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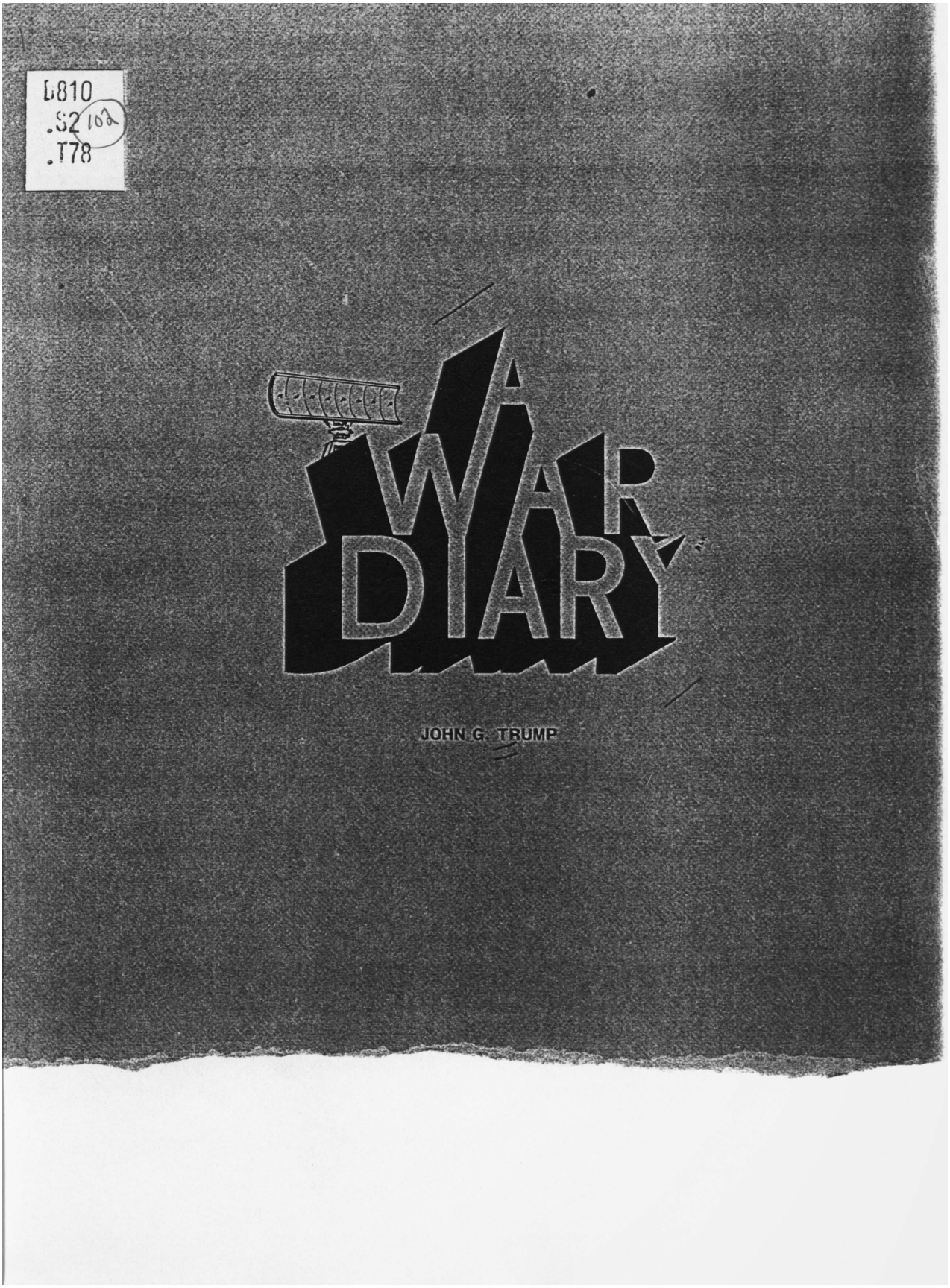

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A WAR DIARY 1944-5

This account of the radar activities of the British Branch Radiation Laboratory covers the period of my assignment to England as its director from February 1944 to May 6, 1945.

Those days of heightened resolve and awareness were also days of high adventure for the men and women who came to BBRL from OSRD's great microwave radar development center at MIT - the Radiation Laboratory - and from the associated industrial companies.

Our directive was simple - to do our utmost toward bringing into effective operational use by the U.S. Air Forces the new high-resolution airborne and ground-based search and control and gun-directing radars then emerging from the first crash-production programs at home.

That microwave radar proved valuable in the great invasion and the final victory in Europe is testimony to the extraordinary receptivity, rapport, and determination of the officers and men of the U. S. Air Forces at all levels. Nor can the BBRLers ever forget the friendship and assistance of the British scientists at TRE (Telecommunication Research Establishment) in Great Malverne, England.

John G. Trump

John G. Trump

March 1, 1973

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V01925

OFFICE FOR EMERGENCY MANAGEMENT
OFFICE OF SCIENTIFIC RESEARCH AND DEVELOPMENT
1530 P STREET NW.
WASHINGTON 25, D. C.

VANNEVAR BUSH
Director

March 5, 1946

Dr. John G. Trump
Radiation Laboratory
Room 24 - 090
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

Dear Dr. Trump:

This letter is one which I have wanted to write for a long while. It has been over a year since you tendered your resignation as Technical Aide in Division 14 of the National Defense Research Committee. Since then, however, I have been aware that you were continuing to serve OSRD in the same field even though not as our direct representative.

With the affairs of demobilization well under way, there is now time to look back and take stock of the past years. You are one of the first persons to come to my mind, not only because of your great contributions but also because you were among the first to join our ranks in a program of national defense. That was a year before Pearl Harbor when it was so urgent to get our organization started. I believe that our initial effort was responsible for much of our later achievement. Certainly, you can take a justifiable pride in having participated in performing one of our greatest experiments, the Radiation Laboratory.

Let me, therefore, express my keen appreciation and deep gratitude for the services you performed both in the early years of the Radiation Laboratory and later as our representative for the British Branch of the Laboratory. Without the cooperation of men such as yourself, I am convinced we never could have achieved what we did. I believe you may take great satisfaction for your part in the progress of such a new animal as radar.

I offer my hearty congratulations on what you have accomplished and best wishes for your full success in the future.

Cordially yours,

V. Bush
Director



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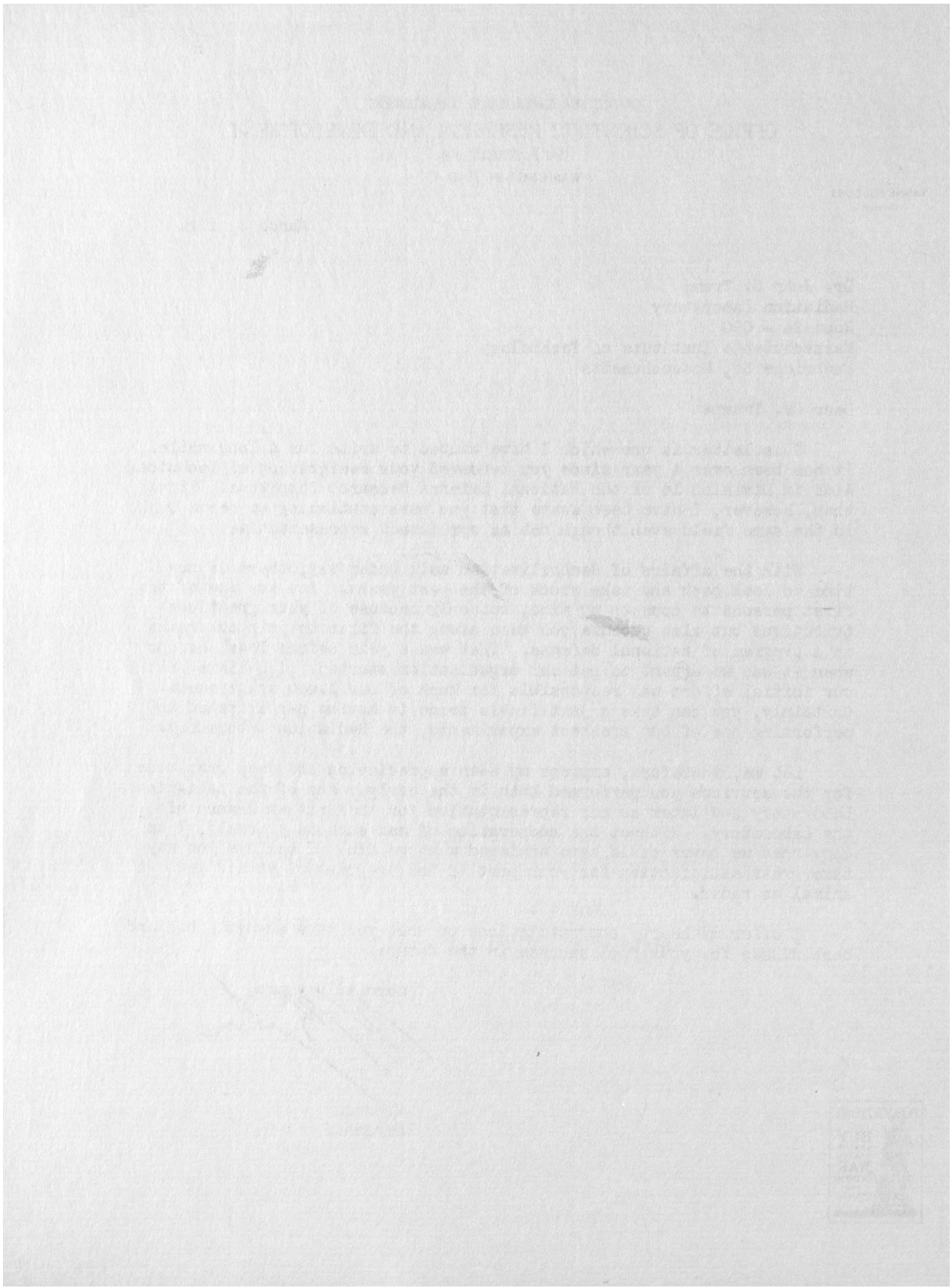

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Division 14, NDRC

DIARY OF JOHN G. TRUMP

The following is an account of the events leading up to my assignment as Director of the British Branch of the Radiation Laboratory. This account will be supplemented by further notes until the mission has been completed.

February 4, 1944

Drs. E. L. Bowles and J. A. Stratton of the Office of the Secretary of War have recently returned from a survey of the situation within the U. S. Air Forces in England and the scientific assistance on radar and other devices required for the forthcoming invasion "Overlord". Their recommendation, which L. A. DuBridge supports, is that a civilian scientific advisor be attached directly to the staff of General Eisenhower (Supreme Commander); further, that a civilian technical advisor from OSW be attached to the staff of General Spaatz. This civilian was subsequently determined to be Dr. L. N. Ridenour--two members of his group to be Dr. D. R. Griggs representing the H2X program and Dr. Victor Fraenckel representing counter measures. The desirability of concentrating the scientific and technical assistance on radar devices in BBRL was agreed upon. The necessity of immediately strengthening this group by additional personnel in order to produce the maximum influence for the forthcoming months was emphasized. In particular, the desirability of improving the relations between BBRL, London OSRD Office, and ABL-15 was pointed out. This led to the consideration of a new director and ultimately to the tentative selection of J. G. Trump.

February 5, 1944

At the Steering Committee meeting a description of the BBRL situation and its relation to the invasion plan was discussed by L. A. DuBridge and E. L. Bowles. In a subsequent short session the selection of Drs. L. N. Ridenour and J. G. Trump was further developed and approved.

At my request and for the reasons enumerated below, my expected stay at BBRL is to be for a period of four months. In any event, it is not to exceed six months, and it will be part of my responsibilities to install an effective working director before departure. The reasons are

(1) The particular problems which led to my selection are primarily those dealing with realignment of organization, as stated above. There will, of

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course, be the additional job of improving the internal arrangements of BBRL itself, securing an increase in staff, and determining its program for the coming months. All of these problems should be well resolved within a three to four months' period.

(2) It is desirable from the OSRD point of view that continuity be maintained in all of the technical and business administration of the affairs of the Radiation Laboratory and other Division 14 contracts. The Division organization is unique, and these functions have been taken over primarily by the small secretariat--the Division Committee itself serving mainly as a well-informed board of directors. It would be desirable, therefore, that I return to this work after the present BBRL affairs have been directed through the next critical months.

(3) My personal preference to return to the United States after a moderate stay in England.

(4) The general policy approved by Dr. Compton and Dr. DuBridge of rotating the directorship of BBRL so as to maintain orientation with the parent laboratory.

February 7, 1944

Dr. DuBridge and I agreed to leave at the earliest possible date--preferably before the end of February. At luncheon with Dr. Compton, he discussed his letter to Archambault describing his views on the manner of operation of BBRL and its relation to the London Office. These were to the effect that BBRL must manage its internal affairs and must be free to make its contacts with British laboratories and Army groups once the initial contacts have been established through the London Office. This manner of operation is recognized as substantially the same as that of the Radiation Laboratory in this country. It was mentioned that Archambault had made an extended reply, which I shall study. It was evident that Dr. DuBridge felt that there was an important difference of opinion between BBRL and London OSRD which must be reconciled.

Received initial shots of typhus, typhoid, cholera, and tetanus, and vaccination for small-pox.

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Dr. Ewing made the recommendation that BBRL send more adequate reports and letters to the Radiation Laboratory.

Dr. F. W. Loomis reported the request of Lauriston Taylor, Operational Research, for two men from BBRL.

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DIARY

J. G. Trump

Friday
February 25, 1944

Left East Boston Airport on American Airlines 2:30 p.m. flight. Elora and Johnny saw me off. Blithe farewells by a brave and lovely girl. Met Mom at LaGuardia. Her pride in me will be a source of strength. Arrived Washington at 6:40 p.m. Dinner at Cafe du Bois with Alfred Loomis, Lee DuBridge, I. I. Rabi, and Milt White. In Alfred's room discussed the BBRL program. Telephoned Elora.

Saturday
February 26, 1944

Breakfast with Alfred Loomis. Flying arrangements finally made. Flying with No. 1 priority in C-54 Douglas operated by ATC. Louis Ridenour deduces from our introduction to fellow passenger Lt. Gen. Hodges that we are being accorded honorary status equivalent to that of major-general. Were briefed in "ditching" procedures and safety devices. Medical briefing referred to presence of "medical" members on flight--meaning us. Took off about 3 p.m. Gen. Si Marriner, Capt. Davis, Mjr. Ramsey on board.

Arrived Stephenville, Newfoundland, at 9:30 p.m. Three-hour stopover, strange breakfast, then Officers' Club, where music and dancing was noisily in progress. Outside there was snow and the smell of coke--like England.

Sunday
February 27, 1944

Took off from Stephenville at 1:30 a.m. Now scheduled--because of adverse winds--to land at Greenland and Iceland. Landed Juliannesehaag at 7:30 a.m. (Wash. time), where we had breakfast at Officers' Club. Considerably better than that at Newfoundland. The morning was beautiful in this spot--surrounded by rugged snow-covered mountains. Noticed Eskimo language on walls of washrooms: Arnat - Arngutit (men). On the signpost: Newfoundland-Greenland 1010 miles, Greenland-Iceland 760 miles, Iceland-Prestwick 780 miles. Flew over the Greenland icecap after taking off at 9:50 a.m.: a high, snow-covered plateau bounded by jagged rocky peaks along the coast. Many glaciers could be seen flowing toward the fjords, with small and large icebergs taking off.

Arrived Prestwick, Scotland, at 10:54 London time (5:54 Wash. time). Our total flight time was 26 hours+. Immigration procedure was eased for the party. After dinner at the airport, wrote letter No. 1 to Elora and went to bed (also at airport).

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Monday
February 28, 1944

Called at 7:45 a.m., and off again at 10 o'clock in a DC-3, arriving in London at 12:30. We were met there by Arch and driven to Claridge's, where a suite de luxe at 7 guineas was reserved. Dinner in sitting room, then a long discussion (mainly by Ed Bowles) on Army organization and problems, the functions of the civilian advisory group of OSW attached to Gen. Spaatz, the relation of BBRL, ABL-15 with Army, etc.

At 6:00 p.m., left with Lee and Louis for OSRD, 117 Park Street, where we met Jack Pierce, Dick Lawrance, Betty Cooper, Guy Stever, Dave Langmuir, George Mercer, etc. Dinner at the Connaught Hotel with Arch, Guy, and Dave. Discussed Oboe, BBRL in general, AJ, and began exploring a basis for good relations. Back to Claridge's, where Bob Robertson was present. Impressed by the solemn darkness of London blackout, the brightness behind the closed doors, and the prospect of a heavy raid, which at 10:45 had not materialized.

Tuesday
February 29, 1944

Called at 8 a.m. The night had brought forth no raid--probably because of weather conditions over enemy territory. Last week there had been a raid on London every day, totaling about 600 sorties. Had breakfast, then went on to OSRD at 10 a.m. Met more of the staff, including George Mercer, Laurence Clarke, BBRL secretary Brenda Palmer, and others. Talked over phone with Denis Robinson. Registered as an American alien at Piccadilly Place Police Station. Had lunch with Arch, Lee, and Jack Pierce. Called Ted Anderson and told him that we would be at Malvern on Saturday. Sam Goudsmit came in with Joe Platt en route to Oboe base. He described the OSRD-BBRL difficulty as a bubble which had disappeared. Stated that the Director had three full-time jobs to perform: (1) to direct the internal operation at Malvern, (2) to keep in close contact with the field organization and their immediate Service contacts, (3) to keep in high-level contact with Services both American and British.

Lee and I called on Sir Robert Watson-Watt at Church House in Dean's Yard. We--mainly Lee and W-W--discussed BBRL and OSW changes, Crossbow, present Nazi raids on London, the British Mission Report, etc. Sir Robert indicated to me his willingness to assist both directly and indirectly in BBRL problems. He understand the field engineer policy of BBRL.

Discussed the Loran and SS Loran program with Jack Pierce, who will leave next week with Betty Cooper for the United States. Vissers, Henson, and Martin will continue at the African stations until about April 15. Davidson will stay on to assist Bellringer. We discussed the Azores SS Loran possibility and the Division 11 RL program. Jack is eager to work on the low-frequency system.

Discussed the London BBRL office function with Brenda Palmer. This office should be very useful as London focal point of BBRL activities.

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Dinner at Choy's Chinese restaurant in Soho with Arch and Guy. Back at OSRD, discussed London OSRD-BBRL relations. We mutually agreed on the necessity and desirability of BBRL managing directly its own affairs, including contacts with Services and British, referring to OSRD such matters as pertained to it or on which they could render assistance. Arch indicated his desire of retaining Guy, but offered Guy's services in the work and interests of BBRL and agreed that the direction and reporting of the radar activity should originate with BBRL and not develop a parallel track.

A small raid, later determined to be 12 to 20 planes, one of which was shot down, occurred during this session.

Wednesday
March 1, 1944

Called at ETOUSA for card of admittance to Officers' Mess (foot of Park Street) and also a PX card. Left with Louis Ridenour for Alconbury in an Army Ford driven by a fancy-free English gal, "Mabel", as U.S.Army driver.

At Alconbury had discussion with Col. Moore, C/O of 8th AF Pathfinder Group. Agreed on conference in about 2 weeks on bombing-aid program of the future. Met Dave Halliday, Frank Zaffarano, Al Dunbar, Don Redmond, and Bob Kulp (the latter two Philco field engineers just arrived). Frank is to leave Saturday to install second BGX beacon at Halesworth on the east coast. Col. Moore is now training 42 APS-15 navigators who will go to the three Divisions of the 8th. On February 26, twelve B-24 and 27 B-17 planes were equipped with new APS-15's. Halliday is helping in the training program. Nine of the original 12 H2X sets are still operational. Returned to London at 6:30 p.m. with stop-off for tea. Dinner at Officer's Mess with Sam and Lee.

In evening discussion with Ed Bowles and Lee, the OSRD-BBRL set-up was the subject of conversation, Ed having already talked with Arch. He had arrived at substantially the same understanding which I had reached with Arch the evening before. Ed pointed out that Arch's decision to keep Guy on staff placed on him the responsibility for avoiding difficulties. Both Lee and Ed indicated disapproval of Arch's request to Marshall for copies of all BBRL correspondence.

Thursday
March 2, 1944

At 3 a.m. we had the first air-raid of intensity since our arrival. There was no heavy AA fire, nor did bombs fall near. Five raiders were reported shot down.

Arrived at Widewing at 10:15 a.m. with party. In General Fred Anderson's office, Ed Bowles explained relation of scientific advisors: L. N. Ridenour, H. Robertson, V. H. Fraenckel, and L. A. DuBridge; also of the Director of BBRL and the Head of the London Mission of OSRD. Met Col. Glenn Williamson, Col. Fred Maxwell, and Col. Sutherland, who is under Maxwell on technical requirements.

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After an excellent dinner in the Generals' Mess, where I sat next to Col. Hughes (A-5 plans), we drove to Pinetree, HQ of 8th Bomber Command. Met Gen. Jimmy Doolittle, who indicated their need of help and their hope that the "sanded thumb" would be applied when necessary.

Back to OSRD, where Jack Pierce introduced me to Bellringer (TRE - Loran). Met Rawcliffe, who was en route to Alconbury to check on H2X supersonic trainers. Had sherry, dinner, and long talk with Sam Goudsmit, which gave me the biggest lift of the day.

Friday
March 3, 1944

The morning was spent composing a letter for Gen. Spaatz' signature describing the CSG (civilian specialist group) and the cooperating civilian agencies: OSRD, BBRL, ABL-15. Left at 2:30 with Sam Goudsmit for Widewing and teletype. Met Major Brousseau, who is in charge of teletype communications, and later Col. Dixon, C/O, and his aides: Lt. Col. Hollingsworth and Capt. Mandell. After teletype, talked with Col. Fred Maxwell about the problems of 8th BC.

Back in London at 7:30, to Claridge's and bed after bouillon and whiskey to break up incipient grippy feeling.

Saturday
March 4, 1944

Left with Sam and Lee in BBRL car for Malvern. Stopped at High Wycombe, where we met Col. Osborne and Col. Garland. Arrived Malvern at 4:30. Was assigned Room 27, formerly Larry Marshall's, overlooking garden. Met the boys and girls, who were very friendly and seemed to thoroughly enjoy things. Louise Winston served tea, bread and jam. Dinner at the County Hotel, with the old ladies and microscopic amounts of meat and sugar--just as I had pictured, only more so. Mr. Rowe, Chief Superintendent of TRE, came over and talked with Lee, Denis Robinson, Sam, Ted Anderson, and myself for several hours. He was most friendly. Agreed on an "all-American" soviet for the Sunday a week hence. He told of Mannheim announcement: ".....as a reward for heroic conduct of Mannheim citizens during recent British criminal terror raid, a special ration of 2 eggs would be issued to each person. These eggs would not be available for a while....etc."

Sunday
March 5, 1944

Excellent sleep. Was conducted through the laboratory and new buildings by Ted and Sam. Saw the AGL-T at TRE and later their supersonic H2S trainer. Met A/C Brown, G/C Pretty, A/C Leedham, and the Chief of Coastal Command.

Discussed H2X with Dave Halliday and Troop Carrier Command with Charlie West.

At 4:30 we adjourned to the Monastery for BBRL seminar. Lee gave a talk on the Civilian Specialist Group and the BBRL program. I said a few words in the capacity of new director. Left on 6:15 p.m. train for London.

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Monday
March 6, 1944

Left at 8:30 a.m. by car for HQ, Troop Carrier Command, with Lee DuBridge, Ed Bowles, and Louis Ridenour--a 140-mile trip to Grantham. Met Gen. Williams, Col. Richards A-3, Col. Crouch, Col. Baldwin, Major Blair, Capt. Jefferson, and Lt. Boussart. An excellent session followed, in which the plans, equipment, problems, etc., were frankly discussed. The assistance of Charlie West and Joe Kane were greatly acknowledged. Decided that the 6 BUPS should be brought promptly by Golian to assist in forthcoming operation. Left at 3 p.m., passing through Cambridge, where we looked at King's College grounds and buildings.

Supper in London at Officers' Mess. At OSRD, later, talked with Dr. Ginster of Sperry on ground echo elimination survey. He returns to the States tomorrow.

Tuesday
March 7, 1944

Left at 8:30 a.m. for 9th Bomber Command HQ at Marks Hall, Colchester, with Ed Bowles, Lee DuBridge, and Louis Ridenour, and Robertson. Met Gen. Sam Anderson, Col. Maude, Capt. Williams. Also Larry Taylor, ORS; Dr. Mohler, R. W. Larson, and Joe Platt. General discussion after lunch on Oboe II. Review of ground station program: 2 Mark II stations in operation, 4 mobile stations scheduled for operation by the end of March, Mark III (4 channels with width modulation) probably not available for 3 or 4 months. The need for an Oboe Mark II coordinating committee under AEAF was emphasized.

Stopped at OSRD, where I sent a cable to Bill Breazeale suggesting that he get on BBRL pay roll.

Went with Lee to see A/C Leedham, MAP, where we had a general discussion including the County Hotel situation. He agreed that the Hotel should be requisitioned.

Dinner at the Officers' Club with Lee and Vic Fraenckel. He and I are empowered to act on BBRL and ABL-15 housing and salary questions.

Glass of Barclay #1 with Jack Pierce and Betty Cooper at Simonds. They are leaving for the USA tomorrow morning. Sent message to Elora via Jack.

Wednesday
March 8, 1944

In the afternoon, had conference with Gen. Marriner, Air Vice Marshall Tait, A/C Hart, and A/C Brown. On our side were Ed Bowles, Lee DuBridge, Louis Ridenour, Vic Fraenckel, Arch, and myself. Discussed AEAF coordination problems, including radar and counter-measures. Use of SCR-584 was suggested for mobile GCI.

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Officers' Mess for supper with Vic Fraenckel. At a conference at Claridges in the evening, there were present: Lauriston Taylor, Dr. Mohler, Ralph Johnson, Zimmerman, Col. John Harlan, Lt. Col. France, Norris Tuttle, and Norton and our gang.

Thursday
March 9, 1944

Morning spent at OSRD. Composed letter to Col. Stice, ETOUSA, requesting 7 vehicles.

Took the 1:50 p.m. train with Guy, Arch, and Sam to Exeter. Met by Mike Chaffee, who took us on a two-hour ride over hill and dale, beautiful countryside, and old villages to Start Point. Stayed at Officers' Mess in Trout's Hotel overlooking the sea. It reminded me of Le Lavandee, the moon, cliffs, shingle beach. Visited MEW site, met Al Bagg. The RAF Controller of MEW is S/L Geoffrey Cherry-Downes. John Rutherglenn, TRE, under Dr. Taylor, is busy installing a Type 24 3000 mc. height finder. Discussed program for 2nd MEW at Grayfriars and the need for 20 BASN's. The 2nd MEW program (mobile or not) needs clarification.

Friday
March 10, 1944

Spent the morning inspecting MEW, cliffs, and old fishermen's houses. Drove back to Exeter with Al Bagg, where I entrained for London. In London met Col. Art Warner--just in that morning by ATC. Had Supper at Officers' Mess, where we met Col. Jefferson.

Saturday
March 11, 1944

Drove to Malvern with Ed Bowles, Lee, and Louis. Noticed along the road extensive supply dumps ready for the invasion. Had Dinner at Westminster Arms in Gt. Malvern. Later inspected BBRL buildings and ABL-15. Met John Dyer and others. Dance at County Hotel in the evening.

Sunday
March 12, 1944

Was issued my permanent entry pass for TRE and attended my first TRE Soviet. Mr. Rowe, Dr. Lewis, Dr. Robinson, Mr. Holt-Smith, Dr. Smith (Gee, G-H, etc.), Dr. Lovell, Dr. Pringle (K-band, etc.), Mr. Ratcliffe (PDS), Mr. Reeves (Oboe), Dr. Cockcroft (ADRDE), Mr. Rowe, Sir Robert Renwick were present. E. L. Bowles described new set-up and introduced Louis and myself. There ensued a discussion of ORS, the function of BBRL, and the war.

At 3:30 Louis was introduced to speak on BFR (blind-flying radar), Eagle, and H2K. Ed Bowles was introduced, and then they left for London.

Conference on Oboe program resulted in decision to prototype one 584 Oboe ground station. Talked with Dave Halliday, who thinks H2X equipment job is done. Talked with Dave Davidson. Loran SS local coverage stations are in preliminary operation. He, with Bellringer, will leave tomorrow for Northern Ireland to install Loran receivers in Coastal Command planes.

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Monday
March 13, 1944

First full working day at BBRL. Morning conference on agenda for tomorrow's meeting in London on Oboe. W/C Fennessy, Capt. Williams, Col. Maude to attend. Conference with ABL-15 on (1) per diem, (2) mechanics wages, (3) taking over County Hotel. With Denis Robinson to lunch at Abbey Hotel (RAF mess). In afternoon, conference with A. H. Reeves and Hooper on BBRL ground Oboe program. They endorse it and ask that we, in addition, provide 584's to back up the two South Coast Type IIM's. Back to Canadian shack after dinner for notes.

Tuesday
March 14, 1944

Drove to London with Sam, Guy, and Herb Weiss. Stopped at AAF Bomber Command, six miles out of High Wycombe. Talked with Dr. Harris of ORS (H2X) and Mr. Beard, ORS, on Oboe. In OSRD at 3:00 p.m., conference on Oboe ground stations with Col. Maude and Major Williams of 9th BC, W/C Fennessy of 60 Group, S/L Burnett of Air Ministry.

Checked in at Mt. Royal Hotel, Room 142. Will consider single at Cumberland soon. Dinner at Officers' Mess with Guy and Vic. Talked with Louis, Lee, and Dave Griggs, who arrived today.

Fairly heavy raid on London tonight. No moon, London black, many incendiaries dropped. Sam and I watched the spread of a fire which gutted several blocks. No water and poor fire watching and fighting.

Wednesday
March 15, 1944

Morning spent browsing about 9th AF HQ. In the afternoon back to Uxbridge to attend conference on GCI, EW, and light warning, and other requirements of 9th Commands. Col. Cody (Sig. Off., AF), Col. Garland, Gen. Burnell and Gen. Curtis, 9th ADC; Gen. Marriner and Major Ramsay, AEAF; G/C Keighley, AEAF; Capt. Stover, Lt. Col. Lotz, 9th AF; L. A. DuBridge, and L. N. Ridenour were present. I brought Ed Schneider, just in from the U.S.A.; who contributed a good deal. The 9th will ask for 20 SCR-615's (10 already en route under Lend-Lease), 20 SCR-584 for GCI, several SCR-582's. The second MEW is to be set up at the earliest date and made mobile concurrently. Twenty RASN's for fighter photo reconnaissance will be theater-requested. BBRL will assist in modifying SCR-584's to GCI function. Dinner with L. N. Ridenour, L. A. DuBridge, Dave Griggs. Talked with Sam, "the Egyptologist", until late.

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Thursday
March 16, 1944

Morning spent at OSRD. Saw Major Neal Crane. Left by automobile for Dover (through Maidenstone and Folkstone) to visit Oboe ground stations, Mark I, II, and III (Hawkshill). F/L Smith was in charge. After dinner at Swan Hotel in Deal, returned to Mark II station to watch "mouse" operation on Cologne. Herb Weiss and John Faulkner check with ground-station people on Oboe Mark II difficulties.

Dover appeared thoroughly shelled and desolate at the waterfront. Life continues behind the fronting buildings. Miles and acres of barbed wire. Peculiar number code at RAF station. Had strange sensation on looking 20 miles toward enemy coast....even stranger sensation experienced after Oboe release signal while the bombs were still falling through the air on Cologne.

Friday
March 17, 1944

Left Deal at 8:15 a.m. Drove along coast past convoys, RDF stations overlooking the channel. Stopped at Canterbury, walked through the Cathedral--very cold, badly damaged, but with a good deal of repair done. Interesting countryside, quaint but drab village, with many picturesque scenes. Struggled through suburbs of London, arriving at OSRD about 11:30. Had teletype retyped and went on to Widewing with Ed Schneider in limousine. Ted and Louise had the teletype well in hand. Talked with Ed Bowles, Col. Dixon, Capt. Richardson. Met Major Flanahan, SC. Returned to London with Ted and Ed, excellent dinner at Jardin des Gourmets (Greek Street near Soho Square).

In the evening we had a brief air raid alarm. Drove car from Claridge's to garage--first time in England.

Saturday
March 18, 1944

Visited Col Eyster, G-3, with Lee, but found him unavailable. Tom Murrell, Larry Henderson, Bob Watt, Leroy Blackmer, and Ed Brazell arrived in London from the States. Went to Claridge's with Lee to work up program for Tom and Larry.

At 1:30 entrained at Paddington with Ed Schneider and Lloyd Dorsey for Exeter. The train was crowded, but finally found seats. Had tea in diner to make up for missing lunch--had toasted rolls, jam, cake, and tea. Mike Chaffee met us again with BBRL beachwagon, accompanied by F/O "Peg" Frazier (controller at MEW station) and Penny Cox, TRE draftswoman and artist who did the translucent glass control board. Met RAF controllers F/L "Jeff" Cherry-Downes (C/O), F/O Wright, also Lt. Jim Loving and Lt. Brown. In the evening, spent some time with the MEW. Abormal propagation showed up clearly the Cherbourg Peninsula. Telephone lines are not yet in; so operations are delayed. Enjoyed beer and songs in the hotel lounge, then to bed and sound sleep.

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Sunday
March 19, 1944

After breakfast walked along cliff path east from Trout's. Light drizzle, destroyers firing intermittently offshore. Letter to Elora and Otto Sahler. Then walked to MEW station. The type 24 height-finder was going in.

Visit of ADGB group (G/C Cherry) postponed until Monday because of weather. Would like to meet him and Lt. Col. Hopkins of 9th ADC, but ought to get back to Malvern. Decided that Ed Schneider would stay. The decision on site for MEW No. 3 should be made soon. Suspect that Greyfriars is best. Coverage for 8th BC needed there. The southern coast is amply covered by Beachy Head, Hythe, and Ventnor stations. Probably the Start Point MEW could be spared best for the continent later on. Saw practice operation in the afternoon. The American controllers and staff need a lot of practice, and British experience is once again invaluable. Walked east along the cliff path, where I met an elderly couple evacuated from the bombing range. The rugged shore scenery is quite beautiful. Here and there the primroses are beginning to come out. Probably this part of the country is raw and bleak during the many winter months, but today is fine, and it will be even pleasanter later on.

In the evening, back at the MEW station, we could see enemy and our own aircraft on the screen. An interception was made, and the signal disappeared. Later on we learned that a Dornier 177 was shot down. Left for the hotel and bed at 1:00 a.m.

Monday
March 20, 1944

Lt. Buchhalder drove me to the station at Exeter. Caught the 10:28 a.m. train passing through Bristol and Hereford, arrived at Malvern at 4:30. Went down to the lab for a couple of hours.

Tuesday
March 21, 1944

Conference with Fraenckel, Dyer, and Arnold. ABL-15 does not wish to match BBRL's per diem. Four more SCR-584's arrived, two to be used for GCI tests. Took Army driving test, had second tetanus shot at the 19th General Hospital. Discussed Oboe program with Dr. Jones, TRE, and Herb Hall. May build two mobile units, using 584's and TRE single-rack console. Dinner in the evening at the Bookers', Combermere, Avenue Road, Malvern. The Warrens and Mrs. were there.

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Wednesday
March 22, 1944

At BBRL. Conference with Dr. Lines and Dr. Francis re 9th TCC. Organization needs strengthening. A Philco man to aid on Rebecca is indicated. Decided to install TRE single-rack consoles in 584's to form self-contained mobile units.

Thursday
March 23, 1944

Drove the Pontiac to Widewing, leaving at 7:00 a.m. with Dick Lawrance. Conference with ASG group, Col. Warner, Ed Schneider on use of 584 (or 615) for GCI. Two RAF controllers, S/L's Geddes and Craig attended. Decided on range tests at Malvern on the 584. If successful, we shall have full GCI tests. The 9th AF is to accept either a 584 or 615 solution.

Met W/C Drew at OSRD, where we discussed microwave fighter recognition set to permit night fighter penetration into London after turning off AA.

Had dinner in Soho with Ed Schneider, Tom Murrell, and Larry Henderson. Later in the evening we went to Claridge's where we discussed with Lee, Louis, John Cockcroft, and Pringle the use of 584 to direct close-in bombers in close ground support work.

Friday
March 24, 1944

Spent the morning in London office. At 10:00 a.m. drove to Widewing with Ed Schneider. Had talk with Louis Ridenour re things which BBRL could help on. These can be summed up as follows:

8th AF
1. H2X program, including equipment in Division, trainers, photo reconnaissance.
2. BGX beacons
3. MEW #3 to assist in North Sea navigation
4. Miller's modified H2X
5. Eagle
6. H2K
7. Loran

15th AF — As above.

9th TCC
1. Gee, Rebecca-Eureka
2. SCR-717C
3. Light-weight S-band beacon BUPS
4. Ground beacon, BGS

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9th BC Oboe Mark II - Air-borne and ground station

9th Air Support and Air Defense

1. MEW #2 for fighter sweep control
2. MEW #3 (mobile) for use on continent
3. MEW #5 for use of 8th BC, navigation and fighter sweep
4. GCI program using SCR-584's or 615 as determined by test
5. Close-support bombing with 584
6. Air-borne beacons for photo reconnaissance - BASN's

AA Command

SCR-584 with 80 mm. General field assistance.

Air-Sea Rescue

SCR-717's in Warwicks

Amphibious Forces

Teletype conference, then back to London by car. Dinner at Sherry's near Claridges. Heavy, noisy air raid during which I fell asleep.

Saturday
March 25, 1944

Morning spent in London. Drove Col. Warner, Ed Schneider, Larry Henderson, and Tom Murrell to Malvern, arriving at 6:30 p.m. Had tea at an interesting inn near Tewkesbury.

Sunday
March 26, 1944

Morning conference with Col. Warner, Ed Schneider, and others on 584's for GCI. Bob Watt to be project engineer. Range tests of 584 to be made first after 1st-class tuning up at Malvern. Tests to be at GCI station at Comberton, 10 miles away. Then a 2-unit GCI display to be prototyped. The 615's are to be used in lieu of 584's if range is inadequate. Close air support trials can be made as well.

Conference with Charlie West and Joe Kane. Larry Henderson and I are to go to Grantham on Wednesday to study their problems.

Held first Steering Committee meeting of BBRL. Present were Anderson, Henderson, Schneider, Murrell, Col. Warner (guest), Street and Simmons to be members on arrival. Regular meetings will be held on working Sundays at Malvern. The Director has final responsibility and say on all commitments. Discussed reports, field engineers for 584, cohering the Malvern group.

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Seminar at Monastery. I introduced new arrivals and gave short talk on BBRL program. Col. Warner gave fine talk on SCR-584 development and uses.

Sent cable request for Fitzgerald and Cherry for field engineer service in 8th BC. They would bring total to six.

Monday
March 27, 1944

General activity at BBRL. Had talk with Phil Jacobs, who had just returned from Oboe installation work at Stansted. He goes to Alconbury and 8th BC Division to look belatedly into regulator difficulties on the H2X.

Had conference on living and quarters allowance for BBRL staff. Recommended $6.50 per diem in Malvern, $5.00 for those without dependents. Cross-section of staff -- Louise Winston, Betty Pooler, Dick Anderson, Ed Worth, and Al Dunbar -- agreed that this was best of a necessary change.

Conference with Dr. Lines, Larry Henderson, and Charlie West on TCC. Plan to go to N.Witham tomorrow.

Talked with Capt. Otto Sahler by phone. Plan to drive to see him in Bath next week-end.

Tuesday
March 28, 1944

Drove through Stratford to North Witham with Lines, Henderson, and West. Had lunch at 9th TCC Pathfinder school mess with Col. Crouch, C/O. In the afternoon, attended at conference of PFF with the air-borne wing commanders. Presided over by Col. Sprague, A3. Much discussion concerning lack and poor performance of radar navigational aids. I was stirred up to defend the basic plans for G, Rebecca-Eureka, 717, and BUPS. Obvious that stronger organization, more training, more radar officers, and men, and the rapid flow of request equipment in TCC is badly needed. Conference arranged for tomorrow with Capt. Jefferson, Capt. Derey, Lt. Bessardi, Henderson, West, Louis, and myself to make quantitative summary of situation.

Spent night at George Hotel, Grantham.

Wednesday
March 29, 1944

Morning at St. Vincent's with Capt. Jefferson, Capt. Derey, Lt. Bessardi--working out detailed requirements of 9th TCC in equipment (Gee, Rebecca-Eureka, 717-C, BUPS, including spares and test equipment) and personnel. Situation obviously bad and needs much action. Larry Henderson to summarize equipment requirements to Major McNary on Friday's teletype.

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Obvious also that TCC school could be a pathfinder force (not merely a school) and should work with an air-borne parachute company--not with 14 air-borne groups.

Dropped Larry at Alconbury, arrived London 7:30 p.m. Have reservation at Cumberland for next Wednesday night.

Thursday
March 30, 1944

Discussed TCC with Lee DuBridge. Cabled to Radiation Laboratory for one Eureka, three Rebecca field engineers on BBRL staff for 9th TCC. Lee reportedvisit to 8th Fighter Command who want MEW and TW.

Talked with Brenda re London BBRL office set-up. Widewing in late afternoon. Called Gen. Partridge to recommend Rawcliffe's staying here rather than accompanying Dave Halliday to Italy.

Talked with Col. Warner re Window tests on 584 to be set up on AA site near London. Meeting tomorrow with Col. Scherer, ETOUSA, at 10:00 a.m. on BBRL assistance.

Had supper at Officers' Mess with Bill Breazeale and Ed Schneider. Bill is to:

1. Organize so that BBRL staff cover British component-development meetings.

2. Re-analyze component program of BBRL in advance of Jordan's arrival and work up list of required apparatus.

3. Work up preliminary list of equipment likely to be useful in U. K. to be set up as sample at BBRL. Such a program is likely to be a strong unifying force at BBRL and increase the effectiveness of its contributions to Services.

Friday
March 31, 1944

Conference with Archambault re: Civilian advisory group for SHAEF. Watson-Watt is to be chairman, reporting to Tedder; Ridenour, Fraenckel, Dyer, Trump, Langmuir, and Robertson to represent the American side; Rowe, Lewis, Blackett, Cdr. Leddell, and Larinder represent the British. The committee is to be formalized soon. Discussed space at Hereford House. Resisted the idea of Stever in BBRL room because of obvious overcrowding. Archambault mentioned four of Taylor's men who are discontented because of lack of specific work and asked if BBRL could take over.

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Conference with Col. Scherer, Assistant Chief Signal Officer, ETOUSA; Col. Warner, Ed Schneider, Major Crane, Major Edwards on BBRL assistance on 584 program.

To Widewing for teletype. Capt. Jefferson, 9th TCC, and Larry Henderson worked up statement on 9th TCC personnel and equipment requirements. Excellent teletype conference, showing splendid cooperation by Radiation Laboratory. The speed with which FM test set--sorely needed for H2X program--will be forthcoming is surprising. Good exchange of spot information. TCC picture was clarified except for 717 requirement.

Stayed at the Cumberland for the night.

During 12 days of February, Germans dropped over 1100 tons of HE and fire bombs on London.

Saturday
April 1, 1944

Spent morning at OSRD, and with Arch arrived at an excellent BBRL office arrangement. Browsed about London, including Selfridge's. Had picture taken for AGO card.

Left at 2:00 p.m. by Pontiac for Malvern with Larry Henderson, Ed Schneider, and Lloyd Dorsey. Receiver Letter No. 14 dated March 20 from Elora. Met Nottingham and Leverenz. Wrote No. 14 letter home.

Sunday
April 2, 1944

Meeting with BBRL staff spelling out three elements of new program: (1) BBRL direct liaison with British Committees, (2) program of bench sets and samples of forthcoming equipment at BBRL, (3) re-examination of Component Group needs. Gave reassurance about draft situation.

Afternoon seminar on phosphor and skiatron screens by Leverenz of RCA. Met Bradfield and others of his group. Afternoon Steering Committee meeting in new office building. Among other things, the morale at BBRL was described by Ted Anderson as low. I doubt it.

Monday
April 3, 1944

A drizzly day. Saw Bradfield's 4 ft. skiatron projection with Leverenz and Nottingham. Wrote instructions for Dave Halliday, who goes to Italy for the 15th BC. Discussed getting a bench APS-15 (H2X) and an APS-2 (RCA TW) from TRE with O'Kane. Worked up an organization chart of BBRL. In evening, went "pubbing" with Phil Jacobs, Bill Breazeale, and Norm Leavitt. Very thin beer and darts.

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Tuesday
April 4, 1944

Left Malvern early with Ed Schneider and Bill Breazeale. Attended conference at Pinetree on H2X. Gen. Partridge, Col. Sullivan, Col. Garland, Col. Osborne, Dave Griggs, Louis Ridenour, Lee DuBridge, Tom Murrell, representative of the three Divisions of 8th BC, Col. Moore of 482 (Alconbury) were present. Defined duties of the BBRL field engineers and Tom Murrell, who momentarily is radar operations planning by virtue of his assignment to Gen. Orville Anderson, but whom I have asked in addition to act as technical mouthpiece of BBRL on question of H2X modifications. Gen. Doolittle has written request that BBRL act as final authority on H2X modifications. Gen. Partridge outlined H2X developed from the first 12 sets to present. Need for more training, more sets, more bombing practice was emphasized.

In afternoon, attended first meeting of Scientific Advisory Committee (to SHAEF) on Radio Aids at Church House. The Chairman, Sir Robert Watson-Watt, presided. A list of 16 problems was presented.

Back at OSRD, Sam Simmons had arrived with three letters from home. Vic Fraenckel and I sent cable to Ford and Claflin on living and quarters allowance for BBRL and ABL-15 staffs. Supper at Officers' Mess with Ed and Bill, then a talk with Art Warner and Hank Abajian, who leaves soon for the Pacific.

Heard "war news" at 8th BC in the "war room", where our conference was held. An interesting 5-minute summary.

Wednesday
April 5, 1944

Long talk with Sam Simmons about his job as air-borne radar head for BBRL. Later talked with Joe Platt regarding Oboe project. There is to be an Oboe-accuracy meeting at Air Warfare Analysis Section (AWAS) under Dr. Roberts, ORS, for RAF group.

In afternoon, George Huff and Frank Bidwell arrived. Had conference with Col. Erik T. Bradley, Air Technical Services, G-2, who is responsible for examination of captured enemy radar equipment.

Thursday
April 6, 1944

Decided that George Huff should work on 584, assisting Bob Watt. Conference at 10 a.m. with Archambault and Larrie Taylor. He outlined the work of his ORS men, including:

1. Snow and West - bomb analysis for 9th BC
2. Armstrong - bomb analysis for Oboe
3. Merton - Oboe ops. data, if he makes good.
4. Balmer - temporarily on tests of GL and general radio
5. Hutzenlaub and Jost - bomb analysis

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Worked hard on various reports for Lee to carry back. Busy until 1:00 a.m.

Friday
April 7, 1944

Spelled out to Lee our field engineer needs: 6 Philco men for H2X in 8th and 15th (may need 2 more); 1 Eureka and 3 Rebecca plus 2 WE for 717C to be used by 9th TCC; 3 GE or WEMCo men for 584's immediately.

SACRA meeting at Church House on Y information. Program of TRE and ASE in getting accurate dope by May 15 was described.

Saw Lee off to ATC depot at 7:30 after dinner at Officers' Mess. He has done a splendid job. I was touched to see him go, particularly at the thought that he would be home by late Easter Sunday if the weather holds good. Beer and talk in Claridge's with Louis, Larry, George, Sam Simmons, and Tom Murrell re BBRL organization. Larry's work being tacitly regarded as ASG, 8th AF bombing at night, etc.

Saturday
April 8, 1944

Left late in the morning for Malvern via Widewing and Pinetree. At Pinetree introduced Sam Simmons to Col. Sullivan, Chief Signal Officer for 8th AF, and explained BBRL organization on 8th's H2X program. This is to be clarified and confirmed by letter. Arrived Malvern at 6:30. Louise Winston did her usual good job of greeting and spreading cheer. Talked until 12 with Sam Simmons and Tom Murrell on H2X program. Agreed to cable for Jim Valentine.

Sunday
April 9, 1944

Easter Sunday. Spent morning with Bob Watt and Col. Warner at the 584. Tracked an unknown plane to 64,000 yards. Drizzly weather. In the afternoon, looked up NALO report in partial preparation for forthcoming SACRA meeting. Had long talk with Louise Winston, including tea with bread and jam. Met Louise Goldie and John Freehafer on 9:05 p.m. train. Easter Sunday service at Baptist Church across the way from 6:30 to 7:30. Rather enjoyed it after a while. These three days are an English "long holiday", and no one is about.

Monday
April 10, 1944

Talked with Gingrich and Thresher at the lab. Thresher is OSRD liaison on centimeter work and will spend time at ABL-15. Tom and Sam rode off to Alconbury with Al Dunbar to look into pressurization difficulty on H2X Mosquitoes for radar reconnaissance. We have agreed to

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assign Phil Jacobs to the Mosquito program temporarily, as requested by Col. Sullivan. Wrote letter to Gen. Partridge defining position of BBRL people on H2X program. In the evening drove down to the station in a jeep to greet Curry Street, but he evaded us in a limousine. Had long talk with Curry in the evening. Ralph McCreary also arrived today.

Tuesday
April 11, 1944

Showed lab to Curry and Ralph. Had conference with Jones and Company on Oboe parts for Herb Hall's ground stations. Agreed to lay on meeting with G/C Foss to determine use of these two mobile stations. Also to look into Loran tangle on Navy grounds of interference.

Meeting in the afternoon with Capt. Kirkpatrick (Operations, PFF) and Lt. Boussardet (radar, PFF) on BBRL assistance to 9th TCC. Later, conference with Dr. Lines and Mr. Pringle on 9th TCC. Agreed to try to get A/C Hart to assign Dr. Lines to 9th TCC. Golian arrived to handle BUPS for TCC.

Wrote digest of NALO reports for Sir Robert Watson-Watt. Week-end housing problem at Malvern is aggravated by additional personnel and policy of encouraging return on week-ends from field bases.

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Wednesday
April 12, 1944

Left Malvern for London with John Freehafer and Louise Goldie, stopping en route at Pine tree. Had half-hour session with Gen. E. E. Partridge about BBRL staff assisting in the 8th AF H2X program. Left with him a memorandum describing this arrangement. Agreed to press hard on installation of H2X in Mosquitoes for radar reconnaissance. He described failure of today's mission because of bad meteorological information. Even fighter reconnaissance one hour before main flight failed to disclose presence of heavy weather front over enemy coast. Described for him the BBRL and ABL-15 ASG set.

Discussed with Col. Osborne the BBRL organization engaged on H2X program.

