carry out his own tests.

### **Station Lists**

The Station List is a very important document which has by the series of events been thrown into the wrong position in the chain of development. A Station List details all the items which are required to create a complete station, installation or set, and it is perfectly clear that both Ordnance and the unit require this information before they receive the equipment. The kitting is only a transitory condition and exists from the time the set leaves the contractor until it reaches the unit. As soon as the cardboard cartons are opened, the kits cease to exist and the unit is left with an installation and a list in which the same item may appear in two places.

One difficulty is this, we can produce early in the development of any new installation and accurately schedule of components but we cannot so quickly produce the actual item. We can gamble and say that an item will be of a certain size and can be packed in a certain carton, but with vehicle fittings it is not always so easy and it is safest to see the gear. An item may be too heavy or too awkward to go into the carton at all. Therefore it is not always possible to finalize kitting and produce the station list before every item of an installation has been produced. But, as I have previously remarked, it is possible to produce a provision schedule and show on that schedule the precise condition of every item.

I sympathize with E.S.2W. Unless they are given a clear cut picture of a new requirement, small items may be missed and it is the development and completion of the small items (which often do not amount to more than 5% of the total) which fixes the date on which the complete information can be handed over. Therefore either a complete station list must be issued with the statement that everything is complete and in the hands of C.I.E.M.E. or a schedule which shows the condition of every item. Before issue, the schedule must be reviewed by some official with a very complete knowledge to ensure that valuable information has not been withheld.

For example, what might be considered as a very minor item, say Connector 4 point No. X approx. 6" long, full detail cannot be supplied because the actual length cannot be quoted before the installation has been completed. To the uninitiated this seems to be a simple item, but the Cable Electric 4 core Cabtire 9/0017 may be difficult to obtain, therefore a schedule should state this requirement in the appropriate column. I think the complete station list can be produced here better than anywhere else however perfect the schedule, small points will continually arise which can be cleared much more easily by personal contact. I believe that a special section should be formed to produce the schedules.



There is not very much wrong which the system whereby individual officers control design or are responsible as representatives of S.R.D.E. for seeing that a contractor's development is acceptable but I would feel more happy if the E.O.s concerned were more experienced. Perhaps it is because of this fact, as well as outside interference, that recent developments have differed so much in detail. Standardisation should be one of the main themes of the section preparing schedules and ensure that this would mean contact with a project from its initiation. This should greatly assist the E.O. concerned as he would be relieved of the worry of much practical detail although of course, everything that was suggested would have to be

approved by him. The section should also keep in touch with the Provision Branch after they have been notified of a new requirement by E.S.5.

I feel that the practical discussion with S.E.2 at the initiation of a new contract where bottle necks occur and if an alternative method of production was equally suitable, we could say so. As an example, quite recently we have developed a number of soft rubber mouldings and plug and socket connectors; this had created a bottle neck. Had we known earlier, a number of these mouldings could have been produced in P.V.C. and still can be.

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Sergeant F. Goldstone at Woolwich Dockyard in 1914. (Left)

Photograph of Mr Goldstone taken in 1913. He became manager of the S.E.E. Workshops and stayed with the establishment until his retirement in the 1950's. (Right)



Cut-out of a Signals Experimental Establishment staff group photo taken out at Woolwich in about 1928. Mr F. Goldstone is seated in the top row, 4th from right. It is interesting to note that Major-Gen Fuller (the inventor of the Fullerphone) is also seated at the top row at the first seat from the left, and Miss Fletcher, an expert on crystals, at the extreme right.

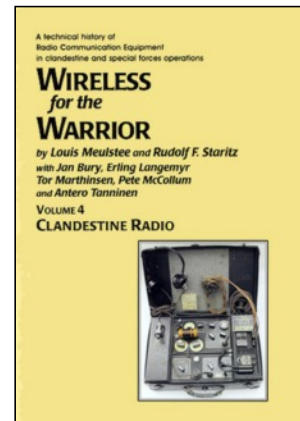
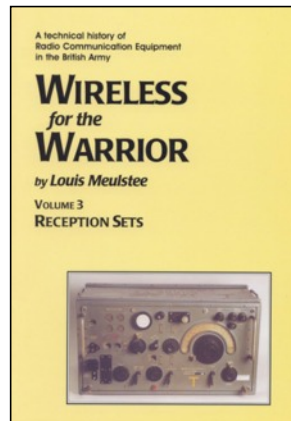
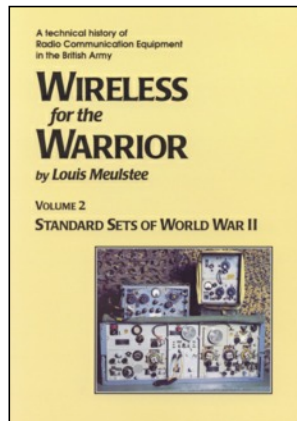
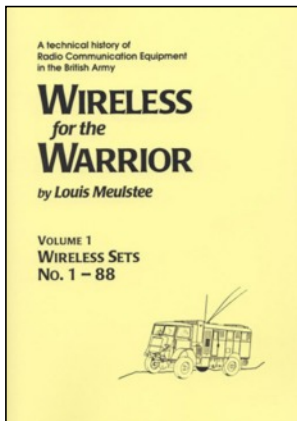
Explanation of abbreviations occurring in this paper:  
 C.E.O.= Chief Experimental Officer.  
 E.O.= Experimental Officer.  
 R.E.C.= Royal Engineers Committee.  
 C.Q.M.S.= Chief Quarter Master Stores  
 R.E.B.= Royal Engineers Board.  
 C.I.E.E.S.= Chief Inspector Electrical Engineers Stores

