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1	NAME OR TITLE Dr. Kullback	#062-9/ASS	INITIALS		CIRCULATE
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REMARKS

Would be most appreciative of such comments as are deemed appropriate on the various items in this trip report by Professor Wilks.

FROM NAME OR TITLE William F. Friedman <i>can</i>	DATE 3 January 55
ORGANIZATION AND LOCATION Special Assistant	TELEPHONE 60493

DD FORM 95 Replaces DA AGO Form 895, 1 Apr 48, and AFHQ Form 12, 10 Nov 47, which may be used.

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18 December 1954

MEMORANDUM FOR MR. WILLIAM F. FRIEDMAN
 EXECUTIVE SECRETARY
 NSA SCIENTIFIC ADVISORY BOARD

SUBJECT: Report on Visit to GCHQ, September 9-11, 1954

1. I arrived in London about 10:00 a.m. on September 8 and went directly to Colonel Barton S. Pulling's office to discuss arrangements which he had made for my proposed visit to GCHQ September 9-11. He suggested right away that it might be just as well to go to Cheltenham early the morning of September 9 as the afternoon or evening of September 8. I accepted the suggestion and during the hour before lunch and with the assistance of Colonel Pulling's secretary I made hotel reservations to stay in London the nights of September 8 and 11. She also handled my hotel reservations at Cheltenham, provided me with information concerning schedules of train services between London and Cheltenham, and made a plane reservation for me to Paris on September 12 to catch a MATS plane leaving Paris on the 12th for Washington. Colonel Pulling and I went out to lunch at one of the Clubs near Grosvenor Square.

2. After lunch I talked with Colonel Pulling for more than two hours about the purpose of my visit, the U.S. military and civilian personnel stationed at GCHQ, the extent of interchange between NSA and GCHQ personnel, the organization of GCHQ, and other similar matters. I found him to be very alert, energetic and enthusiastic throughout the more than four hours of time I spent with him that day.

3. I left London in the morning of September 9 and arrived in Cheltenham shortly after noon where I was met by one of Lt. Colonel Zeller's assistants who took me straight to Colonel Zeller's office. I spent the entire afternoon with Lt. Colonel Zeller and Dr. Rutledge discussing the organization of GCHQ. They went into considerable detail concerning the re-organization of GCHQ which had been announced on 9 August, referring me to his memorandum of 11 August on the subject. In briefing me on the organization of GCHQ Lt. Colonel Zeller took up the various divisions and top people in a completely thorough manner one-by-one, indicating how the existing set-up would be changed under the re-organization. Lt. Colonel Zeller also gave me an excellent briefing on the U.S. military and civilian personnel stationed at GCHQ.

4. With this background of information in hand concerning GCHQ I explained in some detail that I was particularly interested in talking to the appropriate GCHQ personnel on the following subjects:

(a) The organization of T/A effort and how closely it was integrated with C/A effort.

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- (b) Problems of personnel recruitment and selection.
- (c) Problems of quantification and graphical presentation of intelligence concerning [redacted]
- (d) Mathematical and statistical problems arising in C/A and T/A.

I explained that being a mathematical statistician by profession I had a natural interest in (d), but that as a member of WEASAB and as a member of the Robertson Study Group I had developed rather strong interests in (a), (b) and (c).

5. With this layout of interests before him, Lt. Colonel Zeller and Dr. Rutledge proceeded to set up a series of appointments for me for September 10.

6. Having spent the entire afternoon with Colonel Zeller and Dr. Rutledge I was taken by Dr. Rutledge to a little sherry party at his home at 5 o'clock at which Lt. Colonel Zeller and the following GCHQ staff members were present: [redacted] and J. Tiltman.

7. My first visit on September 10 was to the office of [redacted] who is in charge of Personnel at GCHQ. I was accompanied by Dr. Rutledge, not only on this visit but all the others. He outlined the general policy for recruiting young men from the universities for the professional grades. He pointed out security difficulties similar to those existing at NSA in providing able young men enough information about the work of GCHQ to enable them to make sufficiently self-convincing decisions as to whether to go into the work or not. He believed that a partial answer to the problem was to work through university professors who had had GCHQ experience and in whose advice students could have confidence. The main problem here was to persuade more university professors to spend some time at GCHQ to work on its problems and acquire enough background to enable them to give sound advice to students whom they knew well. [redacted] went into some detail as to how the British Civil Service system operates. I can easily see from the thoroughness of their selection procedures why the British Civil Servants, as a class, are so competent. I gained the impression that many of the personnel of GCHQ had spent much if not most of their careers in that work.

8. In reply to my inquiry concerning tests and examinations for the selection of C/A and T/A personnel he stated that they had begun some experimental testing with a series of tests known as Progressive Matrices and referred me to [redacted] for details concerning the results of these tests. [redacted] showed me some results which he had obtained by giving the tests to personnel at GCHQ as well as new applicants. He was quite optimistic about the possibilities of using the progressive matrices to improve their selection procedures for T/A and C/A personnel.

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In my own opinion NSA would do well to do some experimental testing with this type of test. If this test has some validity for selection of T/A and C/A personnel or if it can be further developed to have sufficient validity, its use could, I believe, eventually contribute a great deal to improving C/A and T/A effectiveness at NSA.