Short conference with Professor Blackett, ORS Admiralty, at 5:30. Blackett interested primarily in non-radar problems confronting amphibious landing operations. Louis Ridenour and I are to get fully informed prior to Saturday's SACRA meeting.

Evening session with Ridenour, including Larry Henderson later. Agreed to investigate BBRL participation in G-H program of 8th AF. Louis to get more information from Tuttle, I to get in touch with Dr. Francis with regard to personnel.

Agreed tentatively to a Ridenour-Trump trip to Italy beginning the end of April. Ridenour to investigate with G/C Lugg the most fruitful itinerary, which will certainly include MAF HQ, 15th AF.

Larry Henderson reported highly successful Pathfinder information last night by 9th TCC. The morale of air-borne forces now suddenly high.

I recommended a meeting with A/C Hart, Marriner, and Ridenour to get Dr. Lines assigned full-time to 9th TCC.

Thursday
April 13, 1944

Called on Col. Eyster, A-3, ETOUSA, to get advice on method of keeping younger BBRL staff members out of the Army. Present procedure appears to be, when draft leave has expired, to present candidate with choice of enlisting in the Army here or being shipped home. Col. Eyster suggested that we discuss the powers of the draft board in the ETO with General Betts, Judge Advocate General, U. S. Embassy. In talking with General Betts by phone, he suggested a meeting early next week to include Major Bodovitz of the American Consul General's office. I asked Archambault if he would not plan to be present.

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Left for Widewing, where Louis Ridenour was trying to get indoctrinated via Colonel Lack and at the same time to obtain an appointment to see Captain Thackrey, USN. No progress. I made an appointment with Commander Caruthers, Communications Officer, USN, Norfolk House. As suspected, invasion planning information from Caruthers proved exceedingly difficult to get and indicated the necessity for working through proper channels.

Back to Widewing to see General Bull, Assistant Chief of Staff, SHAEF. It was pointed out that Sir Robert had arranged a program for the examination in detail of scientific aids to the forthcoming invasion and that the British members were completely informed on British plans. It was expected that the American members would correspondingly be in a position to discuss American plans. General Bull was torn between the obvious necessity of bigoting some or all of the American Committe members or retarcting his intention of having the American group participate in SACRA on an equal basis. He agreed to give a decision on the following morning before the scheduled SACRA meeting at 10:30.

A short talk, primarily Ridenour with Colonel Fred Maxwell, asking for a theater request for the diversion of an H2X-equipped aircraft to the Radiation Laboratory for high-altitude experimental work.

Supper at Officers' Mess with Curry Street and Louis Ridenour. Curry reported LORAN interference issue raised by Admiralty was being satisfactorily handled by G/C Foss. A date for an open meeting to determine the use of BBRL's high-power mobile ground station will be set as soon as definite completion dates are supplied.

Friday
April 14, 1944

SACRA meeting at Church House on "radar aids to close support". I described the investigation at BBRL on the use of the 584 for this function. After some opposition by Dr. Lewis, the Committee endorsed this recommendation to SHAEF and agreed that the 584 application to close support of ground troops is the only promising radar aid for the invasion.

Left SACRA at 11:20 for Widewing to be bigoted. General Bull did a good job on the five of us: Ridenour, Trump, Fraenckel, Dyer, Langmuir--pointing out the danger of disclosures of invasion plans and implying the penalties. Colonel Shane of G-2 SHAEF added his several notes of caution. We adjourned to the SHAEF invasion war room, where the operational plan was disclosed.

Afternoon meeting of SACRA on "radar aids for air-borne forces". Ridenour and I discussed in some detail the plans and present state for radar pathfinder and following by the 9th TCC. Questions of Gee range, available channels, saturation of Eureka beacons, and the use of microwave radar for making landfalls were discussed. This seemed a good meeting in the sense that several points were discovered which required effort.

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Saturday
May 15, 1944

SACRA meeting on "radar aids to amphibious landings". Professor Blackett pointed out the need for assistance in radar map-making, these maps to be used with the microwave radar on amphibious landing craft and minesweepers. I described the radar planning device on which Lloyd Dorsey is the leading exponent and indicated the possibility of his services being available.

Stopped at Pinetree for talk with Norris Tuttle on G-H program in 8th AF. Was surprised to find 18 operational G-H equipped aircraft in 2nd Division, 6 in the 1st, and several coming into the 3rd. Present operating range at 23,000 ft. in Liberators is 270 miles. This appears to be 30 miles short of the calculated range and 60 miles short of what might be expected under favorable propagation conditions. Tuttle asked for BBRL help in making a scientific check on G-H equipment performance. Met Col. Geerlings.

Arrived Malvern at 7:10 p.m. with Curry Street, John Freehafer, and Louise. Had short talk with Bob Watt on the 584 performance for GCI. One 584 is now at Comberton and has automatically tracked to the extreme range of 96,000 yd.

Decided to put Herbie Weiss on the study of the 584 application to close support. Ralph McCreary and George Huff will work together on experimental 584 to be installed outside of London for "Window" studies.

Sunday
April 16, 1944

BBRL is now completely in the six TRE huts recently constructed.

Had conference with Street, Davidson, Dippy, and Bellringer on the G-H. Decided to have Dick Lawrance become familiar with the Gee and G-H programs. Brief talk with Redmond, Kulp, Simmons, and Murrell on H2X set-up in 8th AF. All are happy with this arrangement.

Steering Committee meeting from 2:30 to 5:00 p.m. Seminar by Tom Murrell on H2X.

Monday
April 17, 1944

Approved Ed Schneider and Mike Chaffee's plan for a "sector Type B" presentation which gives a true vector direction for fighter control. If successful, this will replace the Type B scan now at Start Point. Expounded to Sam Simmons on 9th TCC organization. Sam will be at North Witham pathfinder headquarters during coming week.

Lunch with Denis Robinson, who agreed to give two RCA tail-warning sets to BBRL for 8th FC. In afternoon meeting with Colonel John Howard on the County Hotel requisition, I asked him to survey Malvern for additional hotel facilities to provide for the next period. Talk with Dr. Francis on PDS activities, particularly in 9th TCC. Mr. Meagher, RCA man on TW and altimeters, arrived. He is scheduled to go to 9th TCC.

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At supper, Golian described his three days in field setting up BUPS. Both sets were found on arrival to have been damaged in shipment, and Golian succeeded in making one work. He will stay at BBRL tuning up the other two battery BUPS before returning to 9th. In the evening, Dr. Lines reported on his afternoon session with G/C Lugg and Ridenour. Lines is to spend a solid fortnight beginning Sunday at 9th TCC and will act as senior civilian in that organization. He expects to visit frequently enough thereafter to enable Charles West to act as his deputy.

Tuesday
April 18, 1944

Left County Hotel at 7:40 with Louise. Over hill and dale to Bath, where I spent one hour with Captain Otto Saylor at the 190th General Hospital. Then on to London via Stonehenge and the Salisbury Plain. In London talked with Lloyd Dorsey and Ed Schneider on map-making for the invasion. Also with Gordon Brown and R. S. Brost, newly arrived Philco H2X engineer. Ridenour reported disinterest by Air-Sea Rescue Command in microwave equipment plus corner reflectors for dinghies. Agreed to stimulate TRE into setting up trials.

Wednesday
April 19, 1944

Talked with Colonel Warner about his connections with SHAEF. He pointed out that his present attachment to the AA Section is not satisfactory insofar as he is now concerned primarily with new applications of the SCR-584. He suggested that he might operate better under the Experimental and Training Section, which is headed by Colonel Lack of G-3, SHAEF. I suggested that Ed Bowles could handle this.

Lunch with Colonel Warner and Colonel Child. Colonel Child is now Assistant Inspector on Radar Production and extended an invitation to visit several British plants. He recommended that BBRL not accept the executive responsibility for 584 design modifications, but that it act in a purely consultive capacity. He invited both of us to week-end with him at his home on Wilton-on-the-Thames.

Talked with Mr. Francis and F/L Blaksley of MAP on the high-power mobile Oboe program of BBRL. He agreed that the production of additional units using the Type 51 console should be decided upon only after trials of the two sets now being completed with TRE consoles. We agreed that in any event not more than six additional sets should be undertaken. I mentioned that the completion dates for the first two were May 5 and May 15 and that G/C Foss would schedule a meeting next week to decide on the sites.

Conference with J. Hamilton, Prof. Blackett, and Ridenour on radar map-making of the amphibious landing coast. Hamilton is carrying out an herculean job of computing the radar echoes as seen by a Type 970 set located 3500 yards and 4 miles from the shore on the approach line. Hamilton's predecessor has carried out mathematical analyses which give the signal strength above noise as a function of height and range for land objects subtending less than a full radar beam width and for the finite pulse length. Terrain cuts are made for every 5°. These studies are carried out for two heights of ship antenna above water: 27 feet and 35 feet.

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D810.S2.T78. A War Diary, 1944-45. John G. Trump, 1973.

April 19, 1944 (cont.)

The point completely missed by Hamilton and Blackett was that the precision of these calculations is far beyond the accuracy of other factors which determine the PPI picture. For example, the set performance will vary as much as 20 db. one from the other; the PPI screen can be read to only ±100 ~~miles~~ on the 7.5-mile scale; etc. It seems clear to me that, if scale models exist of the invasion coast, the quick approach to the development of suitable PPI pictures would be by the use of the illumination method, of which Lloyd Dorsey is the local exponent. I postponed decision on BBRL assistance until I had talked with Commander Carruthers and had investigated the availability of the necessary terrain models.

Thursday
April 20, 1944

To Norfolk House in the morning to connect up Comdr. Carruthers' request for BBRL assistance with the radar map-making project of Professor Blackett's. Long talk with Lt. Comdr. Emuss and then with Lieut. McBride, who promised to relay story to Carruthers.

To COHQ to insure that Hamilton understood our assistance was contingent on using the illuminated scale model technique. He fully agreed and mentioned that scheduled completion date for British landing areas was May 5. Hamilton estimated that American areas would not be completed until May 20, all things remaining the same.

SACRA meeting in the afternoon on ADI (Science). It became evident from Dr. Frank's exposition that ADI (Science) had actually little quantitative information on German jammers. Methods of locating jammers and destroying them were discussed.

Summarized to Sir Robert the results of the Blackett-Hamilton-Ridenour-Trump inquiry into assistance on radar map making. He agreed to present requests for scale models and for Dorsey's bigoting to General Bull on receipt of exact information from me.

During the afternoon meeting, Sir Robert left for discussion with Mr. Attlee, Deputy Prime Minister, on the requisition of the County Hotel. He later reported to me and phoned Archambault the decision not to proceed with this requisition. The alternative recommendation of requisitioning four large and adjacent buildings for the two Laboratories subject to their being staffed with American help was mentioned.

Ed Schneider and Mike Chaffee reported on their conference with 8th FC and ADGB, in which it was agreed that the control of MEW #5 on the east coast would be handled by 8th FC.

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Friday
April 21, 1944

Met Colonel Milwit, Chief of G-2 ETOUSA, with Dorsey to learn firsthand about availability of scale terrain models of the invasion coast. Colonel Milwit provided a diagram showing the model numbers available. In general, much of the invasion coast has already been modeled to the scale 1:25000. Certain sections of it are modeled to the scale 1:5000.

Proceeded to see Hamilton at COHQ to get precise model numbers required for the illumination plotting technique. Hamilton agreed to get an additional large room for Dorsey's work. This information was summarized in a letter handed to Sir Robert recommending that he initiate the procurement of these models and the bigoting of Dorsey.

Lunch with Archambault, Dyer, and Langmuir, in which we discussed the County Hotel and general housing situation. Agreed to further meeting on Wednesday morning.

SACRA meeting in afternoon on Oboe accuracy. Present operational accuracy is about 450 yards as against the predicted 150 yards. Blackett pointed out that improvement in TI marking would result in tightening up the follow-up bombing. The 9th BC bomb distribution from a box of 18 planes is 500 x 800 yards. This would not automatically tighten up if Oboe areas were reduced, but would if similar channels and similar formations were used. I agreed to provide data on operational accuracy of the G-H system as used by the 8th AF.

This discussion was followed by one on anti-Window measures for use with interception aircraft. This discussion was based on a paper prepared by Dr. Lewis and pointed out the comparative need for S-band equipment such as the Type 21. Lewis argued that Type 21 sets would be available in time. The Committee recommended that verification be obtained from the D of R. Should this be the case, the BBRL investigation of 584's for GCI would be of little value. The status of these double 584 GCI tests were briefly described.

To Widewing with Louis Ridenour for the teletype conference. Louis questioned the temporary assignment of Larry Henderson as deputy to Lines on the 9th TCC. Supper at Senior Officers' Mess with Louis, Larry, and Vic.

During Tuesday's raid, 13 planes were shot down--8 or 9 by night interceptors. The percentage was reputed to be 20-25.

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Saturday
April 22, 1944

SACRA meeting on additional Surface-Vessel Watch. Brig. Schonland presented the coverage chart for the invasion. The influence of anomalous propagation in extending this coverage and the considerable probability of its existing on D-day was discussed. It was suggested that the MEW at Start Point be tied into the Surface-Vessel Watch system.

As the second subject, there was a discussion by Dr. Cockcroft on the spotting of shells directed at land targets. It was pointed out that under favorable terrain conditions 5.5-inch shell bursts could be seen on X-band radar, which is, however, not generally available. Shell tracks could be followed with S-band radar. Dr. Cockcroft agreed to initiate tests to determine more precisely how much spotting could be expected.

Officers from SAS (Special Airborne Section) attached to 38 Group described the military function just prior to H of these parachute units. Their navigational aids will be Gee and Rebecca-Eureka, as in the case of 38 Group itself. The Gee coverage in the invasion areas at 500 feet was questioned. It was indicated that R. A. Smith of TRE has a theoretical Gee-coverage map on which actual data is plotted where available.

I proposed as a new subject for SACRA the consideration of microwave techniques in air-sea rescue work. I am to prepare a note on this subject.

Left for Malvern at 2:30 with Colonel Warner, Ed Schneider, Gordon Brown, Louise Goldie, and Walter Jordan, who had just arrived. Stopped at Pinetree and picked up from Norris Tuttle his ORS report on G-H accuracy. Based on a relatively few operational cases backed by PRU's, this accuracy now averages about 500 yards.

Sunday
April 23, 1944

Curry Street and I heard a detailed report by Joe Platt on present Oboe performance and problems. This showed a considerable number of unsuccessful missions due to apparatus trouble, inadequate training, and faulty ground-station operation. The two new mobile South coast channels are, however, being straightened out by TRE personnel. The general seriousness of the present scheduling of Oboe missions through 8 Group was again impressed upon me, and I agreed to discuss this with Sir Robert Watson-Watt.

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April 23, 1944 (cont.)

Afternoon Steering Committee devoted primarily to a review of BBRL undertakings. Five o'clock seminar by Joe Platt on Oboe in the 9th BC.

Evening Steering Committee meeting in which the following additional BBRL undertakings were suggested:

(1) An exploratory program of microwave H tactical uses to be conducted without great fanfare by the 482 Group under Colonel Moore with BBRL cooperation.

(2) Assistance to the 9th Tactical Command in its forthcoming night-fighter program. This program contemplates three squadrons of P61 or P70 planes equipped with SCR-720's. (Subsequently it was agreed that this assistance could best be provided by the British.)

(3) The use of the SCR-584 for GCA.

(4) The use of successive pinches of Window for plane identification in GCI close-support and GCA applications of the 584.

Monday
April 24, 1944

Monday-Morning Soviet with TRE in Mr. Rowe's office on the general subject of "Microwaves for the Invasion". It was attended by a large gathering and had as its primary feature the discussion of microwave undertakings of BBRL. The contribution of this meeting was the full agreement of TRE to back the 584 close-support program. This was reflected later in Mr. Woodward's visit to BBRL and his suggestion that the close-support program be carried on at Sledge Green. He indicated that he would secure the assignment of a plane, a controller, and a TRE man for it. This first BBRL-TRE meeting was generally regarded as excellent, and Mr. Rowe suggested that it become a monthly event.

In the afternoon a short meeting on housing with Mr. Rowe and others. It was recommended that Colonel Howard and Mr. Jones of TRE secure from the local authorities of Great Malvern their cooperation restricting the number of Malvern visitors so as to provide more hotel facilities for both American and British staffs.

Afternoon discussions to clarify the programs of close support, GCI, and 9th TCC.

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Tuesday
April 25, 1944

Left Great Malvern at 8 a.m. for Alconbury with Sam Simmons and Tom Murrell. Passed through Stratford and Coventry, where we viewed with interest the severe results in the center of the town of the German blitz. At Alconbury talked with Captains Mac Cade and Bob Saxe on the H2X training program.and the status of the trainers and of the two Mosquitoes now being equipped for radar reconnaissance. Forty-six APS-15 sets have now been dispersed to the Divisions, but nine have already been destroyed. The second dispersal is scheduled to take place on the first of May. This will provide within each Division two Groups each having an H2X squadron.

Met Harvey Brower and Reuben Brost, the two Philco H2X engineers, who had arrived in London a few days previous. They informed me of the accident which had occurred the previous Saturday night in which Arthur Kulp was injured. A B-24 badly damaged by flak made a bad landing at Heppel and crashed into the radar shack, killing one crew member, the radar technician who was in the shack, and injuring several others including Kulp, who was standing outside. This first casualty of the BBRL group, however, is not serious and Kulp is scheduled to leave the hospital in a few days.

In the afternoon, we had a long talk with Colonels Moore and Garland on the desirability of instituting an experimental project on microwave H blind bombing. It ended up with their being impressed with the natural way in which such a system would fit the 8th AF requirements for tactical bombing. This system was described as capable of providing the same coverage and operational accuracy as Oboe and G-H, but would require no additional air-borne equipment, would involve relatively simple ground-station organization, would have greater traffic-handling capacity, and would operate in the microwave band, which is less susceptible to enemy counter measures. On receipt of a proposal from BBRL, Col. Moore agreed to forward it to the 8th AF with the recommendation that it be set up as a project. Col. Garland, who is momentarily acting for Col. Cowart (now in Italy), agreed to return to 8th AF and add his recommendation to that of the Commanding General that the project be accepted.

Returned to London via Pinetree, where we dropped off Tom Murrell.

Wednesday
April 26, 1944

Today definite action in procuring the 1:25000 scale models of the invasion coast was begun with the aid of Col. McCrimmon, G-3 SHAEF. Dorsey's check on several models of the proper region showed that the illumination technique would work in spite of the

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flat terrain.

At SACRA meeting on Air-Sea Rescue, Louis and I pointed out the desirability of analyzing corner reflectors designed for life rafts. Ranges of 12.5 miles with ASG-3 (British Mark 4), 6 miles with ASD, and 4 miles with ASV were quoted. Several Wing Commanders from ADGB were present. It was agreed that trials would be laid on by TRE at MAP instigation, following which a demonstration would be made to Group Captain , Assistant Director of Air-Sea Rescue. It was pointed out that the MEW is now tied into the Air-Sea Rescue network.

Analysis was made of the Mark III IFF program during Overlord by Wing Comdr. Keighley. The enormous number of planes which will be active on D-day and thereafter will completely saturate IFF channels unless suitable precautions are taken. Among the precautions recommended by Wing Comdr. Keighley and members of his panel were (1) the elimination of all omnidirectional Mark III IFF and all continuous IFF interrogation, (2) the restriction of Mark III IFF interrogation to stations which were prepared to act significantly on the data received. Highest priority in the use of Mark III IFF was given only to Naval vessels and to night fighters. Many other functions were curtailed or completely restricted in their use of IFF even though it was a disadvantage, (3) the reduction of the power of IFF equipment.

After the meeting I discussed with Sir Robert Watson-Watt the need for a more adequate arrangement between 9th BC and 8 Group to invite 9th BC to supply a full-time officer for scheduling liaison work at Huntingdon. It was further agreed that a study would be made of the Oboe channel allocation between 8 Group and 9th BC for the next ensuing period and particularly for the time when the 9th BC would be operating from the continent.

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Thursday
April 27, 1944

To Bovingdon with Sam Simmons to see Col. Cass Hough regarding APS-13 TW equipment for 8th AF fighters. Col. Hough is Director of the Operational Engineering Section, which originally was limited to the 8th Fighter Command, but now acts both for the 8th AF and the 9th AF. He was anxious to receive BBRL help in acquiring and installing this RCA tail-warning equipment. I informed him that at least one set was likely to become available within ten days, and that we would assign Mr. Meagher to assist. Col. Hough will provide all necessary facilities including housing. First installation will be made in a P-51 Mustang; the second, if it becomes available, will be installed either in a P-38 or P-47.

Col. Hough described the need for a fighter search radar to locate the swarms of German fighters which build up in advance of approaching bomber formations. These German fighters, advised of the progress of the bombers by GCI, select the opportune moment to strike en masse. At the present time, American fighters must be dispersed in order to guard all possible approaches and are hence at a serious disadvantage. Col. Hough asked for a radar which could be fitted into a P-38 and would have a 75-mile range on such German fighter pools. We found Col. Hough would not be too unhappy with a range of 25 miles, and Sam Simmons undertook to make a report on what could be done. At this moment, it would appear reasonable that the SCR-720 might come close to this performance, and we may end up by suggesting that trials be laid on using a 720-equipped Mosquito. This could be accomplished within a week.

Agreed with Col. Howard to commit BBRL for 35 additional rooms by the end of June. By appealing to the Chief Clerk of Malvern and to the Association of Hotel Owners, and by agreeing to make a commitment against loss, Col. Howard has succeeded in getting promises for a total of 50 rooms--10 of which would be additional rooms in the County Hotel.

Cocktails with Alan Shenstone and Louis Ridenour in Alan's flat off Berkeley Square. This intriguing little spot is entered through a narrow panel cut in the erstwhile barn door. A squash court has been built behind the single square room with fireplace. Later we repaired to the Savile Club on Upper Brook Street, where we had a good dinner with wine, and then watched "Snooker pool". Still later left for Louis' flat at Claridge's, where the conversation turned to the need in AEAF for an American counterpart to Dr. Lines, who is to head up British PDS activities. G/C Lugg, recently arrived from the Mediterranean, will handle radar for the Signal Section of AEAF. According to Louis, Lugg proposes to strengthen and control the AEAF radar activities. I tried to make it clear that BBRL would not relinquish control of its men in the field and that Louis' position in USSTAF did not mean control of civilian radar activities, though it did mean influence. It was agreed that I would talk with G/C Lugg directly some evening at dinner--to be arranged for by Ridenour. Finally adjourned at 12 o'clock.

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Friday
April 28, 1944

Talked with Captain Stover on the progress of the GCI and close-support investigation at BBRL. I requested a radar officer and four men for the close-support program. We reached a tentative agreement on the 9th AF instituting theater requests to support BBRL needs for civilian engineers on the 584.

Talked with Joe Platt on Oboe developments. He cited evidence that 9th BC liaison with 8 group was still bad and resulted in a high percentage of scrub missions. I mentioned my conversation with Sir Robert and his undertakings. Talked with Lieut. Col. Uhrane, Director of Technical Liaison, ETOUSA. Became convinced that the Technical Liaison Section was not the proper place for Lieut. Schedlbauer, whose services on the SCR-584 we are trying to secure. Agreed with Col. Uhrane that Schedlbauer should be attached to the 9th Air Support Command.

Got my AGO card with status of Lieut. Colonel. Supper with Guy Stever and Curry Street. In the evening, with Col. Warner and Lee Davenport we adjourned to Guy's room and discussed 584 close-support program in considerable detail. Herb Weiss's memorandum on this subject was corrected. It was agreed that the first trials should cover the radial approach and the equi-range (Cat) approach using a 40-inch control board. This board would have the origin in one corner and the scale of 2000 yards per inch. These trials would be followed by trials of the general approach in which only the last 5 minutes period or so is in a straight line directed at the target. Ultimately an automatic recorder is visualized and some work will be instituted at once.

Saturday
April 29, 1944

Lloyd Dorsey reported on his conversation with Hamilton regarding radar map making. Hamilton was uncertain on American amphibious landing data; so Dorsey contacted Comdr. Caruthers, then visiting at Plymouth, and also Lieut. Smith was dispatched to London to supply missing information.

If possible, we will get Dorsey to prepare radar plot of the landfall for the SCR-717's of the 9th TCC.

Newspapers and radio generally report this to be the fourteenth day of the softening up of the enemy invasion coast by heavy aerial bombardment. Daily day and night raids by 8th AF and RAF Bomber Command on strategic-tactical targets and continuous attacks by 9th BC and TAC on scattered targets such as Paris, Pas de Calais, and Cherbourg.

To investigate with Sir Robert the possibility of utilizing the ground-station Loran system in England for establishing the line of position in the invasion.

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April 29, 1944 (cont.)

Drove to Battery C at Enfield, where we left George Huff with the experimental 584 equipped with N^{2} gate. This set will be used to observe enemy Window. Continued on to Great Malvern with Ralph McCreary, Norman Morrison, Curry Street, and Louise Goldie. Stopped at the Golden Hind just outside Amersham for tea and cakes.

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Sunday
April 30, 1944

Typical Sunday morning at BBRL in Malvern with people milling about generally. Short discussions with various members on problems and procedure. Went down to the lower plane field to see MEW #3, which is being made mobile. Captain Andress, siting expert of 9th AF, has been put in charge of this MEW. He, Ed Brazell, and 13 GI's are attempting to complete the unit in one week. Complete MEW convoy will consist of nine trucks, including one for five indicators, one for two or more controllers, one VHF and teleprinter truck, one Type 13 height-finder, one indicator van for Type 13, and two power-supply trucks.

Dave Davidson calculated the precision of the Loran ground stations along a line extending from Cherbourg to Dover. Near Dover the error diamond is $\pm 1\frac{1}{2}$ miles long in the direction of France by ± 1 mile wide. Just east of Cherbourg the error is twice as great. The usefulness of the Loran ground-station system in establishing the line of position for the invasion therefore appears questionable.

Steering Committee meeting in afternoon emphasized primarily a discussion of projects in hand and undertakings for the next week. Tom Murrell reported among other things that 24 officers and men were being trained in radar map reading beginning Monday. Excellent radar photographs were brought in by Redmond which showed interesting B-24 radar shadows.

Louis Ridenour suggested that S.S.Loran be used for photo reconnaissance. He and Curry Street to discuss this with Colonel Eliot Roosevelt, who is in charge of this activity, and then carry the matter to Air Ministry as a reason for laying on S.S.Loran.

Some vigorous table-thumping was done on the need for getting on with the close-support program and really giving it highest priority as decided last week.

Ed Schneider reported increasing enemy activity over the southeast coast, with MEW #2 directing out at least one strike per day.

Successful drops made on BUPS last week developed such enthusiasm in 9th TCC that an urgent cable will be dispatched to Radiation Laboratory for at least twelve more units by May 20, bringing the total of battery units to sixteen.

In the evening discussed the AEAF job with Dr. Lines over a cider and whiskey and two games of ping pong. Lines suggested Larry Henderson as his logical American counterpart.

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Monday
May 1, 1944

Conferences to determine manpower requests to be made to Lee DuBridge for the general BBRL program over the next two months. Some fifteen men are indicated, including four for GCI close support headed by Ernie Pollard, three for beaconry headed by Preston, two general air-borne radar men (later increased to six), one ship radar man, one transition man, and one technical assistant.

Asked Ralph McCreary to turn over the experimental 584 for Window studies to the three GI's with full operating instructions. For the next two weeks no serious enemy activity over London is to be expected because of the full moon. Ralph is to become senior man on the microwave H project for 8th AF with occasional diversions to watch the AJ situation. George Huff will return to the GCI program.

Explained to S/L Everett that close support has top priority and secured his willingness to devote full-time attention to this project in favor of all others. It seems likely that Ed Schneider and Lee Davenport will now get this undertaking moving along in good style.

Left Malvern for London at 6:15, arriving at 10:00 p.m. Dinner with Louise and Charles Ahern at the Bell Hotel in Tewkesbury--a fine old-timbered hostelry.

Heavy Allied air raids on continent continue. Last Saturday's daylight H2X raid on Berlin was made by heaviest bomber formation to date, and apparently caused great destruction in the center of the city. Sixty-three bombers were lost.

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Tuesday
May 2, 1944

SACRA meeting at Church House on "the probability of enemy counter measures" and "strikes against enemy jammers". The sense of the meeting was that Gee has a high probability of being jammed and that effective measures should be organized to cope with both fixed and mobile jammers. It was considered that 500-watt jammers would be effective.

This pessimism was accompanied by the recognition that few measures could be organized at this late date which might be really effective against mobile jammers. Homing aircraft were the most promising measures mentioned, and six of these are being equipped by TRE.

I recommended that, in addition to striking at enemy jammers, the Committee emphasize the need to utilize to the fullest extent the microwave gear available in Overlord, both ship and air-borne. Urged that ships be provided in advance with radar maps of the invasion coastline in assisting line of position. Suggested also that Oboe be used to drop markers at the termini of this line. This suggestion was referred to Comdr. Liddell for discussion with Comdr. Paul.

In the evening, saw "The Song of Bernardette" at the New Gallery on Regent Street with Louise.

Wednesday
May 3, 1944

John Hibbert arrived from the States. He reported on the abandonment of the H3X program at the Radiation Laboratory at the request of General McClelland; also on the need for someone back in Washington to implement the H2X program as Larry Henderson had done. Gave him a little digest of the job which lies ahead of him. He will spend the balance of the week at Malvern getting oriented before proceeding to Alconbury.

Visited G/C Lugg and Colonel Stearns, both AEAF, at Bentley Priory. Both men have recently returned from their corresponding jobs in the Mediterranean area. Colonel Stearns replaces General Marriner, who has gone to the Mediterranean.

Pointed out that the Corsica MEW could not be effective as a fighter control station unless an experienced MEW controller were made available promptly. Stated that Chaffee's going to Corsica was contingent upon such a controller's being secured. It was agreed that Ridenour would present this situation to Marriner so as to elicit a statement from General Eaker on the use to be made of the MEW, coupled with a theater request for the second RAF controller at Start Point.

Discussed the general radar problem in Italy aside from H2X and an improvised Gee. No radar aids are available in that theater. At the moment, the Gee chain is inadequate because the selected site for one station is still dominated by the enemy. It would appear that both the 12th and

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15th could profit by (1) BGX beacons, (2) Micro-H for blind bombing, (3) 584's for close support, (4) SS Loran for general navigation. Both Lugg and Stearns reacted favorably to these suggestions, though they are, of course, no longer seriously concerned with the Mediterranean theater.

Got the impression that the Mediterranean was of distinctly lower priority and importance. Project Anvil is not altogether certain to come off, and in any event not before the main invasion attempt.

In the evening, with Curry Street, went out to Soames House, where Louis Ridenour and Dave Griggs treated us to an excellent dinner. This is the former home of a vice president of BTH. The corporal in charge of the GI mess was formerly the head waiter at the Mayflower Hotel in Washington, D. C. The luxuriousness of this establishment in which the Advisory Specialist Group finds itself is touching. Griggs reported on the H2X activities in the 15th AF, which is getting on surprisingly well. He has become a candidate for the Purple Heart, having been touched with a bit of shrapnel on his very top during what was supposed to be a "freshman mission". Spent the evening discussing the BBRL personnel requirements for handling the radar job in this theater.

Thursday
May 4, 1944

Morning conference with Colonel Roosevelt and Colonel Cleveland of the 8th AF Reconnaissance Group. The purpose was to create in Colonel Roosevelt the desire to use SS Loran for his job. It was agreed that this equipment was appropriate for photo reconnaissance activities, that such work would be a necessary means of establishing the accuracy of SS Loran over the continent, and that representations should therefore be instituted to have SS Loran turned on. Parenthetically, it should be noted that present Gee coverage is adequate for much of the 9th AF reconnaissance, that home station and SS do not provide good navigation information over the channel south of England. Roosevelt's program contemplates six camera-equipped Mosquitoes by the middle of June. Operating at 10,000 feet, they take seven overlapping films, each about three miles square. Overlap is 60 per cent.

In the late afternoon, with Curry Street and Ridenour visited Air Vice Marshall Tait and G/C Foss. Representations that SS Loran should be turned on were definitely countered by Tait with the suggestion, on the one hand, that ground station interference during the opening stages of Overlord would arouse stiff Admiralty opposition; and, on the other hand, that the premature use of a few Loran-equipped Mosquitoes for a relatively minor purpose would defeat the ultimate use of SS Loran by the RAF Bomber Commands. He stated that the Bomber Commands firmly expected to use SS Loran beginning in October, when long nights again would permit deep forays into enemy territory.

I was personally convinced that Tait's views were sound and that a more important use of SS Loran must be found before an early start could be successfully argued. It was encouraging to hear the affirmation by

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both Tait and Foss that the use of SS Loran in the fall was a firm policy of the RAF. Later in the evening, I urged on Curry the desirability of getting the 8th AF to institute the use of SS Loran at an early date as a supplementary navigational aid to H2X. The recent evidence that SS signals can be synchronized for all except the four hours around noon makes its use for daylight navigational purposes a reasonable thing. Further substantiating evidence is required, however.

Friday
May 5, 1944

Meeting in morning at Air Ministry, Whitehall, called by G/C Foss to determine the best use to be made of modified SCR-584 and Oboe mobile ground stations. This meeting was well represented by 9th BC, 60 Group (W/C Fennessy), 8 Group (W/C Finn), Dr. Roberts, and others. Three uses for the two stations scheduled for completion by EBRL by May 14 were considered:

(1) Use at Hawkshill Down on Channels 11 and 12 to overcome the shadow over the Paris area caused by faulty sighting of present Mark II equipment.

(2) Use for an independent inland Mark II ground system operating on Channel 13.

(3) Use on East Coast sites to extend coverage by virtue of the higher RF power.

The second plan was chosen, and a committee headed by Mr. Francis, DCD, and including Joe Platt, S/L Hart, W/C Fennessy, W/C Finn, and Dr. Roberts was named to draw up a definite plan and put it into effect. As I see it, this will set up an independent Oboe system on which newly trained crews can become practiced, which is suitable for 9th BC training, which may be used to resolve questions of Oboe accuracy, and finally which can be swiftly transformed into operating equipment should this become necessary either at the South Coast or on the continent.

In the afternoon teletype conference, at which Ridenour, Street, Simmons, Schneider, Warner, Murrell, Henderson, and myself were present. At the other end a longer list, including General McClelland and DuBridge, who had come specifically to answer our cabled request for 15 additional men. Transmission took from 4:30 to 7:00 and ended fairly satisfactorily, with promises of 11 men in hand. Pollard is to come over by May 16 with a Class 1 priority. Four more battery BUPS to come within two weeks, bringing total for 9th TCC up to 8. Another four to follow in June.

After buffet with ale at the Crown and Thistle in Kingston, the Steering Committee met at Soames House. Arrangements were discussed for the forthcoming meeting of the board of 9th AF generals interested in close support and GCI at Great Malvern on May 13. Other topics included the use of H2X equipment in Mosquitoes or P-38's for low-altitude bombing, and the adaption of SS Loran by the 8th AF as a supplement to H2X. Such a Loran policy on the part of 8th AF would probably overcome RAF Bomber Commands' objection to its use before October, 1944.

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Saturday
May 6, 1944

Breakfast with Denis Robinson, who stated that he is at last to return to the United States--Professor Rowe having recovered and come back to TRE. Denis is trying hard to find a good use for the ASD-1, which tests here have shown to be a very superior X-band equipment, but which has no important program. British trials on a simulated German submersible boat target gave ASD a range of 17 miles as against half as much with other air-borne radar. I suggested the possibility of its being used for low-altitude blind bombing in fighter aircraft. Denis feels peculiar about leaving here just before D-day, but is convinced that it is sound. Expects RAF will have several squadrons of H2K by late fall.

Dorsey reported invasion-coast models were on hand at Combined Operations, but is still struggling to get precise landing plans from American Navy.

Rich, Philco engineer on Rebecca-Eureka, arrived and was scheduled to go directly to North Witham with Henderson and Captain Jefferson.

Left for Stratford-on-Avon with Louise. Stopped at Gray's churchyard at Stoke Poges. Saw the first part of "Hamlet" at Shakespeare's Memorial Theater. Returned to Malvern in the evening.

Heard reports of fairly good tracking in the close-support tests at Comberton. Plans are to move the SCR-584 to Sledge Green, where better VHF facilities are available.

Sunday
May 7, 1944

Left Malvern at 8:00 a.m., stopping off at Coventry to leave Louise with relatives. Arrived Bramhall at 1:15. Dinner in afternoon with Beryl and Donald, with little Johnny climbing all over me and Robert holding off a bit. High tea at Mr. and Mrs. Williams'. They have all managed to hold their own fairly well in spite of the heavy destruction that took place in Manchester nearby as an almost daily event for about one year. House and gardens look as well kept and affluent as ever. Really felt welcome and at home. Left at 6:30 p.m. after a quick look in on Jess and family. Arrived back at Coventry about 10:15. Returned with Louise to Malvern about midnight.

Monday
May 8, 1944

Looked over the 584 and camera obscura tracks in the close-support tests. These show close correlation. In about six trials on a target 18 miles away, the average error was about 500 yards. The tracks showed that S/L Everitt, the controller, was not anticipating sufficiently in directing the pilot over the target (anticipation necessary because of the time delay in transmitting and plotting the aircraft position data); also that 10-second plotting intervals are too long.

It was decided to provide instantaneous azimuth information by projecting a light beam on the control board through a pointer carried by the azimuth selsyn. Now only range information need be transmitted to the plotter,

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who places it on the azimuth trace. This should reduce the time interval between plots and increase the ease and accuracy of the whole system.

Dick Lawrance reported briefly on the G-H program in the 8th AF. About 12 sets are operational in the 2nd Division. Some 30-odd operational runs have been made. It would appear that G-H equipment should be regarded as available for the blind-bombing tactical program which the 8th AF will be obliged to perform during the next months.

Major Maximoff, my former student, now with the Signal Corps, 8th AF, called regarding the APS-13 tail-warning equipment. It would appear that BBRL efforts on this device will have to be coordinated both with the Signal Corps and the newly formed Operational Section under Colonel Hough.

Dave Halliday reported on his observations on H2X in the 15 AF. Dispersal of the 30-odd H2X-equipped aircraft among the three Wings took place on the day he and Dave Griggs arrived. General radar maintenance was quite good, and in Halliday's opinion little more was needed than was already being supplied by Jarvis and Davis.

Only four all-out H2X bombing raids were made by the 15th AF at the time of their departure early in May. Targets included Sofia, Bucharest, Ploesti, and cities in northern Germany. Performance was quite good. No complaints were made about leaving the target signal when close in.

The navigation problem of H2X in Italy is simplified by the presence of coastline along the length of the country. Likewise, flak is relatively light compared with Germany, except for the Anzio beachhead and Ploesti, where the concentration is reputed to be the heaviest in the world. The 15th AF has tackled the use of H2X with much vigor and little red tape. Major Heddrick has been in charge of the radar pathfinder activities. Generals Born and Twining are in charge of operations under General Eaker.

Halliday reported on the usefulness of at least two BGX's in Italy. These have been requested. He also pointed out the problem of maneuvering the fighter escort to the bomber formations. This problem might be eased by some fighter search radar, as is being examined for the 8th.

Visited J. Woodford to insure the complete availability of a VHF channel during the forthcoming close-support work at Sledge Green; also requested the assistance of a controller, and we were given F/L Evans. R.C.M. Barnes of Woodford's group, working with our close-support team, has been operating the camera obscura and is now picking out a new target site for the Sledge Green installation.

Met Mr. Gray, who is the GCA exponent at TRE.

In the afternoon examined the mobile MEW which is within two days of leaving for Exeter, where it will be put into trial operation. Captain Andress has done an excellent job in planning and carrying out this work expeditiously. About 25 GI's are now on the job in the lower plane grounds of TRE.

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Tuesday
May 9, 1944

Worked on the first BBRL monthly activity report which will probably come out about two weeks late.

Visited Mr. Roe and summarized the progress on close support. This was with the intent of insuring that TRE would continue to supply the space, VHF, and personnel facilities at least until after the demonstration to the 9th AF Board. We went on to discuss the progress of the war. Mr. Roe expressed the somewhat pessimistic view that there was one chance in four of the invasion's succeeding at all, in which case the effect on Allied morale would be serious indeed. I reiterated my sublime belief in the ability of an offensive force with the initiative, time, and place to overcome any opposition at localized points along an extended front. The issue as I saw it was not whether the invasion would succeed, but what would be its cost. Advance enemy information, the prevalence of high winds or high seas, or a series of unlucky accidents could run our losses up tremendously, though ultimately--with the full resources now stored in England ready to come into the breach--it seems clear that the foothold would be gained and extended.

Denis Robinson dropped in to discuss tests by TRE and ADRDE on the recognition of moving ground targets from aircraft using the pulsed doppler effect. Evidently they are quietly investigating this effect with a view to a crash program should the peculiar envelope fluctuating signals characteristic of a moving ground target be recognized on the Type A scope in an aircraft. I uttered some notes of discouragement by pointing out that, while such pulsed doppler signals had worked quite well for road watch in experimental sets, the problem was greatly complicated when scanning was involved and particularly when the radar was mounted in an airplane.

Robinson and I drove to Sledge Green through the beautiful rural countryside to see the two 584's for close-support studies which are set in a clover field. Then back to Malvern, where I met Professor Dee, who has returned to TRE after three months' recuperation, thus freeing Denis for return to the United States. Later, talked with Dr. Lovell on the H2S and H2X program in RAF Bomber Command. About 80 operational H2X equipments are available. Lovell had some moderately good radar photos of Berlin.

Joe Platt and Herb Weiss reported on the 9th BC program of putting Oboe air-borne equipment in A-20 aircraft. One air-borne set taken from a damaged Marauder is being installed on an A-20 with the aid of our BBRL group, including Phil Jacobs. A total of 60 will be equipped using sets from the 20 recently shipped by "Queen boat", but now lost in the ETO.

The weekly USSTAF Intelligence Report gives the following summary of German aircraft and their disposition on the various fronts:

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	Western Front	Sou. Germany and Austria	Mediterranean and Balkans	Russian Front
Single-engine fighters	815	200	240	360
Two-engine fighters	735	145	50	85
Fighter-bombers	30		90	335
Long-range bombers	445		230	505
Reconnaissance planes	175		195	445

Wednesday
May 10, 1944

A telephoned report from Ahern, who with Morrisson is assisting in the corner-reflector tests by CCDU (Coastal Command Development Unit) at Angle, gave ranges of 17 miles for the ASD-1 and 12 to 14 miles for the APS-15. ASG tests are still to be run.

Results of the range tests of an SCR-720-equipped Mosquito with W/C Jackson at the indicator against a fighter pool of 50 aircraft sent up by the 8th AF were reported by B. J. O'Kane and Sam Simmons. The 720 was unfortunately down in its performance, giving only a 3.5 range against a Beaufighter instead of the standard 5. A maximum range of 5 miles end on was observed on the fighter pool and a maximum range of 7 broadside. The SCR-720 resolution is such that groups of four planes appeared as a single system, but the general fighter pool appeared as separate blibs. The fighters were a newly arrived group which had never taken to the air before and were disposed of over an area approximately 1½ miles long and 1½ miles wide. Discussions with Simmons and Jordan indicated that higher performance might be anticipated if pulse length was increased to 5 μ sec. and the receiver band width correspondingly reduced. The high loss due to the continuous scanning of the 720 was also cited. I agreed to get information as to how separated the aircraft of the German fighter pools are likely to be in practice.

Spent some time lining up the program for the forthcoming visit of the 9th AF Board. Lunch with Ridenour, Griggs, and Mr. Clark of BTL, temporarily attached to the Secretary of War's Office and completing a two months' mission in the Mediterranean and England on communication problems.

In the afternoon, drove out to Sledge Green and witnessed the installation of the new close-support control board in which instantaneous azimuth is presented by a beam of light defined by a slitted bar on the 16-1 #5 azimuth selsyn. This arrangement greatly simplifies the plotting procedure since only range need now be read and plotted, thereby increasing the speed and accuracy. At my insistance, a run was made that evening in which apparently very effective control was obtained.

Ridenour and Street reported on their dinner the night previous with General Doolittle at Soames House. General Doolittle apparently took to the suggestion that SS Loran would be useful to the 8th AF, but, as is his custom, deferred decision on the matter until it had been considered by his staff.

Left Malvern at 8:00 p.m. for London, arriving at 11:00 p.m.

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Thursday
May 11, 1944

Lunch with Lt. Beaudoin, BuAer, in which he agreed to provide BBRL with an ASD-1 and expressed the attitude of general helpfulness. Will plan to see Comdrs. D. R. Hull and Henry Bernstein before they leave the ETO for the purpose of learning how BBRL might assist in the ship radar program.

Discussed with Archambault the matter of having Guy Stever work more closely with BBRL. The record of the past month or so indicates that he is falling out of touch with our work. Later invited Guy to become a member of the Steering Committee, with the understanding that he would be called upon to perform certain work for BBRL. It is understood, also, that he will continue to do the liaison work in those regions where the BBRL staff has not yet taken the initiative.

Secured an extension to June 2 of the orders of Lt. Daly and the two sergeants who are operating the experimental SCR-584 at the Enfield Battery in connection with observations of enemy "Window".

Saw "Love for Love" at the Theater Royal on Haymarket Street with Dave Langmuir. A fast bawdy play by the restoration playwright William Congreve. Dinner with Dave at the Danish Restaurant off Regent Street.

Friday
May 12, 1944

Larry Henderson reported on the 9th TCC drops which simulated the scheduled operations for the night of D-day. These were made on 7 independent DZ's, 4 of them within 5 miles of each other, and the other 3 elsewhere. On the first 4, the PFF's pinpointed on 2 and were 400 yards off on the other 2. The drops took place at about 1:00 a.m., with 700 to 800 aircraft participating. Presumably the DZ's were located by a total of 21 PFF aircraft, with the air-borne forces led in by other PFF aircraft. Some of the BUPS worked very well, while some confusion existed as to the location of the BUPS which Golian was managing. He arrived to find his coordinates were squarely in the center of a town. The over-all performance was regarded as good, though evidently some of the air-borne forces were dropped in the wrong places.

Talked by phone with Ed Bowles, who has just arrived with General Henry and Hartley Rowe. Ed and General Henry will stay for two or three weeks, in the course of which they plan to be at BBRL.

Meeting with Dr. Roberts of RAF Bomber Command and Joe Platt on Oboe acquisition. Roberts is now over-all coordinator of the Oboe organization. He is particularly concerned with determining the several sources

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of Oboe errors. Evidently calibration is responsible for a large part of the consistent errors. This calibration involving inaccurate determination of the response delay time of the aircraft equipment. On Oboe Mark I the total response delay time is about 0.25 miles. In addition to a constant time delay, there is a variable time delay which is a function of the signal-to-noise ratio. This variable factor is twice as great in the case of Mark I as for Mark II. Measurements are being made to determine a good mean value for this variable. A total time delay for Mark II of 0.50 miles is being recommended.

At Widewing, Tom Murrell related his conversation with General Orville Anderson, who apparently was in the depths concerning the H2X performance. General Anderson felt that the whole 8th AF bombing program would not be available inasmuch as it has led, in his opinion, to the development of "mission munia" among higher Army authorities. This has kept the 8th AF off the ground, lost them many planes, and the H2X missions has not produced any substantial damage to the enemy. General Anderson used the figure that it was 1/20 as effective as visual bombing, though the meaning of this expression is not clear.

To Malvern with Louise, Louis Ridenour, and Captain Mattie Pinette via Evesham.

Evening meeting at Malvern on the coming close-support demonstration. Ranges of 35 miles on the A-20G plane at 10,000 ft. and 25 miles at 5,000 ft. have been obtained. Ranges of 25 miles were obtained on a Spitfire at 10,000 ft. The average accuracy appears to be about 250 yards determined by a camera obscura, though after practice a series of missions were run with an average error of 100 yards.

Saturday,
May 13, 1944

The demonstration of close support using modified SCR-584 to the 9th AF Board went off very smoothly indeed. Attending members of the Board were Brig. Gen. O. P. Weyland (Com.Gen. 19th TAC), Col. Reed (Commanding Officer, 10th PRU), Col. Maude (HQ, 9th BC), Major Gillard (HQ, 9th TAC), Capt. Dixon (Radar Officer, 19th TAC), Col. Mace (HQ, 9th BC), Capt. Short (Radar Officer, 9th ADC), Major Mims (9th ADC).

The meeting began with some introductory comments by yours truly and an excellent detailed presentation of the SCR-584 set-up for close support by Lee Davenport. This was followed by luncheon at the Westminster Arms, after which the party proceeded directly to Sledge Green. The weather, which Met had predicted would steadily improve, grew steadily worse, but the A-20G plane, piloted by Lt. Moore, made three passes over #22 25 miles distant and then proceeded to make three passes over a new target selected by Col. Reed, 10th PRU, for the purpose of checking the photo reconnaissance value. It unfortunately turned out subsequently that the camera failed to operate in these latter runs. Several runs were also made with a Beaufighter flying to within 150 yards of the A-20G. Both planes buzzed the field when the missions were completed.

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At the afternoon discussion, the Board endorsed the value of the modified SCR-584 for both the direction of night photo reconnaissance and for support of ground-force bombing by medium bombers. General Weyland, who is of the 19th TAC, expressed the opinion that such control was not feasible for the fighter bombers in his Command, since they are all relatively untrained and susceptible to control, and since they do not fly under obscure or night-darkened conditions. It was agreed that the Board would recommend that a total of eight 584's be prepared for close support, two of them by BBRL. Independent crews for manning these 584's were to be supplied by light-warning companies presently belonging to TAC, but to be attached to the AA Commands. BBRL agreed to investigate the use of beacons so as to extend the range of this equipment to night-photo reconnaissance.

Dinner at the County with Col. Mace, G-3, and Col. Maude, SC, of the 9th BC. Mace expressed concern over the complacency of the Germans regarding the forthcoming invasion. This complacency is evidenced by their lack of effective bombing and dropping of parachutists at strategic points prior to the invasion, and means, Col. Mace feels, that they are confident of being able to handle what is coming.

Discussed with Ed Schneider the possibility of cranking range in automatically on the close-support plotting board.

Sunday
May 14, 1944

Discussed the close-support demonstration which is scheduled on Monday afternoon for the AEAF. G/C Atlee, W/C Keighley, and W/C Craig will be present, as well as TRE representatives, including Mr. Roe.

Settled on the immediate program for close-support with Ed Schneider and Lee Davenport. This will include the construction of an improved plotting board with automatic range if possible, the modification of two additional units immediately, the assignment of Brazell and Schedlbauer for training the Army personnel. With lower priority, Bob Watt is to work on the long-range unit for use with microwave beacons. No GCI work is to be done, at least until Ernie Pollard arrives.

Ed Schneider gave a very good seminar on the MEW program describing the Peartree Point MEW in considerable detail and its function as a fighter-direction station.

The afternoon Steering Committee covered in some detail the close-support program and how things could be kept moving rapidly, the performance of H2X, and other items. Guy Stever attended his first session and will, I am convinced, prove to be a valuable member.

