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Working with Montgomery: On Being a Scientific Adviser to a Commander-in-Chief (21 Army Group 1944–1945)

B.F.J. Schonland

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Operational Research scientists played an important role in the Royal Air Force and Royal Navy but the army resisted efforts to employ civilian scientists until Sir John Cockcroft, one of Britain's leading scientists, persuaded Lieutenant-Colonel B.F.G. Schonland to take charge of an Army Operational Research Group with the Ministry of Supply. Cockcroft counted on Schonland to overcome the army's opposition to OR.

Basil Schonland was an inspired choice. A graduate of the Rhodes University College and Cambridge University, he had served with the Royal Engineers on the Western Front 1915-1918 and was twice mentioned-in-dispatches for bravery. By 1917 he commanded eight wireless stations, and when the war ended he was serving as a Chief Instructor, Wireless Communications. In 1919 Schonland went back to Cambridge, spending four years at the Cavendish Laboratory before returning to South Africa where he established an international reputation for his studies of thunderstorms and lightning. Schonland had been one of the early investigators of cathode rays and the South African government invited him to take charge of the development and application of RDF for the South African armed forces. His team built their own radar sets for installation on the coast. This equipment was also used in the air defence of East Africa and the Middle East. Schonland was attached to General Wavell's headquarters in 1940 as RDF advisor. In early 1941 he was sent to Britain to examine developments in radar and purchase equipment on behalf of his government.

Schonland's military background and scientific reputation were essential qualifications for his new job, but it was his personality that mattered most. Those who worked with Schonland invariably describe his ability to gain the confidence of senior and junior officers and of civilians and other ranks. He spoke with quiet authority but always encouraged his subordinates to speak frankly and to develop their own initiatives. According to D.K. Hill, who worked closely with him, Schonland was a good research scientist who was interested in issues beyond his own field. He got on well with army officers, stayed above political and department intrigues, and learned to suffer fools gladly while maintaining his purpose. Such men were rare indeed and army OR was very fortunate to obtain Schonland.

When No.2 Operational Research Section was formed to serve with 21 Army Group Schonland's deputy, the Canadian scientist O.M. Solandt, took over the Army Operational Research Group and Schonland joined Montgomery's staff as his scientific advisor.

Schonland was given the rank of brigadier which, at least theoretically, placed him on an equal footing with the heads of Monty's intelligence and operations sections. He found

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that "Freddie," Lieutenant-General Frederic de Guingand, Montgomery's chief of staff, was "kind, courteous and accessible." His fellow brigadiers had been told that he was there "to solve difficult problems for them" and they seemed quite willing to try him out. In a 1951 memoir Schonland noted that the "solving of conundrums" was an important subsidiary function of the Scientific Advisor. Most of the puzzles were deadly serious and technically complex. Others were more easily solved. When intelligence officers asked whether the enemy could "electrify the sea" by running leads from local power stations into the ocean at the landing beaches he assured them that this was impossible.

For Schonland the principal function of the Scientific Advisor was to promote the application of operational research to the battlefield and to ensure that the recommendations of the OR teams were acted upon. Those charged with commanding operations today might well consider Schonland's advice.

In the following narrative, written in February 1951, Schonland details his experiences as the Scientific Advisor to Field Marshal Montgomery in Northwest Europe and shares the lessons and principles he learned during that period.

Terry Copp, Wilfrid Laurier University

Some years ago Sir John Cockcroft suggested to me that I should put on paper something about my experiences as Scientific Adviser (SA) to Field Marshal Montgomery and some ideas drawn from this experience. For various reasons I did nothing about it, principally from the feeling that I had not much to say which would not be known to the Army Operational Research Group (AORG) and the Scientific Adviser to the Army Council, but also because without the war diaries of the SA's section and the Operational Research Section (ORS) of 21 Army Group to refresh my mind I could not write a proper account of all that happened. However, it seems to me that something in the nature of what the Army might call the "doctrine" of the use of a scientific adviser might now be worth putting on paper. So I here lay down certain principles and illustrate them from my experience with 21 Army Group. Others may object to some of these principles and they may, in any case, be out of date, but at least they are here to be seen by, and perhaps amuse, anyone who has to fill such a post in the future.

(1) The Scientific Adviser should have had previous military service, preferably in a campaign.