**References:**

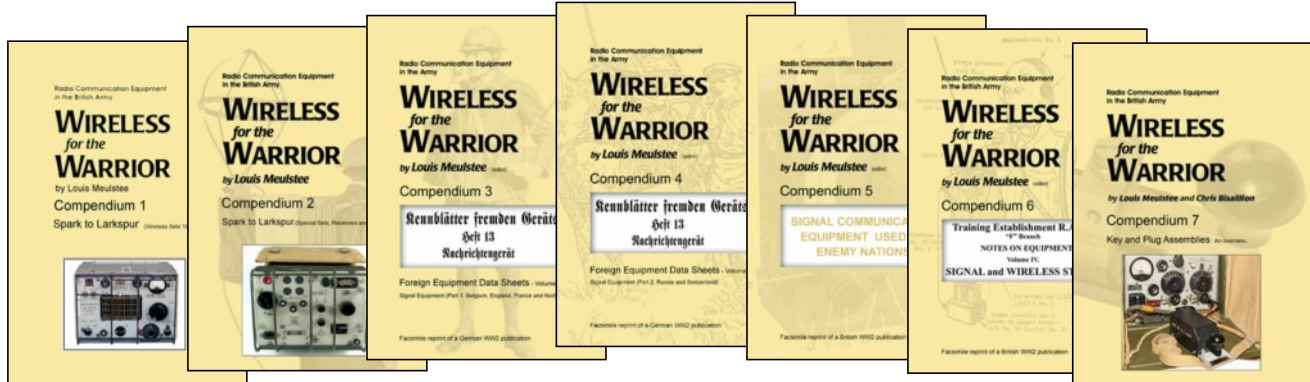
- Original manuscript of a report written by Mr. F. Goldstone, early 1945.
- *SRDE 1903-1973*, Dr E. Gwynne Jones, HMSO, 1975.
- *The story of Woolwich Common*, J.C. Franey, AWRE News, May 1964.
- Photographs and documents courtesy Royal Signals Museum, Blandford Forum, UK.
- Royal Signals Museum website: <http://www.royalsignalsmuseum.co.uk>

## About the Wireless for the Warrior books.

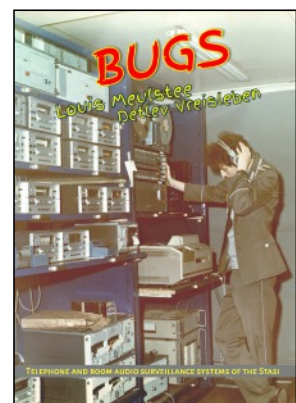
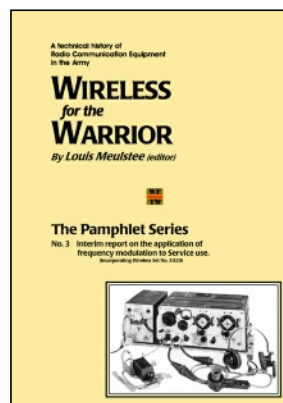
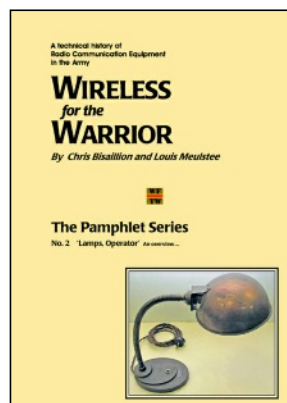
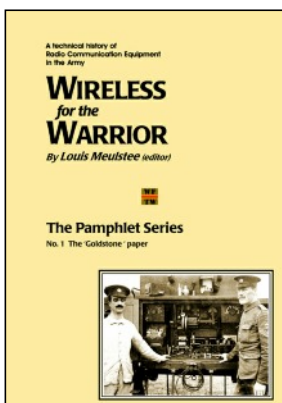
The Wireless for the Warrior range of books (comprising the **Volume** and **Compendium** series) are intended as a source of reference to the history and development of radio communication equipment used by the British Army from the very early days of wireless up to the 1960s. Line equipment and military radio communication equipment from other countries is also covered in the recently published Compendiums. For detailed information, review pages and order information visit [www.wftw.nl](http://www.wftw.nl)



The books in the WftW **Volume** series are very detailed and include circuit diagrams, technical specifications and alignment data in addition to technical development history, complete station lists and vehicle fitting instructions. Generally no operational histories are given as these have been published extensively in numerous other books.



The WftW **Compendium** series is a new addition to the Wireless for the Warrior range, currently comprising 7 books. The new series is principally intended as a practical guide and reference source to vintage military signal communication equipment. The books are particularly valuable to anyone with an interest, professionally or otherwise, in this subject, requiring an elementary but complete quick reference and recognition handbook. Containing condensed data summaries, liberally illustrated with photos and drawings, explanatory captions and short description of the main ancillaries, its pocket size format and laminated soft cover makes it an ideal reference and reliable companion for events such as auctions and radio rallies, or just for browsing at leisure.



The WftW **Pamphlet** series is the latest addition to the Wireless for the Warrior range, created to accommodate a future range of reprints of articles and reports of historical importance, hitherto not published documents, and technical reports on British Army signalling. This new series replaces the now discontinued 'Overview' booklets, free to download and print ready.

WftW **'BUGS'** is the newest book describing the technical history of telephone and room surveillance systems of the Stasi.