Discussed with Currie Street and Walter Jordan the need for ending the confusion in Hut 8 by separating the administrative and technical staffs and of dividing the responsibilities of the secretaries.

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Monday
May 15, 1944

A meeting with Dr. Smith and Dr. Johnson of TRE on the use of G-H equipment in the 8th AF. They pointed out that RAF Bomber Command has just begun the serious use of G-H for tactical bombing and has gotten in a number of performances. They disclosed that the production of an additional 200 air-borne G-H units was just beginning and that some could be requisitioned by the 8th AF. If some additional range was needed, it was pointed out that higher-gain antennas could be substituted for those presently on the G-H studies. They would be glad to institute a request for such action to the Air Ministry.

Discussed also the possibility of H bombing in microwave frequencies. They expressed interest in the BBRL investigation of the combination of BGX and APS-15 for H bombing, but indicated preference for modifying present G-H equipment by the introduction of microwave RF. The possibility of RCA's H system, SCR-297, coming to this theater in the fall was also discussed. It is evident that--left to itself--an undue crop of H-bombing systems is likely to appear.

Set up a new secretarial arrangement at BBRL, naming Louise Winston as head, with responsibilities for all correspondence, documents, teletype, and cable material. The responsibilities of the others were also defined. Ted Anderson, Betty Pooler, and John McCarthy are to move to Hut 5, thereby separating a good part of the traffic which now creates confusion in Hut 8.

Col. Richardson of MM&D arrived at BBRL with Maj. Williams, who is concerned with guided missiles. Richardson agreed to endorse a request for two APQ-7 (Eagle) equipped B-24's with full crew and operating spares. He agreed to process such a theater request through USSTAF.

Left Malvern at 7:20 p.m. for London with Dick Hillger and Louise. Arrived at 10:00 p.m.

Tuesday
May 16, 1944

Wrote newsletter to Lee DuBridge to be carried by Dave Halliday along with the first BBRL activity report when he leaves tonight for the USA.

Lunch at the Cumberland with Comdr. D. R. Hull. He indicated that Lt. Comdr. Middlebrook of the U.S.Naval Base at Exeter is in charge of installation and maintenance of all ship radar in this theater. His commanding officer is Comdr. Blakesly. He will provide an introduction for me and Ed Miller. He felt that BBRL assistance would be greatly desired. Comdr. Ellis was stated to be the proper ship radar officer for corresponding contact for the amphibious forces, which are based at Plymouth.

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Comdr. Hull, who has been generally about in England, reported that all ports clear up to the northernmost part of Scotland are chock full of Naval vessels gathering for the approaching storm. These vessels lie so close together that an air attack is almost certain to hit something. The Germans are beginning to use their radio-guided missiles in this theater.

In discussing his trip through the Pacific in February, Comdr. Hull reported that Japanese ship radar is now evidently moved up from 200 to 400 mc. He believes that the readiness of the Jap navy to seek an engagement was due to their recognition that they must bring their radar up to date. Hull returns to the US in 10 days.

At the SACRA meeting on close support, the results of the recent trials were already being presented by Louis when I arrived. W/C Keighley and G/C Lugg were present for the 8th AF. In the face of definite assurance that the British would set up a clearcut program of use, I agreed to have BBRL modify two SCR-584's, each to be equipped with an improved plotting board--the first of these units to be made available at AAAF for tests at Milford. Dr. Lewis agreed to assist in this program in every way possible.

The SACRA Committee agreed that real close support had no available radar aid other than the 584's. B/G Schoenland, who presided, proposed the problem of meeting a concentration of German armed attack which he suggested might be expected on the night of D+1. Against such a gathering attack, no close support to the ground forces was available other than the use of the RAF Bomber Command working on Oboe.

Supper at Soames House with Ed Bowles, Hartley Rowe, General Henry, Ridenour, Griggs, Warner, and Archambault. Afterwards, Dave Griggs held forth on the poor performance of H2X equipment in the 8th AF and the need for resolving the present apparatus difficulties during the bombing run. This difficulty is manifest only in some of the equipments and consists of a series of rings in the 0-defined mile range into which the target signal disappears and is lost. We agreed to call a meeting at Alconbury next Tuesday at which the BBRL H2X staff and the interested Army radar men would be present.

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Wednesday,
May 17, 1944

Breakfast at the Officers' Mess with Sam Simmons and Dave Halliday, whose return to the States has been delayed by a mishap to the Prestwick plane. Discussed 8th AF H2X program, with the following conclusions: that the Radiation Laboratory with Philco should resolve the present target confusion which occurs near the bomb-release point and that the proposed use of the Norden bombsight with radar data cranked into it up to the 4-miles-to-go point was a way out of the present difficulties; that PRU results or some other method of checking H2X performance was imperative (the use of timed PPI photos for the period up to bomb release is a partial answer). It was estimated that, with the proposed radar bombsight technique, bomber speed could be determined to about 10 miles per hour.

Drove with Sam Simmons to Bushey Park near Watford, which is the headquarters of the 8th Fighter Command. Dr. Ralph Johnson introduced us to Captain Elsas, G-2. We discussed the technique of providing fighter escort on 8th AF bombers. The plans for several missions were examined in detail, including the one of May 14, in which approximately 40 bombers were lost. The present German technique is to concentrate a large force of fighters which, then aided by GCI, sweeps through a section of the parade of bombers in almost wing-touching formation and very nearly eliminates everything in its path. The plan is to intercept and break up these pools and to get at them before they have formed up. Via GCI the German fighters are gathered together in little strings of 6 to 12 planes, at which time they are still quite vulnerable.

The great difficulty of our fighters rendezvousing with the bombers at the proper point and even of identifying themselves as friendly was discussed. Failure to rendezvous has often resulted in heavy bomber loss, and materially reduces the effectiveness and range of the fighter escort. In fact, the whole problem of providing overlapping fighter escort to the bombers became evident for the first time. We proposed a plan in which bomber control of interception is provided to the bomber control fighter escort. This contemplates a bomber provided with an S-band search radar which would interrogate light-weight beacons installed in one of each group of fighters. This means a coded indication of the approaching fighter group giving direction and range would be obtained and the bomber could "pass the information" to the approaching fighter escort as to the direction to proceed. Insofar as this search radar would also be capable of seeing any approaching enemy group, it would further serve the function of giving warning of enemy ships which could be passed to the fighters by VHF. An improved SCR-720 with 2 μsec. pulse length, an ASG-3, or even an SCR-615 is suggested. The only means whereby real range on enemy aircraft could be obtained is one which relies on enemy responders. These are provided in the Benito (GCI) responders with which all German fighter aircraft are equipped. The simplest proposal would be to place a homing receiver in the bomber control plane to detect air-borne Benito responsers. Such a system has already been worked out

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for introductory purposes and is known as Serrat B. A further refinement which would give range and direction would make use of a transmitter to trip off the Benito receiver.

From a defense-of-bomber-formation point of view, the above problem seems to be one of the most important in the 8th AF. Both rendezvousing and meeting consolidated enemy attacks are now seriously handicapped once the formation has passed outside the scope of friendly land ground radar. The entire skyful of our planes is watched by the GCI intelligence of the enemy with at present no aids other than provided by eye. The scheme skeleton above appears to be a promising answer, and further though leading to a definite proposition will be given to it.

We later met Colonel Callahan, whom we had seen at Bovingdon with Colonel Hough, and also Colonel Hill, the Judge Advocate General. General Campner is the Commanding General of the 8th Fighters.

Currie Street, Sam Simmons, and I had supper at the Cumberland. Currie reported on the meeting at Air Ministry on Oboe development. The British are confronted with the need of rapidly replacing present internal Oboe antennas in Mosquitoes with external ones. Various technical questions regarding the operation of Mark III Oboe with 8 repetition frequencies were discussed.

We considered the possibility of requesting George Valley by cable to head up the H2X program for BBRL, thereby relieving Sam Simmons for concentration on other air-borne problems, such as the one outlined above.

There has been no enemy action over London lately; therefore there is no "Window" to be observed by our crew at Enfield. We are considering moving it to Plymouth, Portsmouth, or some other southern site, where considerable enemy activity is currently going on. The Germans are now using their radio-controlled bombs and have recently done considerable damage in Plymouth and Portsmouth, though with high losses.

Thursday,
May 18, 1944

Asked Fred Whipple and John Dyer about getting S-band "Window" and "Window" dispenser for identification purposes. Also spoke to John Dyer about using Surrat B equipment, which homes on Benito-equipped aircraft for use in locating German fighters.

Conference with Colonel Howard, John Dyer, Gene Hotchkiss, and Ted Anderson in which we agreed to put the Trump-Fraenckel living-and-quarters allowance formula into effect on June 1.

Discussed the possibility of moving the experimental SCR-584 from the Battery C site at Enfield to some other point such as Portsmouth or Plymouth, where enemy action is much more prevalent nowadays. Ralph McCreary is to retire gradually from microwave-H work and concentrate on AJ activities. Suggested to Col. Warner and Ralph that "Window" and jamming information be secured routinely from the AA batteries employing 584's.

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Archambault dropped in to describe the several G2 teams which are being organized to go onto the continent and examine German captured equipment. Guy Stever and an ABL-15 man are to be attached to the team of Col. Eric T. Bradley of the ASC staff. He requested that BBRL earmark one such man for radar purposes. Apparently the AF, the Ground Forces, the Navy and corresponding British groups are organizing such teams. OSRD is contributing men from its several Divisions.

Decided with Sam Simmons that George Valley could be effectively used to head up the H2X program for BBRL, thereby relieving Sam to concentrate on other air-borne radar problems. Ed Bowles and Louis Ridenour dropped in at 5:30 to discuss the H2X program and the possible placing of George Valley in it. Louis endorsed the idea of putting a candle in the window for George Valley as a member of the BBRL staff, and Ed Bowles relinquished the thought he evidently had of placing him in USSTAF. Bowles discussed the need for placing a civilian expert in staff position within each of the several Commands. He renewed the idea that men concerned with operational planning should be free from any attachment in order that their loyalty might not be doubted. I contested this reasoning, which sounds like pure theory and which, in fact, has not been substantiated by our experience so far. The idea, however, of enlarging somewhat a very small group of competent individuals placed within the Army in various positions is not unsound, particularly if these individuals have the right personal characteristics.

Treated to dinner at the Cumberland by Louise.

Friday
May 19, 1944

To Bushey Hall, 8th AF, to see Captain Elsas, G-2, and Ralph Johnson. Captain Elsas' bright idea which brought me there was not so good after all--merely being the thought that the 3 Wye planes could contribute definite frequency information on German GCI. This could be VHF-ed to a fighter plane quipped with suitable homing device. The fallacy in this is that the Wye planes' search receivers make a record on a steel wire which can be analyzed only back home. I agreed to work up a complete plan of radar aids to the 8th fighters.

To Widewing for teletype conference, with Louis to get in the theater request and air priority for the close-support items up to 44 sets. Discussed 8th AF bombing results with Dave Griggs.

In the teletype, the Radiation Laboratory renegged on living and quarters differential after OSRD imposed the London Bureau of Budget schedule.

Discussion with John Dyer and Bill Evans regarding use of German GCI called "Benito" and operating on 38-40 mc. Apparently this is no longer used much during the day-time and is liable to be turned off completely if we use the aircraft transponder against it.

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The possibility of homing on enemy VHF was suggested as more feasible. Receivers are available, but an estimated two months was required to work up satisfactory directional antennas.

To Malvern with Ralph McCreary and Louise, arriving at 10:45. A lively dance was in progress at the County, which terminated according to rule at 11 o'clock. Scotch and grapefruit juice in Walter Jordan's room.

Saturday,
May 20, 1944

In the morning at BBRL, heard status of the close-support program and speeded up schedule for producing the first improved unit for AEAF bombing tests at Milfield. It is likely that this unit will be available on May 27. The second unit for 9th AF should be ready by June 5.

Meeting with G/C Johnson, secretary of the Radio Board. The Radio Board is the primary British policy-forming board on radar. It reports to the War Cabinet through Oliver Littleton, Minister of Production. The chairman of the Radio Board is Sir Stafford Cripps.

Received letter from General Doolittle, 8th AF, requesting BBRL assistance in investigating the microwave-H tactical bombing using APS-15 equipment.

Dinner with G/C Johnson, who discussed some of the early radar efforts, including the haywire CH and CHL stations. These were almost completely devoid of engineering design and would cease to scan when winds more than 45 mph. prevailed.

Discussion of micro-H program in Walter Jordan's room. Agreed that Ralph McCreary would gradually retire ~~retire~~ from this work, but first assist Dick Lawrance in working up the ground-station location and target ranging procedure. Further flight trials would be carried out primarily by Frank Zaffarano. Danielson would head up the project on arrival. The first operational phase of micro-H bombing would make use of three fixed stations--the ones at Halesworth and Beachy Head having already been set up. Curry Street and Sam Simmons are to investigate with the 8th AF how the ground organization is to be attached. It was felt that the ultimate program on the continent would require a total of 10 mobile ground stations, of which five would be operational. The two mobile beacons left over at the Radiation Laboratory from the H3X program are to be requested by cable.

Sunday
May 21, 1944

Conference in the morning to determine the position we would take at the forthcoming H2X meeting at Widewing on Thursday next. A teleprinter message from General Doolittle requests me and associates to be present. Simmons, Murrell, Redmond, Hibbert, Capt. Cade, and Al Dunbar discussed

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the instrumental, operation, and other factors which contribute to present mediocre performance of H2X in the 8th AF. Among the definite conclusions are (1) We should endeavor to resolve by high-altitude test that portion of the poor pattern which is caused by dish distortion. (2) We should recommend the immediate use of Norden bombsight with H2X data as an escape from the present poor close-in radar resolution. (3) If it appears that shifting to the $\frac{1}{2}$ μ sec. pulse is causing difficulties, we should recommend that one H2X squadron be modified to have only the 1 μ sec. pulse.

A meeting with Colonel Howard, Dyer, Arnold, Hotchkiss, and Cullum to discuss yesterday's teletype information from Loomis that OSRD living and quarters schedule had been imposed, and that MIT was unwilling to raise the difference to the Trump-Fraenckel formula. We agreed that Colonel Howard should make strong representations to Archambault and Stewart. In the event no relief is obtained, it was further agreed that Arnold and Anderson would devise means for adjusting salaries of the individuals who would otherwise lose.

I regard Archambault's self-contradictory cable to Dr. Bush as at best an example of failure to discharge intelligently a straight-forward responsibility, and at worst, an evidence that Arch is not interested in advancing the work of the two laboratories. This cable, which was sent without my knowledge, in spite of a prior agreement, is the third action which can be regarded as unfavorable to the interests of BBRL. The other two are Arch's unwillingness to recommend Dr. Stewart's approval of the hotel commitments which the two laboratories were obliged to make and which were worked out by Colonel Howard; and, secondly, his refusal to allow the radar report files to be set up and organized in the BBRL section of the OSRD suites.

An excellent seminar by Don Redmond on H2X in the 8th AF as seen from the Divisions.

Lunch at the Abbey at the invitation of Dr. Lewis on the occasion of the visit of the Parliamentary Secretary, Mr. Boyd. Mr. Boyd is Secretary to the Minister of Aircraft Production, and he himself has Ministerial rank. Tall, energetic, with a fund of robust stories, I found myself seated on his left, Rowe on his right, and Sir Robert Renwick just beyond.

Steering Committee meeting began at 2:30. L. J. Henderson reported on 9th TCC situation, which seemed to be very good. General Williams now insists on the use of BUPS in the forthcoming events. The recommendations of the 9th AF Board on Close Support were read. It appears that one improved close-support unit can be ready by the end of May and the other shortly thereafter. Tests of 584 range on Rosebud were arranged.

We discussed the proposed radar aids to the 8th fighter escort problem. This is left for Sam Simmons and me to work up, with Guy Stever to investigate what the British 100 Group may have done on DF-ing on enemy by VHF.

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We agreed that Ralph McCreary is to stand by for consultant work in connection with the intelligence teams now being set up to investigate enemy equipment found on the continent.

After the meeting, a short talk with Lines and Henderson in which I urged that TRE not pull Joe Kane out of 9th TCC at this time. The matter is left with me to settle with Dr. Francis. Larry asked permission to be on route-marking PT boat on the night of D-day to assist Captain Jefferson in handling the several beacons and light markers. This I refused.

Tom and Sam agreed that George Valley would fit well into the H2X scheme of things. I will dispatch cable request tomorrow.

Monday
May 22, 1944

General activity at the lab. Ridenour and Griggs arrived for a short session in the afternoon, particularly with reference to close support. Louis reported that AEAF will handle the theater request for the combined British and American requirements on close support. The Advisory Specialist Group will shortly make its report to General Spaatz. Drove Louis and Dave back to Defford, where I collected Serge Golian, who had arrived in a C-47 from 9th TCC.

Golian reported on the present status of the use of BUPS for the invasion drop. He appears to think that BUPS will be used only as route markers and in the marker boat. General Williams, however, according to Lines and Henderson, has decreed that BUPS will be used wherever possible, and it is known that two units will be dropped with the pathfinders.

With Sam and Curry, welcomed Ernie Pollard at the Malvern Station and drove him to the lab in "SNAFU", the jeep. Ernie seemed pleased at his reception after being bounced about for several days by ATC and finding no one on hand Sunday night in London. I requested that he concern himself with ground radar generally, leaving Ed Schneider to concentrate on MEW's and Lee Davenport as project engineer on the 584 for close support. Additional problems awaiting attention are the 584 for GCI, 584 for GCA, and the use of air-borne beacons with all of these devices.

The following AI operations were reported by ADGB during February, 1944: 1248 enemy sorties were made, mainly against London. This is the greatest number since June 1941 and double the January 1944 figure. Of the planes involved, 4.9 per cent were destroyed by ADGB, 0.2 per cent by Naval and ship guns, 2.6 per cent by AI, and 2.3 per cent by AA. There were 189 attempts made to intercept by AI Mark 8 under GCI and CHL control. These led to 17 combats and the destruction of 13 enemy aircraft. There were 101 attempts made to intercept by Mosquitoes with AI Mark 10 (SCR-720) under GCI and CHL control. A total of 9 combats resulted in 5 aircraft destroyed and 2 probably. This was the first use of Mark 10 and gave the same efficiency as Mark 8. The efficiency has subsequently risen materially. As the result of 89 searchlight-aided detections, there were 11 combats, with 5 enemy destroyed and 1 probably. Dueppl caused abandonment of 15 per cent, or 89, of the 574 abandoned interception attempts and was a subsidiary cause in 61 others.

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D810.S2.T78. A War Diary, 1944-45. John G. Trump, 1973.

Tuesday
May 23, 1944

Several talks with Ernie Pollard regarding work to be done on ground radar and relative priority.

In the afternoon, with Lee Davenport, we drove to Sledge Green and put the 584 in operation. We all took turns in plotting the course of planes which happened to be flying about. Report from Bob Curtis on the performance of the 584 at Anzio. In one month, eight 584's shot down a total of 56 enemy aircraft. On the day these units appeared, 5 aircraft out of a formation flight of 12 were shot down. No formation flying has been done over the beachhead since that time. Curtis reported complete jamming of the SCR-268. The appearance of "spoofing" on microwave equipment was reported for the first time. This appeared as six aircraft flying in perfect formation when the sound of only one aircraft could be heard.

The 9th AF is sending two officers and 28 men to train on 584 for close support. AEAF is sending six men.

In the evening, Golian, Simmons, Pollard, and I analyzed the lightweight air-borne and ground beacon program. The situation is complicated by the various uses of horizontal and vertical polarization and the different wavelength bands of ground and air-borne equipment.

Wednesday
May 24, 1944

Conference in the morning with Mr. Gray and Mr. Phillips of TRE, S/L Everitt, Ed, Ernie, and Lee on close support. We agreed that the modified 584 with the new plotting board should get on the road for Malvern next Sunday accompanied by Lt. Schedlbauer, Ed Brazell, and Ernie, who is to head up these tests. The modification of the additional units and the training of the 30 officers and men arriving from 9th TAC will be supervised at Malvern by Lee Davenport. The general program was thoroughly planned.

Ed Schneider returned from his visit to MEW Nos. 2 and 3 and the SCR-615 at Swanage. He reported on a raid ~~on a raid~~ on Southampton this week by 80 enemy bombers in which plenty of "window" was dropped. Although this "window" appeared as discreet marks, confusion repeatedly occurred between the fighter plane and "window". Ed got the strong impression that continuous tracking with the SCR-584 would have great advantages.

We discussed the present plans for MEW No. 3 to go over on D+6. This seems unfortunately early, since it would appear to jeopardize the equipment unnecessarily.

In the afternoon, Colonel Howland, Executive Officer, CSO, ETOUSA, was shown about a bit by yours truly. He seemed to be favorably impressed. In the evening he was the guest, along with Mr. Rowe and Dr. Cockburn of the ABL-15 group, at Westminster Arms. This party was really done up brown, with various choice French vintages and later champagne, cordials, and

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whiskey being served us. Cockburn proved to be a good raconteur, though I cannot remember his stories. Mr. Rowe told again his two stories about Churchill: In the first one, Winston pokes one of his corpulent associates in the tummy and says, "Boy or girl?" This elicits the following reply: "Well, sir, if it is a boy, I shall name him George after the King; if it is a girl, I shall name her Elizabeth after the Queen; but, if it is merely wind--as I suspect it is--I shall call it Winston." The other story concerns the long and formal report which Anthony Eden wrote on India. Churchill inquires of his associate whether he had read the India report. "You should," said Churchill. "It contains every known cliché from 'God is love' to 'Please adjust your dress before leaving.'"

Thursday
May 25, 1944

To Pinetree for conference on H2X called by General Doolittle. Colonel Sullivan presided, and all the H2X radar navigators and officers were there. The morning session was not too fruitful, but did elicit the impression that the excessively poor PPI pattern, such as might be caused by dish distortion or excessive tilt, is not generally experienced throughout the squadrons. There is considerable difference of opinion as to whether the $\frac{1}{2}\mu$sec. sweep should be used. This is now necessarily used because the range circle appears only on this pulse length. The afternoon session with radar officers alone was much more progressive, and an excellent discussion of causes of H2X failures was had. A BBRL-8th AF committee was set up to tour the Divisions and to make a quantitative analysis of instrumental factors leading to poor bombing performance. This committee consists of John Hibbert, Walter Jordan, Al Dunbar, Don Redmond, Major Maximoff, and probably Captain Cade.

In talking with Colonel Osborne, we came to the conclusion that the preferable way of organizing micro-H would be to put the stations as close as possible to present G-H sites and make use of 84 Wing as is presently the case with G-H. There appears to be no alternative since telephone lines did not exist between 8th AF and other BGX beacon sites, nor does 8th AF wish to get involved in the ground-station organization problem.

In the evening, after dinner at the Cumberland with most of the above people plus Larry Henderson and Win Salisbury, Larry reported on his 9th TCC work during the past week.

Friday
May 26, 1944

After working on various items, including a report to Lee and a replacement schedule for the BBRL staff, I dropped in to see Lloyd Dorsey at Combined Operations. Dorsey has just about completed the artificial PPI scope pictures of the invasion landing areas. This was done finally using Hamilton's mathematical method, with the illuminated scale-model technique used only as a check. The reason for this was the assertion that the PPI's were to be used for actual ranging. The 1-25,000 scale model ~~area~~ of the invasion area was laid out on the floor, and I examined

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with interest the O and U lines of approach of the American Forces. Dorsey is also trying to supply some scope pictures of the landfall for the 9th TCC. He has done a great amount of work and encountered much confusion in getting exact positional data from the American authorities.

We discussed the present enemy activity in setting up and moving barriers on the beaches. Dorsey reported also the concentration of a number of armored divisions near the British landing point. I drove off to Widewing feeling that the business was not going to be so easy.

At Widewing, encountered Colonel Howard, Gene Hotchkiss, and Ted Anderson, who were scheduled for a five o'clock conference with Archambault in an effort to get him to reverse his stand on the proposed living and quarters formula. For some reason or other, they proposed to recommend the upper figures of the OSRD scale, namely, $7.00 and $4.90. I argued there was not much point in thus confusing the issue and suggested that we all, including Vic Fraenckel, see Archambault. Back at OSRD, all parties stated their case. Hotchkiss rolled over the barrel for having introduced the 28.02 idea into Arch's thinking. Arch expressed strong resentment over my comment in last week's teletype. After an hour and a half, not much progress was made. It was agreed that Arch and I would work on a cable to Stewart.

To Soames House, arriving at 7:30, for buffet supper and Steering Committee meeting. Both, it seemed to me, were excellent sessions--the latter being over at 11:30.

Saturday
May 27, 1944

Mike Chaffee reported on progress of MEW #5 at Grayfriars on the east coast. The ship carrying the 200-odd crates arrived somewhere around Monday, May 15th, and on the following Thursday night, the first convoy of of 13 trucks rolled up to Grayfriars. This was followed by similar convoys on Friday and Saturday, with the last few crates, including the pedestal drum, arriving on the following Monday. Today Mike reported the set receiving signals, though the plotting screen and the skiatron are as yet not arrived from BBRL. Since a week is involved in training the plotters, Mike is afraid that his promise of operational use by June 5 will not quite be met. Meanwhile, the toll among straggling bombers returning over the North Sea indicates the great need for this set.

Discussed the GCI program with Ernie. GCI, unlike close support, is blessed with a fond parent in the form of General Burnell and the 9th Air Defense Command, which means that the necessary personnel and facilities are readily assigned to it. Complete agreement now exists all round in the desirability of proceeding with this program, though in such a way as not to interfere with close support. Though this has been the policy of BBRL for some weeks, Ed Schneider's observation of the confusion caused by "window" in the usual GCI equipment has helped to solidify the opinion.

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In the afternoon, spent an hour with Arch trying to get him to send a straightforward cable to Irvin Stewart recommending his approval to the proposed living and quarters formula of the two laboratories. Arch, though pressed in the corner and admitting the formula to be fair and reasonable from practical considerations, still insisted on cabling Stewart for more definite instructions as to the basis upon which he is to make his recommendation.*

Talked with Ed Bowles regarding the functioning of USSTAF and BBRL in this theater. Bowles has evidently helped in stimulating cooperation between the Ground and Air Forces and focussing their interest on the 584 as an instrument for close support. Evidently he also strongly favors the introduction of a few improved devices, such as Eagle, for special combat purposes and general orientation of the prospective using Air Forces. He has left Mr. Hartley Rowe in the position of Scientific Advisor to General Eisenhower and also senior member to the Advisory Specialist Group, USSTAF. Ed carries back my second newsletter to Lee DuBridge. He expressed the opinion that another six months would see the European conflict nearly over and the BBRL function largely performed. Discussed also the possibility of setting up a branch laboratory on the continent. A brief session at the Mount Royal Club and dinner at the Cumberland with Ed Schneider.

*My suggested cable for Arch's signature was as follows:

> Re East 741: On basis of additional information provided me by ABL-15 and BBRL representatives and taking instruction only from cited cable, without consideration of Administrative Circular 28.02, I am of the opinion that Trump-Fraenckel formula is a reasonable and practical living and quarters arrangement for the two laboratories' staffs, and therefore recommend your approval.

Sunday
May 28, 1944

It is three months today since I arrived in London. In this time I have seen the allied military effort gradually gather itself for an overwhelming invasion effort. I have come to know where and when this invasion will take place and something of the functions and strength and plan of attack of the Strategic and Tactical Air Forces, the Amphibious Forces, and the Ground Forces. More recently, I have become aware of the moves which the enemy has probably made to resist us, of his solid array of beach defenses and mines, of his concentration of several armored divisions near a critical point, of the strong possibility that he may jam our essential navigational aids and other radar and communication facilities. Three months ago, the allied effort appeared to me as uncoordinated, lacking personnel, training, and essential equipment. Today I have the definite feeling that it is ready. Equipment has arrived, and training is now sufficient to give assurance for a good show. In three more months, the effort--if it were not made--would be stale. The issue will undoubtedly turn on wind and tide, the cards of chance, the ability of individual men to make sound decisions at spot crises. If the effort succeeds, it may well be over before next Christmas, or practically so. If it fails, as it

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well might, we shall be still at it two years hence.

Called on Lloyd Dorsey and Ed Schneider at Combined Ops. today to see how they are getting along on providing PPI predictions for the 9th TCC. It was interesting to see the actual route, turnings, and drops, and to puzzle over the misguided demands which TCC makes in stating its requirements. Looked over a map of beach defenses on one of the landing regions.

To Soames House, where with Dave I reworked the draft of General Doolittle's memorandum setting up with H2X Committee. Mentioned the idea of using "window" packets on parachutes as an aid to air-sea rescue in giving a longer time for DF-ing. Louise and Shirley White got employed in last-minute letters for Louis and Vick to be carried by Ed Bowles.

Discussed briefly with Ed Bowles the possibility of a laboratory on the continent. He has apparently asked Dave Griggs to concern himself with close support on a basis agreeable to Louis and me. It appears as though General Bradley of the Ground Forces and the several Air Forces generals are sold on the idea of closer air support of ground troops operations than has previously existed. In such cooperation, a modified 584 would be one of the most valuable instruments. Having been committed by Dave to a 10 o'clock meeting with General Doolittle at Pinetree tomorrow, I returned to London.

Drove along the river from Battersea Power Station past the Houses of Parliament and Westminster; over Westminster Bridge to the Thames Embankment, where we stopped and looked across; then back to the other side, up Whitehall past the Cenotaph, 10 Downing Street, Combined Ops, along Pall Mall, and Piccadilly to the Mount Royal.

Monday
May 29, 1944

Drove to Pinetree to meet Dave for a conference with General Doolittle at 10:00 a.m. Stopped first and talked with Major Boris Maximoff, my former student, who is now working under Colonel Sullivan on various radio engineering problems. General Doolittle accepted our recommendation that a composite BBRL and 8th AF committee be set up to survey H2X equipment in the Divisions and make its report to him. Colonel Sullivan pulled a fast one by naming Colonel Osborne as committee chairman, whereupon we named Dr. S. J. Simmons as technical coordinator. In the course of the interview, General Orville Anderson walked in and discussed yesterday's bombing results--which, I took it, were not too good, but which he hoped would prove better today.

There was some discussion of recent tests to see if an armored division dispersed on open, even terrain could be seen by an H2X plane at 15,000 ft. The results were in three trials entirely negative. This is evidently a job for Eagle--if only it were over here in time.

Back to Colonel Sullivan's office, where I brought up the need for factory-trained engineers under the Air Service Command for use in the H2X squadrons. Colonel Sullivan agreed and offered to send out a cable request for nine ASC men plus three per month thereafter.

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I discussed the general problem of fighter escort and the proposed radar aids. Colonel Sullivan was entirely in favor of the plan, agreed that the tests now in progress under Colonel Hough should proceed informally, and that, when appropriate, the matter should be brought up again for full implementation.

Lunch at Pinetree with Tom Murrell and Colonel Geerlings. Saw the beginnings of a radar overlay which ultimately will give the radar appearance of all of Europe.

To Bovingdon, OES, where I discussed the fighter-escort radar problem, the tail-warning (APS-13) work, and tests on a Window dispenser for identification purposes with Colonel Hough. Mr. Meagher showed me the TW installation and described the results of the first two flights, which were quite favorable, as had been anticipated. This afternoon Colonel Hough and Mr. Meagher will fly in a following plane, and I expect that a favorable report will be made to General Doolittle within two days. These results will also go out over the teletype.

To AEAF, at Air Ministry, where I discussed the close-support program with Colonel Benny Stewart. He was pleased down to the ground to get some up-to-the-minute gen and agreed to see that proper steps were taken for the modification of 44 units and the acquisition of parts. Later, I learned from Louis that the Deputy Commanding General of AEAF had already given a carte blanche for seeing that 44 units were modified. Louis is going to try to apply the necessary pressure in the appropriate places.

To Hereford House, where I talked briefly with Ralph Johnson, Guy Stever, and Dave Langmuir about the fighter-escort problem. When I came in, Dave was just giving considerable expression to the conclusion that the development of suitable DF-ing means on enemy communication was the most important thing which could be undertaken. After some discussion, this promising way of contributing bad data to the clear-cut information which could be gotten from an S-band radar and appropriately placed beacons, it was agreed that any use of enemy radiation should be forgotten for the moment. Brief chat with Clarence Henson, who has just returned from the most easterly of the African pair of SS Loran stations. He reported nearly 24-hour synchronization with the other African station, and the signal strength from the Scotland station was good only at night-time minus two hours at each end.

To Soames House for dinner. George Metcalf, who has just arrived from the States, discussed some of the things which ARL is interested in. He discussed the status of some Army air-borne items, such as ARO, AGS, Eagle, APS-13, H2X, etc. He stated that General Colton is completely behind BBRL and has offered to help in any way possible if advised by teletype.

Back in London, Dick Hodgson and Hugh Kendall had arrived. They were full of news about the Radiation Laboratory, and we discussed some organizational matters, including personnel problems, cables, and teletype, and other items.

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Tuesday,
May 30, 1944

Breakfast at the Cumberland with Leo Sullivan, who has just returned from six weeks in the Mediterranean assisting AA batteries in their use of the SCR-584. He described some of his experiences during two weeks on the Anzio beachhead, where about 16 SCR-584 controlled batteries are now operating. Raids were a nightly experience, and the average score he estimated at 20 per cent. In one 5-plane raid, all 5 were brought down. The Germans make considerable use of Window, which made the 268's useless, but did not scatter sufficiently to make
The Anzio beachhead was about 8 x 10 miles. Life went on normally underground, with apparently only moderate activity until the big push two weeks ago.

Drove to Pinetree for a conference on the micro-H bombing system. The meeting included Colonels Sullivan, Garland, and Osborne, Curry Street, Frank Zaffarano, Dick Lawrance, and several others. The following decisions were reached:

(1) The ground-station program would make use of stations at Halesworth, Beachy Head, and Tilly Whim (Swanage). The Tilly Whim station is to be mobile.

(2) A computing group is to be organized within the Operations Control Section of the Eighth AF. For the present experimental period, one signal officer, one navigator, two enlisted men for computers, headed up by Dick Lawrance, would comprise the computing group to work out target calculations, calculate necessary time delay, and perform the general ground-station functions.

(3) It was planned that the first delay circuit would be installed by Frank, probably in the southern station, and that he would supervise the training of GI maintenance men.

(4) Bombing procedures to make use of the Norden bombsight in the same way as in the H2X program.

(5) A joint report to the Commanding General would be prepared by RBRL, the 482nd Bomb Group, the Signal Office, and Operations. This is to be complete and include equipment and organizational requirements, training program, coverage accuracy, range, and tactical employment. It was variously estimated that the report could be prepared in about three to four weeks and in advance of the completion of full bombing tests.

This meeting brought out again the inflexibility of the Army's T/O (Table Organization) system. Only by the greatest promotional effort, by straining other important work, or by working for months on Washington can adequate personnel be secured for new projects. While on the one hand this inflexible T/O system means that the less useful organized Army functions will be scraped to provide for new ones, it jeopardizes many an undertaking which should be generously sponsored.

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To London, where I deferred a trip to Malvern with Hugh Kendall, Dick Hodgson, Ross Milley, Colonel Metcalf, and Louise because of a newly developed meeting at Air Ministry on the following day.

Dinner with Harry Dunn, newly arrived WE engineer, and Colonel Richardson.

Wednesday
May 31, 1944

To Air Headquarters with Louis and Dave for a meeting in A/C Hart's office on the making of a photographic radar record of the invasion. Sir Robert Watson-Watt, W/C Drew (who heads up the AA section of ADGB), G/C Lugg, and Colonel Stern were present. I agreed to arrange for the photographic of PPI and Type B scan of the MEW at Peartree Point. The British will undertake to get photos of the Type 14 and 16 units at Ventnor. A/C Hart, after some pressure from W/C Drew, advised us as to the time when the photographic equipment must be ready. It was understood that the record should be continuous for three days commencing D-1.

To Malvern with Colonel Warner and Leo Sullivan. Stopped at Signal Service Section of ETOUSA at Cheltenham, where we met Colonel McCarthy, Lt. Col. Abbott, and Major R. H. Hughes. I gather that some unassigned tonnage exists in cross-channel shipments scheduled for D+16 and later.

Later, we drove to the sub depot of G-24 to see a wrecked SCR-584 which had tumbled down an 8-foot embankment. A certain amount of distortion of the body and shearing of the mount bolts had taken place, requiring complete mechanical realignment, but the electrical gear seemed intact and probably would have worked if power had been put on it. Warrant Officer Saparito was in charge of this sub depot, including SCR-584 training, maintenance, and salvage.

At Malvern, began getting up to date on the progress of the GCI and close-support programs. Assigned Dick Hodgson to the job of working up a complete parts list, organizing the procurement of all items required for both close support and GCI programs, and following the modification of the parts.

Thursday,
June 1, 1944

Discussed with Ted Anderson the request from Lee DuBridge that he return to the United States to work in the newly formed advance production set-up. It was agreed that Ted would return on or shortly after June 20, having by this time put in some seven months' very effective work in the ETO. Cabled for Jeffries, who has been employed by Lockheed in Ireland on product control, to come to BBRL for an interview. MIT has agreed to accept him as their fiscal agent and, if possible, he will handle fiscal matters, transportation, hotel arrangements, and property accountability for the lab. Dick Hodgson will act on all special procurement problems and as contact man on Army Service facilities. Hugh Kendall will be concerned with the report functions of BBRL and local administration. In this way Ted Anderson's job is divided among three.

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Discussed briefly with John Freehafer his work here on radar propagation and agreed to his return to the United States on June 7. John has calculated that the maximum effect of abnormal propagation conditions on the accuracy of Oboe was less than 10 yards in 150 miles.

Spent some time with George Huff, Ernie Pollard, and Ed Schneider in clarifying the training program on close support, including specifically the training of the 30 officers and men now at Malvern. This resulted in a more clearly outlined program.

After some unanticipated moves by Louis Ridenour to provide the Start Point MEW with 16 mm. cameras from the H2X program, we finally got back on the track of using the 35 mm. hand-cranked cameras already available. The hand-cranking feature is more than offset by the unavailability of 16 mm. film in this theater and the poor record which can be gotten on this size film.

Needled Louis on the need for a definite Army organizational set-up for close support. Louis countered the best he could by pointing out that General Cassada of the 9th TAC was sold on the idea, but sitting on the pier all tarred and greased. All principal parties, including General Bradley of the First Army, are highly interested, but completely absorbed. Louis agreed, however, to secure from General Bradley an Army Liaison Officer to represent the Ground Forces' interest. He is working on getting Col. Cowart assigned to 9th TAC to plug close support. As second choice, he will go after Col. Reed of 10th PRU.

Col. Metcalf, impressed with the performance of BBRL, has requested ARL officer representation, to which, of course, we heartily agreed.

Friday
June 2, 1944

Drove to Defford with Ed Schneider in a jeep to meet Colonel Dixon's plane en route to the MEW at Peartree Point. Ed went along to get the PPI photography set up in time for the invasion. According to A/C Hart, the apparatus must be ready be Saturday night.

Returned to Malvern with Col. Metcalf, who had been touring the station. George had been shown the AGL-T (S-band tail gunsight radar), but had the impression that it was still in an experimental stage without any crash program behind it as had been reported some months ago.

To the lower plane field, where about six 584's have been broken out for training the ½ U-team of the 9th TAC. George Huff is running the training program and doing a good job of it with a faculty composed of Leo Sullivan and the two corporals from the Signal Corps, ETOUSA, who had worked on the Enfield unit. All of these men are scheduled to leave in another few days, and some more definite organization is necessary.

Discussed the close-support program with Capt. Byfield, Ernie Pollard, and George Huff. Capt. Byfield is C/O of Company D, 555th SAW Battalion. He expressed the wish that his entire company be diverted to close-support

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work. This is good sense since it maintains an Army organizational unit. We determined that a close-support unit required ½ U-team and 4 controllers from AAF and 4 liaison men from AGF. Company D consists of 3 U-teams and would therefore form 6 close-support units. It was estimated that the present ½ U-team would complete its basic training on close support by June 30, whereupon it could move off with one SCR-584 support set for further field practice beginning July 1 and every month thereafter. The training of two units could be handled at Malvern provided the propoer assistance in instruction and otherwise were given by the Army.

Lee Davenport reported the Milfield equipment had been set up for several days, but, because of weather, had been tried out only today--with fairly satisfactory results.

Saturday
June 3, 1944

Reported to General Burnell, 9th ADC, that two 584's with GCI plotting table were ready to move off to Church Fenton with normal tracking range units. The 50-mile tracking panels would be completed during next week and substituted as soon as ready.

Started at 12:15 for the MEW at Peartree Point with Bill Latady. Our route was through Gloucester, Bristol (where we were impressed by the gorge and Clifton suspension bridge), Bridgewater, Taunton, and Exeter. At Taunton I stopped at the 67th General Hospital, but Lt. Col. Jack Spencer was away. Thereafter we passed through Newton Abbot and Totnes. Got lost in the backwoods during the last 10 miles and had the pleasure of riding through narrow roads with high walls overgrown with vegetation which closes in overhead. The little villages reminded one of rural France and Italy. Arrived at the Trout Hotel at 7 p.m.

Climbed up to the station on foot from the Hotel after supper, paying particular attention to the large number of LST's with barrage balloons overhead, which were in the bay close in-shore, and the still larger number with heavy naval vessel escort some miles further out. Studied this formation through field glasses borrowed from some soldiers on watch at the cliff. In all, an estimated 100 LST's could be seen with about a dozen naval vessels of various descriptions gathered about. This I was later told was not so much as had been used in previous practices. In the Ops Room, the recently installed off-center sector scan showed three strings of boats and escort vessels. Abnormal propagation clearly brought out the Isles of Aldersney, Guernsey, and Jersey, as well as part of the Cherbourg Peninsula. The Type 24 height-finder is now finished and getting into operational use.

Ed Schneider had arranged a remote 7-inch PPI in the maintenance shack, and we prepared to attach the Exacktor 35 mm. camera to it. A total of nine enlisted men with photographic experience plus Capt. Summerhayes were on the site--these having been secured through USSTAF and Alconbury for the purpose.

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Sunday
June 4, 1944

In the morning, several lines of LST's and escort vessels could be seen rounding Start Point in the direction of Plymouth. One barrage balloon was suspended above each LST. The fairly high breeze of the day before was still blowing, which did not auger well for an immediate invasion. Abnormal propagation had ceased, but I noted that the Cherbourg Peninsula and the adjacent islands would appear a bit and disappear again rather suddenly. The camera installation was completed, and test exposure shots were taken. These subsequently showed that for a single sweep of 30 seconds the F4.0 stop was best for the Super Double-X film. Talked with Cherry-Downes, Ed Schneider, and Mike Chaffee on the use made of this MEW. Found that they now feel that its use is appreciated by both British and Americans and that an adequate number of fighter flights were being assigned to its control.

It was hard to appreciate that an invasion attempt was near when surveying the peaceful and beautiful seacoast scenery from the top of Peartree Point, except for the strings of invasion vessels, which were after all only small dots on a big expanse of water, and the few machine guns and armed guards which had been hastily set up in expectation of retaliation. The place looked as it had a month ago. Although somewhat disappointed at not being there when the show began, I felt I had enough actual data to imagine what it would look like when it finally came off.

Left at 3:15 with Bill Latady, Capt. Summerhayes, and Penny Cox for Malvern, arriving at 9:15, with supper at Officers' Mess at G-50 (Southern Supply Base), Taunton.

At the County Hotel, heard Walter Jordan's report on the H2X Survey Committee. This sounded very sensible and had as its main points the ordering of 100 improved dishes, the use as soon as possible of the bombsight technique, and the modification of H2X sets in one squadron to work only on 0.8 μsec. pulses.

Lee Davenport and Art Warner reported on bombing tests at Milfield. In the first tests with bombs yesterday, four bombs were dropped and fell with an average error of 100 yards from a height of 10,000 ft. This unanticipated accuracy is beyond the capabilities of the instrument, but has apparently served to completely convince the people at Milfield of the amazing possibilities of the close-support unit.

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Monday
June 5, 1944

Called on Mr. Rowe in his tower room at TRE. We discussed whether the invasion would still come off. The initial date for D-Day had been Sunday, but it had been postponed because of the gale. The day could be progressively postponed until June 9, after which it would have to await another fortnight for the tide to be right. Outside the wind was still blowing hard.

We discussed the attitude which TRE development effort should take toward the war in the Pacific. I suggested that the radar problems there were actually similar to those in this theater and would require such devices as Loran, H2X, and H2K for navigation; MEW; and close-support radar. I saw limited use for short-range precision bombing, such as Oboe, though micro-H would be valuable as a supplement to H2X if land bases were available. Mr. Rowe said that England must participate fully in the Pacific war or run the serious risk of being criticized 20 years later by the typical Midwestern farmer whose son Joe had been killed in France. We agreed on a TRE-BBRL-ABL-15 meeting next Monday to discuss invasion topics.

Further bomb results were reported from Milfield. The errors are still smaller than they should be, and for the six runs made at angels 10,000 they are 85, 95, 120, 160, 95, and 350 yards.

I encouraged Ernie Pollard to leave for Start Point a day sooner. Talked with Steve Jeffries, who is here for interview from Lockheed, and offered him position as fiscal agent for MIT at BBRL.

Lined up with Sam Simmons the micro-H and air-borne programs.

In the evening, walked along the top of the Malvern Hills, beginning at Witches' Gulch. A high breeze was still blowing.

Tuesday
June 6, 1944

The invasion is on. The news was first given me by Curry at breakfast and consisted of a rebroadcast of German news that parachutists had landed in Normandy. This news was confirmed during the day by radio reports by Churchill, Eisenhower, and Montgomery. They reported 4,000 ships, 2,000 small craft, and 11,000 aircraft engaged in the operation. The troop-carrier operation was stated to have been accomplished between 6:00 and 7:00 a.m. with good accuracy. There were 640 heavy Naval guns blasting at shore defenses. The underwater defenses were stated to be less serious than had been supposed. There was very little real news, and there appeared to be a great absence of dramatic value in the broadcasts during the day.

At 9:00 p.m. (England double summer time - 2:00 p.m. EWT) there was a broadcast by King George calling the nation to prayer.

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In the afternoon visited Sledge Green, where the first BUPS beacon runs were in progress. Beacon operation seems to increase the azimuth hunt, and some effective means of reducing this must be accomplished.

During the evening, Lt. Schedlbauer returned from Milfield. He confirmed the news of the bombing accuracy and described the operation of straffing through overcast in which the aircraft is vectored to a certain position and then performs a 60° turn and 60° dive into an aircraft from above overcast. They have tried Window as a means of identification and find that a single package gives a tremendous signal. Apparently one-fourth of a package would suffice.

Wednesday
June 7, 1944

Dr. John Warren of the Air-Borne Radar Section of TRE reported on some news which was available at Air Ministry yesterday. Apparently no serious jamming had been encountered on D-Day. With no exception, every type of radar worked very well. A total of three Divisions, probably two American and one British, had been landed, with only 3 per cent loss instead of the anticipated 20 to 25 per cent. Very few ships had been hit by the shore batteries, many of which had been put out the night before by concerted Oboe and H2X raids, in which 5,000 tons of bombs were dropped. These raids had also eliminated a considerable number of fixed radio stations which probably would have been jamming.

A general discussion with Colonel Howard, in which I suggested that the two laboratories act as a unit in their field activities in the Mediterranean and on the continent.

In an afternoon meeting on GCA with Mr. Whitford and Dr. Taylor, I backed their proposal to DCD (A/C Leedham) that one or two of the four GCA units coming to England be set up operationally instead of going into training programs as planned. Also agreed to secure from the Radiation Laboratory one GCA expert.

Harold Edgerton arrived from 10th PRU, where he has been working with his flash photography method of night photo reconnaissance. The light equipment which he uses requires flying at a height of not more than 5,000 feet. He feels that a close support working against a beacon is necessary to insure proper navigation of the aircraft, and several test flights are scheduled in the next few days. Harold reported on his experiences in Italy, where the larger-size photo flash equipment proved inadequate because its maximum ceiling of 10,000 feet was still too low for flak areas. The alternative is to use the lighter-weight equipment at lower altitudes in Mosquitos, A-20's, and other high-speed aircraft.

Herb Hall reported the two SCR-584 ground-station Oboe units in operation, the one at Ilfracombe in north Devon and the other at West Malvern not far from Witches' Gulch. On the first test on the Ilfracombe station, a range of 193 miles was achieved--terminated by interference caused by another aircraft. The second test gave solid signal to 203 miles and intermediate signals out to 215 miles. The test flight sched-

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uled by the 9th AF and 8 Group are momentarily canceled by the invasion. An effort is now being made to get aircraft laid on for bombing runs.

Charlie West reported on the 9th TCC operation. This was apparently completely successful, and jubilation reigns at North Witham, with General Williams directing several commendations. Colonel Crouch is reputed to have said that BBRL can have anything it wants. Gee was not interfered with. The Rebecca-Eureka's worked fine. Four BUPS were dropped, and satisfactory operation was reported. Golian was at the Bill of Portland attending to a marker BUPS. Only a few aircraft reported seeing the water-borne BUPS. This was due to the fact that the crossing was lined with ships, making radar markers practically unnecessary. The landings were all made 4 or 5 miles inland from the east coast of the Cherbourg Peninsula and had the purpose, among other things, of preventing the flooding of this low area. Charlie reported that land fighting was apparently progressing more favorably than had been supposed, and several planned missions were therefore being postponed, the Commands remaining on the alert.

Drove to London, arriving at 10:15 p.m.

Thursday
June 8, 1944

Met Gordon Danielson, L. H. Orpin, A. C. Byers, A. R. Tobey, L. A. Hartman, and the two secretaries, Marion Fillmore and Janet Desaulniers, all of whom had arrived the night before. They left for Malvern by car and train.

Lloyd Dorsey reported on his activities and plans. He completed his PPI predictions for both the United States landing forces and the 9th TCC in time for distribution for the invasion. In all this, he did an extremely creditable job, not the easiest part of which was to examine the necessary bigoted information regarding the precise landing strips from the Navy Operational people. Dorsey reports that AEAF has now acquired scale models of the Cherbourg Peninsula and other invasion regions and is definitely planning to use the illumination technique for site determination. We agreed that his job in this theater has been completed and that he should plan to leave in ten days or so.

On bus to Widewing for talk with Louis Ridenour regarding the close support meeting tomorrow at Bentley Priory called by Colonel Stern, AEAF. This meeting will have mostly American Signals people present and is intended to set forth the proper tables of organization and equipment and training requirements. Later talked with Captain Richardson, ASC, USSTAF, regarding the type VHF for close support and other items.

Back in London a message was relayed from Ernie Pollard to the effect that the photographing of the invasion from the Start Point MEW had been completely successful and that the pictures would last 100 years. They were being brought to Malvern.