Such service could perhaps best have been with an ORS in the field in a previous war. But without military service the SA would be very much at a loss on the field, wouldn't know what to do in an emergency and in general would be simply a dressed-up civilian. The alternative, which was tried in the North Africa Campaign, of attaching an experienced staff officer to the SA as a sort of bear-leader, does not work. No one can work closely with a busy Army Group staff through an "interpreter." The SA's nickname in the Mess will probably always be "The Professor," but it should be a term of affection invented by his friends and not a form of sarcastic wit.

(2) The SA must be a member of the Main Headquarters staff.

An Army Group in the field has three headquarters; Tactical, Main and Rear. The Chief of Staff is for much of his time at Main HQ which is restricted to the essential administrative, operational and planning staff of the General Officer Commanding (GOC), plus a few necessary specialists. The Rear HQ consists of the big administrative sections of the Army Group including the Medical, Transport, Supplies, Printing, Pay, Labour and Civil Affairs branches. If the SA is not at Main HQ, he will know little or nothing of what is going on operationally and will be quite valueless.

When Main HQ of 21 Army Group moved to its first "battle" position near Portsmouth and left Rear HQ in London, I found myself with Rear HQ. Fortunately an appeal to the Chief of Staff by me was successful in getting me moved to Main HQ. From time to time in the advance it was clear that the Chief of Staff was anxious to cut down the size of his Main HQ as much as he could. He made some of his sections either move back to Rear HQ or cut their staffs drastically. In my case, however, he said I was very useful at

Brigadier Basil F.J. Schonland

Main HQ and was very lightly staffed and need not worry. Which brings me to point 3.

(3) In the initial stages of a campaign the staff attached to the Scientific Adviser should be reduced to the absolute minimum.

At the start of a campaign a single extra fighting man or load of shells or vehicle is more valuable than a dozen extra administrative or advisory staff officers. All GOCs issue the most stringent orders cutting down the number of 'extras' who shall be transported early to the lodgement area. The placing of a SA at the Army Group's Main HQ thus depends upon his having with him a minimum of staff. This has also a good psychological effect in showing that he is not "building an empire." He can always get more experts later if he wants them, permanently or on visits, when transport is easy.

I had not been long at 21 Army Group when I was asked what I wanted in the way of an Establishment Table for my section. Following the lines of other Brigadiers it was expected that I should have a General Staff Officer (GSO) 1 and perhaps two GSO 2s and a few clerks. I rather surprised them by insisting that I wanted nothing more than one GSO 2 (Major Hill), one clerk and a driver.

Much later on the Chief of Staff himself told me that if I wanted more staff he had no objection. I had no wish to increase my own staff, but saw that the ORS got what it wanted.

(4) The Scientific Adviser should not exercise direct command over the Operational Research Section with the Army Group.

I came to 21 Army Group rather late and the ORS under Lieutenant-Colonel Patrick Johnson was already there, operating under the direct command of the Brigadier General Staff, Staff Duties (BGS (SD)). One of the functions of the BGS (SD) is to deal with training and equipment policy, with priorities in the supply of equipment, with requirements for new equipment and with reporting on the performance of equipment in the field and the training of troops in the use of weapons. These are some of the things that an ORS studies, and for it to have made its reports to the SA would have led to confusion and difficulty with BGS (SD). It was, however, necessary for the SA to exercise close indirect control over the ORS, advising the BGS (SD) as to what it should do and whether it was doing its job correctly and what changes were necessary in its staff. The ORS staff are scientific men and they need to be

watched over and helped by someone who is not a regular soldier but himself a scientist.

This arrangement sounds difficult, but in practice it worked very well. One of the things a SA must ensure is that the BGS (SD) leaves the ORS a good deal to its own devices and yet is ready to help it when help is needed. For instance, the ORS may wish to study a battle or a section of an operation and may need to be accredited to and kindly received by the Army or Corps concerned. Here the BGS (SD), who is a very powerful man, can help considerably, much more than any SA, since he has almost daily personal contact with the forward units concerned and they trust him. In the introduction to "Operational Research in Northwest Europe", an account of the work of No.2 ORS with 21st Army Group, it is stated:

> The section came under the Brigadier Staff Duties and not the Scientific Adviser. Only one concession was made; that the Scientific Adviser should control us in Air matters; in everything else his influence was indirect and unofficial. Throughout, indeed, we benefited from a none too precise definition of our functions and rights. As a result we were allowed complete freedom as to where we went, what units we visited, how we worked and how we finally presented our results. Whether this freedom was the outcome of an intelligent appreciation from above, that a set of independently-minded men would only work well in such an atmosphere, or whether it was merely an oversight of the military machine, we never knew; our freedom at any rate was not shared by various other odd units appended to the Army Group.[1]

Laurier Centre for Military Strategic and Disarmament Studies Photograph Collection.