9. My second visit was to see [redacted], Associate Director, who impressed me as a most capable man. He is the man perhaps most responsible for developing the philosophy on which the re-organization of GCHQ is based. He went into considerable detail concerning the reasons for the changes. I don't think I need go into a full statement of the reasons for making the change and the principles which were followed since they have been set forth in Lt. Colonel Zeller's excellent memorandum of 11 August 1954. [redacted] did emphasize however the particular importance of the new Division "J" (devoted to the [redacted] problem). He was strongly convinced that by focusing the T/A, C/A, and other skills on the [redacted] problem GCHQ's effectiveness in dealing with that problem would be considerably increased. He referred specifically to the success with which the [redacted] was having with respect to the development of intelligence concerning the [redacted]. He looked forward to similar approaches to other segments of the Russian-military machine.

10. My third visit was to the office of [redacted], Deputy Director, with whom I discussed various general features of the GCHQ organization. I also discussed with [redacted] the role of NSASAB and he showed a good deal of interest in the idea of such a Board of outside scientists and wondered whether this is something GCHQ should consider. He referred to an internal advisory committee at GCHQ. I should say that I also talked with [redacted] about NSASAB, its functions, how it operated, and so on. He also showed some interest in this idea. I am sorry I did not get to see [redacted]. He was away at the time.

11. In the afternoon, my first visit was with [redacted], Head of the Reporting Division. I explained to him that I was particularly interested to find out what progress had been made in the development of indices of [redacted] which could be exhibited or graphed in time. This is one of the problems pointed up in the Robertson Report. He said his Division had given a great deal of attention to this problem and that in his opinion the [redacted] had made considerable progress on it. He immediately arranged for me to visit that group. Before making the visit however, [redacted] gave me an excellent briefing on their reporting procedures, including descriptions and examples of their various series of reports.

12. Leaving [redacted]'s office Dr. Rutledge and I went over to visit the [redacted] where we spent nearly an hour. I was very much impressed by a graphical method they were developing for presenting [redacted] of all kinds as a function of time. It seems to me that this development not only has possibilities for giving a much better visual account of what is going on with respect to [redacted] but has equally good possibilities for [redacted]

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Unfortunately, I was unable to learn whether similar work is going on with respect to [redacted]. There are, of course, more than a dozen U.S. Naval personnel in the [redacted] and I presume they will bring back to NSA some of the ideas being developed there. I believe, however, that it would be useful if some of our NSA personnel concerned with the analogous problem for [redacted] could have some contact with that group, since the presentation problem for [redacted] have many points of similarity.

13. As a matter of fact, after my visit at GCHQ and remembering the great interest in the work of GCHQ on the part of AFSS which I discovered in my visit to AFSS in the summer of 1953 in connection with the work of the Robertson Study Group I have been wondering whether there is enough liaison between AFSS and GCHQ. I found a good deal of similarity of outlook on the quantification problem between [redacted] of GCHQ and some of the staff members at AFSS. I would suggest serious consideration of more contact between these two groups than seems to exist at present.

14. After my visit with the [redacted] I returned to [redacted]'s office for further discussion about the problems of presentation. He is very much interested in the problem of developing sound indices of [redacted] and the presentation of the information. He is keenly aware of the pitfalls in developing such indices, and of the necessity for developing the indices through close cooperation between those responsible for developing the information through analysis and those responsible for reporting.

15. At this juncture it was 5 o'clock. I went home with Lt. Colonel Keller and had an excellent dinner and delightful evening with Lt. Colonel and Mrs. Keller. Among other things we discovered that all three of us were graduate students of the University of Iowa, and of course we had many things to talk about regarding the University of Iowa!

16. On the morning of September 11 (Saturday) I spent nearly three hours with [redacted] talking about many of the mathematical and statistical problems which have arisen in the work of his group. As these problems are all rather technical I shall not attempt to discuss them here. I am very much impressed by [redacted]'s ability. In my opinion it would be very useful for him to spend a few months at NSA with Dr. Leibler's group. Unfortunately, I did not see Mr. Alexander. He was playing chess in a tournament in Amsterdam at the time.

17. Finally, I regret to say that [redacted] were away when I was at GCHQ and hence I did not have an opportunity to get a good first hand account of T/A activity at GCHQ. I did, however, pick up a good many sidelights on it from [redacted]. I gained the impression that there is a good deal more

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integration of T/A/ and C/A effort at GCHQ than at NSA, and that in the new GCHQ set-up there will be even more integration.

18. I left Cheltenham in the early afternoon of September 11, and after an overnight stay in London I flew to Paris where I caught a MATS plane at 4:00 p.m. on September 12, arriving back in Washington, D.C. the morning of September 13.

19. Finally, I should mention that I actually left Washington on August 31 by MATS, arriving in Paris on September 1. I went to Amsterdam on September 2 and spent five days at the International Congress of Mathematicians before making my visit to GCHQ. I had originally planned to make the GCHQ visit first but found that at that time an even larger number of the staff personnel at GCHQ would have been away.

20. In closing this memorandum I want to take this opportunity to express my appreciation to Captain McDonald on this side and to Colonel Pulling, Lt. Colonel Zeller and Dr. Rutledge for making the arrangements required in making the trip. The arrangements were excellent in every respect.

S. S. WILKS
Chairman, Mathematical Panel
NSA Scientific Advisory Board

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