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Larry Henderson, just back from a visit with Colonel Crouch at 9th TCC, North Witham, confirmed the information that the troop-carrier operation had completely successful, with Colonel Crouch very grateful for the work which BBRL people did. A meeting is to be arranged soon for a discussion of a future program.

A convivial one-half hour in the Mt. Royal Club with Dave Davidson and Ralph McCreary. Later discussed Ralph's plans to investigate captured German radar equipment on the continent as a member of a G2 party. Ralph is scheduled to go over about D+29. I may see if he should not provide the groundwork for future BBRL staff members who may need to go over.

The invasion appears to be going satisfactorily. Papers report hard fighting around Caen and Bayeux in our hands. It appears that the several beach landings have now been made nearly continuous.

Very excellent progress has been made on the Italian front. Rome was occupied four days ago, and advance patrols are now 50 miles north of Rome and following a rapidly retreating enemy.

Friday
June 9, 1944

Meeting at Air Headquarters on close-support program. Colonel Stern had signal officers from AEAF, 9th AF, 9th ADC, 9th TAC present. Representing the British were G/C Atcherley, G/C Furness, Mr. Gray, and others. At the meeting, it was agreed that AEAF would write directives for the 9th AF calling for the modification of 12 SCR-584 close-support units, as well as for the necessary auxiliary gadgets, including VHF and tractors. No action was taken on the manning of these units, though some discussion on the composition of each team developed appalling numbers--upwards of 125 men. On the whole, the meeting did summarize at one time and at one place the results of the trials at Sledge Green and Milfield, and the steps which would have to be taken equipment-wise to get the program under way. BBRL undertook to supervise the modification program.

Stopped in at W/C Drew's office to see movies of the 500 mc. and 3000 mc. set at Ventnor taken during the invasion. These were on 35 mm. film and were taken every sweep, giving 6 slides per minute. The pictures were quite realistic, but extended only 60 miles outward from Ventnor. The repeated mass raids which passed almost directly over Ventnor were striking.

On the way home, Louis Ridenour's car, driven by a GI chauffeur, sideswiped an elderly lady, and we were held up for an hour while her minor injuries were being ascertained. Postponed return trip to Malvern.

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Dinner with Joe Platt, Phil Jacobs, and Lieut. Bob Kite at the Cumberland. Phil expressed himself as not at all anxious to go home if there was still work for him to do here.

Saturday
June 10, 1944

Left for Malvern at 11:00 a.m. Lunch with Tom Murrell at Pinetree. Stopped at Cheltenham for talk with Major Hughes about available VHF. At Malvern, Sam Simmons reported on the micro-H program. It was decided that we would not follow Gordon Danielson's suggestion to investigate the interest of the 8th AF in H3X at this time.

Ernie Pollard reported on his trip to the MEW at Start Point and showed the interesting radar pictures which he had gathered there. A large part of the air-borne invasion forces, as well as the ship armada, can be seen in these pictures, which extend to a range of 160 miles from Start Point. The Cherbourg Peninsula is outlined due to abnormal propagation. The air-borne forces are shown by long continuous signals representing strings of planes 50 miles long in space. On the whole, the pictures are much better than those seen at Bentley Priory a few days before.

Called Dave Griggs in response to his note that Major Headrick of 15th AF wanted two Philco men to return with him to Italy. Decided that Don Redmond could go at this time for a two-week trip to survey the situation, Redmond then to be followed by two Philco men of his selection. Decided that Herb Weiss should not go through Italy on his way home.

Dinner arranged by Col. Howard at the Beauchamps for the three TRE personalities: Mr. Jones (CMAR), Mr. Knight (Housing), and Mr. Ayre (Building Superintendent). This proved to be a relaxing affair mellowed by some slightly over-age French Grave sauterne. We discussed everything from British-American relations and housing requirements to the causes and date of the next war. I left at 10:30.

Sunday
June 11, 1944

Attended the Sunday Soviet with Sam Simmons for about 3/4 hour. Sir Robert Watson-Watt was present, and he had brought an outline of Pacific problems as given by DCD. There seemed to be in general two schools of thought: the one, that we should now sit down and think up some new cute radar ideas to meet the special problems of the Pacific; the other, to which I belong, that the necessary radar for the Pacific was either already available or nearly so and that the remaining problems were its employment and practical improvement, such as by tropicalization.

Ernie Pollard gave a seminar on GCI comparing the English, German, and U. S. Navy methods of performing this function. He described also the two SCR-584 methods of control. I made a brief statement on the manner in which radar had been employed on D-day and the preliminary reports on its success.

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Steering Committee from 2:30 to 7:00 p.m. After discussing critically the lack of Army organization for close-support, it was agreed that the Sledge Green unit would be moved as soon as possible to 10th PRU for further experimental trials under the stimulation of the most interested user, Col. Reed, for night photo reconnaissance.

In the evening walked out to the Essingdon with Ted Anderson, discussing, among other things, general organizational problems. The Essingdon is a simple old inn surrounded by a beautiful garden--far nicer than the County or other hotels in Malvern.

Monday
June 12, 1944

Meeting in Mr. Rowe's office with TRE, BBRL, and ABL-15 representatives--about 50 of them. Most of the radar developers in England were present on this occasion, which had the purpose of discussion of radar in the opening days of the invasion. Mr. Rowe made a brief statement to the effect that the scientist had contributed very much to the radar plan and execution though his efforts for a long time had been unappreciated, and the suggestions made in the TRE "invasion panel" had for the most part gone unheeded.

G/C Larnder of ORS, AEAF, described the invasion as he had watched it from the Type 14 station at Ventnor. His outstanding impression, after observing for hours the regular flow of large groups of planes toward the invasion area (and presumably their disappearance off the end of the 60-mile screen) and their subsequent return to England all according to plan, was "What a marvelous thing is Gee!" Mr. Reeves described the performance of Oboe on D-day, with ten RAF missions and six American missions against radio stations and shore batteries. A slightly lower schedule than this had preceded D-day and was maintained on the days thereafter. In most of these the preliminary evidence was very satisfactory.

Mr. Pringle reported on the performance of the navigational aids for the TCC's, both 38 Group and 9th TCC. These in both cases were more successful than had been hoped. The British made use of only Gee and Rebecca-Eureka, their air-borne forces relying to a considerable extent on accurate map reading as a navigational aid. Pringle described the American system as capable of handling larger forces with less training and as therefore superior in the long run. Dr. Taylor reported on the performance of the several fighter-control stations at Ventnor and Beachy Head. John Hibbert described the assault by 1500 AF planes on the invasion beaches using H2X bombing in complete overcast from an altitude of 15,000 feet. This unique operation, perhaps the one really close-support job of the 8th AF, was apparently carried out without casualties to the amphibious forces which were already touching shore when the raid was made.

Dr. Cockburn reported that German jamming was virtually non-existent. This was described as due primarily to the fact that, as a result of bombing, of the more than 100 German radio and radar jamming stations only 5 were still on the air on D-day. By D+12, 15 had come on the air.

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The last part of the meeting consisted of a discussion of the 584 close-support program, H2SD (detection of moving targets from an aircraft by H2S using doppler technique), the micro-H program, and the problem of operating Oboe on the continent.

I personally felt that this meeting, which I had recommended to Mr. Rowe, had been interesting and useful. As a result of some of the discussion, I felt strongly that what the Radiation Laboratory has always lacked and what BBRL also lacks is adequate liaison with the Army Ground Forces. We have always been surrounded with people interested in the air-borne function, but have only the smallest idea of the material problems in ground operations on which radar might help.

Walked back to the County with Vic Fraenckel, who felt--probably momentarily--that his job in the ETO was nearly done. This feeling was perhaps due largely to the fact that German jamming had not developed and that the German radar had been eliminated by more violent methods.

Meeting on close support attended by G/C Atcherley, G/C Lugg, W/C Keighley, and Major Crumley. Mr. Woodforde and Mr. Gray attended for TRE; and Curry Street, Lee Davenport, Dick Hodgson, and I for BBRL. After Atcherley's statement that they were convinced by the tests at Milfield and Sledge Green that the close-support unit was an important radar aid and should be implemented as a program, it was agreed that

(1) All controller and crew training should be performed at Milfield, where as soon as possible a second unit should be made available.
(2) The production schedule from Burtonwood should be at the rate of two per week beginning July 7.
(3) BBRL would instruct 584 maintenance men if none could be obtained from the theater.
(4) BBRL would continue the development program at Sledge Green.
(5) On June 24 and 25, a demonstration of 584 close support would be made before top members of AEAF and Ninth AF. Gen. Vandenberg, Air Vice Marshal Sir Stafford Leigh-Mallory, and others would be present.

Meeting with Dr. Francis and Mr. Ratcliffe to discuss PDS on the continent. Agreed that American assistance on the continent would be required in the case of Oboe and close support.

Supper with Ernie Pollard and Curry Street. Ernie had just returned from 10th PRU, where he had sold Col. Reed on the idea of accepting an experimental 584 unit, and was mortified to learn that we had switched plans on him.

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Discussed the beacon requirements on the continent with Serge Golian and Charlie West. It is intended to set up within days a CPN-3 (BGS) on one of the landing fields in Normandy. This beacon will be followed by others. Further assistance on CPN-3's will be required by 9th TCC at North Witham.

Talked for several hours with Ed Schneider, Ernie Pollard, Hugh Kendall, and Walter Jordan on the close-support program and the organization to handle it.

Tuesday
June 13, 1944

Arranged for Bill Latady's return to the United States. Discussed with Sam Simmons the possibility of getting P/O Hack and two other Canadian officers who are trained on APN-13 to help out in the present flap in the IX TCC. Of the three APN-13 beacons available, two are to be set up on the Normandy beachhead within the next few days. P/O Hack had been helpful in instructing GI's in their maintenance and in tuning up.

Brief talks with Lee Davenport, Herb Weiss, Bob Kulp, and Hugh Kendall about their respective jobs.

Left Malvern at 12 noon with Dick Hodgson. Stopped at the Bell Hotel in Tewkesbury for a glass of sherry at the old bar and then dinner. Afterwards we walked through the 14th century Norman Gothic abbey across the street. Stopped in to see Col. Reed of 10th PRU at Uxbridge. It was not difficult to undo Ernie Pollard's work of the day before. Col. Reed was convinced that his best bet was to forward through channels his requirement for one close-support unit for photo reconnaissance. He was pleased that the program seemed to be proceeding on a formal Army basis which contemplated both the supply of needed equipment and furnishing of personnel. He showed us some interesting photos taken with Edgerton's flash photography, some of these over the invasion area. Edgerton's lightest flash photography unit for night photo reconnaissance gives good pictures up to heights of 2500 feet.

Stopped at Pinetree and discussed the micro-H program with Dick Lawrance and Gordon Danielson. Gordon, just arrived, was impressed by the amount of good work which Dick had done, and was disturbed to think that Dick might be leaving for the United States in a few weeks. Before proceeding to London, we talked briefly with Tom Murrell.

In London, Dick Hodgson, Larry Henderson, and I had dinner at the Cumberland. Larry reported the first use of Crossbow last night, in which a reputed eight units had been fired on London and a larger number on Southampton. A 10-foot section of one unit was stated to have been found in London. I regarded this information with considerable skepticism and am looking forward to further evidence.

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Wednesday
June 14, 1944

Left at 8:30 a.m. with Col. Metcalf, Dick Hodgson, and Larry Henderson for Bentley Priory, Stanhope. Discussed with Col. Stern and W/C Keighley the close-support program and what definite steps would have to be taken to implement it. Left Dick there to work out the program with W/C Keighley. Col. Stern is all for going ahead full steam and getting controllers and 584 maintenance men from the States through high Army request.

Drove on to Alconbury with Col. Metcalf and Larry Henderson. Lunch there with Sam Simmons, Gordon Danielson, John Hibbert, and Capts. Mike Cade and Bob Saxe. Then proceeded with Sam and the others to North Witham for a scheduled afternoon conference on future troop-carrier radar aids with Col. Crouch. Major Dersy, Col. Blair, Lieut. Bossardet, and others were present. Gen. Williams has apparently stated that his Command must be prepared to move intact with all equipment to the Pacific within several months. We agreed that the sound program for troop-carrier included Loran and SS Loran for navigation, 717C as a supplementary navigational aid and for pinpoint location, together with microwave beacons. A request was drafted calling for 500 Gee and 500 Loran equipments, 350 additional 717C's, 200 BUPS, and 50 CPN-8 beacons. Col. Crouch expressed his appreciation for the civilian aid rendered by BBRL and TRE, without which he stated they could not have gotten started on their pathfinder program. Charlie West is the civilian hero of North Witham. The first air-borne troops were just beginning to return on this day, D+8. Capt. MacRoberts, jumpmaster of one of the wings which had the most difficult time, returned just as we were leaving. He reported 66 per cent of his wing missing. TCC stories are beginning to float about. There was one about Germans turning flame throwers on carriers suspended by their parachutes in trees, and another of how a TCC group disposed of a score of German prisoners when hard-pressed by locking them in a French homestead and tossing grenades through the windows. Of the 40-odd pathfinder ships which took off in the initial operation, only one was lost, though its crew was saved. This one lost an engine and feathered the other, thereby losing height. The operator, remembering a ship which he had seen on the PPI, directed the pilot back to this last-seen signal, and the plane was ditched within yards of an American destroyer which picked up the entire crew.

Returned to London, arriving at 9:30 p.m. Brief talk with Lloyd Dorsey, who is leaving tomorrow morning for the States. Dorsey reported that preliminary returns from the American amphibious craft indicated that the PPI predictions had been successfully used. I am to get a report from J. Hamilton on this entire job.

The invasion appears to be proceeding satisfactorily. The deepest penetration at this time is about 15 miles, and the beachhead is secure along its entire length of 60 miles.

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D810.S2.T78. A War Diary, 1944-45. John G. Trump, 1973.

Thursday
June 15, 1944

Conference with General Williams, Commanding General of IX TCC, at advanced headquarters in Eastcote. Colonel Crouch, Captain Jefferson, Colonel Cruett, Major Derey, Colonel Roberts A-3, Colonel Metcalf, Larry Henderson, and I were present.

The TCC radar requirements as worked out in yesterday's conference were presented to General Williams, who approved and ordered them put into effect. I pointed out the large scale of this radar program and emphasized the need for additional radar maintenance personnel.

General Williams expressed his appreciation for the civilian assistance which had been rendered to his Command in its use of radar aids. He indicated his conviction that future TCC operations would be performed without visual aids, depending entirely on radar navigation. In the D-day operation, 25 per cent of the air-borne forces were dropped without any visual aid, and the balance received some assistance from visual aids, such as landing lights. General Williams stated that in his opinion the troop-carrier operation on D-day would have been only 10 per cent as effective had it not been for their radar program.

Back in London for lunch with Sam Simmons, Gordon Danielson, Herb Weiss, and Ed Miller, who had just arrived.

Discussed the need for a survey of the Mediterranean radar situation with Louis Ridenour at Widewing. Louis suggested that Larry Henderson be set up in General Eaker's headquarters as representative both of USSTAF and of BBRL. I regarded this as an improvement on my original suggestion and agreed. Louis will arrange for a request from General Eaker via Marriner for the three of us, Louis, Larry, and myself, to proceed to the Mediterranean.

Discussed with Louis the need of BBRL for information on Army ground problems. It is clear that the development of radar aids to ground forces has suffered from the complete lack of knowledge or appreciation of ordinary ground force procedures and difficulties, whereas hundreds of air-borne officers of the AAF and USN have visited the Radiation Laboratory and are in continuous contact with it. There is no representative and absolutely no knowledge of the practical problems of ground troops. Later, in talking this over with Mr. Rowe, it was agreed that he would ask General Allen of the First Army to provide a representative for BBRL. I suggested that this representative be on hand some days before the big close-support demonstration at Great Malvern on July 25.

In the evening went to the Marble Arch Pavilion with Louise to see Noel Coward's "This Happy Breed", a fine story of an English family in the years 1919-1939.

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Friday
June 16, 1944

Beginning at midnight last night, German pilotless jet-propelled aircraft bombed London, continuing intermittently through the next day. Between 100 and 120 were reported directed toward London during a seven-hour period. The "buzz bombs" appear as fiery comets moving in a straight line across the sky. Speeds were reported between 220 and 250 miles per hour, and later at 350. Net weight of explosive is reported to be 1000 kg., though estimates as low as 500 kg. are given. The pilotless planes fly at a much lower altitude than had been anticipated--between 1000 and 4000 feet--thereby offering poor targets for the 584-directed 90 mm. guns, which are relatively ineffective at altitudes less than 6000 feet. The missile employs a jet motor of extreme simplicity, consisting of a multi-check valve air intake and spark-plug fired explosive chamber with continuous low-grade fuel intake and an exit nozzle which develops approximately 2000 hp. under normal flight conditions. The motor parts are die-cast and punched and well adapted to mass production. Tanks containing 160 gallons of 70 octane fuel are provided. No definite evidence exists yet of radio direction. It is generally believed that the missiles are merely gyro-controlled with magnetic compass correction. Should this be the case, the possibility of deflecting the missiles in flight through the use of large current coils either on the ground or carried by aircraft is suggested. It is conceivable, however, that the missiles do not require compass correction.

In the morning, with air warnings on intermittently, the streets were remarkably clear of people and traffic, though this built up again during the day. No particular concern, however, seemed to be evident among the general populace, and Mr. Morrison, Home Secretary and Minister of Home Security, assured the House that "vigorous action" was being taken.

Assisted in the preparation of some teletype material, caught up on mail from the Lab, talked to Archambault regarding Technical Observer status for BBRL members, and talked with Larry Henderson about his going to Italy. Ralph McCreary reported the almost complete cessation of AJ effort by the British. This latter action is due to the effectiveness of the direct attacks against enemy jammers made by the Allies prior to D-day and to the growing belief that most of the AJ tricks are now known.

In the evening went to the Savoy Theater in the Strand with Herb Weiss, Ralph McCreary, Brenda, and Louise to see "The Last of Mrs. Cheney". Supper at the Bryanston Cafe in the Cumberland. Afterwards an hour's discussion at the Mt. Royal Club with Hugh Kendall, Ed Schneider, and Ralph McCreary.

Saturday
June 17, 1944

SACRA meeting on the detection of enemy armor hidden in wooded areas. This problem was proposed by Brig. Schonland, who stated the academic case of detecting enemy armor hidden in one of three woods each approximately three miles on a side. The necessity later developed of locating small accumulations of enemy armor on roadsides and elsewhere. A/C Hart, AEAF, reported that the Germans were displaying singular skill in moving their armor

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in driblets along roads and securely hiding them from aircraft by turning into cover. The roads in Normandy, he stated, always appeared to be completely empty on inspection. Among the several approaches to the problem which were considered and discussed were the use of eyes, visual photography, MAD, thermal detection, acoustical detection, Eagle, and H2D. In commenting on night photography, I suggested the use of the Edgerton flash technique as superior to flares in providing both better and more pictures at heights up to 3000 feet. A considerable amount of discussion developed on MAD, and it was agreed that tests should be laid on to determine if this device can detect a small number of tanks from elevations of 200 to 400 feet. I suggested that SACRA recommend to G-3 SHAEF the procurement of a few Eagles for operational use in this theater at the earliest date, their use for tank detection being only one of the many possibilities. Dr. Lewis stated that successful tests were made on Friday using the 584 to guide an H2D-equipped plane along the roadway. In this discussion, it was evident that the 584 unit would be a necessary supplement to the Edgerton flash-photography method for MAD and H2D.

Left London at 2:30 with Sam, Guy Stever, and Louise. Tea and cakes at the Chester House in Beaconsfield. Stopped off at Pinetree and discussed with Colonel Sullivan the need for ASC Philco-trained H2X men for the Eighth AF, also commenting briefly on the micro-H program, which appears to be going satisfactorily.

Dinner at the Beauchamps arranged by Colonel Howard, with Sir Robert Watson-Watt and Mr. Rowe as guests. Afterward a dance at the County, and then a beer with Sir Robert in the smoking room. Discussion followed, including the possible end of the war--Sir Robert stating that he believed November was a possible date.

Sunday
June 18, 1944

Meeting with Woodforde on the close-support training program, which now contemplates basic crew training at Malvern and complete crew and controller training at Milfield. Lee Davenport and Dick Hodgson gave a seminar on close support. Colonel Bill Cowart, formerly of the Eighth AF and now attached to the 19th TAC, has finally come to spark-plug the close support program for the Army AF and looks as though he will do a lot of good.

Steering Committee session included a presentation by Louis Ridehour of most of the information which is now available on the pilotless planes. Louis has become convinced that this is the outstanding development of the war. The only obvious defenses for this device are AA guns and fighters. Since the missiles can be seen from great distances, it is evident that day fighters can be used at all times. My own reaction is that the use of a dense line of balloons before London may result in the missiles being raised to higher altitudes, thereby bringing them into the range of effective fire of 90 mm. AA guns. Fighter chasing seems only moderately feasible because of the evidence that the Germans can step up the speed of these devices.

Saturday night's bombardment of London appears to have been considerably more intense than previous ones.

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Monday
June 19, 1944

Joe Kane reported on the SCR-720-equipped British squadron which is being used to shoot down pilotless aircraft. This squadron was stated to have shot down 58 at a loss of six aircraft, though a later report stated that no planes were lost in this way. Dr. Taylor of TRE came in to discuss the problem of identifying pilotless aircraft. TRE has developed a system of expanded sweep which permits propellor modulation to be observed. It was agreed that we would send for Sambo indicators and amplifiers and that they would proceed with their modulation scheme at the same time. Various reports indicate that three out of four of these missiles are now being intercepted and shot down.

Charlie West reported on the actual performance of the troop-carrier air-borne forces. Apparently, although the radar devices worked all right, there were plenty of mistakes made in the operation. Several crews were dropped from aircraft traveling at 150 miles per hour, with the result that more than half of them were incapacitated before reaching the ground. At least one stick was dropped in the middle of a river, and all were drowned. Some of the aircraft were caught in the searchlights, and, after the first few had jumped, the rest were riddled with machine-gun fire. Two-thirds of MacRoberts' stick were killed in this way. It is reported also that one group of gliders landed on the wrong DZ. The air-borne forces are being called upon to take the brunt of the peninsula fighting, and it is stated in today's paper that they succeeded in cutting through to the west coast of Cherbourg. Their period of active duty is evidently much longer than was originally planned.

Ed Schneider reported on the pilotless planes as seen from Dover. He suggested that the MEW would not be needed since there was an SCR-615, a Type 13, and plenty of other radars which could be used in tracking and identifying these devices. It was agreed late at night that Ernie Pollard and Bob Tobey would go down to Dover to tune up the 615 and show the operators how to collect data on the course and thereby detect the origin of the missiles.

Tuesday
June 20, 1944

Attended conference at TRE School House called by Pringle to discuss the British troop-carrier requirements. Mr. Rowe, Dr. Lewis, Dr. Lines, Sam Simmons, Larry Henderson, and Charlie West were present, as well as several others. The American troop-carrier program was described, and in the end Pringle accepted this as desirable for the British. This includes the use of Loran in the Pacific and of microwave ASV radar, such as the 717 now and APS-10 ultimately, for navigation and pinpointing. The use of microwave beacons was approved. Rebecca-Eureka was described as a device which should be employed because of its versatility as long as it is not interfered with by the enemy. It was agreed that modern improvements which could be effected quickly should be made, such as increasing power of the beacon and improving the frequency distribution so that all channels could be successfully employed. A considerable discussion developed on the need for more liaison and information on ground force problems. Talked with Sanders and Eicher, who arrived

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today, also with Ed Miller who may assist in the siting problems of the AEAF. With Ted Anderson worked out salary increases for BBRL staff and discussed the insurance policy for men in combat areas.

Spent a part of the evening bowling on the green.

Wednesday
June 21, 1944

Ted and I dropped in to see Mr. Rowe regarding the forthcoming close-support demonstration. Also took up the matter of setting up temporary buildings on TRE ground, which he approved.

Drove to London with Curry Street, Larry Henderson, Ed Miller, and Louise. At USSTAF talked with Louis, Hartley Rowe, and B. J. Thompson, who had arrived from the States.

In London met Ernie Martinelli, who has come to replace Dunbar on antennas. Talked with John Faulkner regarding flight testing of micro-H in the Eighth AF. Johnny is to be weaned from the Ninth BC Oboe project.

Dinner at Cumberland with Herb Weiss and Lieut. Sherman. Saw Herb off on the 7:30 ATC bus for the US. Lucky guy!

Thursday
June 22, 1944

At Air HQ, Bentley Priory, where I talked with A/C Hart, Col. Stern, Major Crumley, and Col. Bill Cowart on the close-support demonstration to be held on Sunday. This seems to be getting reasonably well lined up.

Talked with Dr. Ewing and Ed Miller regarding the radar siting project using illuminated scale-model technique. The models of the Cherbourg Peninsula used by Dorsey, 1:25,000 scale, require too much space for general siting studies. Ewing and Miller will investigate with Col. Milwit the procurement of models on a 1:100,000 scale. If necessary, Lieut. Florsheim will come to England to work up such models.

To Widewing for a conference with Col. Dixon on ASC requirements for civilian radar specialists. Larry Henderson, Dave Griggs, Capt. Richardson, and others were present. I pointed out the need for ASC to bring into the theater civilian specilists in ASC status to take over growing radar problems such as H2X in the 8th and 15th, the TCC program, and the SCR-534 program of the 9th TAC and 19th TAC. Col. Dixon agreed to this and will make an official request to all Signal Officers asking that they come to an evaluation of their ASC requirements after conference with BBRL representatives. Col. Dixon very freely stated that BBRL was doing an essential radar job which ASC was not able to do.

With Mr. Rowe went over to SHAEF to talk with Col. Lack about the need for an Army Ground Force liaison man. Major Hutton has been selected to visit BBRL beginning next Monday as a start in such an effort.

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Louis indicated that he and B. J. Thompson are likely to leave on Saturday for Italy, flying in the two remaining seats in General Baker's plane. Larry Henderson and I indicated that we would follow soon thereafter via ATC.

In the evening, talked with Dick Hodgson, who has just returned from Burtonwood, where modification of the SCR-584 is proceeding apace. Also talked with Don Redmond and C. E. Fitzgerald.

Friday
June 23, 1944

Arranged for yellow fever and tetanus shots and for necessary visa for travel to northern Africa and Italy.

At Widewing in the afternoon, convinced B. J. Thompson that we should travel together on the Mediterranean trip. Plans now call for departure from London on Tuesday night.

Drove to Malvern with Curry Street, Ed Miller, and Louise, stopping at the Cotswold Gateway Hotel for dinner. Stopped outside Cheltenham for speeding.

The buzz bombs (or doodle bugs) continue. Some Londoners are beginning to show signs of strain and nervousness.

Saturday
June 24, 1944

Drove out to Defford for lunch with G/C Atcherley, John Woodforde, and Mr. Gray on the June 25th close-support demonstration.

In the afternoon, drove to Sledge Green to see the equipment with new automatic range-plotting table which has just been set up.

Spent an hour telling B. J. Thompson something of the functions, projects, and facilities of BBRL.

Late afternoon meeting of all interested in close support, including Col. Bill Cowart and Capt. Byrum of Company D, in which it was agreed that the training of the first ½ U-team should continue at Malvern instead of at Milfield and that on or about July 30 it should move to Middle Wallop, HQ of 19th TAC, where final full-dress controlling work-out can be carried out with adequate aircraft and VHF facilities. It is still hoped that this unit might be ready to move to Normandy shortly after the first week in July.

The Russians are reported to have opened up a new offensive in the area of Vitebsk.

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Sunday
June 25, 1944

To Defford Airport with Sir Robert Watson-Watt at 9:30 a.m. Discussed the two-day-old Russian offensive, which he said had been planned definitely to be synchronized with the invasion. It has already broken the German defensive line in two places. W-W reported the speed of the buzz bombs as varying between 350 and 420 miles per hour. He stated that there were still a considerable number of unlocated sites. (I have not previously recorded that the sites which had been so actively bombed by the AAF were not the ones now in use. These are considerably smaller, simpler in design, appeared late, and were regarded as of no consequence.) For Sir Robert's meeting tomorrow on countering pilotless planes, I mentioned Eicher's suggestion that Falcon planes be used (B-25's equipped with ARO and super-elevation sight for 75 mm. cannon). These might prove useful if equipped with proximity fuses.

About 50 people attended the close-support demonstration. At 10:45 a.m. at Sledge Green, G/C Atcherley talked on the function of close support, discussed the dive-bomber tactics which had been worked out at Milfield, and described the program for the day. Lee Davenport spoke briefly about the equipment side of close support. Among the Army people present were A/C Trail of 2nd TAC; Col. King, Major Crumley, and a number of others from the War Office; A/C Hart from AEAF; B/G Hinds from FUSAG; Col. Williams and Major Dixon from 19th TAC; Capt. Stammerjohn, 9th AF. Two controlled dive-bomb attacks were observed at Sledge Green, after which the planes were vectored to buzz the set, and the spectators left for lunch at the Abbey. In the afternoon, the party proceeded by bus and car to Hilltop Farm, a target 25 miles from the set. A VHF receiver broadcasted the conversation between controller and pilot. After some minutes the planes were seen flying at 6500 feet, partly lost in overcast, off to one side. The count - 5, 4, 3, 2, 1, 0 - was heard, at which point the leader wheeled in a 120° turn and 60° dive, followed by the remaining 8 planes in line. The attack was made with great precision at the spot where the party was standing and created a tremendous impression on everyone. About 20 minutes later, a second "bad weather" attack was made from low altitude, which was likewise successful. For these attacks the pilot had been briefed on the ground and shown an aerial photograph of the target. The party then proceeded to a second target of opportunity, some miles distant, which consisted of a small clearing in a large wooded area, crossed by a road running north and south and a small gauge lumber railroad track running east and west. The pilot was briefed in the air. Some time later, the planes could be seen in formation, again off to one side. At the zero count, the formation was completely lost in overcast, but obviously in the proper position for the prearranged 120° turn and 60° dive. Some seconds later, the leader emerged headed directly for the group, with the other planes lashing out behind them. The whole demonstration was an outstanding success.

General Hinds pointed out that the SCR-584 was a useful instrument for the artillery in that it would permit accurate control of the scouting plane used for artillery target reconnaissance. The discussion brought out the general usefulness of this device both for reconnaissance air attack and for control of ground fire. It is believed that the demonstration contributed materially to the momentum which the 584 close-support program is gaining.

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Discussed V-beam policy with Ernie Pollard, Ed Schneider, and Curry Street. I stated that our interests in the V-beam set were contingent on its availability for the field in not more than two months from now. The laboratory's proposal to construct 5 better units in 9 months is not likely to be useful in this theater. It was agreed that representations to this effect would be made to RL.

Ed Schneider and S/L Jeff Cherry-Downes discussed the removal of the MEW at Start Point for intermediate use in tracking the pilotless aircraft. The Start Point set has now been dismantled and by next Tuesday will be in operation at a selected site 20 miles from Beachy Head. It was agreed that this set would give the best performance on these targets of any radar in the theater, but that after two or three weeks it was essential that the primary purpose of moving out toward Normany be realized. Ed estimated that this intermediate use on Crossbow would delay the second mobile MEW unit by about one week from the previous schedule.

Drove with Louise to West Malvern for supper with Dr. and Mrs. D. H. Black. They have a home half way up the other side of the beacon hill and overlooking the Welsh mountains. It was a very enjoyable and relaxing evening.

Later discussed with Sam Simmons the plight of the two P61 squadrons of the ADC, which are without spare and test equipments. Also discussed the developing difficulties at Alconbury in getting proper support on the H2X and micro-H programs from the 482nd Bomber Group.

Cherbourg is encircled, with our troops 3 miles from the sea. The invasion (D+19) is reported 6 days behind schedule. This is probably only with reference to the capture of Cherbourg.

Monday
June 26, 1944

Stayed in bed late this morning. Then walked about generally, talking with people and winding up my affairs in preparation for the Mediterranean trip.

Major Hutton, G-3 SHAEF, arrived for a two-or three-day visit and discussion of close-support requirements of the Army Ground Forces. He pointed out the desirability of including a mortar observer and an artillery observer, as well as an air observer, at the 584 close support unit site in order that full advantage may be taken of the ability of this device to locate targets which are suitable for all types of ground-fire, as well as air bombardment.

With Steve Jeffries, Ted Anderson's successor and here on a four-day visit, defined the responsibilities of the business manager as including all fiscal matters, property accountability, transportation, hotel arrangements, and personnel administration.

This evening Cherbourg was reported as completely occupied--this completing the first important phase of the invasion on D+20.

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Tuesday
June 27, 1944

Left Malvern by car at 10:00 a.m. with Lee Davenport, Dick Hodgson, Dave Davidson, and S/L Everitt. The trip to Italy is on! Said farewell to Ted Anderson, who will be gone before I return. Curry Street--ably backed by Walter Jordan--will carry the ball. The ride to London was through alternate showers and sunshine, and planes and gliders were everywhere. Stopped at Air Headquarters for lunch, and Dave and I were WAAF'd to London, arriving at 2:30. Found my passport all in order. Larry was on hand and reported that two Wings of 9th TCC were to move to Italy. Bought Bartholomew's Compact Atlas at Bumpus', collected laundry, and got a haircut at the Mount Royal, checked in at ATC on Old Quebec Street at 4:30, and was instructed to leave by sleeper for Cornwall at midnight. Talked with Brenda, and then with Brooks and Moskey, who had just arrived. Told them about their jobs, life in the ETO, the speed and "crash" character of the work here. They look all right--I hope they get built in properly.

Walked about with B. J. Thompson, discussing the personnel problem in AAF when a new radar requirement comes along. Recommended a reserve T/O set-up at USSTAF to handle such cases until a permanent T/O can be established. He was impressed with this and agreed to take the matter up with Ed Bowles on his return. At Berkeley met Alan Shenstone. We enjoyed a scotch at his apartment and discussed buzz bombs. Gathered from various sources that the pilotless aircraft are about one-quarter as effective as regular gas-engine-driven planes. Their range is determined by an air-flow prop feeding into a mechanical counter. This finally turns off the fuel, puts the craft into a dive, and arms the fuses. The pilotless aircraft are arranged to turn and thus have been able to bomb various coastal towns. In London, the sirens kept wailing intermittently, and explosions could be heard occasionally for which no warning had been given.

Supper at "Willow Run" mess. Guy Stever and Bob Robertson dropped in, having been held up in marshalling yards for three days and now scheduled to fly to France. Spent evening alone writing letters. Entrained at 11:20 p.m. in GWR sleeper bound for Newquay, Cornwall, near Lands End. This was probably the most luxurious train left in England--single bed, basin, emergency chain to stop train, with "penalty for improper use - £5".

Wednesday
June 28, 1944

Roused by steward with tea and cookies. Left train in pouring rain for Great Western Hotel. Day spent in reading, table tennis, idle conversation, short walks between rain squalls, and a visit to the Customs in afternoon. Late in the afternoon saw "Madame Curie"--or most of it--with B. J. Thompson. I liked Greer Garson and Walter Pidgeon in spite of the over-dramatized story and the ridiculous portrayal of scientists at work. I suspect that medicos feel the same way about medical films which might seem all right to me.

Left for the airport at 9:30 and were about to embark when the flight was canceled because of the 200-ft. ceiling. This would have been OK for the take-off, but insufficient ceiling for landing if anything should go wrong. To bed at 11:00 p.m. for 12 hours of continuous slumber.

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Thursday
June 29, 1944

In the early afternoon walked along the cliff edge past Porth Bay. An old man told me about the "barrows" in which the Briton chiefs were buried facing seaward. The one barrow I was sure of was about 50 feet around and 15 feet high. The shore is a rugged, rocky ledge rising out of the water with many projections and bays, with fine flat, very wide sandy beaches occasionally fitted in. The country is rolling, without many trees. The houses and hotels in Newquay are most uninteresting--typical unimaginative resort. Wrote home and then had tea in Newquay. Left at 8:15 p.m. for airport and took off in B-24 at 10:00 p.m., flying due west. Saw Lands End and Scilly Islands in distance. Sunset about 11:00 o'clock, with fine clouds and patches of open blue sea beneath. Curtains were closed, and we flew past enemy-occupied shore under cover of darkness.

Friday
June 30, 1944

Arrived at Casablanca at 7:00 a.m. Took bus to camp--rugged drive. Enjoyed good breakfast of fruit juice, oatmeal, bacon and eggs. B. J. asked for some orange marmalade and received second portion of omelet.

Took off at 10:00 a.m. Casablanca, as seen from the air, is a surprisingly large city with many new white multistory buildings. It lies on a flat treeless plain with a breakwater harbor. The countryside looks grey and light tan as though it is semi-arid. We skirted the lower edge of Spanish Morocco. The country is a plateau broken occasionally by an ancient dried-up river bed with erosion-worn hills. The Atlas Mountains are to the south--long lines of steep, tree-covered slopes. Several towns slid by below us, their centers appearing as crusted jumbles of white masonry.

Passed three miles south of Oran. An English passenger leaned over and pointed out the harbor in which the French fleet was surprise-attacked and sunk by the British a few years ago. This harbor lies within the curving arm of a headland and is almost entirely enclosed by two breakwater arms. Oran, he said, was still strongly influenced by Vichy and Spanish Falangist propaganda. The English passenger, who later proved to be an OWI broadcaster based at Algiers for the last 15 months, went on to discuss the concern of the French for the possible loss of their territory in Africa and Indo-China. He described the economic struggle in North Africa as a continuous exploitation of the indolent native with money the sole objective. These French favored the Nazis because they paid them for lemons and fruits, whereas the British refused to pay the excessive prices.

Stopped at Algiers airport, Maison Blanc, for two hours. Algiers could be seen 15 miles away, a cliffside of white buildings spilling down into the sea, and surrounded by a 30-mile belt of fertile and irrigated land. Otherwise, North Africa looked arid, the hills essentially brown with little useful vegetation. The coastal road could be seen in the distance, and I was assured that the villages and ancient Roman and Cartaginian ruins are of great interest.

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Arrived at Naples at 7:00 p.m. We were later picked up at Capodiccino airport by Major Goldman and Lt. Col. M. J. McGowan of General Marriner's staff. Goldman handles ground radar. General Marriner had arranged for us to stay at the elegant "Cascades" camp above the "Palace" headquarters used by top-ranking officers of MAAF.

Saturday
July 1, 1944

Late breakfast with General Marriner anda ride down Cascade Pool Drive. Discussed our itinerary in General Marriner's office, which is in the elaborately decorated "throne room" of the Palace of the King of Naples, 1850. Went to PX to buy officer's outfit, then to General Eaker's for brief session in which he reiterated that close support was now working. Lunch back at Cascade mess, followed by discussion with General Marriner on Larry's joint capacity of Secretary of War representative and BBRL contact. Meeting in palace in which Louis discussed the performance of radar in ETO on D-day. To PX and then drive about Caserta to locate wallet and bathing suits. Swim in pool with imported Pompeian columns.

Supper with Air Vice Marshal Aiken, followed by drinks at the Club. Aiken, Dr. Raymond, and Col. McGowan were present. Among radar problems discussed were the need for GCI at the Russian bases where the 8th AF stops on its shuttle-bombing run, the need for CM and spoofs for "Anvil" operation, which is on once more. They were much interested in Louis' account of the H2X bombardment of beaches. The use of scale models for siting and working out undetected approaches was mentioned, with some interest evidenced.

Caserta is a typical southern Italian town--dirty streets and children, masonry houses built out to street.

Sunday
July 2, 1944

Left Caserta in two Command cars at 8:00 a.m. Crossed Voltura River, where active fighting had demolished and marked most buildings. From this point on, as far as Rome, practically every building was down. Cassino presented a scene of complete destruction. The Abbey atop the mountain appeared as a pile of white dust and rubble, with a fragment of wall or tower standing here and there. The town below was similarly in complete shambles, only the road (Route 6) having been cleared, with signs on both sides warning of mines and booby traps.

Throughout the ride to Rome, the dejected peasantry were seen, walking along the road, the women carrying bundles or pitchers on their heads, or lolling or sitting in front of their ruined dwellings. Old women were occasionally seen selling apricots. General impression of grape vines garlanded between trees, olive groves, corn fields, bullocks drawing carts, countless little dirty children, shambles in every town.

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In Rome, B. J. Thompson and I found a good meal with wine at "Broadway Bill's" transient officers' mess, then met up with the second Command car containing Louis, Larry, and our escort, Major Vance. While they dined, B. J. and I walked about Rome--saw the old Roman wall, noted the completeness with which American and British GI's were occupying the town. Was impressed with the alacrity with which the Italians had adapted themselves from Nazi to Allied occupation since June 4th.

Proceeded to 12th TAC near Orvieto on shore of Lake Bolsena, 100 kilometers north of Rome. Crossed Tiber and noted large new colorful apartment buildings on banks. Road north was strewn with wrecked German tanks, lorries, and other transport. Several demolished cities were passed, but the damage was generally less than between Casserta and Rome.

At 12th TAF, Colonel Hale, Signal Officer, was away. Major Krisberg, Radar Officer, took us in hand after we had had a swim in the beautiful lake nearby.

Discussion at night with Major Krisberg, which brought out the equipment and civilian assistance needs of TC. The 51st TCC Wing here will be increased by one or two wings from 9th TCC. Suggestion that Rich and West come along was welcomed. Their program is similar except that no Gee is available. There are 25 SCR-717 aircraft are operational and it is thought that General Williams will bring down 12 pathfinder aircraft. Shoran was talked up as the logical blind-bombing radar for 12th TAC. Krisberg will request Eurekas, test equipment, and power supply for 717, two GPN-3 beacons, BUPS--all to be brought by 9th TCC.

Monday
July 3, 1944

Met W/C Axon, senior to Krisberg as 12 TAF radar officer. Had a talk with Gen. J. K. Cannon, C/G of 12 TAF, principally to sell him on Shoran. He agreed to the need for blind bombing, pointing out that many of their missions were spoiled by light cloud cover. Gen. Cannon emphasized their bombing objectives were expressed not in tonnage, as with the 8th AF, but in bridges out, etc. He reminded me of Forbes Smith--a bit younger. He gave carte blanche to Louis to talke with Bomber Commands. Direct support, but not close support, was now being given to ground forces owing to the rapidity of movement.

Left at 11:00 a.m., driving southward. Passed Pitigliano, ancient cliff-side town, in which the bridge over a deep ravine was taken out. At 16th Fighter Wing, Orbetello, which handles all radar for 12 TAC, met Capt. Schiff. They have seven SCR-527's, two SCR-582 Mark III's, six SCR-270's (two of which are modified for PPI and with antenna turned around), six SCR-584's, and six SCR-602T-6's for fill-in, plus one Type 14. Two SCR-584's are being modified for GCI with dual presentation, and some trouble is being experienced with the circuitry. It will be necessary to extend auto-tracking to 96,000 yards. Schiff explained the German "shims" dropped at Anzio as quick-falling Window which caused the 584 to drop off the target to ground.

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Drove another 80 km. to General Saville's Advanced HQ, 12th TAC, located in a cork tree grove. General Saville gave most interesting discourse on the general business of early warning and GCI radar, which was very near not worth carrying along. Told of direct air support and his arrangements for close support. The ground targets come out of the ground organization--no AAF air support parties. He described the techniques of "causing air targets" on the German communication system by systematically bombing points "contraditing" to bottle up vehicle movements. The railroad must be out first. General B. Chidlaw, Chief of Staff, showed us war map and explained "bomb line" which was about 6 to 8 km. ahead of known positions of ground troops. General Saville has an experiment, "horsefly", in which the close bombing coordinates are determined in the air by a ground man in a Cub who gives them to an air observer in Cub who passes them back to air groups. In this way, the responsibility for a given target rests on the ground forces more completely.

General Saville in one minute bought the close-support 584 and requested General Barcus, Commanding General, 64th Fighter Wing, to carry out.

The program for our civilian group was planned. B. J. Thompson will now separate from the party and continue the close air support investigation for which he was sent by Bowles. General Saville will handle his itinerary and orientation personally. We will go back to 64th Fighter Group to look into their ground radar problems and set-up.

Tuesday
July 4, 1944

Drove off at 9:30 a.m. for Siena, 40 km. away, which had been occupied by Allies on July 3. Bombed-out bridges were not yet repaired, and many detours through creeks and along mountainsides were necessary. Signs indicating that the area had been mine-swept gradually disappeared, though we did not get to "Achtung-Minen". A descent by command car down the steep switch-back road of a mountain was made--about 3 to 6 backings were necessary at each of the six turns. Arrived at Siena at 12:30. Saw beautiful Roman black-and-white-striated cathedral and principal square. The Italian flags were out, population looked curious, but pleased. French troops and Goons did most of fighting in this region.

Arrived back at 64th Fighter Wing. Supper with General Barcus. Met Lt. Col. Speir, Signal Officer. Captain Schiff described their radar set-up and problems. The 584 close-support unit was described, and it was suggested that one controller, plus Captain Bixby, who heads up the maintenance unit, be sent for two weeks' visit to EBRL. The use of scale models for siting was suggested.

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Wednesday
July 5, 1944

In early afternoon, a phone call from General Saville to 64th indicated that B. J. Thompson was missing in action. He had taken off in an A-20 on night intruder mission with their most experienced pilot. Considered a safe mission. Details are not yet known, but will be forwarded to General Cannon and General Marriner.

During the morning, looked over the maintenance unit of the 64th Fighter Wing headed by Captain Bixby. Two 584's were undergoing modification for dual presentation, but otherwise little was seen there. We then went to the Operations Center a few miles away, saw the WT room, plotting, df plotting, and operations rooms. The captain commanding this unit was soured on radar for the early-warning function. The mountainous territory and poor communications make the set-up a faithful reproduction of the Orlando system--nearly unworkable.

In the afternoon drove up picturesque hill on Orbetello Peninsula to SCR-720 and SCR-582 sites. Total destruction of lovely Italian town reputed to have been submarine base. The SCR-582, which is in charge of Lieut. D. E. Graves, is not appreciated, mainly because of poor tracking control.

Drove 140 km. to Rome, passing the seaport of Civitavecchia, its harbor filled with ships, but the town itself completely demolished.

In summarizing to Colonel Speir and General Barcus the close support program, it was agreed that a controller and Captain Bixby would proceed by July 15 to BBRL for two weeks net and return with close support modifications, that we would assist them in scale-model siting technique if they wanted it, that we would investigate the possibility of sending them the coherent-pulse PE eliminator. My feeling was that radar development had let down the boys who had to fight in rough terrain in that no adequate attempt to get around PE's had yet been made.

Stopped at Hotel Majestic, AAF "rest camp", elegant double rooms with common bath. Excellent dinner with wine and music on terrace. In the evening, skipped out for a walk through the town. In park talked with an Italian and his six-year-old son and a former New York Italian about German behavior in Rome, etc. They were pleased to hear that Siena was intact. Told me that Germans had let civilian population alone after impressing young men for work in Germany. Rome was balmy, picturesque, and GI-filled.

Thursday
July 6, 1944

After a fine breakfast, drove out to Lido di Roma to 51st Troop Carrier Wing HQ. Colonel T. J. Manning, Commanding Officer, discussed their activities and stated that the SCR-717 was indispensable. The 60th Group is flying supplies to Jugoslavia for Marshall Tito and flying wounded civilian population out, Using 717's, they fly 100 to 200 miles beyond

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landfall with excellent results. Brought in 5,000,000 lb. in one month. One plane the other day evacuated 56 babies and 3 mothers. Only a few Eurekas are set up with the partisans. The 62nd Group moved 22,000 wounded in the northern Italy campaign. The 64th Group is in India.

Major Coulter, Commanding Officer, later discussed their radar set-up. They have 22 operational SCR-717 planes; all planes have Rebeccas; they have 61 altimeters APN-1 and like them since they are with 400 to 4000 ft. ranges. They do not care for CPN-3 beacons because of their weight and difficulty in moving frequently and because only the PPI planes would benefit by them. They were intrigued with suggestion to photograph PPI for briefing purpose on Project Anvil, and we promised them a camera. Reaction to BUPS was mild. They are convinced that PPI navigation is all they need and are evidently doing a swell job with it. Have a total of 150 planes which will be increased to about 500 with the advent of General Williams and two wings to this theater. Larry agreed to be back for further discussions in one week. Col. Manning said that they would appreciate civilian help, but felt this should be decided by General Williams (who has already done so).

In Rome, looked up Professor Amaldi, Institute of Physics, but he was away. Went browsing through the town, rode in a horse-drawn carriage.

News reports great Russian advances covering 150 miles since the start on June 22 and including the capture of Minsk.

Friday
July 7, 1944

Acquired an old bearded guide from Thomas Cook and Son at 800, and visited following places of interest: some of the oldest streets in original part of city; Piazzo Espanole, where Keats and Shelley lived; Villa Borghisi, now a public park with tall trees, oleanders, and fountains; Porto di Populo, a principal gate to old city; Venetian Square, containing monument to Victor Emmanuel and balcony from which Mussolini made his speeches; Palatine Hill with theater ruins of 2300 BC, Ionic Temple of Fortune, 200 BC; Temple of Vesta, where burned the sacred fire; keyhole view of St. Peter's dome; grave of Keats, on which was inscribed "Here lies one whose name was writ in water"; St. Paul's Church outside the old Roman walls with 261 medallions of Popes and built in 380 AD; ancient Roman baths and social center now enormous brick ruins; the first baptistry and the Church of St. John Lateran; the Scala Sanita, sacred stairs reputed to have led to Pilate's chambers--the pious ascension of which on bended knee buys you nine years off from Purgatory; the Third Pontifical Church--St. Mary's--smallest of all, but unmodified; the ruins of the Colosseum with an American announcer; and finally St. Peter's, modern church of Catholicism, largest in the world (followed by St. Paul's in London and Cathedral of Milan?) built in the 1600's, the Greek-cross portion of which was designed by Michelangelo.

Drove down Route 1 to Caserta, about 220 km., passing the Anzio beachhead and many ruined towns--the area flooded by Germans above the Volturno.

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Arrived at the Cascade grounds at 7:30. Had drinks and supper with General Marriner. No further news had been received of B. J. Thompson.

"The Stars and Stripes" reports Churchill warning London of the seriousness of pilotless aircraft bombing and suggesting evacuation of nonessential people. Von Rundstadt relieved of Normandy command, and evidence of impending tank battle crisis near Caen and increased use of German aircraft.

Saturday
July 8, 1944

Teletype conference, MAAF to Widewing, with Street, Davenport, Hodgson, Griggs, and Kendall at other end. They reported first close-support unit ready to move to Normandy on the 9th of July after a week of full crew training at Middle Wallop. They estimate that modifications for General Saville's unit could be ready by July 21. Chaffee is held up by buzz bomb flap on MEW, and his departure for Corsica is uncertain. British improvising two MEW's for pilotless aircraft search, using Type 24 parts plus MEW antenna. Ridenour is requested to return via London to USA to copy buzz bomb as per directive of Lovell and Arnold.