This puts the position fairly well. I should add that the freedom given the ORS was no oversight but deliberately arranged between myself and Brigadier Herbert, on my undertaking to see that it was not abused. It was actually not quite so complete as the writer suggests.

My personal control of the ORS in Air matters was not a "concession" but a sensible arrangement. An ORS should be vitally concerned with air co-operation and support bombing and the dropping of men and supplies, because these borderlines between two

Major John Fairlie, Royal Canadian Artillery, was one of the operational research scientists assigned to No.2 Operational Research Section, 21st Army Group.

Laurier Centre for Military Strategic and Disarmament Studies Photograph Collection.

Major David Hill, Brigadier Schonland's GSO 2.

services are usually inadequately developed and trained for before operations start and in any case are very dependent for their effectiveness upon terrain. But the BGS (SD) is not really concerned with them and it is best for the ORS to be directed by the SA in this field.

I have discussed this point at some length because I once met a Staff Officer from India who read the paragraph quoted above to imply that I had been wrong in not taking direct command of the ORS, or trying to do so. I can only say that under similar circumstances I would follow the same policy.

The fine work of No.2 ORS needs no mention here; its reports are its justification. Most of the projects which it undertook came as instructions from the Chief of Staff either as his own idea or at my suggestion. Others came from the ORS itself or from BGS (SD).

The rise in the reputation of the ORS with 21 Army Group came, I think, not from excellent reports on certain technical matters but from the objectivity, accuracy and wisdom of its reports on operations. All army staffs expect that scientists should know technical things like radar and gunnery and telecommunications. But it came as a surprise to the 21 Army Group staff that the ORS could render valuable reports on operations.

My recollection is that arrangements for reporting on operations in the early battles in Normandy were made by the C-in-C with the Director of Military Training at the War Office, who supplied officers from the training establishments in Great Britain for this purpose. Their reports were circulated for comment amongst the Main HQ staff and as far as I remember, comment was so unfavourable that the scheme was dropped. No.2 ORS was soon after encouraged by the Chief of Staff to do more of this type of work itself, and the collected reports quoted above show how successful they were.

It is a great regret to me that I was not able to start them as battle-reporters much earlier. But I arrived at 21 Army Group HQ only two months before operations began, and it took some considerable time after Overlord had started to get the "feel" of the situation and of the possibilities of the ORS in a fluid battle. Moreover the staff had to be convinced that the ORS was not just a "frill."

(5) The Scientific Adviser should be appointed as early as possible in the planning stage of a Campaign.

Planning for Overlord by COSSAC [Chief of Staff, Supreme Allied Command] was in full force all through 1943. 21 Army Group under General Paget was in existence before 1944 and General Montgomery took command and started preparing the final and altered plans for the assault in January 1944. When I joined his HQ early in April everything was already cut and dried and it was not until mid-April that I was given details of Overlord. It was then too late to be of much direct assistance in the assault except in the one important matter of the study of the effect of the contemplated bombing of the beaches of Normandy before the assault. This study was carried out by Major Hill, my GS0 2, and myself on an East coast beach, using American bombers and various types of fuses

and sizes of bombs. I think it was of considerable value in deciding how far to use bombers in this role and in assessing the effect of bombing on movement of vehicles on the beaches. To the problems raised by beach-obstacles the Engineer-in-Chief, General Ingles, had already been devoting many months before my arrival and had obtained much help from the Scientific Adviser to Combined Operations HQ, Professor Bernal. I did what I could but came too late to be of much help in this field.

Had it been possible for me to join the HQ much earlier I could, I think, have been of greater assistance. The SA should be associated with the earliest stages of all planning and so be in a position to suggest points on which further information or trials are required. It was, for instance, only after the landings had taken place that the problem arose of finding in what woods enemy panzer divisions had leaguered for the night. A hasty experiment using MAD [Magnetic Anomoly Detection] and centimetric radar was laid on at our request in the USA but we got no satisfactory answer to the problem in time.

Similarly, after the landings the army had to improvise radar detection of enemy trench-mortar positions with field GL [Gun Laying] equipment in order to subdue this major source of casualties round Caen.

Again, it was during the build-up period itself that the problem of providing DUKWs [amphibious trucks] with some means of finding anchored transports and off-loading points at night without lights was put to me. It was too late to introduce suitable infra-red devices but they would have worked had there been enough time for development and training.