At 3:00 p.m., accompanied by Col. Mike DeArmond, we left on B-17 for Bari, flying over mountainous terrain with hilltop towns and villages and countless olive groves. Arrived Bari at 4:15--clean, but fragrant, seaside resort city modernized by Mussolini in anticipation of African trade. Short conference with General Charles Born, A-3 15th AF on H2X bombing, concerning which he was most enthusiastic. Bob Davis, George Jarvis, and Major Headrick were among those present. Don Redmond was at the airport. General Born leaves tomorrow for USA to take up cudgels for more H2X equipment, better trained navigators, etc. Later, Bob and George explained that very little H2X bombing has been done to date. First real briefed H2X bombing with synchronized bombsight will be done tomorrow.

Had beer with General Nat Twining, Commanding General of 15th AF, who told stories of the remarkable feats of Colonel Stud Wright's squadron in the Pacific a year and a half ago. Colonel Young reported that for the past week 15th AF targets have been heavily masked in smoke. Heavy flak over Vienna, Budapest, Ploesti, and Munich, together with occasional violent fighter reaction were claimed.

Evening at Officers' Club, Hotel Oriente. Talked with Redmond, Jarvis, and Fitzgerald and got further impression as to bad supply, maintenance, and operational planning in the pathfinder program.

Sunday
July 9, 1944

Discussion with Major Headrick disclosed that only about five H2X missions had been conducted, of which the Sofia one had been particularly successful. No careful analysis of blind bombing had been made, and the

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general opinion, shared even by Pathfinder, was that--prior to the introduction of the "synchronized" bombing technique less than one week ago--H2X was not good enough for pinpoint targets. This opinion is now changed, and great optimism prevails that tomorrow's oil refinery target will be plastered.

Heard the "war news" at 9:00 a.m. Large Russian advances, stiffened German resistance in Italy; no real gains after hard struggles in Normandy.

At 11:00 a.m. heard the planning and briefing for tomorrow's raid. The weather, route, assignment of targets to each of four wings, the bomb type and incendiaries, fighter escort, return course, method of bombing--visual, synchronized, or offset--in that order.

In afternoon drove to Gioia, 24 miles away, maintenance depot for 15th AF. Lieut. Grace is in charge. Met Lieut. Dutton, who is here to install two BGX beacons.

It seems desirable to send Don Redmond back to USA shortly to help expedite flow of supplies to both 8th and 15th AF.

In evening at seashore villa of General Twining enjoyed bathing, beer, and good food. Met General Struthers of Fighter Wing.

Monday
July 10, 1944

Flew in B-17 piloted by Lieut. Col. A. I. Lingard to Foggia. Stopped at HQ, 5th Wing, met General Lawrence. Then discussed yesterday's Ploesti raid with the radar navigators, who had been assembled for us. They were enthusiastic about this first use of "synchronized" H2X, but complained of inadequate radar target briefing. They are convinced that pinpoint bombing can be done if they can identify proper spot. On practice on small island, they have been putting center of pattern within 600 feet. Use excessive tilt.

Lunch with 16th Reconnaissance Group. Walked through their "ferret" and radar laboratory. The ABL-15 boys, four of them, are based here under Dr. Raymond. Saw plot of German radar sites along entire Mediterranean coast, as it had been ferreted out by the 16th. Later looked over a captured Wartzburg, about 10 kw. peak, 4 m. disk, manual track, 20-mile range on group of bombers.

At 4th Wing, talked with Colonel Apple, energetic and capable PFF officer. He showed analysis of PFF mission, including recent Ploesti raid, which had mostly missed. He complained of lack of appreciation back at HQ of requirement for training, for adequate test and shop equipment, and for radar reconnaissance.

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D810.S2.T78. A War Diary, 1944-45. John G. Trump, 1973.

Flew back to Bari, where we had general conversation with General Twining's staff at supper, followed by a talk with Colonel Lingard. Louis will carry back to General Mack a complete list of H2X delivery deficiencies. Discussed use of AGS and ARO's by 15th.

Tuesday
July 11, 1944

War report at 9:00 a.m. disclosed further large gains by Russians, stalemate in Italy and Normandy. Discussed strategic bombing with General Twining and General Atkinson, his deputy. The 15th AF is to request two AGS units for use in B-24 radar night reconnaissance plane. Louis will investigate the availability of some ARO's for the 15th--five upper-and five lower-turret ARO's now being scheduled for the 8th. The 15th has already requested total of 75 APS-13 for fighters. The H2X training group at Langley Field headed by Major Webster arrived in Bari this morning and heard the urgent requirements for better trained "Mickey" operators of the 15th. They have already agreed with 8th (and 15th falls in line) to set up a more adequate course, both Air Forces to supply some instructors and to divert some equipped aircraft to Langley.

Colonel Lingard flew us to Bari in a B-17. Talked with General Marriner regarding project Anvil. He has asked for Dr. Cockburn to come in connection with counter measures and spoof planning.

Drove to Naples in jeep with Major Goldman and Major Ernst. Met Bob McCoy, who is now finishing the truck-mounting of the first of two SCR-615's for 12th TAC.

Bob reported the MEW now getting good signals: 150 miles on medium bombers and 20+ on bomber flights. The vertical glass plotting board has not yet arrived. They are using a standard hosirzontal board. The two controllers, Ruiz and Clark,are back from Start Point and on the job. Curtis has one SCR-615 set to go.

Drove along Naples water front and up the hill to the north. This--with the old fort, ships, curved shoreline and facade of buildings, Mt. Vesuvius in the background, and Capri in the distance--is probably one of the finest harbor views in the world.

Returned to Cascade Camp, talked briefly with General Marriner, who has treated us throughout our visit with the utmost consideration and hospitality.

Wednesday
July 12, 1944

Got up at 5:45 a.m., had shower, breakfasted, and left Cascades at 7:00 a.m. via jeep for Capodichino Airport at Naples. Checked through with No. 1 priority on courier plane--a C-47 direct to UK. Took off at 8:45, landed at Algiers at 2:20. Had lunch and took off for Casablanca

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at 3:15, arriving at 7:30. Found that further flights to UK had been postponed because of weather. After excellent supper with the local consul at officers' mess, I was quartered at the Anfa Hotel, a fine modern place surrounded by villas, balcony view of Atlantic.

Thursday
July 13, 1944

To Casablanca. Obtained British visa by wading into Consulate, which had flooded during the night from an open tap. Then went sightseeing through the town. Took off at 9:30 p.m., emerged through thin cloud layer into snow-cloud landscape lighted by the setting sun.

Friday
July 14, 1944

Morning found us flying over an unbroken sea of cloud, through which we dropped slowly for an endless distance until finally the surprisingly green landscape of England showed up. Landed at 6:30 a.m. Sent a teletype report to Widewing for transmission to USA. Took 10:00 a.m. train to London, arriving at 5:45. Had as fellow passenger General Weaver, who was on a survey for the Army Ground Forces of power-generating equipmemt in Italy, etc.

Arrived at Paddington Station, went on to Mt. Royal, and indulged in a hot bath. Had short talk with Major Hutton. Dinner at the Cumberland with Hugh, who reported on the excellent progress at EBRL.

Saturday
July 15, 1944

Spent morning at Widewing. Talked with Dave Griggs and Hartley Rowe about the AGL-1 flap in which this radar was to be applied to light AA guns to improve their performance against robot planes. This idea has now been abandoned, though the British are still proceeding on the applying of H2S sets to this function.

Later talked with Colonel Lack and Major Hutton. Told them of the excellent results obtained in the States on the detection of armor by Eagle. A total of 1900 armored units distributed along roads were detected by Eagle at all altitudes from 5000 to 15000 feet. A row of vehicles, each separated by 70 feet, could be seen 15 to 20 miles away. This information was later made available to Sir Robert Watson-Watt to strengthen the request of this theater for several Eagle planes.

Colonel Lack described the imminent danger of the German use of their vengeance weapon No. 2--the giant rocket. It was stated that 80 such rockets had been fired from sites in Poland. They were capable of ranges of 150 miles and carried upwards of 5 and possibly as much as 20 tons of explosive. The short time of flight--about two minutes to London--indicates that there would be little opportunity to warn or divert. These rockets are radio-controlled, but this control may be active only during the first few seconds of flight.

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Drove to Malvern with Hugh Kendall and Steve Jeffries, arriving at 6:30 p.m. Stopped en route at Pinetree. Told Tom Murrell of the 15th AF performance with H2X, of current enthusiasm for the synchronized bombing method, and of some of their operational and personnel difficulties. Stopped in with Tom to say good-bye to Colonel Garland, who leaves this week for US to take charge of H2X training at Langley Field, with Colonel Dolan coming to the 8th AF. Colonel Garland has requested that Tom visit the US for a 30-day period in August, and this appears to be a wise move, particularly since Tom is likely to continue on at the 8th AF for an indefinite period.

Sunday
July 16, 1944

At BBRL seminar told about my trip to the MTO. In the afternoon the Steering Committee meeting was attended by Dave Griggs and Louis Ridenour. We decided to defer the fighter-rendezvous problem to the RL for development. This action was taken since it was felt that at least four, and probably six, months would be required to bring about an operational use of microwave beacons with SCR-717's and bombers. This period is sufficiently long to permit RL to accomplish the same results, including installation and improvement of microwave beacons themselves. The first close-support unit was reported to have been in Normandy for one week, with the second unit scheduled for shipment to Middle Wallop tomorrow for two weeks' training before proceeding to Normandy. British training at Milfield has bogged down, but G/C Lugg is revitalizing it. Remodification of 584 parts is proceeding at Burtonwood. Guy Stever reported on his trip to Normandy in the course of which some giant Wurtzburgs, a Knickenbein, and several other radars were seen. It was decided at the meeting that BBRL would depart from the TRE calendar and would observe the weekly holiday on Sunday henceforth--Steering Committee meetings and seminars to be held on Mondays.

John Dyer and I dropped up to the tower room at Mr. Rowe's request and were informed that the King and Queen would be at TRE on Wednesday and that we were invited to be luncheon guests. There was one favored position next to the Queen to be allotted. Mr. Rowe tossed a coin (a half crown) to see which of us, John or myself, would be the lucky man. It fell to me. This visit was described as the first which their Majesties had made to an experimental radar establishment.

Monday
July 17, 1944

Wrote a newsletter to Lee in which an essential item was the suggested schedule for returning key personnel from BBRL to the USA. My date was set for September 1 and Curry's for October 1.

Cabled the Radiation Laboratory to expedite the provision of a minimum of five MEW's as the most important ground radar item which could still pay dividends in this theater. Offered to return Ed Schneider, Roy Blackmer, and others to carry on this work if accepted. Later phoned

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Sir Robert, asking him to endorse this request since the British want several additional MEW's for combatting robots. This he agreed to do. Ed Schneider and Ernie Pollard reported on the outstanding performance of the former Start Point MEW now at Fairlight near Beachy Head. This unit sees the robot planes at least five minutes sooner than any other radar, and often detects them before they have left the French coast. This is gradually being used not only for the original purpose of determining the launching sites, but also to control intercepting fighters and to alert AA batteries. The British, with BBRL assistance, are constructing a second MEW using an antenna which was flown from the Radiation Laboratory within three days of requesting it. The modulator and RF portion are all American, but the remainder will be built out of Type 24 (height-finder) parts.

Mike Chaffee is scheduled to leave tomorrow for Corsica with instructions to return Al Bagg as soon as possible. I suggested that it might be desirable to remain until project Anvil was over.

Tuesday
July 18, 1944

With Ernie Pollard visited ADRDE and talked with Dr. Shire regarding their crash program to make light AA guns more effective against robots. Shire described their RO-3 set (built out of H2S parts), which is to supply range to the light guns. Nothing I saw in this connection impressed me as being more than what had already been done by the Radiation Laboratory almost two years ago and subsequently discarded through Army disinterest. It did not seem that this work would make a substantial improvement over the results now being obtained with light guns. At the time of our visit, there were present a delegation of AA people from Washington:

Lt. Col. H. R. Smith	Capt. R. W. Marchetti
Major A. A. Currie	Dr. C. A. Lovell
Major R. S. Cranmer	Mr. R. R. Hough

Wednesday
July 19, 1944

In the morning, the delegation listed above arrived at BBRL, and we discussed a variety of problems, primarily the use of the 584 for close support. Dr. Lovell described the Mark II close-support modifications which were being worked out jointly by RL and BTL, with WE undertaking the production of 25 units within four months. Mark II makes use of an XY plotting table in which the X and Y target positions are taken directly off the corresponding potentiometers, which already form a part of the 584. The aircraft position is indicated by a pointer traveling along an arm which in turn moves up and down, all this being on top of a ground-glass plate covered by thin paper and illuminated from below through a map. Lovell described the filter system which will remove azimuth jitter from the data--a decision still being necessary on whether the time constant for this filter should be as short as 5 seconds or as long as 20. Our recommendation was that it be short. Ralph

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McCreary described the attempt by EBRL to use the Norden bombsight computer to determine the bomb release point in close-support work. Ralph goes to Middle Wallop to try this out tomorrow.

In discussing AA problems, I made the apparently popular suggestion that the best immediate way to improve AA performance against robots was to get more 584's and American 90 mm. batteries into the line. I discounted the usefulness of X-band 584 on the grounds that Window has to date not been too serious and in the weakened condition of the German Air Forces will probably become less so. In any event, X-band 584's are not likely to be realized within 12 months. I expressed the belief that more 584's were required in this theater for special purposes, though there were enough for immediate requirements.

At 12:30 went down to the canteen to attend the luncheon for the King and Queen. TRE had been in some excitement since 10:00 a.m., when a review of two Home Guard companies was made by the King, followed by an inspection of Dr. Lewis' and Professor Dee's laboratories. Professor Dee later reported that the radar item which excited most interest was an S-band waveguide spouting RF power, which illuminated neon bulbs at a distance. The King observed the warming effect on his hand and the fact that the neon bulb was excited even when his hand interfered.

I was introduced to the Queen by Dr. Lewis and later to the King by Mr. Rowe, who went on to explain about the American radar laboratory. The King asked a number of questions about radar work in the United States, which provided me an opportunity to tell him about the Radiation Laboratory, the cooperation between the two countries, and the stimulating effect of TRE's work. I was seated at the Queen's left, with Lady Spencer at my left, and the King directly opposite the Queen. After talking a few minutes with Lady Spencer, I got into conversation with the Queen, who had turned from Mr. Rowe to me. We chatted about a number of topics--including radar, some of its post-war possibilities about which the Queen was most interested and quite well informed, the British love of flowers, the time to see heather in Scotland, and my visit to Siena, where the Queen had at one time visited. I expressed the hope that the Queen would visit the US again and ventured the opinion, with a twinkle, that, if she did, Mr. Roosevelt would be in office to greet her. This aroused a peal of laughter. The Queen recalled their visit to Mr. Roosevelt's home in Hyde Park on the Hudson. She mentioned the hot dogs which she had had and some Indian songs which she had heard sung on the same evening by a full-blooded Indian who afterward came to her with a tear in his eye and confessed that he was partly Scotch.

The Queen was most charming, friendly, easy to talk with, and a really genuine person. She was dressed beautifully in very pale blue, with a triple rope of pearls and a large diamond ring. The King was in the uniform of an Air Marshal, was very tanned and of serious mien, was very democratic in his approach to people and extremely interested in their conversation. The royal party left at 2:00 p.m., after receiving the handshakes and bows from all present and a curtsey from Mrs. Rowe. For me it was indeed an unusual experience.

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The Air Ministry is interested in extending the Loran system to provide better coverage in the region between England and Norway. This can be done by the addition of a single station cooperating with two of the other triplet. Clarence Henson is scheduled to assist in siting this station.

The 9th BC is developing some interest in Shoran, and Lieut. Kite and Joe Platt are here to find out more Shoran detail. This is not available, and we are cabling for teletype data on this on next Friday's TT conference.

The following new BBRL people have arrived: W. A. Mersman to work on the micro-H computing program, John Garfield on photography, Bill Schwann on property accountability, and Betty Reese on drafting.

Thursday
July 20, 1944

Drove to Widewing with Louise and Clarence Henson, stopped at the Red Lion in High Wycombe for lunch. At Widewing, talked with Dave Griggs, Mr. Rowe, and Louis Ridenour, who leaves tomorrow morning for the USA. The original purpose of Louis' trip was to start up a development program involving the reproduction of German pilotless aircraft. He carries a number of additional causes, such as the expediting of MEW's, the sending to the ETO of several Eagles, the improvement of the H2X supply situation for the 15th AF, etc. At the moment, Louis expects to return in about four weeks' time.

In spite of the large defensive effort against robots by ADGB and the considerable offensive bombing which is being done by the 8th and 9th AF's, the flying bomb continues to arrive in the London area, as is evidenced by the following activity data:

Flying Bomb Activity (July 3-10)

Radar Estimate

Number launched	786
Crossed coast	547
Entered Greater London	286
Incidents in Gr.London	233
Incidents elsewhere	244

Casualties

Killed	295
Seriously injured	1085
Slightly injured	1603
Unclassified	337
Total	3320

Number Destroyed by

Day fighters	220
Night fighters	120
Anti-aircraft	38
Balloons	10

*These figures based on estimates of actual strength rather than on T/O's as before. (See May 9.)

Strength of GAF Diminishing *

	West. Front	Germans C.Europe	Medit. Area	Russian Front
SEF	495	475	130	320
TEF	425	425	20	140
LRB	270	0	110	280
GA&FB	20	0	20	500
Recon.	195	55	175	325

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Recent intelligence reports indicate that the strength of the German Air Forces is steadily diminishing, as evidenced in figures furnished on the preceding page. These figures are based on intelligence estimates of actual strength rather than on the T/O's as has been the case before.

Yesterday, the deadlock on the Caen front was apparently broken by a tremendous 1500-plane RAF bombardment of three or four German defense line positions. This appears to have broken the tough crust of the German defense line, and some progress beyond Caen is now being made. Meanwhile, the Russians continue their advances both in the region of Lwow and in the general vicinity of Latvia. They are reported now to be within eight miles of East Prussia. Likewise, on the Italian front, progress is being made--Leghorn having been captured and the 8th Army being within eight miles of Pisa. Evidence is accumulating that the morale of the German Air Forces and ground troops is deteriorating. In fact, the only offensive weapons left to the Germans at this time appear to be their robot planes, which are stated already to have reduced London production by 20 per cent, and the still obscure, but potentially more dangerous giant rocket, use of which is now reputed to be imminent.

Friday
July 21, 1944

Started off the day by dashing to the window to see a particularly close buzz bomb and completing a perfect Steve Brodie to the floor when the motor stopped, apparently overhead. X-ray photos in the afternoon at the 301st revealed that I had fractured the head of the radius of my right arm--entitling me to the award of the Purple Elbow.

TT conference with Larry Henderson and General Marriner's staff in MTO at 2:30, followed by TT with Washington.

Unsuccessful attempt at assassination of Hitler yesterday afternoon is the big news item of the day, with some rumors that a state of incipient revolution exists in Germany.

Saturday
July 22, 1944

Heavy buzz bomb activity during the night. Wrote newsletter to Larry Henderson. Drove to Widewing and then on to Middle Wallop with Dick Hodgson and Hugh Kendall. Talked with George Huff and watched second ½ U-team set-up of the 584 close-support unit at its new site. Later talked with Ralph McCreary, who was preparing for tests showing the suitability of the Norden bombsight computer for the close-support unit. The Middle Wallop headquarters of 9th TAC has packed up and moved to Normandy almost completely this past week.

On the way to Malvern stopped for a few minutes and visited Salisbury Cathedral, reputed to have the highest spire in England and dating back to the 12-hundreds. Unlike most cathedrals, it is separated by a

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green lawn from the houses nearby. Passed again through Stonehenge. A large number of convoys were seen on the road heading south. Stopped at Bath to see Captain Otto Saylor only to find that he has been transferred to the 90th General Hospital. Arrived in Malvern about 10:30.

Sunday
July 23, 1944

Ed Schneider reported on buzz bomb activity, particularly with regard to the use of the MEW at Fairlight, near Hastings. This set, originally intended to locate the launching sites, is now being applied almost completely to the control of fighter interception. It is now decided that there exist over 100 effective launching sites and that these can be constructed and reconstructed so easily that their bombing is not worth while. The launching sites built most recently consist of three heavy concrete blocks on which the launching rails are mounted. Concentrated bombing is now going on of the transportation facilities and supply drums. Attacks are also being made on the giant rocket sites (Big Ben), which are being tackled with 12,000 lb. Army piercing projectiles.

The MEW picks up the divers at ranges out to 60 miles. Fighters are always on the MEW screen, and occasionally as many as 15 divers are seen at once. Because of their high speed, the effort of the controller is to place the pursuing aircraft in front of and from 2000 to 5000 ft. above the diver. The MEW also passes its plots to the CHL station, which integrates all diver data.

It has been reported that at least six divers passed through which gave no observable radar signals on any sets. This mystery, which may simply be a coincidence, suggests, however, the possibility of a non-reflecting coating such as Sambo.

It was decided that Ed Schneider and Roy Blackmer would return to the Radiation Laboratory, leaving about August 1, to expedite the production of five MEW's if the Radiation Laboratory can be impelled to accept this as a program.

In the afternoon, during a discussion with Sam Simmons, we agreed that BBRL should follow through on the fighter-rendezvous problem to the point of installing an SCR-717 in a B-24 and a BUPS in the P-38 as originally projected and not refer this problem back to the States.

In the evening, a number of us went to hear a concert at the Winter Gardens--Walter Jordan, Sheila Largin, Louise, John Hibbert, and myself.

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Monday
July 24, 1944

Talked with Steve Jeffries and Bill Schwann about property accountability. In the course of this conversation, it developed that BBRL was keeping no satisfactory book records of either financial accounts or of property.

Colonel Bill Cowart turned up and reported at Seminar on the five SCR-584 close-support missions in Normandy. These were on the whole quite successful, the primary difficulty being in the identification of proper aircraft and in controller trouble. This work has shown the desirability of 180° plotting boards which will be introduced retroactively in all units. Ed Schneider finished the Seminar by talking about the diver bomb activity and the use of the MEW.

Steering Committee meeeting in the afternoon attended by Dave Griggs and Colonel Cowart, in addition to the usual complement. It was agreed that BBRL would supervise the training of eight enlisted men of the 9th TAC in 584 maintenance, in addition to training close-support crews, provided that suitable Army instructors are furnished.

It was stated that the British are to receive an additional 165 SCR-584's on an emergency loan basis to be used against divers. TRE is investigating whether these could be applied to Bofors guns, which make use of the Mark III computer. While this complex question requires considerable study, it was generally agreed that the best answer to the question would be 584's feeding data into either the British 3.7 AA guns or the American 90 mm. batteries. It was stated that 584 gun batteries fire 650 rounds per bird, while the Bofors fire 1500 rounds per bird.

There was further discussion on the future program and personnel requirements of BBRL. The replacement schedule which had been outlined in my recent newsletter to Lee DuBridge was generally approved.

Meeting in the evening with Mr. Ratcliffe and six of his associates at the Monastery. We discussed the system of graduate training in physics and engineering in England and the USA. They felt the need to find means, such as fellowships, for improving scientific research in Government establishments and in increasing the contact between physicists and industry. It seemed clear that their curricula did a better job on fundamental scientific training.

Tuesday
July 25, 1944

Spent the day in Malvern. Harold Edgerton and Lieut. Williams of 10th PRU showed up and pointed out the need for tail-warning equipment such as APS-15 on night reconnaissance planes. These plans are being chased by Allied night fighters on the one hand and German fighters on the other, and occasionally have a hard time of it. We offered to

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find some APS-13's in the theater and see that they get installed.

Spent the evening with Captain Otto Saylor, recently transferred to the 90th General Hospital in Great Malvern and soon scheduled to depart for marshalling yards. Otto chuckled when I showed him the x-rays made of my recently fractured right arm, and then showed me some real fractures produced by Allied and German bullets.

Wednesday
July 26, 1944

Colonel Graul, Chief Signal Officer, 8th FC, and Major Weatherby, in charge of the MEW installation at Grey Friars, visited the Laboratory to discuss the use of microwave beacons with the MEW. We agreed to install an APN-7 beacon in a P-47 plane. This will greatly assist in identifying particular fighter groups when they are mixed up with bomber formations and will also extend their range on the MEW considerably. Colonel Graul agreed to pass through channels an estimated requirement of BUPS beacons for the 8th FC. He also similarly agreed to go after 100 APS-13 tail-warning sets.

Drove to London with Louise, arriving at 11:00 p.m.

Thursday
July 27, 1944

Drove to Widewing. Sent cable to Larry Henderson on 584 close support, pointing out our intention to ship modification and possibly Ralph McCreary by about August 10, since the controller and Captain Bixby are now unable to come to the ETO.

Talked with Colonel Lack and Major Hutton of SHAEF regarding the use of Eagle for the location of enemy armor and the use of Window-filled mortar shells for locating front-line positions. It seems that Major Hutton and Dr. Taylor of ABL-15 have the impression that these 60 mm. mortar shells are inadequate because of the limited height (1200 ft.) to which they are believed to rise. The technical data, however, appears to be entirely too fragmentary and qualitative for an adverse report at this time.

An unfortunate attempt at close air support was made yesterday at the request of General Bradley in which the Air Force was asked to bomb the region on the French side of the road between St. Lo and Periers. Apparently, against the recommendation of the Air Force, the approach was made in a line perpendicular to the road and in a series of echelons, with the result that the last arriving group found the bomb line obscured by smoke and dust and dropped its bombs short. The American troops were withdrawn only 1000 yards from the road. The recommendation of the Air Force had been to approach in a direction parallel to the road, with succeeding echelons bombing progressively further and further along.

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With Dick Hodgson, talked with Colonel Dixon on a number of items including the need of BBRL for six SCR-584 trained officers on temporary duty and the relation of BBRL to ASC. Dixon agreed to process our request for the six officers. He also agreed to send through formal cables on procurement of APS-15 supplies if we brought these items to his attention via Colonel Sullivan. He and General Knerr are to depart soon for a tour through Russia and the MTO.

Talked with Art Warner regarding his survey of the effectiveness of AA fire against robot planes. AA batteries are now located along the cliff edge, and the 584 is being applied by the British to their static 3.7-inch guns. Two American 584-equipped 90 mm. AA battalions are also in position. Under favorable conditions, about 80 per cent of the robots have recently been brought down by the combined efforts of AA guns and fighters--the honors being divided about equally.

Dinner at the Connaught with Dick Hodgson.

Friday,
July 28, 1944

Drove to Pinetree. Talked with Tom Murrell and Colonel Geerlings regarding their projected trip to the US. Colonel Geerlings' thesis is that principal failures of H2X blind bombing are due to poor intelligence, and he proposes to present this problem and the methods of overcoming it to the people in Washington who are responsible for the training, not only of the 8th and 15th Air Forces, but also the 20th.

Talked with Gordon Danielson and the micro-H boys, who are now housed in a separate Nissen hut on the hill at Pinetree. This program seems to be progressing well. A range test over enemy territory is scheduled for tomorrow, and single-plane operational flights are to follow. The operation and maintenance of ground beacons is again the responsibility of the 482nd Bomb Group, who have assigned one officer and three men to each beacon.

A meeting afterward with Colonel Sullivan, Colonel Osborne and staff, Sam Simmons, Morgan Gunst, and myself. Presented our proposal that the fighter-rendezvous project be continued with the installation of one SCR-717 in a bomber and one BUPS beacon in a P-47 (eventually a P-51)--this work, plus the determination of the feasibility of further work, to be completed by the end of August. Colonel Sullivan agreed to this program and will make the arrangements for the planes and installation facilities.

Recommended to Colonel Sullivan that he place the requirement for about 500 BUPS beacons in order to advance the production of this set in the US. After considerable discussion got Colonel Sullivan to agree to the desirability of Don Redmond's return to the US on a 30-day visit to discuss maintenance and supply problems on the APS-15 with ASC, Philco, and the Radiation Laboratory.

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Among other things, Colonel Sullivan indicated that 8th AF had a requirement for six 584 close-support modifications which would be used for bomb assessment. He also stated emphatically that 8th AF required two additional MEW's to cover the flight paths of the other divisions.

To Widewing to attend TT conference. Louis Ridenour reported that one Eagle-equipped B-24 might become available by the middle of August if an energetic request were made.

Discussed with Colonel Lack, Mr. Rowe, and Dave Griggs the Window-filled mortar shell experiments, and agreed to present a proposal for further work by next Tuesday. Colonel Lack has emphasized the high priority of front-line identification, and it appears that we should make a more careful attempt to evaluate the technical performance and feasibility of this identification means.

Dinner at Soames House with Mr. Rowe, Dave Griggs, Dick Hodgson, Colonel Warner, Dr. Martin, and Mr. Hitchcock. The grounds around Soames House are as beautiful as ever.

Saturday
July 29, 1944

SACRA meeting (a) to review the the effectiveness of RCM in Overlord and (b) to consider again means of locating enemy armor. Heavy discussion resulted from the first topic. It appears that a subcommittee had been appointed by SACRA to make such a study, and after four weeks it had completed only a recommendation as to how the study might be made. Two hours of futile discussion typical of British committees ensued, ending with the understanding that a subcommittee to do this job should consist of two permanent men, with part-time assistance from the several Services. One of the men was to be sent for from the States. On the second topic, the committee quickly approved the recommendation that a high-level request be made through SHAEF for one Eagle (APQ-7). G/C Lugg of AEAF was to initiate such a request through SHAEF. Dr. Lewis described TRE's development effort to produce a high-resolution radar using a 6-ft. dish on an H2X set. Brig. Schonland, ORS, discussed briefly an MAD report which showed promising possibilities for locating the presence of magnetic enemy armor underneath. I was requested to expedite information from the States on MAD tests performed on July 27. It subsequently turned out that these tests had failed since the terrain was over magnetic iron ore deposits, but further tests in Florida are contemplated. AEAF did not show any interest in the Edgerton flash method of night photography.

Left London at 5:00 p.m. with Louise for Malvern, traveled along the Evesham Valley road through Broadway, and had dinner at the nice old Lygon Inn. On arrival at the County, we found a dance in progress, which provided among other things an opportunity to get up to date on several items of business.

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Sunday
July 30, 1944

Talked with Ed Schneider, who leaves early tomorrow for the US, regarding the MEW program both here and at home. The Fairlight MEW is definitely to remain there until the so-called DEW (AMES-26) is completed around the middle of August. After that, Ed and the 9th AF hope that it will be returned to them for use in Normandy, though the British are plugging to have it transferred further eastward to a point near St. Margaret's Bay in order to take care of divers which are now beginning to come from this new direction. The possibility of constructing a second AMES-26 is being investigated. Ed somehow or other feels pretty well "browned off" by British politics and inefficiency. The MEW work is substantially done here until additional units arrive. Ed has done a fine job, and it is most appropriate that he return to the States at this time to expedite and improve the new units. Roy Blackmer goes back with him.

Lee Davenport and Leo Sullivan gave me an unexpurgated account of how things are progressing with the SCR-584 close-support unit in Normandy. There is a small amount of remaining technical difficulties occasioned primarily by the periodic failure of the piano wire range cord. This will be replaced by a fine flexible braid. The important difficulty lies in the inadequate Army organization. The fighter control center at 70th Wing of 9th TAC is not effectively staffed and is not radar minded, and has therefore failed thus far to make any real use of the close-support unit. The few missions which have been tried have on the whole be unsatisfactory. Probably the best solution to this organizational difficulty lies in getting some keen and interested personnel into the fighter control center, such as Colonel Bill Cowart. The close-support unit has also experienced considerable difficulty in identifying the fighter group which are to control. Lee Davenport points out that the fighter boys are a rather irresponsible lot, getting off the field ahead of the schedule, being unfavorably disposed toward ground control, and usually capable of finding their target--or at least some target. This is of course the typical situation in the introduction of a new device. On the whole, there is every reason to believe that the ground-control-of-aircraft idea has sufficient momentum to get through this typical initial period.

It was agreed that Lee Davenport and Leo Sullivan should both return to the States about August 3. Lee is long overdue for return, and my idea of keeping Leo here longer had to be abandoned because of the completely "browned off" feeling which he has developed and which would make his influence ineffective here.

Wrote letter to Lee DuBridge on a variety of topics, including an invitation that he come here, as he apparently has planned. Wrote Irvin Stewart stating that I was in effect directing the activities of BBRL and not acting as an authorized representative of the contracting officer of OSRD. Enclosed a request for leave of absence from OSRD effective March 1, 1944, which he could tear up if, after consultation with Lee and Wheeler Loomis, it did not seem necessary.

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Monday
July 31, 1944

Discussion with Donald Taylor of OSRD, Ralph McCreary, and George Huff on the significance of the Window-filled mortar shell experiments to date. Taylor and McCreary are to write a report summarizing the conclusions reached. These are in substance that a 60 mm. mortar shell filled with 18,000 dipoles gives the signal as well, or better than, a fighter plane, and under flat terrain conditions can be seen 30 miles by the 584. The 60 mm. mortar shells, however, apparently have a maximum altitude of only 1200 ft., and the practical range is therefore severely reduced by obstructing terrain. Recognizing this line-of-sight limitation, it seems desirable to find a mortar shell capable of much higher altitudes.

Serge Golian gave a seminary on microwave beaconry, including an amusing, but factual account of the BUPS experiments in behalf of Troop Carrier in this theater, and their subsequent use on D-Day.

Steering Committee in the afternoon with Archambault as guest. Bob Eicher will manage the fighter-rendesvous problem, using the modified SCR-717, which presents ASV and beacon indications simultaneously through a searching operation providing one beacon pulse for every two ASV pulses. Gordon Danielson reported on micro-H, which is now well set up organizationally both with respect to the operation and maintenance of the several ground-station beacons and with respect to the computing center. Flights over enemy territory to determine maximum range were made some nights ago and showed that operation at 150 nautical mile radius was completely satisfactory. The first operational flight was scheduled tonight against a power house in France by two single PF aircraft, each carrying 2,000 lb. This flight was subsequently canceled because of bad weather, representing the last opportunity for single-plane missions in the next two weeks because of the brightness of the moon.

The Steering Committee voted to restore the old work schedule with Saturdays off.

Tuesday
August 1, 1944

To Widewing with John Sanders, Curry Street, and Dr. Thatcher. Meeting with Hartley Rowe, Colonel Lack, and Major Hutton on Window-filled mortar shells, which resulted in a decision that we stay with 60 mm. mortar shells as the vehicle of front-line identification with Window, but that we investigate with Ordnance the best means of securing altitudes of at least 2000, or preferably 4000 ft. Major Hutton is responsible for this.

This meeting continued with the addition of Major Maximoff, 8th AF, to consider methods of insuring that bombing formations had passed beyond the line of danger to friendly ground troops in heavy close-support bombing operations. Major Maximoff reported that 8th AF was investigating the possibility of (a) DF-ing with radio compass on beacons placed along the front line, (b) using the SCS-51 landing system to establish a vertical fence

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along the front line, (c) the use of R-E. The first of these is being tried, but will probably fail because of the time and errors involved in DF-ing. The second appears practicable, but involves placing a standard 2½-ton truck-mounted split-beam laying transmitter at a position very near the front line. The aircraft fly perpendicularly through this fence and receive an unsafe-safe indication on their standard landing indicator. Thirty-five per cent of 8th AF bombers are equipped with this device. This fence has also the disadvantage of being easily interfered with by the enemy. The use of R-E was abandoned after some trials which indicated that the period of uncertainty was about 10-20 seconds as against 1 or 2 seconds for the SCS-51.

I proposed the use of the SCR-584 close-support unit or of the MEW to give VHF clearance to bombing formations. This completely independent guarantee that the groups had passed into safe bombing regions has the limitation of low load-handling capacity and dependence on the fragile communication link.

Had short talk with Colonel Dixon regarding ASC's and Air Ministry's request for SCR-584's to bolster up their Mark III Oboe stations. Colonel Dixon leaves tonight for two or three weeks in Russia and the Mediterranean.

To London to get Jim Britton to send a concurrence cable to insure the return of Al Bagg. Supper at Choy's with Curry, John Sanders, and Louise. Returned to Malvern at 11:00 p.m.

Wednesday
August 2, 1944

Discussion of the front-line identification problem in heavy bombing operations with Sam Simmons, Walt Jordan, and Dr. Lines. Dr. Lines described experiments made 18 months ago which showed the difficulty of an aircraft following along a tracks of R-E's. Other experiments on a small scale on an H type of bombing with R-E were successful, however. In these, two R-E's were placed four miles apart, and the aircraft passed along the perpendicular bisector and bombed at points four or more miles beyond the beacon line. The suggestion was made that a front-line guarantee could be provided by using two A-C X-band signal generators placed some miles apart either on the front line or a definite distance behind it. These would produce on the PPI screen of the APS-15 equipment a narrow sector. An aircraft passing between these two beacons would therefore know that it had passed beyond the line of the two beacons when the two illuminated sectors were at 180° of each other. This seems to be a promising method for the 8th AF since it would make use of their normal PF equipment and bombing procedures, and requires only two X-band signal generators as the ground markers. The possibility of compromise is remote also.

Discussed with Steve Jeffries and Bill Schwann the policy of BBRL on property activity. We agreed, on receipt of a master list of shipments

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from the Radiation Laboratory to do the best retroactive job possible on listing the items which have been delivered to Army or British establishments. These lists will be returned via Archambault to the USA as requested in John Danforth's letter of October 29, 1943. I will not act as OSRD representative to approve these deliveries. Final property accountability will be considered to have been performed through a final inventory showing goods on hand. Items which do not appear in this inventory or in the 'goods delivered' will be regarded as having been expended.

Talked with G/C Bell, who was just in from Washington, regarding the needs of TRE and BBRL for design and field engineers. Agreed to make a joint request for TRE for two SCR-584 design engineers from GE. G/C Bell indicated that the British were not interested in Eagle for their own use, primarily because of the severe installation difficulties which it involves with British aircraft and because of the 60° forward-looking limitation.

The Russian advance has continued at full speed, reaching Riga on the Baltic, sweeping 25 miles into a section of East Prussia and reaching the outskirts of Warsaw. The Americans are making rapid progress in Normany, a section of the advance now beginning the operation to cut off Brest Peninsula. It appears that the German line in this region has been definitely broken, and the advance is reported as rapid.

The flying bomb activity continues, with about 802 launched during the week commencing July 17, of which 347 were destroyed by various means. To July 24, there have been 4,512 flying bombs launched, of which 1,647 entered the greater London area and 1,838 were destroyed. Casualties were 3,948 killed and 11,697 seriously injured.

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Thursday
August 3, 1944

Spent the day at Malvern. Colonel Warner reported that the anti-buzzbomb SCR-584 AA batteries on the south coast were performing very poorly. The offer of Lee Davenport and Leo Sullivan to postpone their departure for the States was accepted for one week, during which more permanent arrangements will be made.

Curry Street reported success on the SS Loran program. Admiralty has withdrawn its frequency-interference objection, and both the close-in Loran and SS Loran systems will go on the air during August and be operational by September 1.

Friday
August 4, 1944

To Widewing, where there was a discussion with Colonel Warner and members of the 1st Army Group on the problem of determining mortar location by observation of the mortar shell trajectory. This is probably the most difficult problem in radar. With 60 mm. mortars, the enemy tactics is to fire six or eight shots and then move to another of five previously selected and zeroed-in sites. The 81 mm. mortar problem is almost as bad as this. The 105 and 155 mm. mortars are relatively static. I agreed to investigate what ADRDE is doing in this field and to consider what American radars might be adapted. The desire is for something which can be tank- or jeep-mounted. ADRDE, as I remember it, has an X-band set with a 5½' dish rotating 60 rpm. It is possible that the ASD-1 might be useful.

The teletype conference started off at 4:30 p.m., but nothing had been received when I left at 7:00 p.m. except "The quick brown fox jumped over the lazy dog's back," repeated endlessly. Hugh Kendall had it all finished by 9:30, however.

Drove back to Malvern with Ernie Pollard, dropping Gordon Danielson at Pinetree.

Saturday
August 5, 1944

Found out from Ed Brazell and Lieut. Cowan that the Burtonwood modification program on the SCR-584 was actually in bad shape for lack of coordination and parts. The first two close-support units are now expected by the middle of August.

Sam Simmons and Walter Jordan on returning from Alconbury reported the general acceptance of the idea of using two X-band CW oscillators in cooperation with APS-15 for front-line demarkation. Tests will be performed quietly at Alconbury.

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We agreed that ground control of aircraft was too complicated organizationally to help out 10th PRU unless they controlled their own radar. Accordingly, we will propose that the experimental 100-mile SCR-584 be spruced up and be made available purely for night photo reconnaissance purposes using BUPS-equipped A-20's.

Sunday
August 6, 1944

Seminar by Guy Stever on the work of OSRD and the London Mission. The cooperation between British and American organizations effected by the London OSRD Mission was illustrated by three examples: the guided aircraft projectile, the acceleration bombsight (toss-bombing), and the German V-1 and V-2 weapons.

At the afternoon Steering Committee Meeting, Dave Griggs reported on his observations of close support in Normandy. Recently the advance in Normandy has been too rapid to make the SCR-584 close-support unit necessary or effective. An air observer now travels with the forward tank column and indicates by VHF to the supporting fighter-bomber flights the location of enemy obstructions. Colonel Bill Cowert is to become Chief Controller of the 70th Fighter Wing, which is the Fighter Control Center of the Ninth TAC. This should greatly aid the effective use of the MEW and the 584's.

We agreed to urge the British to consider another ersatz MEW, and BBRL will assist. This is being done in part to free the present transportable MEW for the 19th TAC.

Mr. Rowe of TRE has challenged the American laboratories to a cricket match in which the TRE team will be composed of men over forty, and the Americans have no limitations as to age or sex. The outcome of the game will determine "whether the British Commonwealth of Nations absorbs America or whether Great Britain becomes the forty-ninth state of the USA". In anticipation of this, the BBRL boys practiced cricket for the first time in their lives on the upper playing field.

During the past two days, the Americans have succeeded in cutting completely across the base of Brest Peninsula, and armored spearheads are approaching Brest and other principal cities. Other forces are now pushing out from this greatly extended base line in the general direction of Paris.

Monday
August 7, 1944

Today is Bank Holiday in England; however, BBRL is at work--partly because of my feeling that holidays are immoral, at least for Americans.

In the morning, Pollard, Simmons, and I discussed the problem of close support. We brought Pollard around to the opinion that the MEW was not suitable for providing clearance to the 8th AF bombers, primarily

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because of the limitations of the communication link and the problem of identification. We concluded that the MEW was a useful supplement to the 584 close-support unit in vectoring fighter escorts to a rendezvous with armored spearheads. From this point on, the 584 could continue the control.

In a further meeting, we clarified our thinking on air-borne beacons of the BUPX type. Five functions for these beacons are now actively under investigation and installation, and tests are part of BBRL's commitment. They are (1) use of beasons in conjunction with the use of the SCR-717 for fighter rendezvous, (2) for the control of PRU aircraft, (3) for the control of fighter sweeps with the MEW, (4) for the 584 close support, and (5) for GCI aircraft. We concluded also that a coded beacon of the Rosebud type would be useful for IFF provided it was limited to distress purposes only.

In the afternoon, discussed the possibility of an early-warning radar for the V-2 rocket with Walter Jordan, and later discussed property accountability with Bill Schwann. We shall have to get moving on our accountability business since the war now appears to be going very rapidly. Saw "The Adventures of Tom Sawyer" in technicolor at the Winter Garden theater in the evening.

Tuesday
August 8, 1944

Drove to Pinetree with Sam Simmons--in separate cars. Conference with Colonel Dolan, who has just arrived from Langley Field to replace Colonel Garland at 8th AF. Colonel Geerlings, Sam, and Tom Murrell were present. Our purpose in meeting was primarily to get reacquainted and to cover the various radar problems confronting 8th AF. Colonel Dolan kept glancing at the clock because a close-support bombing operation by 8th AF was then in progress. This mission, which later proved to be successful in breaking the German line on the Canadian sector near Caen, was conducted by 600 bombers, which flew a course parallel to the front line. Among other things, we discussed the gradual improvement of H2X bombing, particularly as a result of the synchronized bombsight technique; the remaining intelligence problems; and the use of Eagle and other devices for the location of enemy armor. Colonel Dolan impressed me again as an exceedingly active and intelligent person and a good crusader. He had very sound observations to make on methods of improving H2X bombing which were not at variance with the local thinking. He was completely receptive to civilian assistance.

Arrived at Widewing at 5:30 p.m. and talked briefly with Dave Griggs about travel orders for Tom Murrell's return visit to the States, leaving August 17, for 45 days. Also discussed the forthcoming meeting at Pinetree with Colonel Roosevelt on Friday, in which both the possibility of using SS Loran and that of using the 584 close-support unit for the navigation of PRU aircraft will be broached.

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Contined on to Folkestone to look into the 584 AA battery situation on which Lee Davenport, Leo Sullivan, and Bill Smith are working. This trip was through Sevenoaks and Maidstone, proceeding for a considerable distance lengthwise along the anti-diver balloon barrage. There were thousands of balloons suspended in the sky, reminding one of the Milky Way. Checked in at the 126th Battalion Headquarters and then drove up to the hill at Folkestone, where Bill Smith was engaged in lining up receivers and instructing the two 584 maintenance teams which have been assigned to cover all of the American AA batteries. Bill has found that the receivers, in fact, do not need lining up and will return to BBRL romorrow.

Drove back to Sandsgate and checked in at the Seaview Hotel. Lee and Leo arrived shortly, and we discussed the local 584 situation. They have gone over 14 sets and found a variety of simple difficulties, such as local oscillator out of tune, burnt-out crystal, etc., and are doing a world of good. They expect to complete their work by Thursday afternoon and will report to ATC in London that night for return to the States on Friday. Recommended to them that Lieut. Hyman and Lieut. Glendenning, who head up the two maintenance teams, accompany them on their Thursday trip in order to pick up the practical viewpoint which this work requires.

Wednesday
August 9, 1944

Wakened by the familiar sound of AA and rockets going off at buzz bombs, one of which was knocked down about two miles from the hotel and another directly in front. After breakfast with Lee and Leo, I drove on to Fairlight near Hastings. This coastal region is fairly ugly and bristles with anti-diver guns. A good many 584's and GL-3's are to be seen along the coastal strip. Checked in at the Fairlight station about 11:15 a.m. Met S/L Jeff Cherry-Downes, Major Woodruff, Bob Tobey, Ernie Martinelli, and others. No divers were to be seen on the MEW screen, which, however, is being used for the continuous control of anti-divers and which has detected divers well over the coast of France. Divers have been picked up on the MEW scope at 80 miles, and the photographic record shows at least one set of diver tracks out to 130 miles. The information from MEW feeds to local AA batteries, to the local fighter control, and to the GHL plotting room from where it goes to Stanmore Ops. Since July 4, 103 buzz bombs have been shot down by MEW-controlled fighter sweeps.

The anti-buzz bomb layout is somewhat as follows: Extending in a line approximately 30 miles long and 25 miles south of London is a balloon barrage which contains between 5 and 10 thousand balloons. Extending along the coastal strip for a distance of about 60 miles are AA batteries of all sizes from the American 90 mm. and British 3.7" to 40 mm. and smaller. These define a belt which extends inland three miles and over the coast seven miles. Fighter interception of buzz bombs is practiced in the region in between the balloon barrage and the Ack-Ack belt, and especially in the region extending outward over the channel.

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Saw the Type 26 sets built of an MEW antenna and RF power supply and feed, plus certain Type 24 components. It is anticipated that this will be completed by the end of August.

Had luncheon at the Fairlight Cove Inn with Major Woodruff, Bob Tobey, and Ernie Martinelli.

Left Fairlight for London at 2:30, arriving at 5:15. Talked briefly with Major Ed Hutton, who has located 81 mm. mortar shell, base-ejection smoke, which can be filled with Window and which travels to altitudes up to 5000 feet.

Thursday
August 10, 1944

Spent morning at OSRD. Considered Lee DuBridge's letter which countered our BBRL replacement schedule by suggesting that I stay until October 1 and Curry Street until December 1, pointing out that the European war was over as far as the Radiation Laboratory was concerned, and stating that their eyes are now turned exclusively toward the Pacific.

Lined up Don Taylor and BBRL to get the 81 mm. mortar shells filled with Window and tested against the 584.

Talked with Captain Reilly about the problem of location by radar of enemy mortar. He described the work of ADRDE, which began by using the 517, then the GL-3, then the X-band "shell splash", and finally the 584 to plot mortar shell trajectories. Only the 584 showed useful trajectories, and this only on the 81 mm. size and larger.

Visited St. Bartholomew's Hospital and found that 10 days before a buzz bomb had damaged the building in which the million-volt x-ray generator is housed; so therapy had been discontinued for a month. Dr. Glen Jones showed me about, and with others we had an hour's discussion at tea. On the way back, I dropped in at St. Paul's, which is surrounded by mostly empty space as the result of fires caused by the 1940 blitz.

In the evening, Louise and I saw "While the Sun Shines" at the Globe Theater--a riotous play in which an English earl, an American bombardier, and a Free-French lieutenant vie for heart and hand of an English-lady member of the RAF.

Friday
August 11, 1944

At the TT conference at Widewing, we learned that four Eagles are likely to appear in this theater by the end of August. Most of BBRL Steering Committee members were on hand, and we adjourned at 6:30 p.m. to Soames House for a softball game followed by a delicious dinner.

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At the evening Steering Committee meeting, it was agreed that we should press the British vigorously to construct a second Type 26 set using MEW dish and RF parts. This would free the mobile MEW at Fairlight for use by the 19th TAC on the continent. We agreed that V-beam, in spite of its reputed unreliable construction, should be brought to the theater. This would do a good job in itself for GCI work and at the same time would permit the operational problems to be worked out in advance of production equipment. Tom Murrell reported on the six Micro-H missions to date, which involved a total of 19 aircraft. Only five aircraft bombed successfully on the Micro-H, with a minimum error of around 800 yards. The failures were divided about equally between H2X and the beacons. Tom described the purpose of his 45-day mission to the States. The meeting developed into a discussion of the roles which the 584 close-support unit and the MEW could play--it being arrived at by Ernie Pollard that the former had taken away certain functions, such as PRU control, which MEW could perform more simply. The meeting adjourned at 12:00 p.m.

I remained at Soames House for the night and had a short chat with Hartley Rowe, who arrived about 12:30 from a four-day trip in Normandy.

Saturday
August 12, 1944

Drove to Malvern with Hugh, Walter Jordan, John Garfield, and Louise. Stopped at Pinetree for lunch and discussed with Majors Hopper and Maximoff the desirability of preparing a descriptive folder on the several methods under investigation by 8th AF for indicating "when not to bomb" in close-support operations. Principal methods are the use of the SCS-51 radiophones and the use of two X-band CW line markers which would show up on H2X.

The cricket match between TRE and the American labs was in progress when we arrived in Malvern at 2:45--with the Americans first "at bat". The fans, mostly Americans, restrained their cheering to such conservative English expression as, "Well tried, Old Bean," "Jolly well bowled," etc. The players left the field during the interval for tea served in the theater. The final score at 6:00 p.m. was 72 to 62 in favor of TRE.

In the evening a corking good TRE-American party was held at the Abbey. This was really done up brown, with drinks, cabaret, and buffet on the house. An amusing skit by B. J. O'Kane, Mr. Cockburn, and Mr. Rowe followed, in which they took the American lads over the coals to music à la Mikado.

Sunday
August 13, 1944

Al Bagg returned last night from four months in Corsica, with the MEW in operation since early August. He carried a letter from L. J. Henderson which, among other things, indicated that this MEW was built into the forthcoming Anvil operation. Al discussed some of the vicissitudes of constructing an MEW on the rocky-promontory site at seminar. Called Colonel Sullivan to recommend early departure to France of a Micro-H siting party, which will include either Frank Zaffarano or Gordon Danielson. The first site will be

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near Caen. A second will later be installed a hundred miles south and east so as to give coverage into a new area beyond and below Paris.

Conference with Ernie Pollard, Curry Street, and Sam Simmons on the use of the 584 and MEW for PRU control. We all agreed to proceed with the 584 control for PRU aircraft and will contact Colonel Hall, 9th AF, shortly on this. We further agreed to investigate experimentally if indeed the MEW is sufficiently accurate to do the PRU job. Ed Miller will be assigned to this and will work with the Grey Friars MEW on an informal arrangement with Major Weatherby.

In a further discussion on the problem of mortar location, we agreed to limit BBRL efforts to observing the ADRDE tests scheduled for next week. Len Hartmann will be the observer. The ADRDE unit is mounted on a ½-ton truck, 5½-ft. dish, 60 rpm., S-band, 500 kw. out.

A quickly arranged meeting with Sir Robert Watson-Watt, Dave Griggs, Ernie Pollard, and myself to urge on Sir Robert the desirability of constructing a second Type 26 resulted in his agreeing almost immediately to sponsor this undertaking "with overriding priority". He was not able to assure us that the mobile MEW at Fairlight could be returned at once to the Americans.

To the Malvern Winter Gardens to hear the London Philharmonic.

Florence has fallen to the Allies.

Monday
August 14, 1944

Started letter to Lee expressing importance and continuing nature of civilian radar field assistance and questioning the propriety of the of the tremendous development-production effort at home.

The Americans have made great progress in France during the past ten days. With the aid of the Maquis, they have taken the entire Brest Peninsula, with the exception of Le Havre, Lorient, and St. Malo. American armor has made a long stab toward Paris and then turned northward, forming a trap from which the Germans are endeavoring to escape. The Canadians and British are attacking on the relatively static line near Caen to hold the Germans until the trap is closed. Intelligence reports serious effects on German morale by ground strafing attacks by P-38's and P-47's and rocket-firing planes.

During the week ending August 7, the 8th AF dropped 8,600 tons on the enemy, with a loss of 40 planes. The total tons dropped to date - 281,000 by 8th AF with loss of about 4,000 planes; and 212,000 by 15th AF with a loss of 2452 planes.

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Fly Bomb Activity Report

	Week Ending July 31	Week Ending August 7	Difference
Number launched	740	891	+151
Number which crossed coast	554	583	+ 29
Number which entered Greater London	235	260	+ 25
Kills - Day Fighters	127	122	- 5
Night Fighters	72	52	- 20
AA Batteries	149	207	+ 58
Balloon Barrage	17	53	+ 36
	365	434	+ 69
Casualties -			
Killed	328	326	- 2
Injured	1,361	778	-583

Tuesday
August 15, 1944

The morning newspaper stated that 750 15th AF bombers pounded gun emplacements and radio stations on the south coast of France for the third consecutive day. This sounded to me exactly like a D-1 news item. Before noon, it was announced by radio that the invasion of southern France was in progress. Project Anvil was on! Evening news announced little opposition, successful parachute and glider landings, beach landings in the area between Nice and Marseilles.

Ralph McCreary returned from Normandy, where he introduced the Norden bombsight computer to the two 584 close-support units. These two units are now 200 yards apart and about 5 miles from the front line. On the day after Ralph arrived, three level bombing missions using this computer were carried out successfully. Bombs were dropped so as to interfere with enemy movements during the night. General Quesada was reported as favoring level bombing, and Ralph was quite enthusiastic about the set-up. George Huff remains in Normandy, where he has been doing an excellent job. The only unfavorable news is that Colonel Bill Cowart has received a commission to depart shortly for China on a 30-day H2X assignment.

Wednesday
August 16, 1944

Drove to Widewing with Louise, leaving her to help in setting up the ASG filing system. Lunch with Major Ed Hutton, at which he discussed Window-filled mortar-shell experiments for front-line identification, the several methods of indicating to Bomber Commands "when not to bomb", the desirability of having a base in France.

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To London and then to Air Ministry for an hour and a half with G/C Foss and G/C Pretty. Had an animated discussion of the usefulness of microwave beacons like AN/UPN-2 (BUPS) which left G/C Pretty convinced to the point of suggesting that the British procure fifty. Felt that G/C Pretty will be more favorably disposed toward microwave air-borne beacons during his forthcoming visit to the US, which begins tomorrow, and that he may influence the British attitude there.

Talked with Bennett Archambault and Guy Stever. Arch is leaving tomorrow for six weeks in the States. Agreed to support his request for an additional radar man for the London Mission.

Dave Griggs called to say that at the Anti-Diver and -V2 Committee meeting, Sir Robert Watson-Watt, in spite of opposition, pushed through the second Type 26 program with over-riding priority, as promised. I am invited to be a member of the Anti-Diver and -V2 Committee.

Dinner at the Connaught with Morgan Gunst, Al Bagg, Guy Stever, Bob Tobey, and Louise. Guy entertained us with stories of his experiences in France, including the welcomes by the local citizenry and the assistance which Guy's party gave in the capture by the Maquis of 450 Germans and White Russians.

Thursday
August 17, 1944

Spent the day at the London Office. In the evening, a group of us went to the Windmill and then to dinner at Hatchett's.

Friday
August 18, 1944

At the 2:00 p.m. TT conference with Larry Henderson at Headquarters, MAAF, also attended by Major Vance, Larry reported that radar generally had performed well on the Mediterranean D-Day. Preliminary reports were that the TCC's had navigated accurately. The 15th AF had done a job of beach bombardment which was reported very successful. The entire invasion was seen and recorded photographically by the Corsica MEW, which, however, was not built in very actively into the operational plans. General Saville of 12th TAC is now requesting Ralph McCreary and the close-support modifications to the 584 to come by September 1 if possible, and I indicated that September 1 would be a good departure date. They requested also that all six of their 584's be provided with the modified range unit to give maximum range for height-finding with the SCR-270.

At the 4:30 TT conference with Washington, Ed Schneider reported from the States that the Radiation Laboratory is constructing 5 or 6 V-Beam sets and that the original V-beam equipment might be ready for shipment to the ETO by September 15. We said that we would like the equipment to be sent over as soon as possible.

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Our group proceeded to Soames House and enjoyed a soft ball game before supper. The evening meeting was attended by the full Steering Committee plus Joe Platt, Bob Tobey, and Morgan Gunst. Mr. Rowe, Dave Griggs, and Vic Fraenckel were there from ASG. Art Warner described the present performance and problems of the anti-diver AA batteries. About 700 heavy guns are now set up in the AA barrage. The American SCR-584 AA battery will be limited to five battalions. Two days ago the guns brought down 72 out of 105 diver targets. Joe Platt discussed the Oboe performance in 9th BC, which was used for 44 per cent of the July missions. The serious current problem is that the rapid American advances in France have almost reduced to zero the Oboe coverage on enemy territory. After some discussion, we agreed that strong representations should be made to Air Vice Marshal Tait and Sir Robert Renwick to speed up the planning and execution of the Oboe mobile ground-station program. Dave Griggs, Curry Street, and Joe Platt were named to do this job. Other topics during the evening were a statement on the second Type 26 diver-search radar which is now laid on by the British as a project with high priority, and the dilemma in which we find ourselves with regard to the BUPS program because of the slow production rates quoted in today's teletype. Dick Hodgson, under penalty of using his annual income, was named to work out a way for getting the modifications for one close-support unit for the Mediterranean before September 1. The balance of the meeting, which lasted until shortly after 12:00 p.m., was devoted to a discussion of the importance of the radar field service and of the type of equipment under development by the Radiation Laboratory which was likely to be of value in this and other theaters. Among these sets were the MEW, V-Beam, Western Electric's light-weight search radar, BGX and BUPS beacons, APS-10, Eagle, APS-15.

Mr. Rowe stated that it is his belief that, if he were operating a billion-dollar radar industry at this time, he would invest one-half of it in field service.

Saturday
August 19, 1944

With Louise drove through Hyde Park past the Serpentine to St. Paul's, then to the Tower of London, along Victoria Embankment, and on out of the city. Drove on toward Oxford and stopped at the Lambert Arms Hotel. Relaxed at the bar and then had dinner. Proceeded on through the rain to Oxford, where we parked in front of Brasenose College and inspected several of the buildings of Exeter and the dining hall of Lincoln. Drove on to Stratford-on-Avon. Had tea and cakes on the river bank and then a half hour on the river in a punt, going as far as the old church which can be seen from the main bridge. Arrived in Malvern at 7:30 p.m. after a most pleasant day.

Sunday
August 20, 1944

Left Malvern at 7:22 a.m. for Bramhall, arriving at 11:40 a.m.--a distance of approximately 100 miles. The trip both ways was very interesting with occasional passengers to pass the time, including a British infantryman who had been wounded at Caen, an artificer employed at RME on

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gun-fitting, several GI Joes, two civilian gals--one of whom worked at an RAF canteen and the other at an aircraft factory. The most interesting pick-ups were two children standing in the rain waiting to get on to the next town. They spoke beautiful English, but proved to be Czechoslovakians who had left the Sudetenland in 1939 with their father and mother. Their father was a textile factory owner. Both children were remarkably pleasant and bright and nice-looking. There was also the incident of a flat tire and two small boys who watched the repair job and talked with me in a wonderful dialect. The boys took me with them into their farmhouse kitchen to wash up. There I met their mother--a worn, but kindly woman.

At Bramhall, Beryl and Don were their usual gracious selves, and little Bob and Don were bundles of energy. Tea at the Williams' in the afternoon. They have three 10-year-old children billeted with them from London.

Left Manchester at 6:00 p.m., arriving in Malvern at 9:00.

Monday
August 21, 1944

At Malvern, George Huff reported on his trip to France. During his visit, several missions were carried out using SCR-584 close-support, but the front advanced too rapidly for this type of mission to be very effective. Ralph McCreary is to leave for the MTO about September 1. In the afternoon there was a general discussion of the need for a branch of the lab in France. Also a discussion of lab replacements and Doug Ewing's astounding letter.

At 4:30 left for Soames House with Ernie Pollard and Louise, arriving at 7:30. Louise drove the Pontiac on to London. The evening was cold and drizzly, and the frequent sound of buzz bombs did not make it any more pleasant.

Tuesday
August 22, 1944

Awakened at 5:45 to find it dark and raining outside, with the occasional wail of sirens--wished that I could stay in bed. Had an excellent breakfast at Soames House with Dave, Ernie, and Bill Whitsun, who will be with us on the trip to France. Whitsun is here on the automatic acceleration dive-bombing device for OSRD. Checked in at Heston Airport and returned to Widewing in hopes that flight conditions would be improved by noon. At 3:00 p.m. we were informed that all flights to "far shore" were canceled for the day.

Received a cable from Irvin Stewart as follows: "Your resignation submitted in your letter of July 30, 1944, accepted as of close of business August 17. Letter follows." A week ago I received a cable from Dr. Compton informing me that I had been appointed Director of BBRL at a salary of $650 per month.

Left Soames House at 4:15 by car for London. Talked with Vic Fraenckel at OSRD regarding the future of ABL-15. He believes their job in this theater is nearly over inasmuch as the Germans have little new radar to be jammed

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and since a chance of their being useful in the Pacific theater involves different problems of new frequencies and enemy organization. In these respects ABL-15 differs considerably with BBRL. Fraenckel said that RRL was getting more and more out of touch with theater needs and point of view. Brief talk with Bob Robertson, who is sitting in for Archambault during the latter's six-week visit to the US. Bob was concerned over V-2 and what BBRL might do to assist.

Brief visit with Louise and then back to Soames House for dinner. Walked along country road afterward inspecting five homes devastated by buzz bombs. It was wet and misty. I enjoyed the tinkling music from a distant piano, the quiet country air, the gardens, and the flowers.

Wednesday
August 23, 1944

Up at 5:45 a.m. again, but the weather was still bad, and we were back at Widewing by 9:00. Several buzz bombs came near Heston airport while we were there, and on the way back we stopped at a scene of destruction caused by a bomb which landed 15 minutes before. Several old buildings were demolished, and adjacent buildings were standing with walls missing and roof and floors caved in. Bricks and dust were everywhere, and several minor fires were smoldering. ARP workers in blue uniforms were digging about or checking up on missing persons. Bomb fragments were all about, and we picked up several. These misty days are bad for buzz bombs. They come over intermittently in salvos. The undulating wail of the siren in C-sharp minor is now a familiar and pregnant sound which I have come to dread with some enjoyment.

The war news from France is amazing. The American armored spearheads have crossed the Seine between Rouen and Paris and are turning northward in what threatens to be another large-scale encirclement. General Patton's armor is also reported in Versailles, and another advance is pushing east from Fontainebleau. Brest peninsula is now thoroughly occupied except for the coast bases at Brest, Lorient, which are regarded as low-priority. The Americans have crossed the Loire and are directing a spearhead toward central France, which may some day join up with the invasion forces in southern France. These are now 50 miles inland and apparently meeting little opposition. Toulon is under attack. The interior of France is described as a "vacuum", and the Maquis are doing a splendid job of liberating interior towns, besieging German garrisons, and mopping up generally. They have been supplied for nearly two years now with arms and munitions by night-flying "carpet-baggers" of the 8th AF and RAF using Rebecca-Eureka for pinpointing their drops. The German 7th Army in northern France has been thoroughly defeated, losing about 300,000 men and most of its equipment.

The weather cleared suddenly about noon, and we took off from Heston at 3:00 p.m. in a C-48. Passed by Isle of Wight and landed on ATC strip near Cherbourg, where we heard the radio announcement that Paris had been taken. War Correspondent Heinz, representing the New York Sun, who was a fellow passenger, pointed out the diplomatic value of having the French capture Paris. This enhances prestige of French and avoids increasing the feeling which has developed between Americans and British--the latter having scored no notable success so far.

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Transportation in France is obviously a serious problem. After two hours, Dave got a call through to 9th AF HQ, General Nugent, who promised to send a plane at 10:00 a.m. tomorrow. To Cherbourg in a jeep, supper at Normandy Base HQ at 8:00 p.m., then a stroll through town and along the harbor. Watched Ducks in an endless stream pushing off in the water to get loads of freight from the imposing array of ships in the harbor. Slept on cots in "College pour Jeunes Filles" used as barracks by Germans.

Cherbourg was mildly battered, continential, dirty, and unlovely. I would have been dismayed if I had not known it would be so. As it was, I enjoyed the spectacle and thrill of being in France. We were impressed again with the completeness of our air superiority. Cherbourg harbor was lighted up during the night while unloading proceeded.

Thursday
August 24, 1944

At the Querqueville air strip, the 584 AA battery was replaced by British using GL-Mark III. Thus ADGB takes over the defense of rear areas of France.

Took off at 1:30 p.m. in a C-78. Whitsun followed in an AT-6. Landed 1½ hours later at Laval after interesting flight down the west coast of Cherbourg, sometimes skimming the water from 20 feet. Flew in tight circle around Mont St. Michel, a beautiful spired cathedral atop a rocky pinnacle with a picturesque cluster of houses on one side of the base.

Arrived at 4:00 p.m. at 9th AF HQ located in an ancient oak tree grove, the grounds of a chateau five miles from town. General R. E. Nugent, Deputy Commanding General under General Vandenburg, talked with us for about an hour and a half. We drove to town and put up in the Hotel du Poste. Ernie and I got a good double room for 55 francs. We were picked up at 8:00 p.m. and taken to the Commanding General's house for dinner. This town house had been occupied by German staff officers, and pictures of Hitler and others were shown to us. Colonel Dixon, A-2, Colonel Tindall, Experimental Section, were there, as was Lieut. Thompson, the Commanding General's secretary.

On radar, we did a pretty good job of discussing the utility of the MEW and SCR-584 sets, the supplementary role they play, and their offensive possibilities. General Nugent was most receptive and friendly--a quick-thinking, effective business type of soldier. We conspired with him on how to get the Fairlight MEW back for 19th TAC. He brought up the problem of diminishing Oboe coverage for 9th BC, and we discussed the general problem and the desirability of strong 9th AF representations to Air Ministry for rapid mobile ground station work on the continent. General Nugent is a staunch supporter of radar, and he would like to use Oboe for all close-support bombing. We discussed the "when not to bomb" problem, the use of microwave beacons interrogated by the SCR-584 AA to enable the identification of American night fighters which follow enemy bombers into forbidden (1AZ) zones, the use of Shoran by the 9th BC, the SCR-584 set for night PRU control. In the general discussion General Nugent indicated the strong possibility of the war in this theater being over in one month. He thought civilian

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field service should continue to the end and would pay off in the Pacific. Colonel Tindall said the toughest problem for the 9th right now was communications and asked for point-to-point transmission with 100-mile range which stopped when it got to the desired point. Two channels to each Command plus three to the front would be required--eighteen in all. Whitsun's acceleration bombsight was badly wanted by Tindall, who had been in on the tests at Bovington. The 9th AF later put in a requirement that all of its fighter-bombers be equipped with it.

We departed at 10:30, leaving Dave at the General's house.

Rumania has given up the struggle and now fights with the Allies, reversing the influence of some 18 Divisions on the Russian front.

Friday
August 25, 1944

Back to 9th AF HQ, where we talked with Colonel T. J. Cody re MEW and SCR-584. He is all for using the MEW as the principal operations control center. He described their radar problems as "sector defense" as far as the defense of Cherbourg, Brest, LeHavre, etc., were concerned, and "offensive" meaning fighter-bomber control.

Left at 12:30 for 9th TAC, arriving at 2:00 p.m. Talked with Colonel Hopkins, Radar Officer, and the ORS men--Dr. Smith and McLeary. Spent an hour with Colonel Meyer, A-3. He describedthe day's operations of 9th TAC beginning with the planning at 7:30 p.m. the day before. Today's operations were very extensive and included escorting three armored columns, attacking JU-88's evacuating the Bordeaux area, and attacking Von Kluge's HQ. The results of the latter operation were marked on the operations board as "excellent", and it was later reported that Von Kluge had been killed.

Left after supper and drove to the MEW site near Longy des Perches. Arrived after nightfall. Talked with Capt. Andress, watched MEW plots and general operation. The plotting room is evidently too small, and only 20 per cent of the tracks are now being plotted. There is also insufficient communication to 70th Wing control center to transmit more than this amount of information. A large RAF raid passed overhead and showed up beautifully. The MEW is out in an open field; the Type 13 height-finder is alongside and looked like a good job. It has taken about three days to move from one site to another and get operational. This has now been done three times.

Turned in at 12:00 p.m.

Saturday
August 26, 1944

Today has been tops in interest and excitement. It began with the four of us being wakened by me at 8:00 a.m. We had been sleeping in an Army tent near the MEW with our bed rolls on the ground. Ernie's remark that the "hump" was not in Burma after all seemed quite appropriate, but we had a good night's sleep at that. Breakfast with Capt. Andress of pancakes and jelly, plus an oat cereal. Shaved under the trees, and then made another brief visit to the MEW. Capt. Andress explained the tie-up of the

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MEW with 70th Wing, which does all of the 9th TAC's controlling. It is evident that with the defensive possibilities of their set being appreciated only occasional use of it for the control of offensive sweeps--or at least "riding along" with offensive sweeps--is now being made. This is in large part due to the rapid advance of the American Armies with which MEW could not keep up. When it moved into its present site five days ago, the snipers had not yet been cleared out, but within three days the front was 65 miles ahead. As a GCI unit, the MEW has 35 "kills" to its credit--12 at night and the balance by day--all scored at its first site, where they were nearby fighters to be controlled. At the moment, fighter bases are too far behind and the front too far ahead. The maintenance boys under Lieut. Brown are doing an excellent job, and they were pleased when Pollard told them so. It looks as though Bob Watt would be useful here for a few days, and Andress has asked for BBRL aid. Chief Controller Miller told us a bit about controlling with the MEW, and stated that enemy planes could be determined in 60 per cent of the cases by the way they fly, where they come from, and their Window-laying. The principal technical difficulty with the MEW is the lack of load-handling facilities in the operations room. The B scans are not being used at all and should be. This will be overcome by the James method and large screen being made for them by BBRL.

Left the MEW at 11:30 and proceeded some 6 miles to the site of the two SCR-584's on the grounds of a chateau. Had lunch and then climbed over the first close-support set with Lieut. McDonald. Lieut. Blackburn of the 2nd CS unit was also there. These sets had arrived a few days before from their second site, at which George Huff and Ralph McCreary had assisted. No mission had been laid on since the three-level bombing jobs around Montigny, where McCreary had been visiting. This site, as for the MEW, was already too far behind the front, and the boys had been told by 70th Wing to be content for a little while until things settled down.

We left the SCR-584's at 2:30 and drove eastward to HQ Advanced of 9th TAC in hopes of seeing General Quesada. Arrived at HQ near Dreux to find that General Quesada was in Paris inspecting airports, but expected either very soon or not for days. We chatted with his aide, a Polish squadron leader. Yesterday had been one of the most successful of the TAC with 120 German aircraft destroyed. Forty were on the ground--were transports engaged in evacuation from Bordeaux region; 32 were in the air and were shot down by 9th TAC; the balance in the air by 9th TAC. Our side lost about 20 fighters.

General Quesada arrived at about 4:15. He is a person of quiet zest and decision--absolutely uninhibited. He was delighted no end with the report of what his boys had done the day before. On radar he was quick to show his desire to see MEW and 584 used offensively and more often. He agreed to my suggestion that they all be moved to the Paris area--or just beyond--at once. The MEW he described as the best offensive instrument he had and vowed to use it. In order to break down the lack of understanding at 70th Wing and the "bitchin'" at the MEW, he asked if Ernie could stay and help get things going. We agreed to do this after our survey trip here had been completed.

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D810.S2.T78. A War Diary, 1944-45. John G. Trump, 1973.

Left General Quesada's HQ feeling very much "set up", and--with Dave driving--headed for Paris. More and more burned-out German vehicles were seen on the roads, and occasionally we drove through heavily damaged towns. As we neared Paris, the population moved at us with increasing enthusiasm, and we replied in kind. At Versailles the crowds were in the streets and in holiday mood. At one point there, we got ourselves thoroughly kissed all round by a bevy of damsels. Paris looked as though it had just barely been liberated. Barricades were still in many streets; burned-out tanksand cars plus evidence of street-fighting were all about. But the crowds were out--even more enthusiastic than those in Versailles. We drove under the Eiffel Tower--up to the Arc de Triomphe with its flower-bedecked plaque and ever-burning flame--then on to the Place de Concorde, L'Opera, and Le Grand Hotel. Here we obtained four single rooms. While I was washing up, there was violent shooting in a nearby street as some remaining sniper was ferreted out.

For supper, we crossed the street to what had once been the Restaurant Roulant. It was just closing, but the management on hearing that we were Americans and being pressed by the crowd, invited us in. We soon acquired at our table two young Free Frenchmen and three good-looking mademoiselles. Three bottles of wine, olives, noodles, cheers for the French, cheers for the Americans, Pigeon-French English, embracing by our gals, plus passing gals, made up a very noisy and stimulating evening. Left at 9:30 after paying the 600 franc bill and tipping generously--with our cute Henriette permanently attached to us (particularly me, with whom she was bound she was going to spend the night). Henriette was a cute little child of nature who could draw a 30-inch vacuum when she kissed, was delighted with any attention provided it was intimate. She distributed her affections quite uniformly among the four of us. After a lot of fun, it was finally left to me to take her or get rid of her, and I finally succeeded.

At 10:30 a German air raid on Paris provided us with a dramatic spectacle reminiscent of some of last March's raids on London. Paris is still practically defenseless, and the few guns and 40 mm. tracers must have amused the German bombers, who roamed the city at will for over an hour. We climbed to the roof of the Grand Hotel to see the fires better. Three large fires were blazing, and some sniper bullets were whizzing by. Dave and I decided to drive down to the large fire beyond Notre Dame, which was silhouetted in the glare. Driving the jeep through the darkened streets along the Seine was thrilling. The blaze covered several blocks devoted to wine merchandizing. We rolled some barrels, got all about the place, but failed to acquire any wine. On returning, we started to cross the Seine near the blaze and were brought to a sudden stop by a young Frenchman who ran to wave us away from the snipers on the roofs ahead. At the same time shots rang out, and we backed 100 yards at top speed, stopped, and Dave borrowed a rifle and got in several shots. After an altercation with a drunken major, we returned to the Hotel about 1:00 p.m. with no further mishaps.

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Sunday
August 27, 1944

Breakfast on K rations and excellent white wine at the Cafe de la Paix. Exploratory trip through the German HQ in Paris, which was located diagonally across the street. This was still full of official and personal belongings, but was being evacuated for use as an American HQ. Drove off to West Bank to the Institute of Radium in search of the Joliots. Met Dr. R. Latarget, a pathologist studying the effect of ultraviolet and carbon hydrates on cancer. He informed us that the Joliots were away--Mme. Joliot was in Switzerland. He said Dr. J. J. Miller of L.M.T. was informed on radar developments, and we all drove to Dr. Miller's home near Trocadero. He proved to be an extremely friendly man. Mrs. Miller, a second couple, and Dr. Latarget, plus the four of us made up the party. Miller explained that they did only development work at L.M.T.--had developed a velocity-modulated receiving tube for 5-15 cm. with wide bandwidth, 20 milliwatts. They had also developed a CW transmitting tube for communication tunable from 6-12 cm., 40 watts out. They had assisted in the production of standard blind-landing systems on 10 meters. I may expect Dr. Latarget in the States one year after the war--gave him some names, including Drs. Holmes, Aub, and Dresser.

We understood that Col. Behn, president of IT&T, was in town, having arrived at the head of the 2nd French Armored Division. A call to him from Miller got Dave and me an invitation to lunch at the Ritz, where we met Mons. Rabuteau, director of the L.M.T. laboratories. Rabuteau explained that his company had accepted only development work which would take a long time and that they had steadfastly refused to take on pulsed work. Col. Behn offered the facilities of L.M.T. to BBRL, though without knowing too much about it. We consumed quantities of Bordeaux and Champagne arranged for by the masterly Col. Behn.

We left Paris at 3:00 p.m. and drove approximately 100 miles to Mamers. At Chartres, we inspected the cathedral and had supper at 9th AF HQ (Gangway). At Mamers, we stopped at Hotel Espagnole, from which the Germans cleared out a week before. Walked about with Dave singing La Marseillaise and "bon soir"-ing the inhabitants. After a talk with the proprietor and his wife, we went off to bed.

Army news, August 27 - 2100: "Late flash announced fall of LeHavre and Rouens. In Paris, French and American troops have almost cleared city. Snipers still active, and shots were fired at General DeGaulle in vicinity of Notre Dame. Bulgaria has followed lead of Rumania and has turned her troops against Germans."

Monday
August 28, 1944

Left Mamers at 8:30 a.m. and proceeded to HQ 70th Wing (Forest) some 15 km. away. This Wing, which does all of the controlling for 9th TAC, is just moving out to Versailles. General McCauley was most amiable and spent an hour with us. The MEW is on the road to Versailles, and the SCR-584 to a

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point north of Paris. General McCauley described the MEW as doing an invaluable job and far more than the MEW boys realized. We saw the operations room from which all missions are controlled, and the facilities--Y service, Army and AAA liaison, all radar reports, etc.--plus VHF, FM, teletype and telephone for tying the operations together. MEW reporting--in one case--resulted in the breaking up of a formation of 70 German planes by a flight of 8 fighters, who got 6 and scattered the rest, with 11 more picked up later. He gave several instances where the MEW supplied the data which saved our fighters from being bounced during the beachhead days. He is planning to use the MEW as an advanced control center which could take over when things got out ahead. This means that the plotting facilities need to be expanded and that the beginnings at least of more complete control facilities will need to be provided at the MEW site. McCauley is very much interested in the SCR-584 close-support unit and is looking forward to using it over and east of the Seine.

After phoning about to locate General Weyland, Commanding General of 19th TAC, we took off at high speed for Laval, where Spitfire Rear is located. Neither General Weyland nor Colonel Williams was there; so we reported in to Gangway, 9th AF HQ.

Talked with Colonel Hall, Commanding Officer of the 9th AF PRU. He was much interested in our presentation of the SCR-584 PRU control and undertook to get a request put through for 1-100 mile SCR-584 unit plus ten AN/UPN-2 units. Colonel Hall said the night reconnaissance was becoming more important and that a good navigation system was indispensable. We discussed the use of GEE and Loran for longer range. He could not afford the additional operator which these require except in the A-20 plane.

We had a very profitable talk with General H. S. Vandenburg, Commanding General of 9th AF. Discussed need of BBRL for more direct contact with AF operating groups and suggested a BBRL man be attached to 9th AF HQ. General Vandenburg was most enthusiastic. We learned from him and Colonel Cody that the Fairlight MEW was to be shipped to 19th TAC on August 30. General Vandenburg expressed strong desire for V-beam to take over the defense of Paris when the front moves on. Returned to the Hotel du Poste at Laval for supper; then had long talk until 11:00 p.m. with Colonel Williams at Spitfire with two Scotches at the Chateau Club before returning. Colonel Williams offered to provide air transportation whenever BBRL moved it.

Tuesday
August 29, 1944

Aroused at 7:00 a.m. Proceeded to HQ 12th Army Group for 8:30 appointment with Brig. Gen. John H. Hinds, Field Artillery. He and Colonel Dale are interested in obtaining the SCR-584 modifications for one artillery and mortar-fire spotting control unit. This is already set up as a program with a crew under 2nd Lieut. Ford of the 749 AAA Battalion to run it. I agreed to spark-plug this a bit, working through Colonel Hess and Captain Riley of the Technical Section, ETOUSA. General Hinds stated that the greatest present need of the ground forces was for a mortar-and artillery-spotting unit. Duke Unio has apparently developed a sound ranging device which does a fairly good job at this under favorable conditions. General

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Hinds did not encourage the investigation of a road-watching radar on the grounds that it could be useful only occasionally when line-of-sight conditions prevailed, but mainly because of fear of becoming an experimental section. This should be discussed with ETOUSA. On front-line identification, he was doubtful--in part because the front line was so nebulous, and very few really knew just where they were with relation to the front. In Africa, the command had been unable to get the front line to mark itself with flare shells. This is of course quite different from Window, which cannot readily be seen by the enemy. General Hinds did encourage our investigation of ground force problems. He believes that the Germans are ahead in many Army developments, including better tanks, better armor on tanks, longer-range guns, and better armor-piercing tank guns. At the moment, we are succeeding by overwhelming the enemy numerically. The main war issue is being decided by the relative ability of the opposing forces to supply their basic needs--food, fuel, shells, and transport.

Back at Gangway, Ernie and I talked with Major Stammerjohn, and left with him our four bed rolls. The 9th AF has the following radar:

Air Defense Command - 6 AMES Type 15, 6 Type 21
6 Type 11 (2 operational),
3 Type 14, 4 SCR-602T-1,2,3
9th Tactical Air Command - 1 MEW, 2 SCR-584 (with
4 to come), 2 SCR-582,
2 AN/TPS-3, 2 Type 15, 2
Type 11 (to be replaced by
Type 22), 1 Type 13
19th Tactical Air Command - 1 MEW, 1 Type 13,
4 Type 15, 4 Type 11 (to be
replaced by Type 22), 4 LW's
Type 6, 2 SCR-584 (with 2
to come)

Talked with General Quesada, 9th TAC, who had come for conference. He will try to get the MEW east of Paris and will put the SCR-584 close-support units north and south of it. He asked for means of distinguishing the leader of a group in SCR-584 control. On being told of the BUPS beacons, he instantly arranged to send a P-47 to Defford for BUPS installation.

Back to Laval for excellent dinner and to airport. All flights canceled because of low ceiling (zero) over Cherbourg Peninsula and the Channel. Dave borrowed a C-78 (Cessna) from Colonel "Pinky" Williams, and we took off at 2:15 with intentions to turn back if conditions became too bad. I was navigator, and flew the plane (not rudder control) for about 15 minutes. Flew to St. Michel, then to eastern tip of Cherbourg, then headed for Isle of Wight. Flew at 60 feet just under the clouds and through rain squalls most of the way. Immediately over England the ceiling increased. We navigated accurately to Heston, landing at 4:15 p.m.

Supper at Soames House. Discussed with John Dyer the desirability of BBRL and ABL-15 combining in setting up a Paris branch laboratory for handling contacts, communications, and providing a source of test and spare equipment, plus a home for technical staff. To Mount Royal at 9:30 with Ernie.

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Wednesday
August 30, 1944

Had talk with Louis Ridenour at Widewing, particularly about the field service problem in this theater and the attitude of the Radiation Laboratory toward it. Louis expressed himself as very much disheartened because of the Radiation Laboratory position with regard to field service and BBRL. It appears that they were of the opinion that BBRL activities were necessary only until D-day and that the effort now is of minor importance. His own ideas regarding the tremendous and increasing importance of radar field service, of the futility at this time of long-range development work, and of the fact that the first few equipments invariably do the most good coincided completely with those expressed in my newsletter to Lee DuBridge dated August 17. He felt that I should make a strong effort to sell these points when I returned to the States.

Before leaving for the UK, Louis wrote a letter dated August 21 to Lee in which, among other things, he said:

"It seems to me that a very curious mental attitude seems to be developing at the Radiation Laboratory: one in which the vital interest in the problems at hand, which used to characterize the place, is largely lacking. I can only attribute the doubts which have been expressed about the wisdom of continuing the BBRL organization in this light. There is excellent evidence that BBRL has done an extremely useful and important job in aiding the effective use of radar in the European Theater. This job is continuing and is growing more important daily as the scale of use of radar grows. I hope that you and the other responsible members of the Steering Committee will recognize this by continued vigorous support to BBRL. I should go so far as to say that no single activity of the Laboratory has achieved as much in the course of the past six months toward shortening the war as BBRL has done."

Louis and I discussed briefly the possible future deployment of the Air Forces in this theater, the value of V-beam in the defense of Paris, the fact that the first Eagle is due here on September 15, and the evidence that the "when not to bomb" problem could be solved by the use of Gee since the errors have been entirely gross navigational errors and not near misses as previously reported.

Talked with Colonel Snyder of ASC regarding the desirability of keeping ASC closely informed on BBRL moves so that official action could be instigated. Agreed to have Clyde Cowan act as ASC liaison for this purpose.

Talked with Colonel Lack and Major Hamilton regarding frontline identification with 60 mm. Window-filled mortar shells. Colonel Lack is now prepared to write a requisition to the States for the modification of the 60 mm. mortar shell capable of at least 3000 ft. altitude and carrying 30,000 dipoles.

To Malvern with Ernie Pollard and Louise, arriving at 5:00 p.m.

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At a special Steering Committee meeting, reported on the trip through France and the obvious need for increased BBRL assistance on the continent, for a BBRL representative at 9th AF HQ, and for a Paris branch. Dick Hodgson was chosen as 9th AF representative, and Hugh Kendall was elected to survey the requirements for an advanced base of BBRL. The Committee meeting continued after supper until 12:00 p.m., with a discussion of personnel requirements for the work which a V-beam set and the diversified close-support and MEW effort on the continent would involve.

Thursday
August 31, 1944

Meeting with John Dyer and John Chase to discuss the desirability of joint civilian effort in France. The outcome of this was a decision to act together, with Dick Hodgson being the 9th AF contact for both BBRL and ABL-15. Hugh Kendall, assisted by Gordon McCooch, will consider the most effective set-up for the French Branch, which will most certainly be located in or near Paris. John Dyer and John Chase will join up with Dick and Hugh for a survey trip beginning Monday, September 4, in which they will endeavor to ascertain the RCM and communications problems on which ABL-15 would be helpful.

The concentration in a single unit of civilian technical assistance in the fields of radar, counter-measures, and communications impresses me as an extremely progressive step which conserves personnel and increases the effectiveness of the general effort.

Left Malvern at 4:00 p.m. with Louise for London to attend a conference with General Spaatz. This conference was subsequently postponed to the following day.

Friday
September 1, 1944

Continued my efforts to interview as many key military and radar people as possible before returning to the States, in order to ascertain their opinions on radar in general and on the requirements and utility of radar field service in particular. Met Lieut. Gen. Carl Spaatz, Commanding General, USSTAF, at luncheon at Park House through arrangements made by Dave Griggs. The luncheon party included more military rank than I had ever before seen at one place, including Major General Knerr, ASC and Deputy Commanding General, USSTAF; Major General Fred Anderson, Operations USSTAF; Brig. Gen. Curtis, Chief of Staff; Brig. Gen. Hill, Surgeon General; Colonel Fred Maxwell, Director of Operations. Fortuitously I found myself on General Spaatz' left, with General Curtis alongside and General Knerr across the table. I managed to get in some good licks about radar and field service and found General Spaatz in good agreement. After luncheon, Spaatz signed a letter to General "Hap" Arnold prepared by the ASG in which the continued and augmented assistance of BBRL was urged.

Called on Sir Robert Watson-Watt. He concurred fully with our general beliefs on radar field service. As far as the British were concerned, he stated they had a continuing need for assistance on radar problems, but now--flushed with victory--they were getting very difficult to work with.

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I was not able to say that I had observed this spirit in our American contacts. Sir Robert thought the war with Germany was likely to terminate in a matter of weeks rather than months. He believes that strong field service is essential in the Pacific and that continued field service in the European theater, aside from its immediate value, was desirable because of its importance when these Forces are deployed. After mutual expressions of appreciation, I departed.

Wrote a letter to General Vandenburg introducing Dick Hodgson and Hugh Kendall and explaining the advanced field base set-up.

Saturday
September 2, 1944

Discussed advanced service base with John Dyer, John Chase. Wrote letter of direction to Hugh Kendall and Dick Hodgson, plus letter of introduction for Kendall to Colonel Isosthenes Behn.

Talked with Dave Davidson re Loran. Operation of Loran and SS Loran is now scheduled for September 15. The British have messed up the map situation, but the energetic efforts of Curry will probably get enough Air Ministry pressure to save the day. The first user of the European system, significantly enough, will be the photo-reconnaissance section of 8th AF. Dave has been training them.

Took care of passport visas and signed up with Louise for return flight to good old USA on Pan American Clipper leaving Monday morning.

To Widewing for final talk with Hartley Rowe. He strongly supports our position on radar field effort and showed me his letter to Ed Bowles to this effect. Left Widewing at 4:30 p.m. with Hugh Kendall, Bill Schwann, Al Kelleher, and John Garfield. K-rations en route plus dreary rain. At the lab we found a placard notice: "Farewell Party to John Trump and Louise Goldie - County Hotel - Saturday at 8:00 p.m." It was a swell party. Bill Smith at the piano was the band. Louise Winston and Bud Barnard ran the bar. People said nice things to me, and I danced more than I had ever done before at the County parties. Unfortunately, Louise arrived very late because of the need to clear our flight arrangements before leaving London. We adjourned at 11:00 p.m. to the lounge. Some talk and some songs with Joe Platt at the guitar until 1:00 a.m. It was also a farewell party to Dick and Hugh, who were to leave early in the morning for France. Also for Ernie Pollard and Len Hartman, who had a week's shift in France ahead of them.

Sunday
September 3, 1944

Talk with Steve Jeffries about property accountability and how to wind things up. This was later discussed again at Steering Committee. I am to take this up with the Radiation Laboratory, MIT, and OSRD and indicate the general method. Probably some items will be deployed to the new theater, others turned over to a Government representative--either OSRD or the Army.

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Gave a short talk during seminar, recounting the good work done by BBRL, pointing out the need to continue this effort unabated for the benefit of this and other theaters, describing our plans and the need for an Advanced Service Base in France for BBRL and ABL-15 jointly, explaining my mission to the States, and telling them they were a swell crowd.

At coffee at the County we joked about a BBRL Alumni Group--which would be fun. Charlie West voted the most likely candidate for president.

At Steering Committee meeting, we went over some of the more important projects. The SCR-584 close-support program will need at least one man in the field for each TAC, plus one for 9th BC if their SCR-584 medium bomber control program goes over. In addition, we need one top beacon man plus four technician field men like Rawcliffe or Smith to cover the dispersed BUPS situation. Twenty BUPS radars are to be available late in September. We are putting our only one in a P-47 for 9th TAC now. The group emphasized the value of rotating staff and of making use of company engineers.

An hour's talk at 5:00 p.m. with Mr. Ratcliffe, TRE Superintendent in charge of PDS. He is thinking precisely along our lines on the increasing importance of field effort. They are planning their Pacific set-up now, but it looks as if it would develop slowly. I thought it might be of value if Ratcliffe visitedthe States sometime soon. We made mutually agreeable remarks. Mr. Rowe was still away on a holiday.

Said "good-bye" to the gang and were off at 6:15 for London, driving through a drizzly rain. Louise and I had an excellent supper at the Bell Hotel in Tewkesbury. The last hour on the road to London was spent in driving through the black night without headlights.

Monday
<u>September 4, 1944</u>

It was no struggle to get up at 6:00 a.m. on this overcast London morning. Louise and I breakfasted on canned fruit, juice, and English tea biscuits and took off for Airways House on Buckingham Palace Road for a 7:30 a.m.check-in. I then returned the good old Pontiac to the garage and went back to the terminal via a double-decker bus.

Took off from Croydon at 10:30. Two fellow passengers are known to us: Dr. A. H. Blatt, who has been with London OSRD on liaison work for Divisions 8 and 9 (explosives and chemistry), and Bob Wilson, who has been at ABL-15 for nearly a year. The BOAC C-47 plane is completely blacked out, but has a good-looking English stewardess.

Arrived at Rineanna field outside Limerick, Ireland, at 2:45. Excellent steak dinner for the four of us (Dr. Blatt, Bob Wilson, Louise, and myself); then a 40-mile bus ride along the river Shannon to Foynes. After arriving there, I checked my courier bag at the American Consulate, whose incumbent has barely survived a 15-month assignment to this quiet spot. Ireland looked green, poor, sparsely settled with peasant white-washed stone cottages. Ruins of castles--mostly towers--still stand, lending a touch of glamor and tradition to the countryside. Grazing cattle, ducks, green hills, and views over the Shannon estuary complete the local scene at Foynes. After an excellent high tea with bacon and real eggs, we took off in the giant Pan Am Clipper at 9:30 London time with 11 passengers.

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Arrived at Botwood, Newfoundland, at 7:30 New York time (6 hours behind London time). The trip had been quite steady, and we had enjoyed almost 12 hours of horizontal sleep--in most of our clothes. After breakfast we took a walk around Botwood, which has little to recommend it. It is an RCAF station which Pan Am uses from April to October. Took off again at 9:00 a.m. for Shediak, New Brunswick, with an additional 24 passengers from St. John's.

The New York Times, dated Sunday, was available on our flight from Ireland. The Americans are reported as having captured Lourain and liberated Brussels. Two places have been penetrated along the Maginot Line; evidently it is not seriously defended. The Gothic Line in Italy is reported to be crumbling, Pisa having finally been captured. In southern France, the Americans are still 14 miles from Lyon--strangely enough. General Gordon Saville of 12th TAC is reported to have done a remarkable job in bottling up and destroying German vehicles in the Rhone Valley. Paris has been the target of some robot bombs since Friday, but very few--as we noted--are still coming to London. About half (120) of the Pas de Calais sites are reported captured by the British and Canadian advance along the coast. The Russians are again driving ahead in the Bulgarian region. The Finns have given the Germans until September 15 to leave their country. The general tendency of all this news is to give the impression of a complete, overwhelming victory, with the German war over a few weeks from now. The more conservative military opinion sees a planned withdrawal to German's inner defense lines and a last-ditch struggle which may drag through the end of the year. The weather will soon become Germany's best ally.

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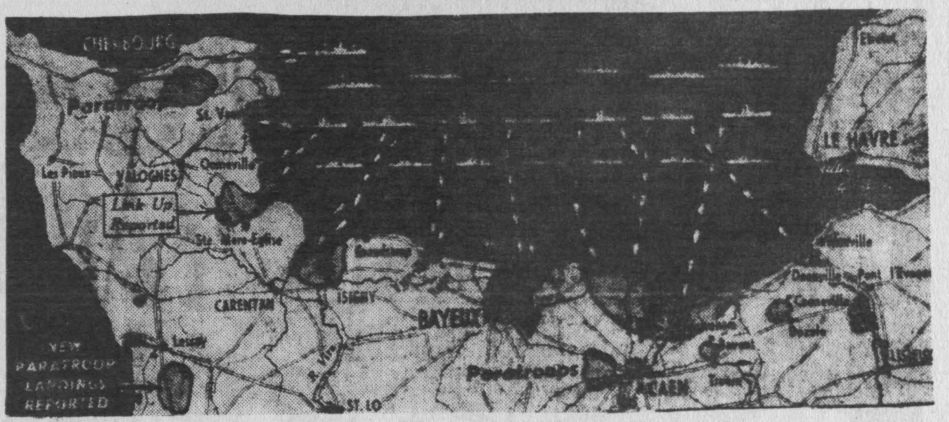
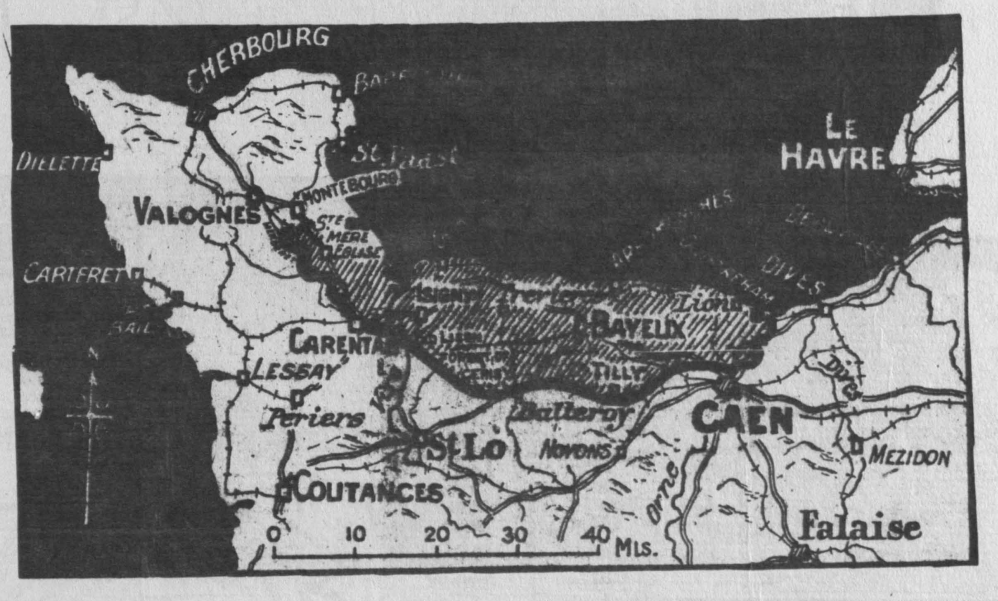
NORMANDY FRONT

(Invasion began on June 6, 1944.)



June 8, 1944



June 13, 1944

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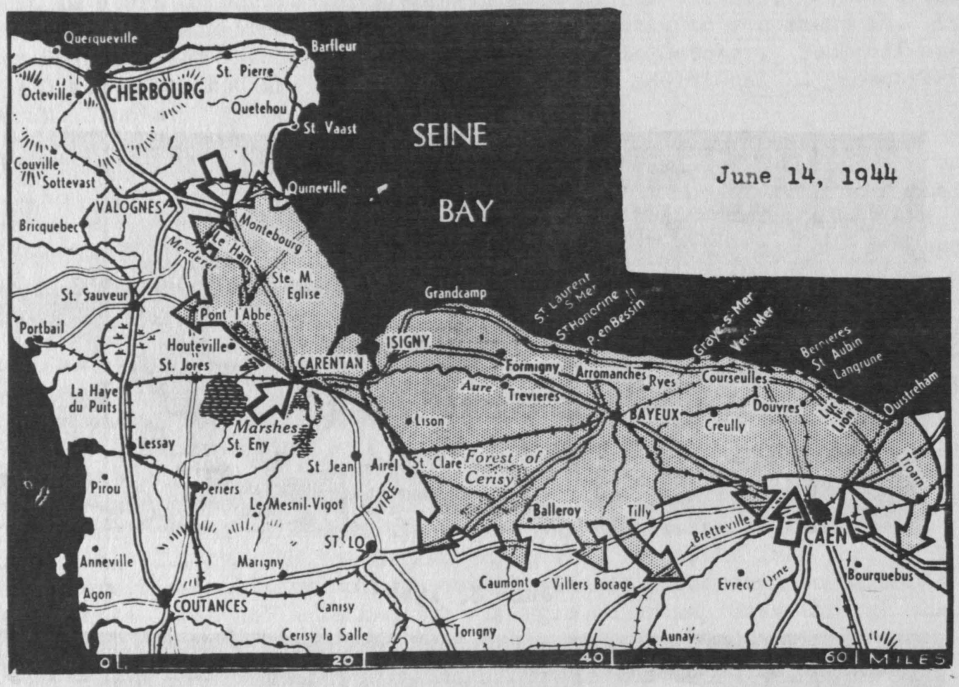
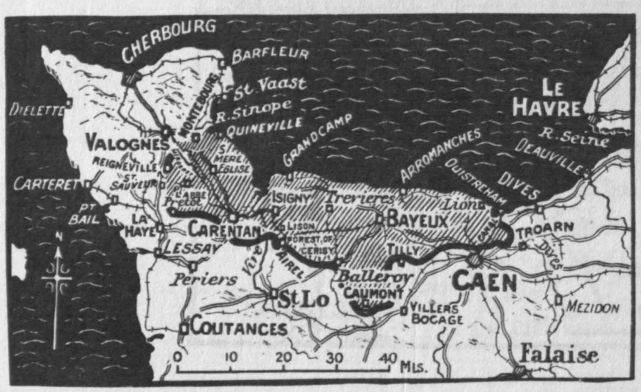
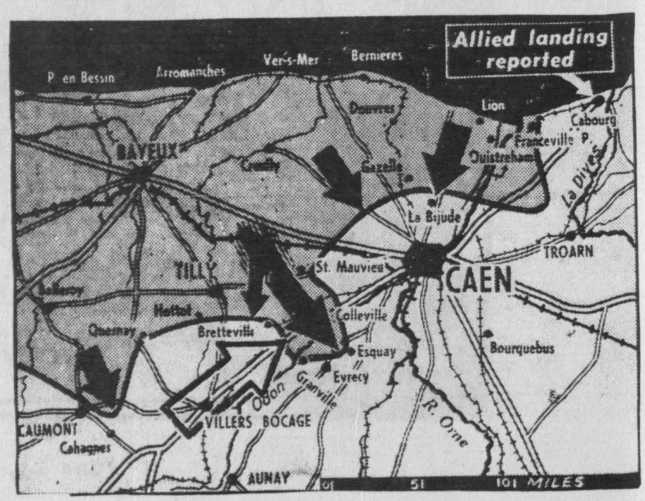
NORMANDY FRONT (Cont.)