Other questions which might perhaps have been considered in the planning stage and been given effective trial and training effort were interdiction of enemy traffic by nights along roads in general and particularly Seine bridges and pontoons, using infra-red or radar detection, and the many problems of air co-operation, including such things as better detection of dummy guns on air photographs and pin-point bombing by the aid of GL Radar.

These examples are all technical ones. I think also the SA could be of use in the planning stage on some tactical points, especially when these are of an inter-service nature. Which brings me to:-

(6) The Scientic Adviser should be in a position to advise on inter-service problems, particularly air problems.

The Air Arm has its own complex doctrine of warfare with much of which the Army has nothing to do. But when the Air co-operates with the Army the results of its actions, close-support bombing, interdiction of traffic or dropping men or supplies, are shown on the ground and it is an important question as to who is to study these operations to learn from them how to do better. The Army is vitally concerned; the Army Commander wants to know what fuses the bombs are going to carry so that he can tell what effect on the terrain and on the enemy is going to follow support bombing. He wants to know what accuracy can be expected of this bombing so as to place his troops in safety and what can go wrong with ground signals to the bombers. And he wants to know afterwards what effect it has had on the enemy and on the "going" of his own vehicles.

For this and a great deal of other air information he must be able to turn to his own advisers. I was fortunate in having Major Hill with me, whom I had previously sent to Army Co-operation Command as an attached member of their ORS, and we dealt with a good deal of this sort of thing. The Scientific Advisers to the Air Force didn't take kindly to our activities and were at first distinctly unco-operative, but we continued and got more help from them later on.

(7) The chief function of a Scientific Adviser is to see that the recommendations in the reports of the ORS are acted upon.

It used to be said, with some measure of truth, that the lessons learned during a campaign were only applied in the next war. For this there is some justification since the soldier is trained to fight in a certain way and given certain weapons with which to fight. To train him differently and to supply him with different weapons takes a long time. One of the uses of operational research is to study troops and their weapons minutely, including those of the enemy, so as to be able to

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Two operational research scientists, Pat Townend and John Young, pose for a photo at the Headquarters of 21 Army Group near Süchteln, Germany, April 1945.

foresee difficulties which will arise in battle and to advise on changes. But in fact, many of the difficulties which are feared never eventuate and quite new ones occur which could not have been foreseen. The chief use of operational research is to study what happens in an operation and to advise on changes in the tactics of future operations.

The fighting soldiers and their commanders are of course well aware of this need and a great deal of immediate consultation and study of tactics takes place after an operation. The ORS has, however, got both the time and the training to make an objective study, both things which the soldier lacks, and can devote itself to replacing opinion by deduction from observed facts.

On this business of application of the lessons learned from operational research, the report quoted previously on the work of No.2 ORS with 21 Army Group ends on an unnecessarily gloomy note:-

> Many of the ideas that emerged from our reports were never adopted, often never even considered, because they were only ideas buried in reports that were never read. The conclusion that must follow from this, is that the investigating body, the ORS, can be lowly-ranked, but that it needs a highly-ranked officer, a Scientific Adviser, to see that its ideas are tried out. Brigadier Schonland, who could have fulfilled this function for us, left just at the point when we had sufficiently developed our technique to be able to give him valuable information.[2]

It should be said, however, that many of the ideas emerging from the ORS reports were adopted. Some, at least, were read and appreciated at very high levels indeed. The campaign in Western Europe ended only a few months after the ORS had really got into its stride and it takes much time and work on the part of an SA to get busy commanders to consider and introduce changes in tactics. The great thing that No.2 ORS did was to show that an operational research section and a Scientific Adviser have as their first duty the rapid application of lessons learned from operations and that they are able to derive such lessons in a form which will carry conviction. Every C-in-C and his Chief of Staff in a future campaign should be given a copy of "Operational Research in North-West Europe" so that the SA and the ORS have not got to convince them of the value of operational research before help and facilities on a sufficient scale are provided.

(8) A subsidiary but important function of a Scientific Adviser is the solving of "conundrums."

The staff from time to time have what I call "conundrums" which they put to the SA and whose solution is of value to them. Of the dozens of such puzzles put to me I remember the few quoted below.

> (a) What will be the accuracy of radar-controlled (Wurzburg) fire by enemy coastal guns in darkness, smoke or fog, against our supporting naval vessels? What can be done to reduce this accuracy? (The solution of this, with the help of AORG was easy.)