June 14, 1944



June 17, 1944



June 24, 1944

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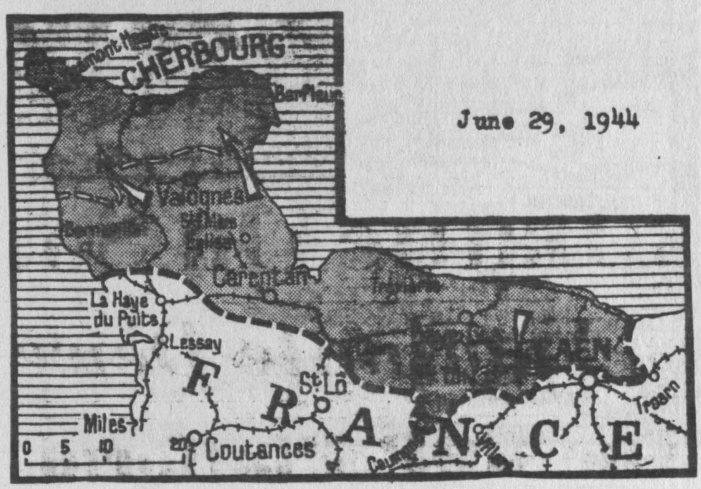
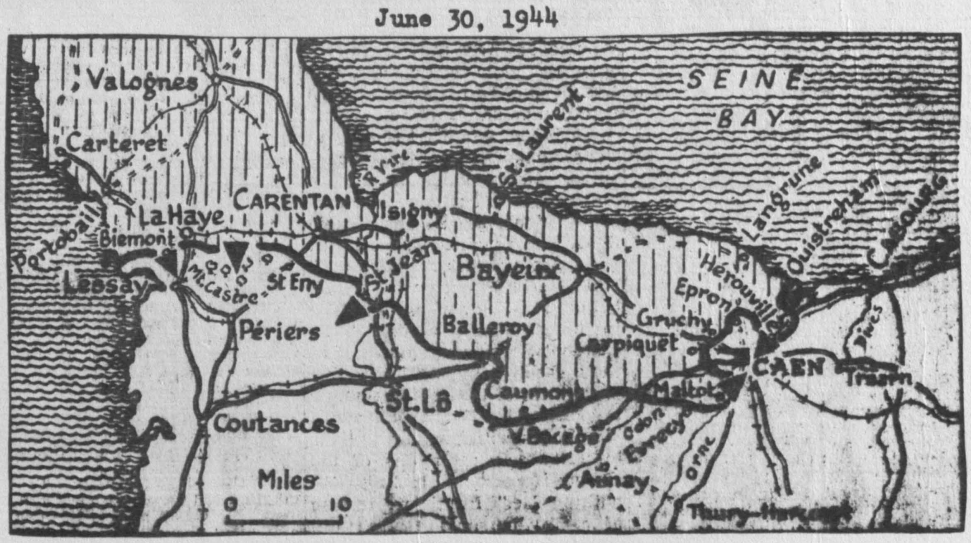


June 29, 1944



June 30, 1944



July 9, 1944

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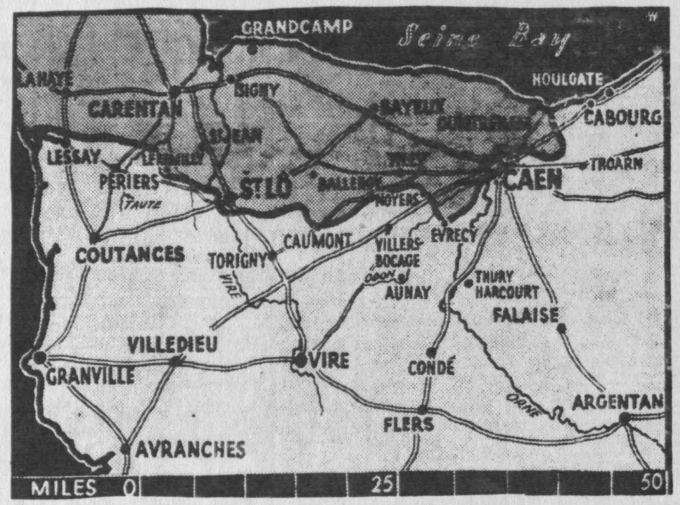
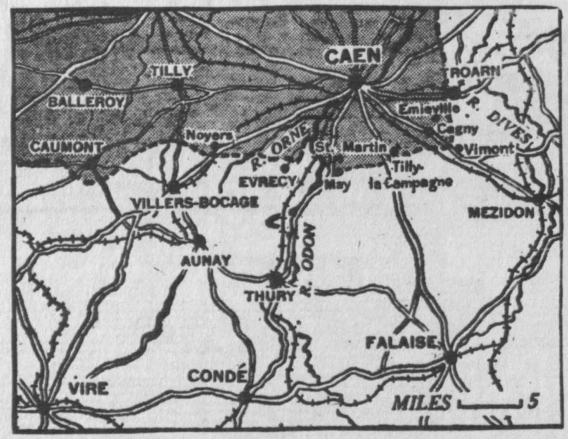


July 19, 1944



July 26, 1944

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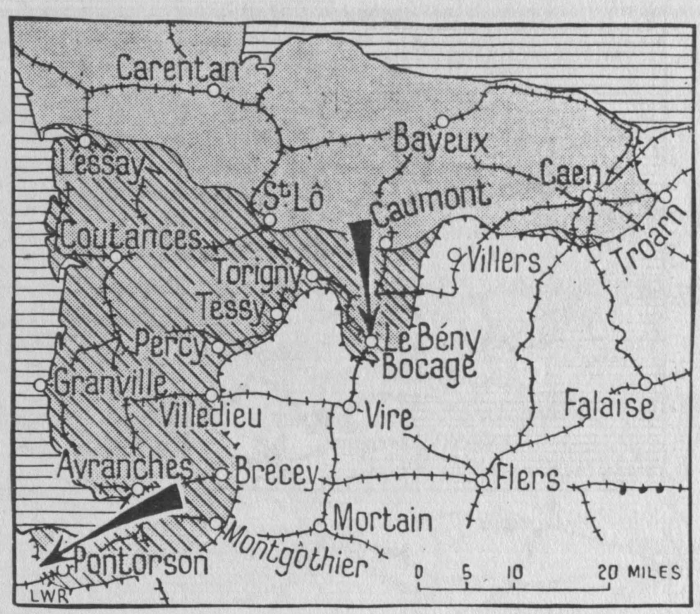
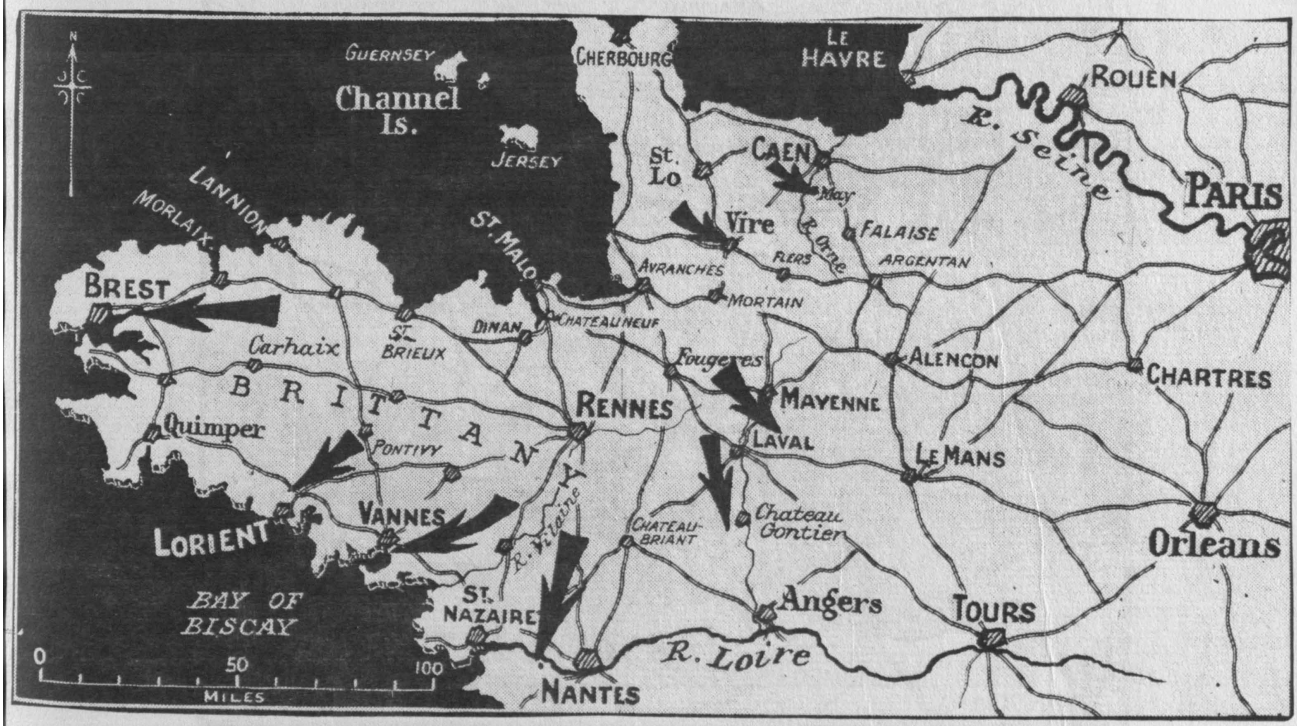
NORMANDY FRONT (Cont.)



August 3, 1944



August 6, 1944

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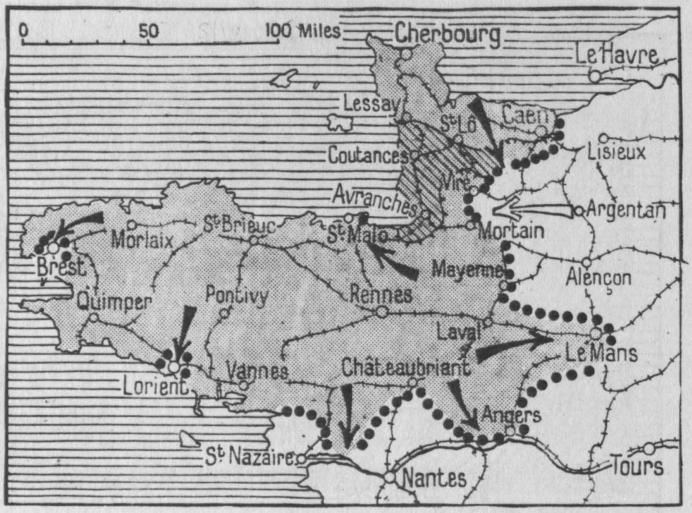
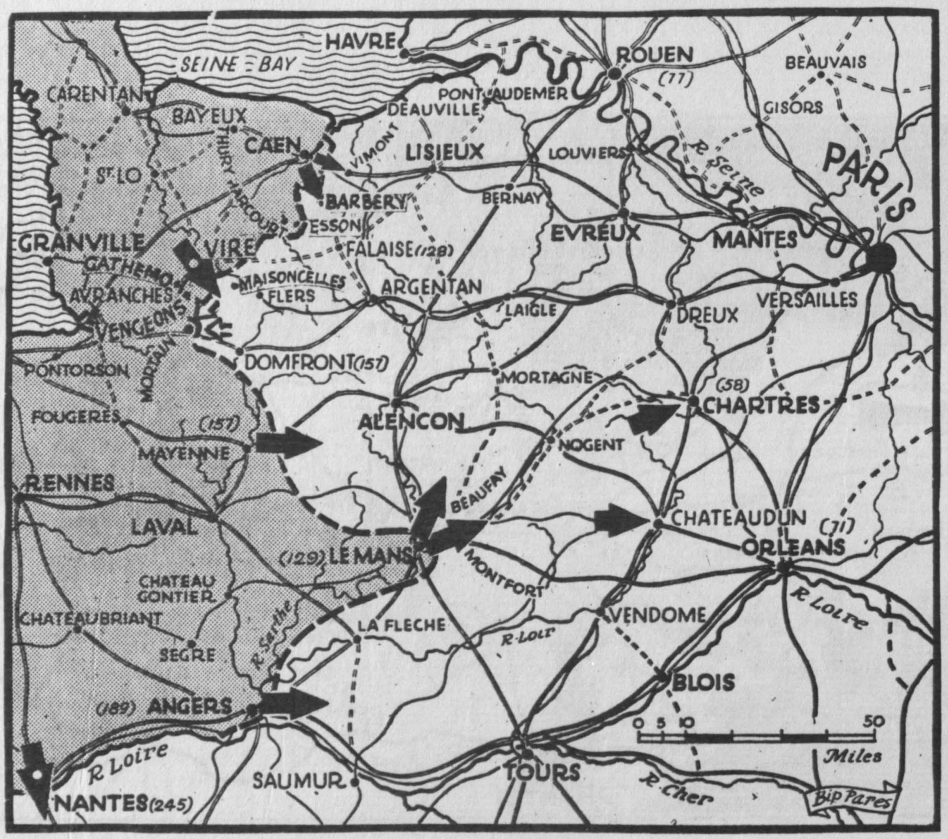
NORMANDY FRONT (Cont.)



August 10, 1944



August 10, 1944

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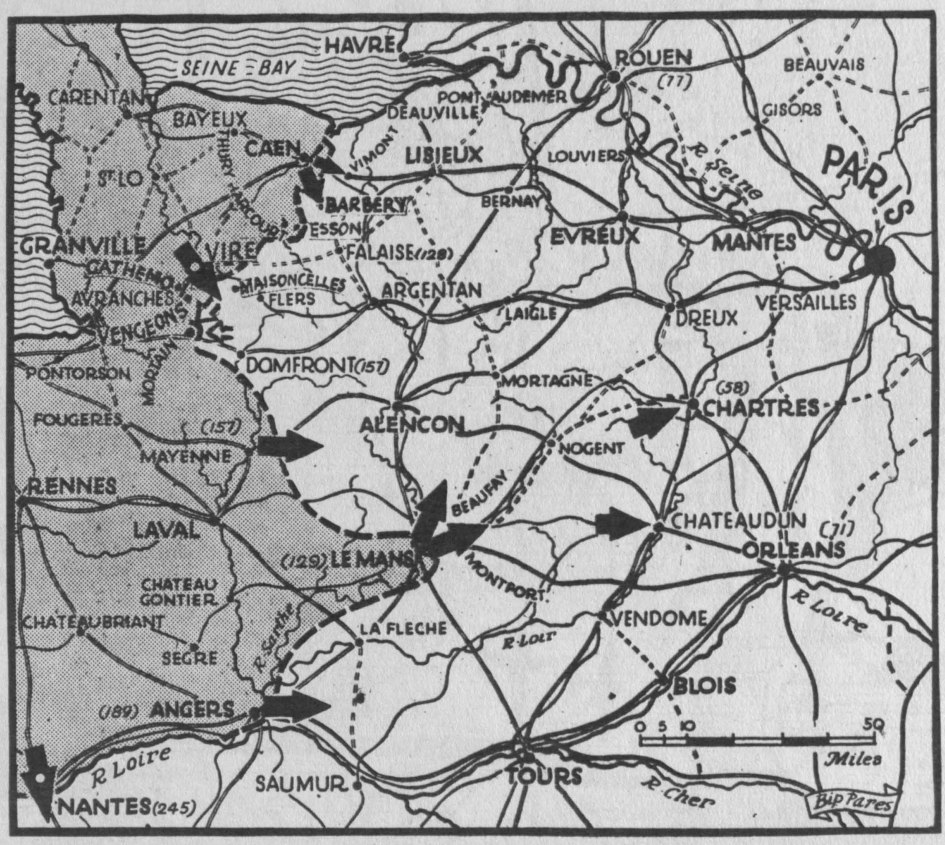
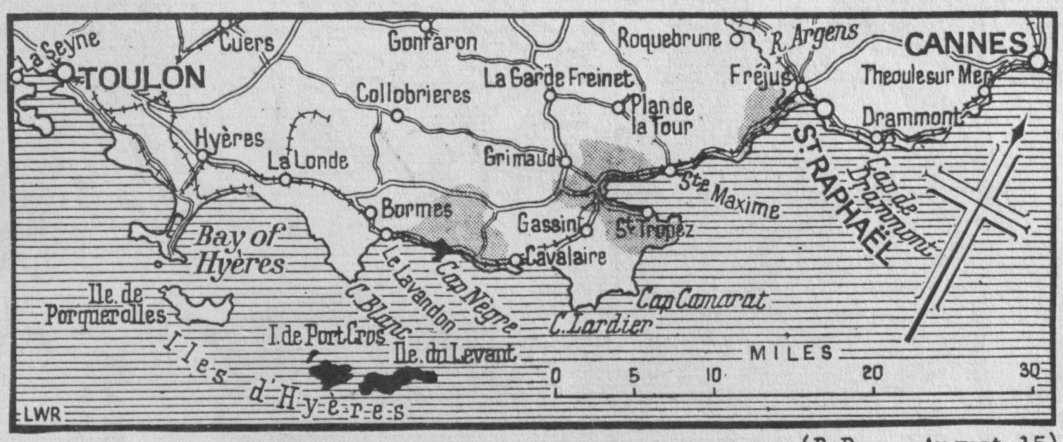
FRENCH FRONTS (Cont.)



August 13, 1944



(D-Day...August 15)

August 17, 1944

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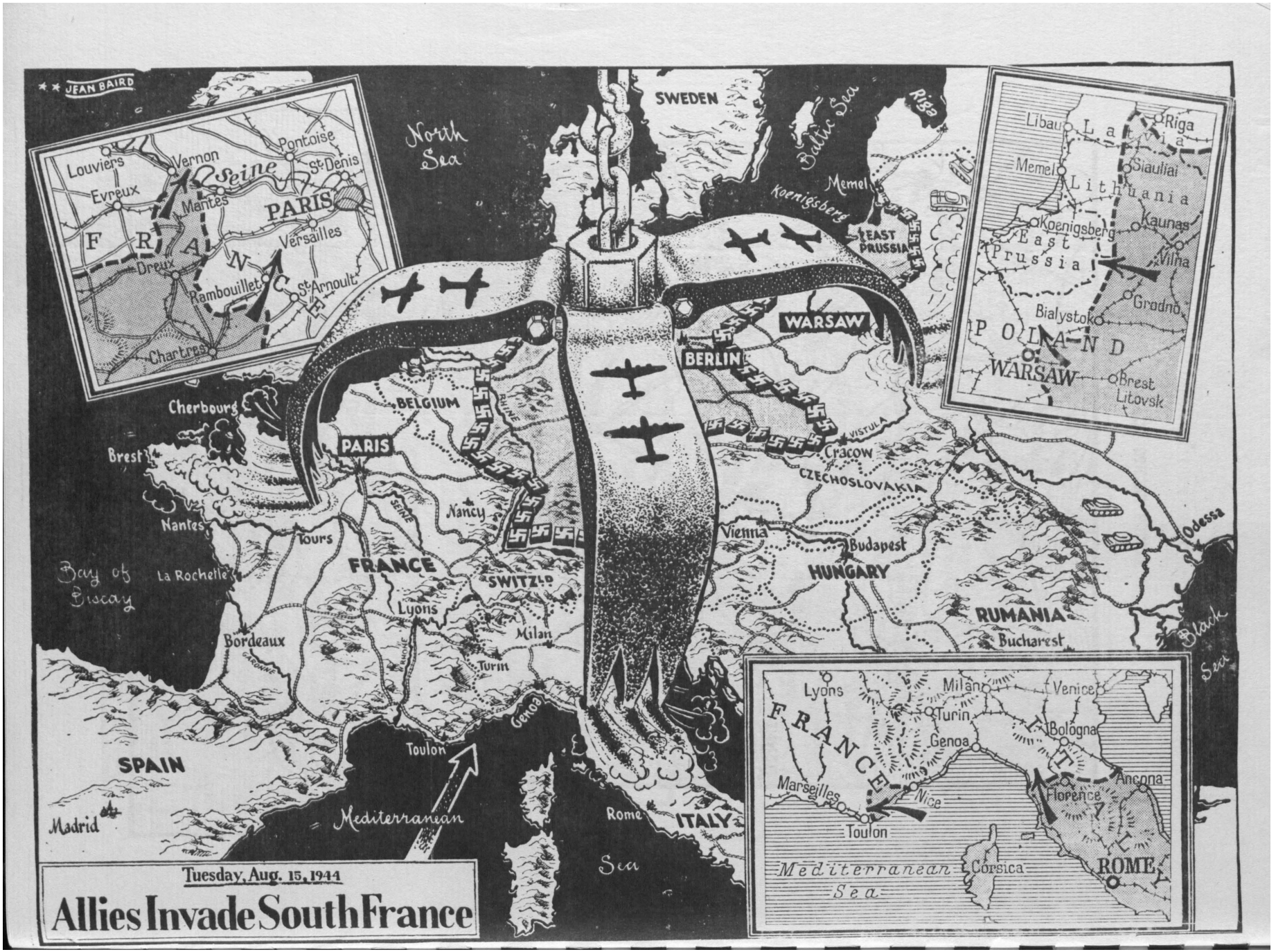

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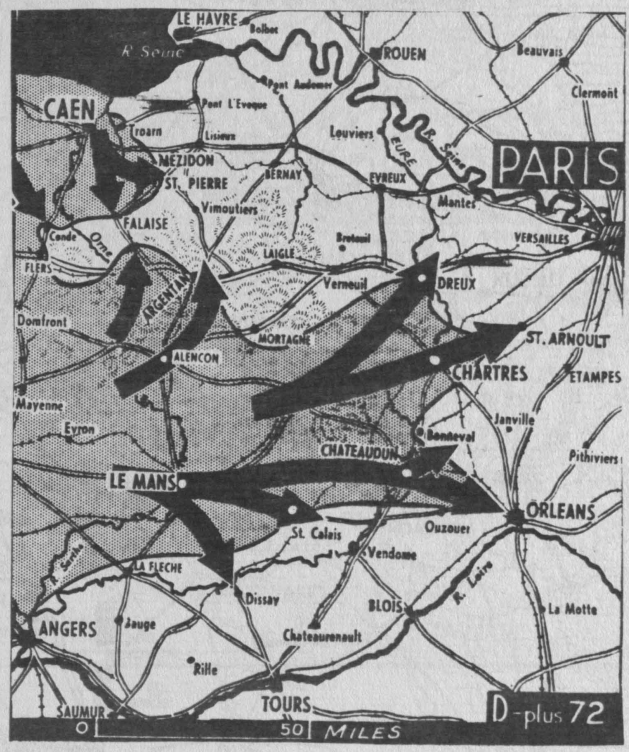
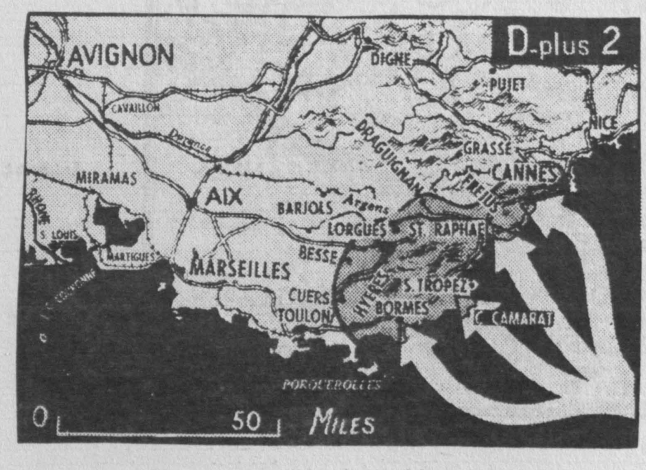
FRENCH FRONTS (Cont.)



August 18, 1944



August 18, 1944

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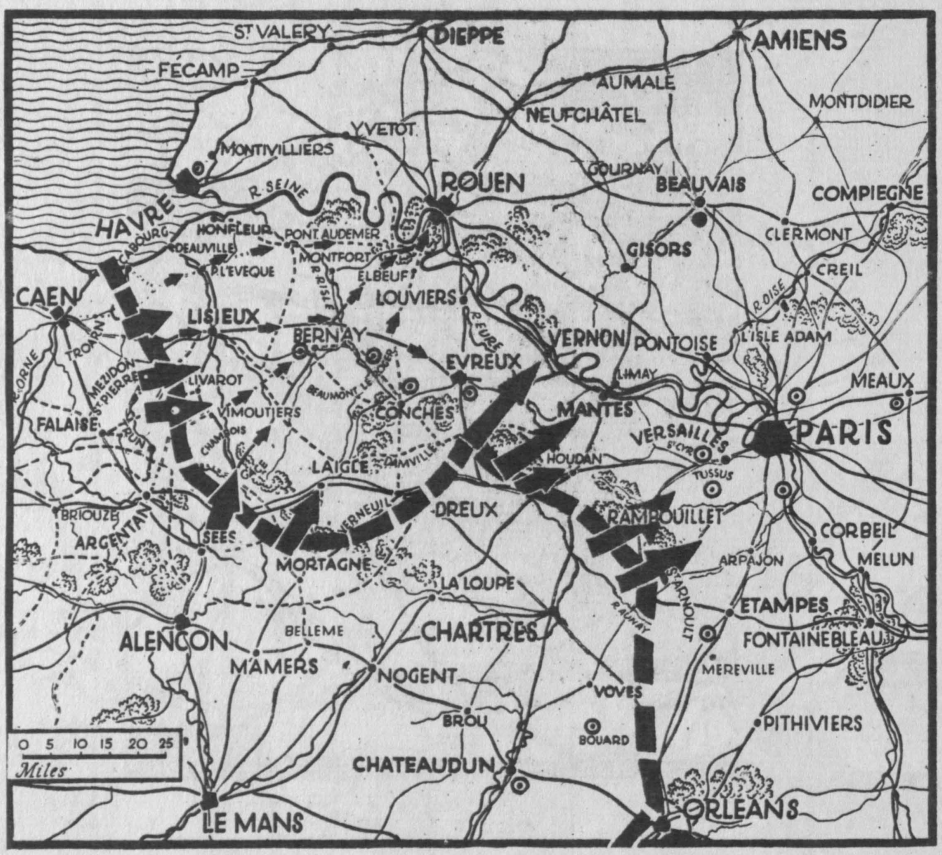
FRENCH FRONTS (Cont.)





August 20, 1944

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FRENCH FRONTS (Cont.)



August 27, 1944

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D810.S2.T78. A War Diary, 1944-45. John G. Trump, 1973.

RUSSIAN FRONT

(Offensive began on June 23, 1944.)



June 25, 1944



June 29, 1944



July 6, 1944



July 8, 1944

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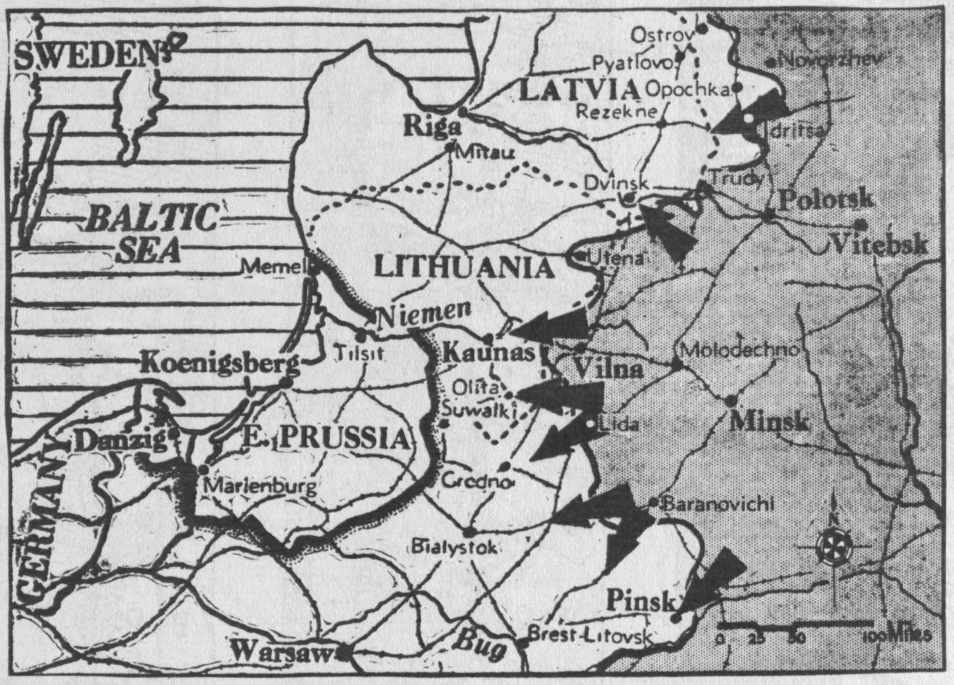
RUSSIAN FRONT (Cont.)





July 14, 1944

July 19, 1944

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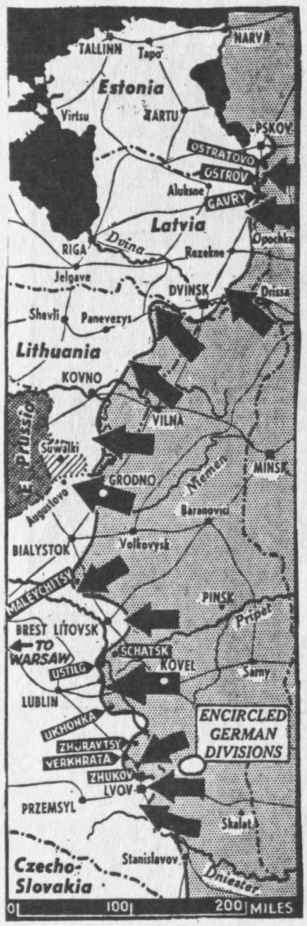
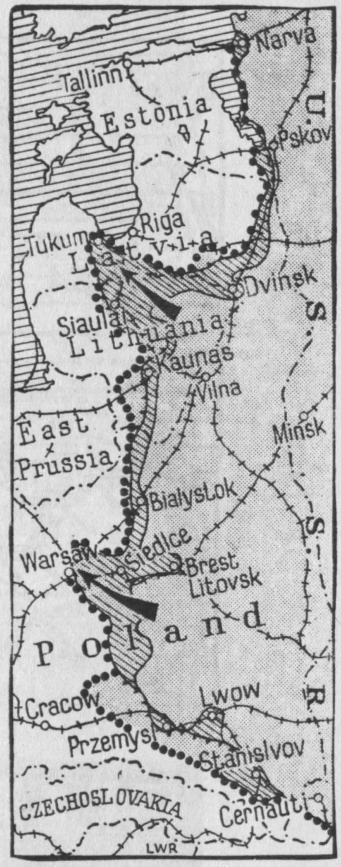
RUSSIAN FRONT (Cont.)



July 22, 1944



August 3, 1944



August 10, 1944



← August 13, 1944

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D810.S2.T78. A War Diary, 1944-45. John G. Trump, 1973.

RUSSIAN FRONT (Cont.)



August 27, 1944

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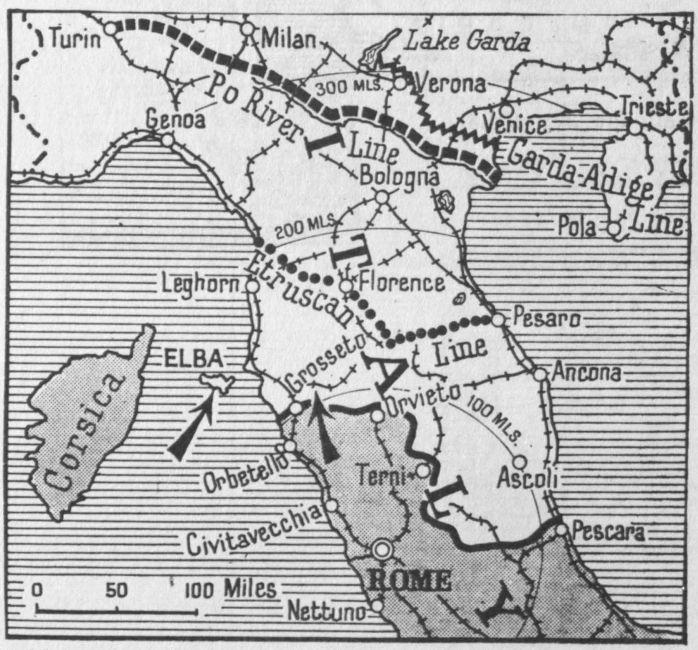
ITALIAN FRONT

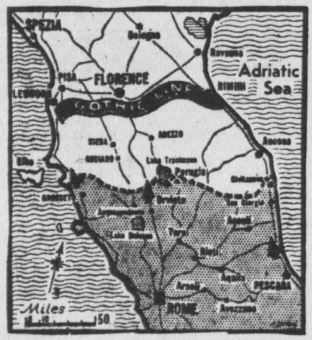


June 13, 1944



Map shows present front and sites of possible further action in northern Italy.

June 19, 1944



June 25, 1944

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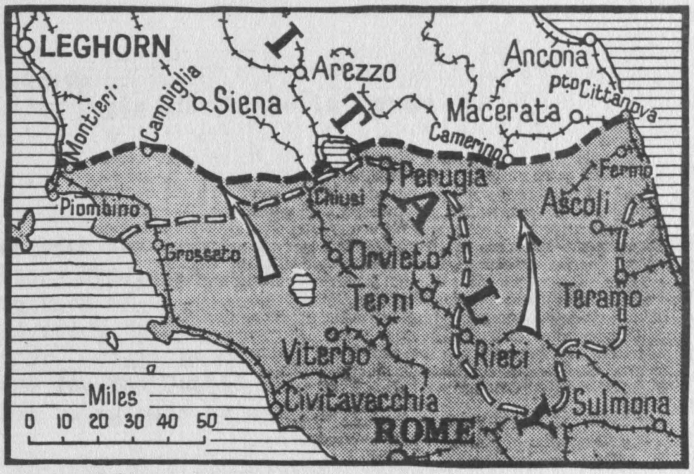
ITALIAN FRONT (Cont.)



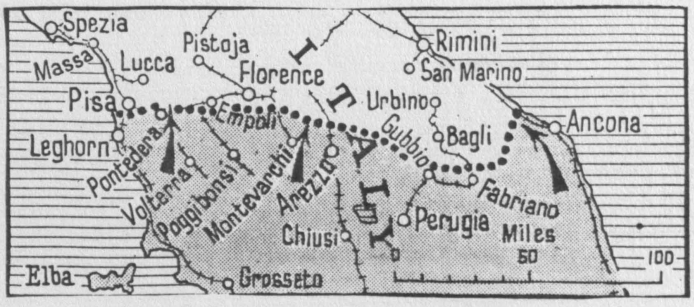
June 29, 1944



July 8, 1944



July 16, 1944



August 3, 1944

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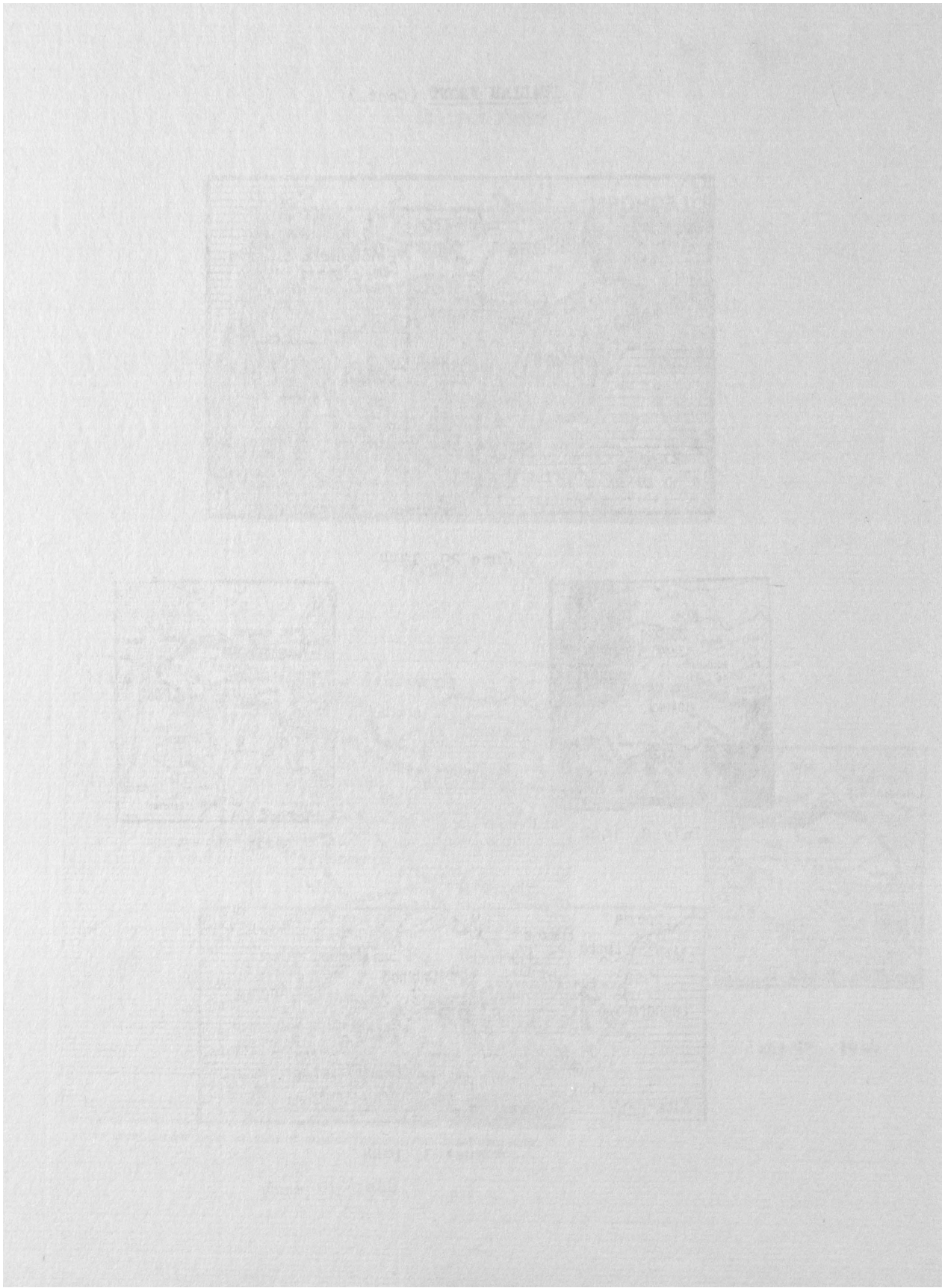

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HEADQUARTERS
UNITED STATES STRATEGIC AIR FORCES IN EUROPE
OFFICE OF THE COMMANDING GENERAL
APO 633

322

22 March 1945

CF

Dr. John G. Trump
Advisory Specialist Group
Headquarters, U. S. Strategic Air Forces in Europe
APO 633, U. S. Army

Dear Dr. Trump:

I have received your letter of 15 March concerning proposed organizational changes in the Advisory Specialist Group and in the British Branch of Radiation Laboratory. The addition of Dr. Jules Halpern and Dr. Raymond G. Herb to my staff as members of the Advisory Specialist Group is most welcome, and I concur in your recommendation that Dr. Griggs be recognized as Senior Member of the Group, following your departure for the United States. My Operations staff has been informed of the changes being made as outlined in your letter.

I should like to take this opportunity to congratulate you and your associates in the Advisory Specialist Group and in BBRL on the splendid job you have done and are doing to help us make more effective use of radio and radar weapons against the enemy. American scientists and engineers have given us electronic equipment of unprecedented military value, and I believe firmly that this equipment has contributed in large measure to the success of our Air Forces. However, introduction of these new devices into effective operational use has been possible only because we were able to overcome a great many technical difficulties. Also, there has been a continual necessity for field modifications of this equipment to meet the demands of changing operations. The technical assistance of the British Branch of Radiation Laboratory, and of its associated agencies and individual experts, has been indispensible to the Air Forces in their efforts to achieve maximum results in combat from the electronic equipment at their disposal. We are counting on the continued help of BBRL for the duration of the war.

To you personally, I give much credit for the valuable work which has been accomplished by BBRL for the Air Forces under my command, and by the Advisory Specialist Group as an integral part of my Operations staff. I desire to express my unqualified appreciation for your services to this Headquarters, and to wish you every success in your new duties.

Sincerely,

Carl Spaatz

CARL SPAATZ
Lieutenant General, U.S.A.
Commanding

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HEADQUARTERS EIGHTH AIR FORCE
Office of the Commanding General
APO 634

Doctor John Trump
Director, British Branch-Radiation Laboratories
APO 121, U. S. Army

Dear Sir:

It is my desire to express my appreciation to you and your staff for the valuable assistance you have rendered to the Eighth Air Force Radar Program.

The rapid development of certain special radar equipment and the present high standard of efficiency of such equipment are due in no small measure to the untiring efforts of you and your staff.

Particular mention is made of the valuable technical assistance rendered in the development, installation and improvement of MEW, Pathfinder, Tail Warning and Beacon equipment in this Air Force. The operational benefits accruing to the Eighth Air Force due to the perfection of the above mentioned devices have been repeatedly proved.

It is a pleasure to extend my thanks on behalf of the Eighth Air Force, to you and your staff for this cooperative and friendly spirit with which you received and so competently acceded to our requests.

Sincerely yours,

J. H. DOOLITTLE
Lieutenant General, U. S. Army
Commanding

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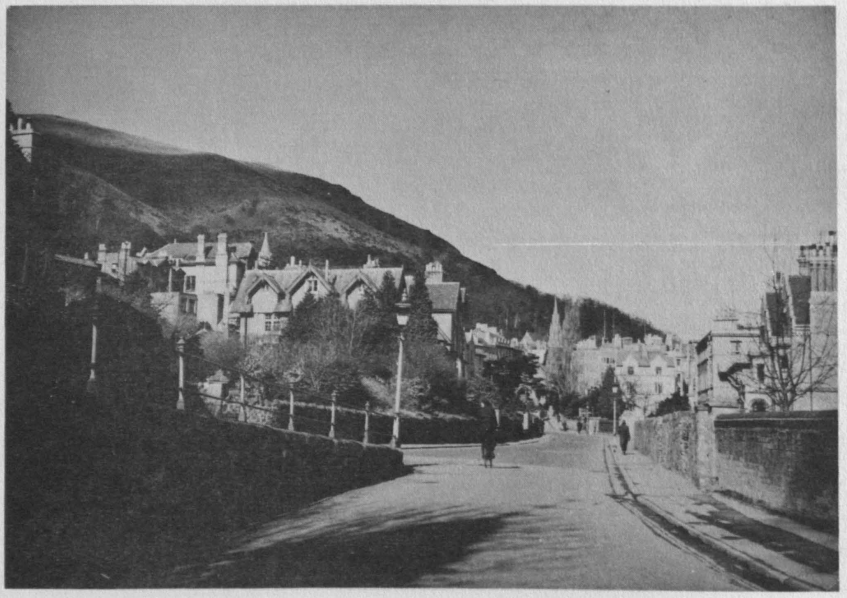

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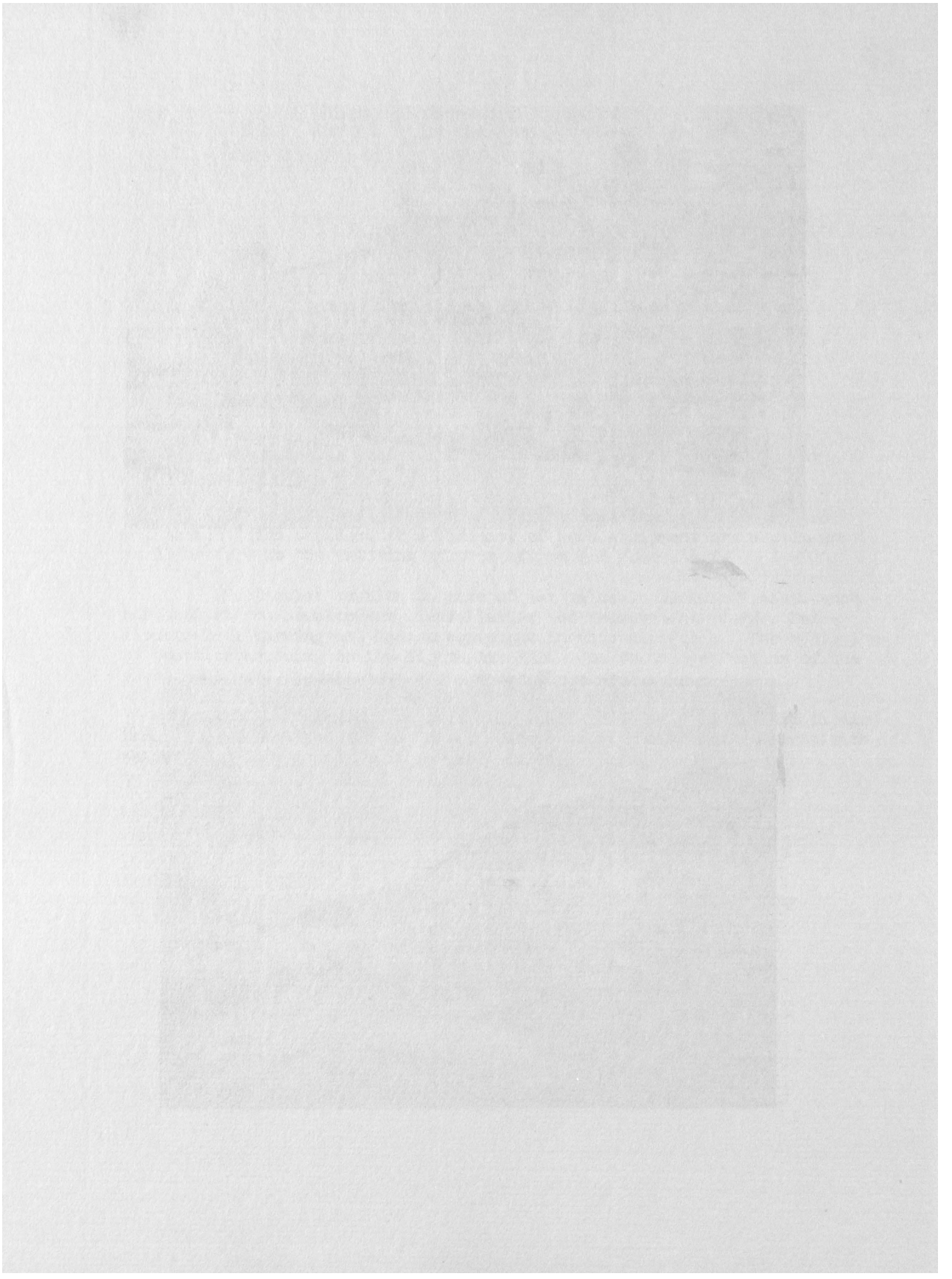

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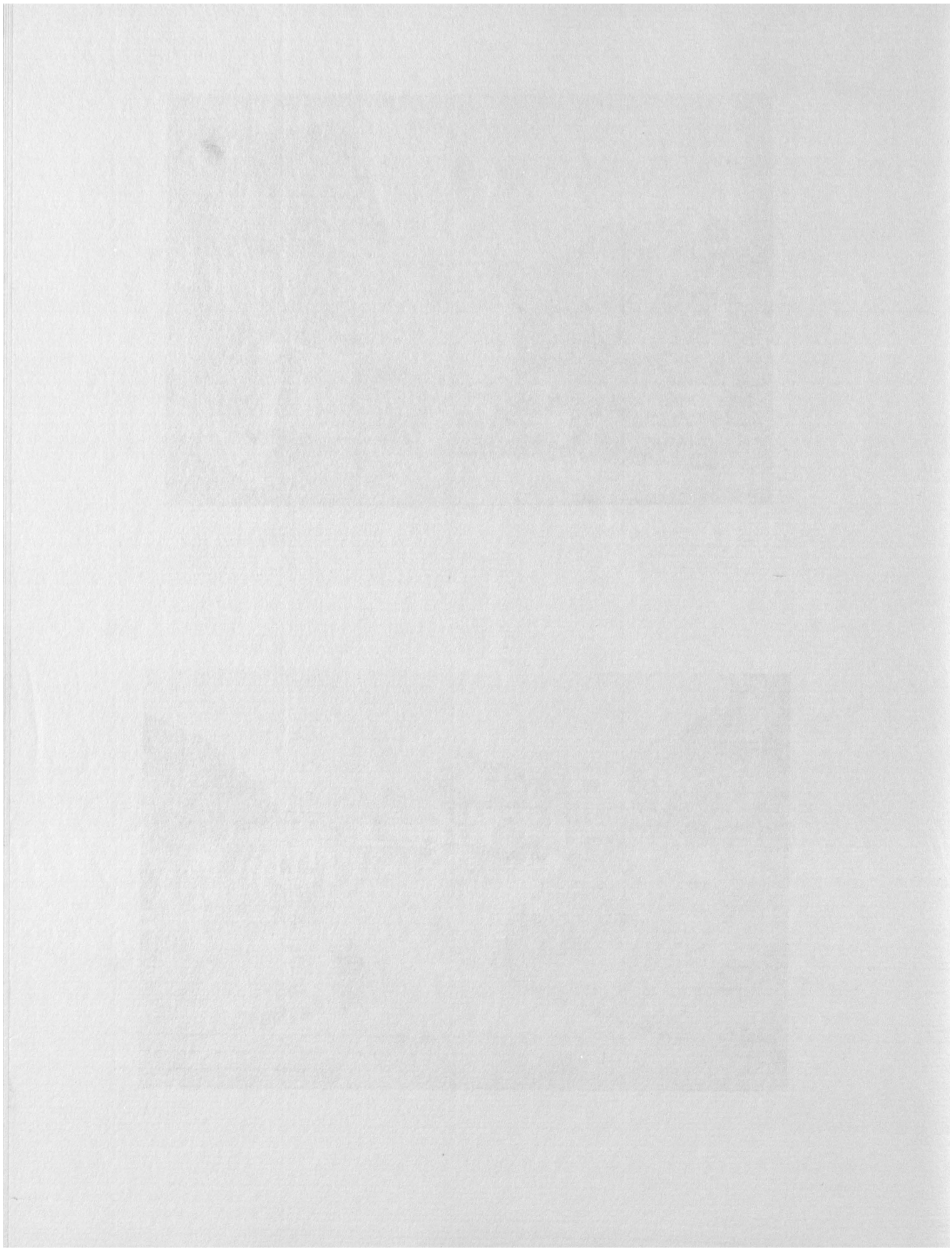

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Beacon Group - BBRL
February, 1945

Bottom row, left to right:
Gordon Danielson
Jules Halpern
Peggy Jordan
Jim Brooks
Frank Zaffarano

Second row:
"Abbie" Abbiati
Ed Brazell
Serge Golian
Norman Morrisson
P-47 Pilot

Third row:
Al Rawcliffe
Phil Doersam
Socrates Gavriel
Ernie Martinelli
(sans barbe)

Back row:
Bill Smith
Charlie Ahern

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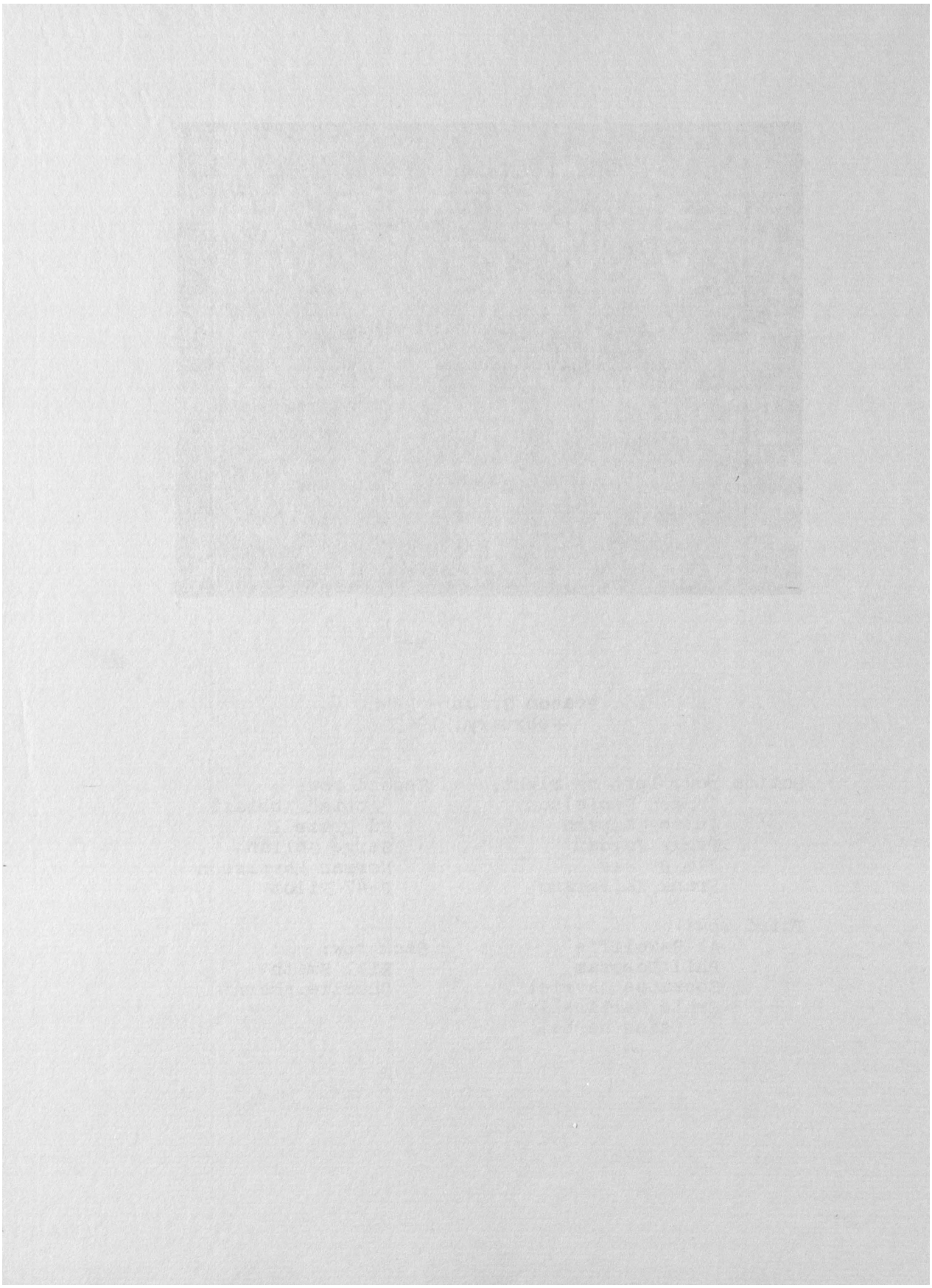

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Sunday
November 12, 1944

This has been the first day back at BBRL. In the morning I gave a seminar on what the people were thinking and doing back in the States and at the Radiation Laboratory and on the importance of the radar problems which face us during the winter months. The afternoon Steering Committee meeting was concerned primarily with the air-borne radar program of the 8th Air Force. The status of some of these items follows:

H2X — The distribution of the H2X equipment in the 8th Air Force is now complete among 31 separate squadrons. Two APS-15A sets have arrived, and an evaluation is being made at Alconbury between the dial and the drum computer, the latter being provided as a modification. Nearly all of the old group of Philco field engineers (Brower, Brost, Kulp, etc.) have returned or are scheduled to return to the States. The new group is relatively unfamiliar with the equipment they are to service. The tendency lately of having these engineers remain at Division headquarters to receive indication of trouble by wire from the Squadrons seems undesirable. Murrell, Tape, and Hibbert will consider an improved arrangement.