(b) It is reported that the enemy has installed leads from local power-stations with which to electrify the sea. As this would affect morale if it can't be said to be impossible, what are the possibilities? (Answer, after consulting a distinguished physiologist and doing an elementary calculation, impossible.) Intelligence put up quite a number of questions of this nature.

(c) If the bombing of beaches is carried out by x bombers of a certain type using such and such bombs, what is the probability that any direct track followed by a tank will find a bomb-hole in the way? (Maximum probability easily found from calculations of bomb-spread and diameters of holes.) This question had several variants and involved the general problem of the use of bombers in advance of a tank attack, including, of course, the extent of the danger-zone.

(d) If we knew of a panzer leaguer and turned Bomber Command onto it, what damage would result to both hard- and soft- skinned vehicles?

(e) The C-in-C's Tactical HQ has its W/T [Wireless Transmission] station half-a-mile (?) away; with what accuracy can the enemy locate it by direction-finding [DF] and thus locate the HQ itself? (Similar questions turned up about the location of forward W/T stations by DF methods since it was wrongly thought that the fire they experienced was due to enemy direction-finding.)

(f) When we have reached the Dutch frontier, what areas of southern England can the enemy reach by V2 bombardment and what area of Holland would have to be captured to eliminate the use of this weapon against England altogether? (Answer given immediately; proved correct later.)

(g) When the port of Antwerp is fully opened, what monthly damage can the enemy do to the shipping in it by V1 and V2 bombardment, using his maximum effort? (This question took a lot of answering; I forget the exact answer, but it was a large fraction of the shipping. Nothing at all like the calculated maximum loss ever took place.)

(h) Does the accuracy of V2 fire against Lille suggest that it is directed by an enemy agent in the city? (Answer, Yes; agent was found.)

(i) If the A.A. round Brussels uses proximity fuses against V1's without a device to make them ineffective before they approach the ground, what will be the casualties in people, houses and farm animals? (Pretty dreadful it turned out to be.)

(9) The Scientific Adviser should have the rank of brigadier.

Main HQ consisted of four major-generals and about fifteen brigadiers, with their staffs. The principal direct advisers to the C-in-C and Chief of Staff were BGS (Intelligence), BGS (Operations), BGS (SD) and BGS (Plans). It would have been difficult for the SA to be on easy terms with these last four if he had himself been a major-general. Unless the arrangements in a future HQ are different, I do not think he should rank higher than a brigadier. On the other hand, a lower rank than brigadier would make his work almost impossible. He must eat in the Brigadiers' Mess and get to know his fellow brigadiers extremely well. Until he ceases to be greeted with polite reserve when he calls on them about something, until, in fact, they reach the stage of calling him by his Christian name or nickname, he is not in a position to do his job properly.

(10) Relations with the SA to the Army Council.

A military commander entrusted with a task in the field requires absolute loyalty from every member of his staff, and there is not the slightest possibility of the SA to an Army Group passing information, other than purely technical information, back to the SA at the War Office if it has anything to do with the operations of his Commander, unless and until it has received the commander's approval. In practice reports of

Laurier Centre for Military Strategic and Disarmament Studies Photograph Collection.

Two members of the No.2 Operational Research Section team examine bomb craters in the village of Petite Launay on the Risle River during their investigation for a report on "Crater Bombing of River Lines in Normandy."

this nature may be held up for a considerable time for the Commander and his Chief of Staff are very busy people. The Army Group staff work as a closely-knit team and any suggestion that an ORS report or one from the SA should go quickly back to the War Office as a comment on operations, whether scientific or not, without the approval of the Chief of Staff, would simply mean that the ORS and the SA would go back too. The SA to the Army Group has therefore to exercise tact and discretion in his relations with the SA at the War Office, who, if he is not familiar with the extreme "closeness" of the staff of a Commander in the field, may not understand. The fundamental point is that the SA and the ORS are there to serve the Commander and no one else. They are not there to provide material for a current history of operations unless the Commander himself so instructs.

Actually, by agreement with the Chief of Staff, a certain amount of technical and DO information can be passed back but it must be realised that at times the SA and his staff are themselves working very hard and keeping very long hours and do not find unofficial liaison very easy.

This concentration of attention on the needs of the Command he serves means also that it is not the primary function of the SA to make a study of special enemy weapons and methods such as the V1 and V2 and other V monstrosities we overran in France. Unless this study is to be of use in future operations it is best left to teams sent out by the War Office to the rear areas. If the SA has time for military archaeology he is unlikely to be doing enough proper work for his Commander.

(11) Bright-Idea Men.

The SA himself need not be, perhaps should not be, a particularly original scientist. A very original man is carried away by his enthusiasms and only one in ten of his ideas is any use. With the remaining nine he will be a nuisance to everyone concerned at a time and in an area where nuisances cannot be tolerated.

The main job of the SA in this regard should be to see where problems exist and to get them solved, preferably at home or, if not, by the ORS. It should, however, be clear to all the Army Group staff that the SA can really produce from home the brightest man available in any particular field whatever as soon as they express a wish to have such a person. And arrangements must be made in advance for him to do this quickly. With the assistance of the Scientific Adviser to the Army Council and of the Ministry of Supply, I was able to bring over in this way several specialists from England once we had secured a proper lodgement and they did first-class work. Much more of this will be needed in any future war and the SA is the correct channel for such visits. Conversely, the SA has to protect the staff against some bright-idea men. For instance, a few weeks before D-Day an eminent scientist who had done very valuable work in collecting information about the beaches of Normandy approached me with the suggestion that he should provide for each commander of a battalion or tank unit a

booklet of detailed information about all the villages and quarries and woods and so forth which he would encounter as he fought his way inland. This was not really a good idea at such a late stage, if ever, and BGS (I) whom I consulted advised me to have it suppressed. Infantry and tank commanders have a great deal of fighting to do and neither time nor staff to use more than the usual detailed maps.

On another occasion I was prevailed upon before D-Day to put up a scheme for clearing a track through minefields by dropping a string of small A/S bombs from a fairly low-flying aircraft. I was unwise enough to work this out in a presentable form and to get a high-level conference called about it. The scheme was excellent except that, as the AOC TAF [Air Officer Commanding, Tactical Air Force] pointed out with some heat, each bombed minefield would almost certainly cost several airmen's lives and lose one or two aircraft. He quite rightly thought minefields were the Army's business.

(12) Relations with Armies and forward formations.

As will be clear from the reports of No.2 ORS, most of their work was done with 2nd Army and Canadian Army and some with tank divisions and other forward formations. It is a matter of regret to me that I myself never developed proper liaison with the Commanders and Staffs of forward formations. This was principally because they were fighting very hard all the time I was with 21 Army Group (I left in November, 1944) and owing to my late posting to the Group in England I had no easy opportunity of getting to know them.

Now that Operational Research has shown its value in the field, it would be easier to make these contacts and I believe them to be very important. The need for them emphasises the point that an SA should be appointed at the earliest possible moment in the planning stage and not just before battle starts.

(13) The Chief of Staff.

In spite of his title, the SA will find that he sees the Army Group Commander extremely rarely. For if the Commander is a man like Field Marshal Montgomery, the staff focuses its advice on to the Chief or Staff who, in the person of General de Guingand, took full responsibility for action which had to follow. The SA is therefore really Scientific Adviser to the Chief of Staff and any future SA will indeed be fortunate if he gets from his Chief of Staff the measure of friendship, support, interest and insight which I was privileged to receive from de Guingand.

(14) Is a Scientific Adviser a necessary part of an Army Group Staff?

The answer to this is bound up with the ORS, with the need for its recommendations to be considered on a high level, with the conundrum job and with the need for the introduction of specialists. I think it is important to have an SA with the Army Group unless the head of the ORS is himself of the standing to be a Brigadier. If he is, an argument exists for making him SA as well. But the difficulty mentioned earlier on that he then interferes with the responsibilities of BGS (SD) and perhaps others to a lesser degree still remains. When I was recalled from 21 Army Group by General Smuts, the Chief of Staff on my advice solved this problem by creating Colonel Johnson the de facto Scientific Adviser without giving him such a title, while keeping him under BGS (SD)'s command. The last paragraph of the report quoted above suggests that this solution was not entirely successful.

In any future war the general, scientific and conundrum responsibilities of the SA will be considerably greater than they were in the last and in my opinion he will be much needed.

Notes

1. The report "Operational Research in Northwest Europe" has been republished by the Laurier Centre for Military Strategic and Disarmament Studies as, *Montgomery's Scientists: Operational Research in Northwest Europe, The Work of No.2 Operational Research Section with 21 Army Group June 1944 to July 1945*, Terry Copp, editor, (Waterloo: LCMSDS, 2000), p.50.
2. *Montgomery's Scientists*, p.53.