Micro-H — Danielson reported on Micro-H, which is being used actively by the 3rd Division with moderately good operational results, though PRU's have not always been possible. The need for more Army staff in the computing part of this organization and for CPN-6 beacons to replace the old experimental units was cited, and suitable action will be taken. Danielson is to prepare a report on the use of Micro-H by the 8th Air Force which it is hoped may become an official theater letter from General Spaatz.

Eagle — Jack Buck reported that the 6db. depression in the Eagle patterns has now been substantially removed as a result of information cabled by the Radiation Laboratory, though an almost equally good scheme had been developed at the same time at Alconbury. The availability of Eagle equipment for 8th Air Force was discussed on the basis of information which John Eggers had provided me. It was agreed that I would participate in a discussion of the Eagle program with Colonel Dolan before long.

SCR-584 CSB — Ernie Lyman reported on the method of use of the SCR-584 close-support units by the 9th Air Force. The 9th TAC now has six units, of which the second pair has just become operational and the third is about to. The 19th TAC has two units with two to come, while the 29th TAC has four units to come. The 12th TAC under General Saville (now in France under 9th AF) has requested four units. During the past month, mainly under the effective influence of Roland Larson, the first two SCR-584 units of 9th TAC have become very effective instruments, primarily for supplying navigational assistance. Larson got

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D810.S2.T78. A War Diary, 1944-45. John G. Trump, 1973.

permission for the 584's to cut in on the RT on any missions within their area which seem to be in trouble. The 584 is provided each morning with the complete operational program and then lines up the day's activities in such a way that they are intelligent about the missions which may come their way. They make use of the df-ing equipment on the RT to maintain directional information on all missions within their area, and this has been found to reduce to a large extent the difficulties of location. The MEW has been found to supply somewhat inaccurate data as to location of missions--this being primarily due to the delay in recording the tracks and transmitting the information to the 584. On the first operational mission of the 2nd 584 Group of 9th TAC a track was secured on a German ammunition dump toward which the dive bombers were directed under heavily overcast conditions. It is now generally agreed that the Norden sight technique of computing the bomb release point in level bombing operations is too complicated. Lyman and Larson have devised a simple computer to perform this function--one unit of which will be built at BBRL.

It is reported that during the past two months German fighter opposition has grown in intensity and that bomber formations are often attacked by over 300 aircraft. The 8th AF is considerably concerned over both this and the increased flak which is now regularly encountered.

Reports indicate increased German use of V-1 robot bombs on the continental areas, including Antwerp. Intelligence Reports state that three German Groupen (75 operational planes) are being formed to increase the intensity of the V-1 attacks on London.

The 3rd Army attack on the region around Metz continues with further small gains reported.

Monday
November 13, 1944

Morning session with Hodgson, Danielson, Tape, Jordan, and Halpern on the 9th AF program. There are now nine BBRL people full-time on this work. It was pointed out that in addition to the MEW, SCR-584, and air-borne beacons, there is some work on low-altitude altimeters for fighter-bombers, on tail-warning sets (APS-13) for night-fighters, and on the introduction of Shoran in the 9th BC. The low-altitude altimeters are needed because of the possibility of dive-bombers preoccupied with the business of attack plunging too low to pull out. John Meagher is assisting in the installation of these altimeters, which are set to show red light at about 400 feet. Bomber Command has not yet definitely established a requirement for Shoran and is posing such questions as its susceptibility to jamming, its accuracy, and number of air-borne units available. Since the answers to all these is favorable, it seems desirable to press Colonel Graul and General Sam Anderson into getting over their half-hearted state and making a definite decision.

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11-13-44 cont.

There was some further discussion of the desirability of organizing the civilian work within the TAC's so that each would have a general advisor on radar. In the case of 9th TAC, Dr. Zimmerman of ORS has been suggested, for 19th TAC Johnny Faulkner, for 29th TAC Joe Platt (if he can be persuaded to return), for 12th TAC either Bob McCoy or Charlie West, and for BC Ralph McCreary.

Left Malvern at 2:00 p.m. in Army beach wagon for Bovingdon to meet Dave Griggs and Ray Herb, who were coming over from France. Stopped to warm up with a quick tea at the Cotswold Gateway Inn. At Pinetree looked over the 16 mm. H2X film which Capt. Summerhayes has finally secured using the automatic camera developed at the Radiation Laboratory. These films, which show a complete bombing mission in less than ten minutes, do an admirable job of showing up the good and bad aspects of the radar navigation on that mission, and should therefore prove valuable adjuncts to training. The film has been seen by General Doolittle and General Spaatz.

Checked in at OSRD at 7:30 p.m. Found that the Paris plane had been canceled. Had supper with George Huff at the Connaught.

Tuesday
November 14, 1944

Spent day primarily at OSRD. In the afternoon, Ray Herb, Dave Griggs, Serge Golian, and Phil Jacobs arrived from Paris. We had a long talk about the Paris set-up, the radar program on the continent, and the probable best arrangements under which we should operate there in the future. It appears that the situation is still too indefinite to lead to a clear-cut decision and the for moment we plan to continue to make use of the facilities of SFR, with offices and billet at the Hotel Louvois.

During the day a war cable arrived from Dr. Bowles to General Spaatz, which is copied herewith:

> "At my instance the following proposal has been approved by Dr. L. A. DuBridge, Director of NDRC Radiation Laboratory: The facilities and personnel of BBRL are hereby placed at the disposal of Military and Naval Forces operating in ETO to aid in the application of existing radar and radio equipment and in the modification of equipment to meet new requirements.
>
> "To insure that this service shall be effective and that the activities of BBRL shall be coordinated closely with current and impending military operations, Dr. John G. Trump, Director of BBRL, has been appointed an expert consultant in my office and will be assigned as a member of your Advisory Specialist Group. As such he will study requirements and plans in ETO and on the basis of the information obtained therefrom will establish programs and priorities of BBRL and in his capacity as Director of the Laboratory will supervise the implementation of these programs.
>
> "Request Archambault, Griggs, and Trump be advised of this. Will confirm by letter.
>
> "New Subject - On basis of recommendation by General Arnold plan to have Dr. Ridenour accompany me on trip to Pacific Areas in view of the wealth of information he possesses on operational application."

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Wednesday
November 15, 1944

Left London at 9:30 a.m. for Malvern. En route Ray Herb described in detail his activities on the continent and some of the projects, including Ed Miller's work on the use of the MEW for aircraft control. Miller's work consists of providing an accurate Type B scan with simple geometric means for extrapolating the angle and range of the target on the target pip. The data so obtained is transmitted by phone to a plotter, who makes use of a celluloid arm and a range slider by means of which R,θ are recorded. The control operates from this spot. It seemed to me that the delay in data transmission and plotting introduce considerable inaccuracy in this method of control which suffers from the fact that a reading is obtained only every 15 seconds at best. There seems some doubt also as to whether the scale chosen for the R,θ board conforms to the available maps.

In the afternoon, a delegation of British headed by Mr. J. S. Hey of AORG visited BBRL to request aid in their efforts to locate V-2 origins with the SCR-584. Mr. Hey had discussed this proposal on Monday with me in London. It contemplates the putting on of an SCR-584 from the British early-warning system. The SCR-584 is to be positioned about 45 miles in front of the point of impact of V-2 and under the trajectory. In this position it is calculated that V-2 will be seen for 10 to 15 seconds and a sufficient trajectory will be seen both to permit extrapolation to the source and to provide a short warning. Col. Radcliffe of Antiaircraft Command, who accompanied Mr. Hey, added that his Command was anxious to try to shoot at V-2. I regard this project of low priority. The Laboratory will, however, assist by loaning for a two- or three-week period an extended range unit as well as a data recorder. I discouraged Col. Radcliffe by stating that the chance of hitting V-2 was less than 1 in 1,000,000. AORG had calculated this as 1 in 8,000. V-2 is now arriving in London at a very uniform rate--4 to 6 per night, and in Antwerp at the rate of 20 per night.

At a meeting at BBRL we discussed the air-borne beacon program of 9th TAC. This had been arranged by Griggs, Herb, and Golian at 9th TAC with General Quesada and approved by General Vandenburg and General Spaatz. We will undertake to install 12 UPN-2 beacons in 12 P-38's and 2 UPN-2's in P-51's, with 4 spare sets. In order to make use of the small vertical antenna, we shall design a vertically polarized antenna for the SCR-584 and at the same time request the Radiation Laboratory to ship such antennas to BBRL as soon as possible. Twelve beacon-equipped aircraft would permit ground control of two groups (or 72 aircraft) on blind missions to ranges of 50 miles. This sort of effort, it is believed, will pay real dividends in the ensuing winter months. A cable to the Radiation Laboratory explaining the purpose and requirements of this beacon program for 9th TAC was devided. It is intended that a similar official Army cable be sent from Spaatz to McClelland.

Dropped in to see Mr. Rowe. He appeared to considerably depressed over the fact that the European War was still very much on. It is evident that the TRE people are finding increasing difficulty in contributing to radar in the European War and are anxious to turn their attention to developments and field work in India and the Pacific. Mr. Rowe stated that, as far as the Pacific was concerned, "the good old days of TRE are over". The Pacific TRE work will be done under very rigid military control, probably by the local Air Vice Marshall.

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Thursday
November 16, 1944

Long conference at Malvern on the MEW program. It was agreed to send an urgent statement to DuBridge and McClelland on the desirability of securing two MEW antennas of double width. These would increase by 40 per cent the range of present MEW's and would make possible the interception of enemy aircraft and control of our own fighters far deeper into enemy territory. It is conceivable that with such extended range the entire tactics of the German Air Force would have to be changed and their bases moved to an effective distance behind the lines. Such extension would also hinder the present German practice of forming strong fighter pools for concentrated onslaughts on bomber formations. It would, in short, provide for us a GCI system extending well into German territory--far superior to their own.

It was agreed to press for the early completion of three complete MEW's around the three MEW mounts which had previously been requested by USSTAF. Subsequently a cable was received from McClelland stating that they proposed in fact to complete three MEW's in this way with delivery in February and that an additional mount would be provided for replacement of the obsolete unit now used by the 19th TAC.

A conference on MEW indicators was scheduled for Paris on November 24 with representatives of all the TAC's and 8th AF invited to be present.

A further conference was held on the SCR-584 close-support bombing program, with Lyman, Danielson, and others present. The requirements in equipment and manpower were established for the 9th TAC beacon program which had been set up with General Quesada two weeks ago by Griggs, Herb, and Golian. It was believed desirable to tune all of 9th TAC's SCR-584 receivers to the UPN-2 beacon frequencies so they could get beacon responses simultaneously. The SCR-584's are not expected to function as a radar instrument when used with beacon-equipped aircraft. The beacons would be provided with a filter which would make them insensitive to other SCR-584's or to MEW's. This filter can be switched out of the circuit when MEW cooperation is desired. The requirements for standard cavities for tuning up SCR-584 and beacon frequencies, power supplies, and other accessories were agreed upon. Jacobs, Abbiata, and Golian will handle the installation of the beacon in P-38's of the 9th TAC. Bill Cunningham will become project leader for the entire air-borne beacon program. Martinelli will design and construct a vertically polarized SCR-584 antenna for use with the UPN-2's to cover the possibility of late delivery of the Radiation Laboratory antenna for the same purpose.

Friday
November 17, 1944

To Widewing with Ray Herb, Walter Jordan, Dave Griggs, Clyde Cowan, Dick Hodgson, Janet DeSaulnier, and Louise Goldie in the Ford station wagon. I called on General Fred Anderson, Deputy Commanding General of USSTAF, with Dave to discuss briefly my new status with ASG. Dave stated

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that he wished me to act as senior ASG member on radar. General Anderson discussed briefly some of the problems of the Strategic Forces, pointing out the possibility that the 8th AF may follow the example of the 15th in bombing individually by H2X. He was skeptical of the merit of the Willie Orphan project because of the policy against area bombing, the lack of information on the trajectory of a tail-less B-24, and the great hazards involved in this technique.

We later called on Colonel Fred Maxwell, Director of Operations, USSTAF, with what I considered satisfactory results.

In the evening after the teletype conference, Dave, Ray Herb, and I accompanied Colonel Bob Snider to the Oxford Group Club, which is located off Berkeley Square in the house in which Lord Clive took up residence upon his return from India. We were treated to music, songs, and conversation aimed at spiritual and moral uplift. It was both an interesting and an impressive evening.

Saturday
November 18, 1944

Discussed with Major Wilkinson of SHAEF Experiments Section and Ray Herb the information contained in a cable to Colonel Lack on the Window-filled mortar shell experiments performed in the States. Wrote a recommendation to Colonel Lack that 500 60 mm. Window-filled shells be procured although these still fall short of the desirable minimum altitude of 3000 feet (stated to have given strong signals at 35,000 yards and weak signals at 67,000 yards under flat terrain conditions); also that a limited quantity of 81 mm. shells be procured (gave strong signals to 67,000 yards and easily attained a 3,000-foot height).

Spent some time thinking about the ASG set-up and the requirements for an editorial staff which would coordinate the reports of ASG and BBRL, putting more emphasis on operational aspects of radar.

Had supper with Louise at La Coquille. At 9:15 drove to Widewing with Vic Fraenckel and Dave Griggs to attend a teletype conference with Ed Bowles. He leaves next Tuesday for a trip to the Pacific with Louis Ridenour. We reported to Bowles that I was acting as senior member on radar for ASG. Bowles replied stating: "With regard to seniority, it is my desire that there be as informal a set-up as possible in order that individual aptitudes of Trump and Griggs can be capitalized upon." We also pointed out the desirability of ASG reporting directly to General Spaatz, to which Bowles replied that he understood the burden of our statement and would take cognizance in his letter to Spaatz.

Sunday
November 19, 1944

Breakfast with Cunningham, Abbiati, and Louise at the Connaught. Purchased uniforms at the Quartermaster Sales Store and then drove on through the rain to Malvern, arriving at 3:30 p.m.

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11-19-44 cont.

At the afternoon Steering Committee meeting, Colonel Art Warner reported briefly on the growing incidents of the V-2's (Brussels having received 200 to date) and requested BBRL assistance in the general business of detecting their source. This is already being provided to the British group which is setting up an SCR-584 using our long-range unit, and we are prepared to go further. Gordon Danielson reported on the outstanding Micro-H bombing job which the 3rd Division of the 8th AF did on Thursday, November 16, in support of the large-scale ground offensive which began on the day before. About 1300 planes bombed on Gee-H and Micro-H--488 of them bombing on Micro-H through 10/10 overcast--with results rated by General Bradley as from good to excellent. Only two planes dropped short, due to faulty bomb-rack release, with no injury to ground forces. Only four planes failed to return, and three of these were subsequently reported to have landed safely on the continent. It is clear that Micro-H has come of age operationally.

A discussion of the serious transportation problem at BBRL followed.

Spoke briefly with Dave Langmuir, who is very much concerned over the laxness of the counter-measures program of ASG and OSRD and has therefore attached himself to ORS, 8th AF, to see if he can do some good there.

Had dinner and spent the evening with the John Warrens. Was very much impressed with the seriousness with which these young English people are viewing the social and economic future of England and its effect on their lives. They see England as an old and worn nation still run by competent people who are, however, set on maintaining the old political and economic structure with a few palliative measures. On the continent is the Soviet Union with tremendous resources and increasing vitality, likely to attain dominance over the Western European nations in spite of their predisposition toward England. Insulated by 3,000 miles is the United States, the most powerful nation--also possessing tremendous vitality and resources--offering the greatest opportunities. John would go to America, but his good wife says, "England is a nice country; let's see it through." John reflects that England certainly is a lot better off than France, Spain, Germany, and Austria.

Monday
November 20, 1944

Dave Davidson reported on the status of Loran in the ETO. Three groups of Bomber Command are counting on SS Loran and already have 200 aircraft flying it. All of 5, 8, and 100 Groups will be already for SS Loran operations by January 1. In the 8th AF three Squadrons are becoming equipped for SS Loran: the Photo Reconnaissance and Weather Group at Watton, a leaflet-distributing group, and an intruder group. In addition, the 8th AF is contemplating a training and fitting program in case of deployment to other theaters.

SS Loran accuracy now averages about one mile and is therefore considerably better than was estimated. Since H2X Mark II is being scrubbed by Bomber Command because of Naxos, increasing dependence on it

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is to be expected. Naxos is a German system of df-ing and S-band equipment using either ground or air-borne receivers, and has already caused Bomber Command to permit H2S operations only within 40 miles of the target. At this time SS Loran permits 17 hours of operation: from 1500 to 0800 GMT.

All installations are dual in Loran and Gee because of the failure ure of the homing Loran chain. This failure is due to the adoption of an excessively long base line of 150 miles instead of 70 to 80 miles as recommended.

Mr. A. P. Rowe called to express his concern again over Schnorkel, the approaching submarine menace arising from the technique of using an air-intake and exhaust port permitting underwater operation of diesels. These submarines are stated to be capable of 15 knots for one hour submerged, followed by lower speeds during the charging cycle. Air Vice Marshall Douglas of Coastal Command recently called to request TRE aid in combatting this menace with radar. About 70 Schnorkel subs are known to be available, and the German campaign is expected to start in about one month. The APS-15 has been stated by CCDU as the best radar for Schnorkel detection, having a range of 10 miles. The use of a large dish, short pulse length, and sea-return discrimination circuits would be desirable.

Squadron Leader Everitt reported on the 9th BC close-support Oboe system. This is beginning to function satisfactorily. A simple RT communication link from SCR-584 to pilot is being developed which will give dot-dash indication in place of oral information. This will be identical to the Oboe system in this respect.

Discussed briefly the SCR-584 program with Lieut. Schedlbauer, Tempest, and Osborne. Colonel Maude has reiterated his request for Joe Platt.

In the evening an excellent party was held at the Westminster Arms Hotel in honor of Walter Jordan, who leaves this week for the States.

During the last several days a full-scale offensive has been launched by British, American, and French Armies on the Western Front--accompanied by heavy Allied bombardment totaling 6000 tons. During the first few days the offensive mounted, with very small but important gains being made. Today it is reported that Metz is surrounded and that the French Army has swept through the Belfort Gap to the banks of the Rhine. Farther north, in the vicinity of Aachen and in Belgium, the progress has been relatively small. There appears to be increasing evidence of difficulties within Germany as indicated by greater public unrest.

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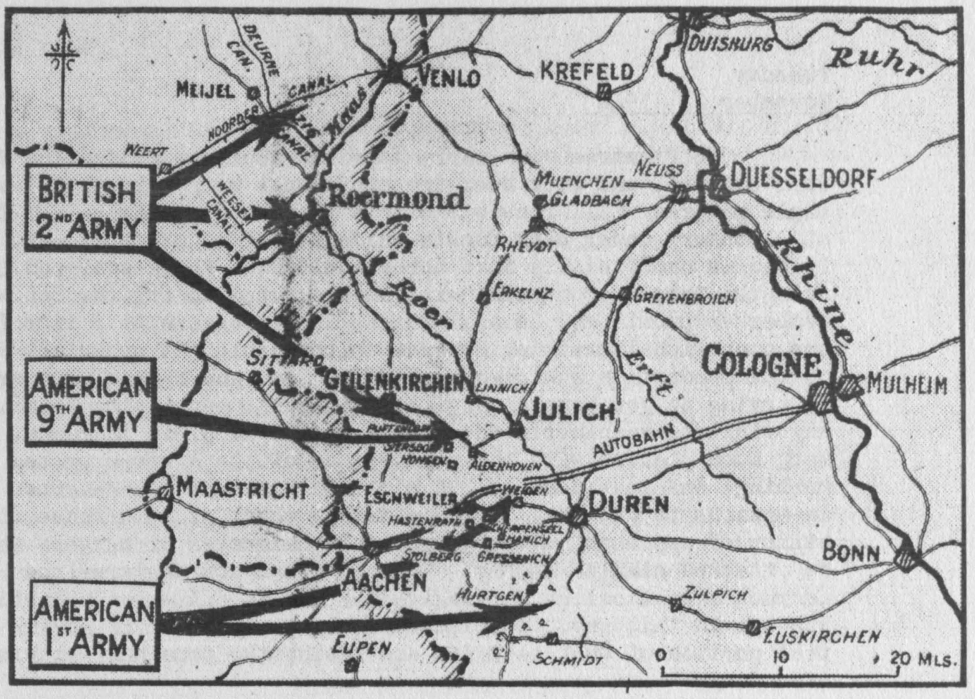
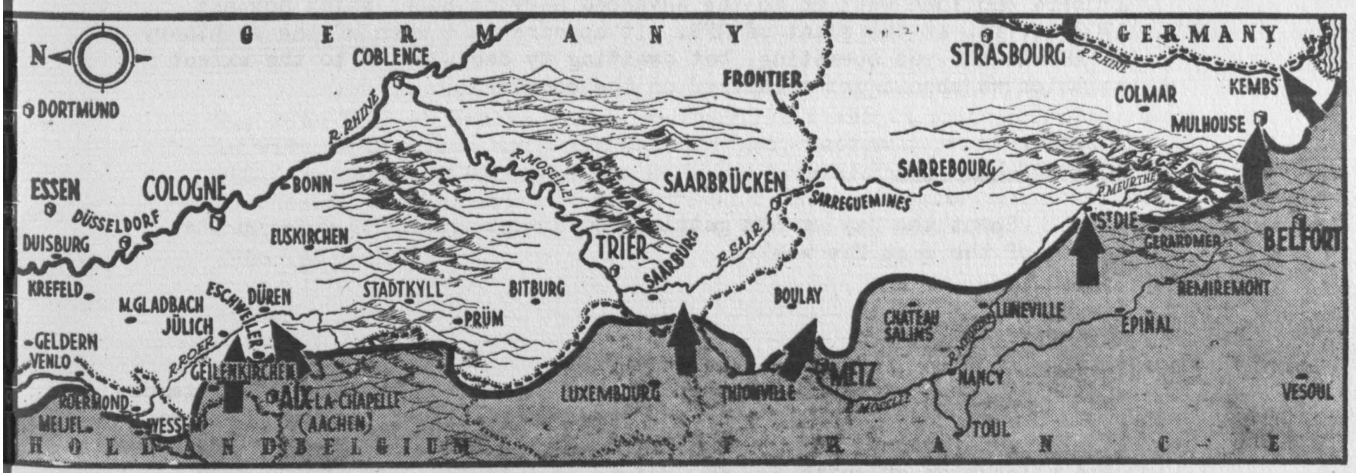


All along the Western Front six Allied armies yesterday advanced towards the Rhine. Geilenkirchen fell and troops reached the outskirts of Eschweiler. Gen. Patton's army surrounded Metz, other forces swept over the Reich border. To the south the French drove to the gates of Belfort.

November 20, 1944



WESTERN FRONT
November 21, 1944

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Tuesday
November 21, 1944

To Pinetree with Gerry Tape and Louise. Joined Tom Murrell, John Hibbert, and Jack Buck for conference with Colonel Dolan. The Eagle program still consists of one plane undergoing a test-flight phase at Alconbury under Jack Buck's guidance. Headquarters, AAF, has informed us unofficially that three additional Eagle-equipped B-24's from the Tucson production will not be supplied for the 8th AF in December as promised. Colonel Dolan, irate because this interferes with the operational training program which should get under way in advance of the production equipment scheduled for January and February arrival, is trying to get General Orville Anderson's permission to make a two-day visit to Washington to explain things in plain language. He is very much pleased with the performance of the Micro-H system of blind bombing, was convinced by 3rd Division's results on November 16, and is anxious to get the air-borne delays which will increase the flexibility of approach to the target and the number of targets which can be attacked simultaneously. Colonel Dolan now declares the 8th AF is as much a tactical as strategical AF and is quite enthusiastic about its use in this way. We discussed the possibility of moving a substantial portion of BBRL to Paris and basing the remainder at Pinetree or Alconbury.

Wednesday
November 22, 1944

Cabled for Joe Platt to act as Command liaison leader in 29th TAC and for Henry Guerlac to assist USSTAF historian, Bruce Hopper, in writing up the radar history of the 8th and 9th AF's for a 30-day period.

Left Northolt Airport with Dave Griggs, Bob Tobey, and Louise for Paris. Descended through overcast and circled the entire city, landing at Le Bourget. First checked in at Hotel Louvois near La Place de l'Opéra and then went on to the Advanced Service Base, which now has 1700 sq. ft. at the plant of SFR. It appears that much of the machinery of ASB is not yet operating, but awaiting my decision as to the extent to which we should get organized on the continent.

Thursday
November 23, 1944

Spent the day at SFR getting acquainted and up to date on the events of the past few weeks.

Friday
November 24, 1944

MEW conference held in the breakfast room of the Louvois, attended by Major Crumley, Air SHAEF; Major Stammerjohn, 9th AF; Colonel Osborne, 8th AF; and representatives of 9th and 12th TAC's. We agreed on the tentative allocation of units #7, #8, and #9 to 12th TAC, 1st French Prov., and 8th AF, thus bringing MEW's in northern Europe to a total of seven. Decided further that seven production CPS-1's should be ordered to serve

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11-24-44 cont.

as spare equipments and for leap-frogging purposes in the TAC's. We decided on the number of PPI and Type B scans as 8 and 10 respectively for the TAC's and 18 and 11 for the 8th AF. The desirability of using the RPD for siting was discussed and it was agreed that steps would be taken to bring Lieut. Florsheim to this theater.

In the afternoon, Hugh and I visited the SC Depot on the other side of Paris, 5000 sq. ft. of which had been offered to BBRL. The inaccessibility of this location, the cold warehouse appearance, the buildings, and the inadequacy of billeting facilities made me glad that this had been turned down.

I am gradually becoming convinced of the desirability of placing the principal BBRL plant in Paris as far as possible. Will try to secure an additional 2,000 sq. ft. from SFR using the adjoining carpenter shop and to apply this space to purely laboratory, shop, and technician purposes. Prepared a letter to Colonel Odom, executive officer to the Director of Operations, USSTAF, for 10 rooms at St. Germain totaling 2500 sq. ft., which would house ASG, the administrative end of BBRL, and the proposed editorial staff.

Saturday
November 25, 1944

Talked with John Chase about BBRL-ABL.15 operations on the continent. He indicated that little countermeasures work was anticipated for the AF's and that no real space requirements exist for ABL-15 either at the ASB or at USSTAF.

To USSTAF at St. Germain with Dave Griggs. Stopped in with Colonel Gordon, A/G.

Sunday
November 26, 1944

Left Paris at 10:00 a.m. with Dave Griggs and John Faulkner for HQ, 19th TAC, at Nancy, 210 miles away. Arrived at 4:00 p.m., checked in with Major Dixon and found Ernie Lyman, George Harris, and McNeil of ORS. Supper at Officers' Mess in Hotel Excelsior, followed by a long discussion on the merits of the SCR-584, Gee, and other radar systems available for navigation. McNeil has written an excellent ORS report on 19th TAC's MEW.

Monday
November 27, 1944

Left in the morning for the SCR-584 CSB unit, which is located 25 miles away. At the time this set was sited, it was four miles from the front line, but the new offensive has put it 18 miles in the rear. It was located in the bowl on the top of a high hill near Allaincort, which had been the scene of bitter fighting, and much residual evidence remained. Two SCR-602 early-warning equipments are part of the unit, but no VHF df-ing set is available. Since the df-ing procedure has been

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found invaluable by 9th TAC in locating aircraft in need of help, a strong recommendation was made to Major Dixon and later to General Weyland to secure such equipment. The SCR-584 has not yet been used operationally, but is scheduled to do so almost at once. It will also within days be moved to a new site closer to the front. The 19th TAC is trying the experiment of having the SCR-584 CSB set operate on instructions direct from Army Corps. This insures quick and direct access to the GF requirements. The 19th TAC's second SCR-584 is being set up independently, and it is not their intention to operate in pairs as in the case of 9th TAC. It was noted that the calibration of this SCR-584 had been performed incorrectly, and Ernie Lyman subsequently straightened out the sighting-in procedure.

After lunch at the SCR-584 camp, the party returned to Spitfire, and Dave Griggs and I had a two-hour session with General Weyland. General Weyland concurred completely with the proposed arrangement for John Faulkner, who is to serve as radar consultant to the C/G and act as coordinator of all civilians in that Command. Johnny was subsequently introduced to General Weyland, who did a heart-warming job of introducing him to the staff, offering him every facility, permission to attend the daily staff operations meetings. Johnny will be administratively under the Chief of Staff, Colonel Roger C. Browne. We later introduced him to Colonel Ferguson, A-3, and to Colonel Hallett, A-2. Colonel Coleman, Signals Officer, was not at Headquarters.

General Weyland was enthusiastic over the work which the MEW is doing for 19th TAC, and he told the following story of a decisive operation in which the MEW had been invaluable: About four weeks before, General Patton sent an emergency call for fighter-bomber assistance. The Germans were counter-attacking with tanks and pushing our ground troops back rapidly, causing heavy losses, and jeopardizing important positions. General Weyland was confronted with this desperate situation at a time when the weather was nearly down over all but one of his air fields and rapidly closing in there. Assured that this situation was really critical, he called for two volunteer squadrons at St. Dizier. These squadrons took off, ascended over the first layer of overcast and were vectored by the MEW to the battlefield area. Told at this point that they were over the battlefield, the planes came out through a 150-ft. ceiling upon the largest tank battle they had ever witnessed, with the German tanks out in open fields because of their complete freedom from fear of plane attack. One squadron destroyed six tanks by skip-bombing. The second made a bombing and strafing attack upon a German column which was advancing along a roadway. The German tanks beat a precipitous retreat, and the counter-attack was over. One plane was lost in the operation by enemy fire. The two squadrons then ascended through overcast and were vectored by the MEW to the approximate location of the only remaining field, which was, however, now also nearly obscured. The leader of one squadron then lowered through the overcast, discovered the exact location, took altitude again so as to transfer this location to the MEW, and then landed. The MEW then controlled all the other aircraft to a safe landing on this field. Congratulatory messages were sent by General Patton to General Vandenberg and forwarded to General Weyland, and appropriate awards were made to pilots and squadron leaders.

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11-27-44 cont.

Feeling that our mission of introducing John Faulkner as civilian leader in 19th TAC had been completely successful, Dave and I left Nancy at 6:00 p.m. and drove along through moonlit roads to Paris, arriving at 11:30.

Tuesday
November 28, 1944

Conference at 11:00 a.m. with Dr. Bush, who had arrived for a one-week visit to this theater--primarily for the purpose of urging the introduction of proximity fuses for artillery. Dr. Bush concurred with my reasons for bringing a considerable section of the laboratory to the continent and expressed considerable interest in my story of the vital importance of radar in the coming months. I told him Weyland's story of the MEW operation and also the part played by Micro-H in the 3rd Divisions bombardment of the front line near Aachen on November 16, the opening day of the present offensive.

Dave and I had luncheon and a meeting with Lt. Gen. Carl Spaatz at Marks Hall, St. Germain. A large number of British and American high-ranking officers were present, including Air Chief Marshall Douglas of Coastal Command, Air Vice Marshall Robb of Air SHAEF, Brig. Gen. Slater of Air SHAEF, Air Vice Marshall Cochran of 5 Group, Air Marshall Oxland of Bomber Command, Major General Vandenberg of 9th AF, Brig. Gen. Curtis of USSTAF, Brig. Gen. Sterling of A-3, Allied Air-Borne Army, and others. On the whole I felt this meeting to be quite successful. General Spaatz made some terse noises of welcome to me as new member of ASG. In our conversation after luncheon, he agreed to the desirability of setting up the key men of ASG and BBRL at USSTAF and referred the matter to General Curtiss for space planning. He also agreed with my recommendation that our group set up an editorial staff to present authoritative reports on the operational requirements for and use of radar in this theater.

I brought up to General Vandenberg the desirability of 9th BC's adoption of Shoran as their blind-bombing equipment for reasons of higher accuracy, simpler ground organization, and complete freedom from dependence on British operation of ground equipment as is presently the case with Oboe Mark II. General Vandenberg then strongly recommended this to General Spaatz, and Dave Griggs was asked to plug for the assignment of Shoran equipment to 9th AF during his return visit to the States.

Air Chief Marshall Douglas discussed with me the Schnorkel problem, stated that 40 Schnorkels were operating in his area and that a total of 190 were believed to be available with an active campaign to begin next month. I assured him that we would give what help we could, first by assisting TRE in the improvement of APS-15 equipment to increase its sensitivity in the detection of Schnorkel against sea return, and second by enlisting the aid of the Radiation Laboratory in the modification of equipment to this end.

Met Colonel Art Warner at the Officers' Mess in the evening and discussed with him the problem of locating V-2 sites. Art is still terribly concerned over the possible nullification of Antwerp's use as a port due to the daily incidents of 8 to 10 V-2's and the corresponding destruction and effect on civilian labor which must be employed.

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LIEUT. GENERAL SPAATZ, commander of the U. S. Strategic Air Forces in Europe, had finished one job June 12, 1944, when he appeared on *Time*'s cover. He had won superiority of Europe's air. On D-day he had begun another job, of helping to secure the beachheads. Then he returned to the strategic bombing of Germany. This Pennsylvania Dutchman, a hard-bluffing poker player and father of adored daughters, has Army's only female aide. She outraged all the aides in the Army by saying, "It's really woman's work, isn't it?"

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11-28-44 cont.

Antwerp has a capacity for 200 ships, 80,000 tons, per week. It is to be the principal port for the supply of the Western Front offensive, 75 per cent of its facilities being allocated to the Americans. We agreed to request the SCR-584 CSB units of 9th TAC to search the sectors where V-2 is known to ascend in order to determine whether they are capable of locking on tracing the ground trajectory of these missiles. I agreed also to make Leo Sullivan available for AA SCR-584 work in a week or two when his present assignment is finished.

Wednesday
November 29, 1944

Arose at 6:30 a.m. and had breakfast with Carroll Zimmerman and Bob Tobey for the purpose of acquainting Zim with Colonel Warner's desire for 584 tracking tests on V-2. Zim agreed to lay on a program of searching for V-2 in sectors to be indicated by Art and to give a report on the success or failure after one or two weeks.

Tried to catch up on intelligence reports and various radar items which had developed during the past two months. A very striking increase has taken place in the strength of the German fighter forces, the production rate being about 150 per week. The line-up of the GAF on the Western Front and Denmark is as follows:

2,040 single-engine fighters
855 double-engine fighters
50 fighter-bombers
130 long-range bombers
95 reconnaissance planes

The greatest attenuating influence on German fighter strength is the heavily escorted 8th AF formations, whose forays on important oil and other targets are subject to fierce enemy fighter attacks with severe losses to us and losses of between 100 and 200 planes to the enemy. Informed circles are surprised at the remarkable recuperative power of German industry, and it is likely that the heavy strategic bombing which had been let down since the invasion will now be actively maintained. Evidently much of German production is underground or so highly diversified that strategic bombing is no longer fully effective. The destruction of German refineries and the capture of important oil fields, such as Ploesti, have 'made oil of the potential Achilles heel of Germany'.

During the week ending 19 November, 69 robots were launched against England, 32 crossed the coast, 6 reached London. AA guns destroyed 34, and fighters got one HE-111 carrier.

The 9th AF has requested 100 APS-13 tail-warning sets for photo-reconnaissance planes, and installation of this equipment on all replacement P-5 planes. John Meagher is now engaged in the installation of a small number of APS-13's in 9th TAC planes. He also is, with higher priority, installing a small number of APN-1 altimeters in P-38's of 9th TAC. This is intended to provide altitude indication during dive attacks to prevent plunging into the ground. A request for 250 APN-1's has been made by 9th TAC.

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Thursday
November 30, 1944

With Hugh Kendall visited Mr. Pont of SFR, who informed us sorrowfully that added space could not be provided us in part because Citroen is terminating their lease on some carpenter shop facilities across the street. With him we investigated a fine house nearby which he offered us in lieu and which was intended as an SFR social center.

Hugh and I visited Colonel Barrows, Post Commander at USSTAF, to determine if more adequate laboratory facilities could be found at St. Germain. We are satisfied now that such is not the case. Hugh will investigate with Major Gray, Town Commander, if some diplomatic solution to the Citroen-SFR difficulty cannot be found.

For the time being we shall proceed with the establishment of the Paris Branch of BBRL at the present available facilities of SFR, bringing over very limited shop facilities and two or three mechanics, plus the indicator group, a draftsman, and test equipment man, with substantial increase in our stock and spare supplies. At the present time, I am trying to define the basis of operation and the organization of the two BBRL branches as well as their relation to ASG.

Friday
December 1, 1944

Capt. Collar, ARL expert on Shoran, arrived in the afternoon. The production schedule of the CPN-2's and APN-3's is quite satisfactory, but absolutely no steps have been taken as yet to train maintenance and operating personnel, to determine recommended operating procedures or theater requirements. The production schedule is as follows:

	Nov.	Dec.	Jan.	Feb.	Mar.	Apr. on	Total
APN-3	24	40	70	120	171	180 per mo.	1,400
	(250 computers for US ordered only)						
CPN-2	4	8	10	18	28	28 per mo.	454

The requirements of 9th BC are evidently regarded as of very low priority. We discussed a schedule of allocation, shipment to ETO, installation, and operational use for 9th BC. Arrangements were made for a conference with General Sam Anderson tomorrow.

At 7:00 p.m. the first teletype conference from Paris to Washington was held. It occupied two hours, and some interesting material passed both ways. We reported on the Paris Branch set-up, the MEW requirements, status of the SCR-584 CSB, and requested investigation of the use of AEW for fighter rendezvous. Washington reported on their clarification of the air-borne beacon program. We were advised that Joe Platt could not be sent.

On the way back to the hotel, warmed my hands over the sacred flame under the Arc de Triomphe, which was bathed in December moonlight.

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Saturday
December 2, 1944

Left the Louvois at 7:00 a.m. and had breakfast at the St. Augustin mess with Dave and Captain Collar. Talked with Colonel Snider and Major Guillou at USSTAF Main. Then proceeded via staff car to Rheims. Lunch with Larry Taylor and conference with General Sam Anderson, Major Dave Williams, and others until 5:00 p.m. Captain Collar provided some useful information on the availability, allocation, and characteristics of Shoran. General Anderson during most of the meeting was disposed to regard Shoran as a program which he could not afford unless the States provided sufficient personnel (260 men, 30 officers) for 11 groups. He pointed out that their present commitment on Oboe was such that they could not extend themselves to absorb an additional program. Toward the end of the meeting, however, he began to recognize the clear superiority of Shoran over Oboe Mark II in point of number of targets which can simultaneously be engaged (20 to 24), the simplicity of ground stations and their operation (which must be handled by 9th BC), and the rapidity with which the ground stations could be moved. General Anderson finally decided to investigate with General Vandenberg the possibility of extracting one bomb group for training as a Shoran Pathfinder group. I committed BBRL to supplying a minimum of four good men for training and spark-plugging this program if it were adopted. It seemed to me that this conference did much to produce a meeting of minds on the capabilities of Shoran, as well as the extensive effort which would be required to make it effective, and that it led to a practical program which may be a useful supplement to Oboe and a means of insuring against future Oboe difficulties. Returned to Paris.

Met Captain Cummings of 12th TACAF, who under Colonel Ben Sterling was investigating availability of GEE and Shoran for the three bomber groups in this organization. Advised Cummings where to go for Gee information and explained the problems presented by a Shoran program. Griggs and Hodgson are to discuss with Ben Sterling the amount of pressure in the 12th TACAF for Shoran with the purpose of presenting to General Spaatz a combined Shoran program for 9th BC and 12th TACAF. Captain Collar is to spend one week in Italy to witness with Major Williams the Shoran tests now in progress there.

Advised by Marjorie Onthank that only 1½ rooms were available for ASG at USSTAF, though this might be increased to 4 with effort. Discussed space and personnel matters with Ray and Hugh.

Sunday
December 3, 1944

To SFR in the morning with Ray, Hugh, and Louise to discuss personnel requirements and other matters before leaving for England. On studying the 584 CSB situation, we concluded that enough personnel were on hand or coming. Among these, the following are already in the theater: Lyman, Harris, Sullivan, Hall, Cowan and two sergeants, and Schedlbauer and six SC officers. Coming are OBrien, Thomson, and a WE engineer on the X-Y plotting boards. This makes the 584 group the biggest team in the laboratory. I pointed out the necessity for Ernie's assuming more and more full control of the activities of these men, in which case they would be quite capable of handling the CSB situation.

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12-3-44 cont.

On the MEW program we had already requested either Roger Warner or Ed Hubbard to do a job of management, and what with Blackmer and Mansur and still later Mike Chaffee coming to this theater, even this large program could be covered.

After an early lunch at St. Augustin mess, we all proceeded to Le Bourget, but the weather had closed down and flights were canceled until morning. Dave Griggs, Dick Hodgson, and Captain Collar apparently managed to get off in a C-78 for General Royce's Headquarters at TACAF to discuss Shoran problems.

Wing Comdr. Fennessy, Head of 60 Group, dropped in, and we had a very informative talk on the ground-station end of the radar navigational aids in this theater.

Four Oboe ground stations are now on the continent operating on four channels, and their performance is steadily improving. Fennessey estimated that about four weeks are required to set up a new pair of Oboe stations, mainly because of the debugging of rather poor British apparatus after each movement and to the difficulties of supplying adequate communication. RAF 8 Group is not doing so well on Oboe bombing, running about 60 percent operational success over the target. He reported that 9th BC was now averaging 70 per cent successful Oboe missions, with an occasional 80 percent. This checks with General Anderson's and Major Williams' statements yesterday.

Wing Comdr. Fennessy is impressed with the value of Gee-H bombing both for the 8th AF and the RAF, and mentioned that upwards of 600 planes of the 1st and 2nd Divisions, 8th AF, had used Gee-H successfully on November 16. The limitations of Gee-H are the lack of air-borne equipment. Sixty Gee-H planes are now operational. A second important factor is the increasing tendency of the Germans to jam Gee as well as Gee-H. This will be obviated by use of a microwave link. An SCR-584 transmitter is being tied on to the ground station to send an S-band response back to the aircraft on receipt of the standard Gee interrogation. The microwave signal is passed through the H2S receiver and then put on to the Gee-H indicator.

Wing Comdr. Fennessy was of the opinion that Shoran was a worthwhile effort and offered to assist in the planning of such a program for RAF. He also stated that 72 Wing now located at Mons under Wing Comdr. Philips was charged with the installation and operation and maintenance of crews of all British ground stations on the continent and suggested that some of their services might be extended to the American Shoran ground-station groups.

We also discussed Gee coverage, the availability of Gee, the error-diamond of Gee, and the H2S Loran program.

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Not So Cold
BOSTON AND VICINITY—Fair today and tonight. Highest temperature near 34. High tides—3:02 A. M., 3:14 P. M. Low tides—9:01 A. M., 9:36 P. M. Sunrise—7:07. Sunset—4:12. Full report on Page 2.

THE BOSTON HERALD

LATE CITY EDITION

VOL. CLXXXXVII, NO. 157 (Copyright, 1944) Boston Herald-Traveler Corporation BOSTON, MONDAY, DECEMBER 4, 1944 ***** THREE CENTS

PATTON SMASHES ACROSS SAAR, FIRST ARMY DRIVES OVER MILE

B29s Fire Plane Plant in 5th Tokyo Raid

WMC ORDERS JOB QUITTERS TO WAR WORK

Shift Barred to All, Employment Service To Take Over Hiring

Beginning Saturday every male worker in the Greater Boston area of 43 cities and towns who quits his job either in essential or non-essential industr, must take a war job if he is found qualified and able.

Also on that day, the United States Employment Service will take over complete control of the hiring of all male workers by business in every category.

That was the pronouncement yesterday of the Metropolitan Boston administration of the War Manpower Commission, after six drastic changes in manpower controls in the area had been decided on to channel needed workers into critical industries producing supplies for the armed forces deemed behind production schedules.

The new controls effective Saturday are described by Leon J. Kowal, area manpower director, as follows:

6 NEW CONTROLS

1. Male workers who quit non-essential jobs, if they are found qualified and able, will be given referrals only to jobs in essential activities. This rule applies now only to workers leaving essential jobs.

2. The exemption currently granted to employers of fewer than eight workers, enabling them to employ male help without referrals from the U. S. Employment Service, is cancelled as of Saturday. Affected by this change are 24,000 employers.

3. The right to hire male workers "at the gate" has been withdrawn from the war plants still permitted to do so.

4. All workers seeking to change their jobs for reasons of health will be required to have their doctors fill out a medical form, drawn up by the Massachusetts Medical Society at the request of the War Manpower Commission. These signed statement w[ill] be viewed by medical consultants, under the direction of Dr. Martin J. Spellman.

5. Newspapers and radio stations will be asked not to accept any employment advertisements from business in the less essential classifications.

(Continued on Page Two)

This
LIBERTY OVERSEAS EDITION
Courtesy of
JORDAN MARSH COMPANY

1 Superfort Lost To Increased Flak, Fighter Opposition

By LANSING WARREN
(Boston Herald-N. Y. Times Dispatch)

WASHINGTON, Dec. 3—Tokyo was visited by United States Superfortresses today for the fourth time in nine days and the fifth bombing attack of the war.

The B-29s of the Twentieth Air Force flew again by daylight from their bases on the island of Saipan, and in the face of opposition from Japanese fighter planes and anti-aircraft fire, showered a Tokyo aviation factory with bombs which started widespread fires.

The Japanese reported that 70 bombers took part in the raid. The communique issued here said one Superfortress was lost to fighter interception over the target, while four Japanese planes were destroyed, and possibly eight others in the air battle over the target.

Tokyo in for Ordeal Like Berlin

The rapid succession of raids on the Japanese capital, it is remarked in War Department circles here, is undoubtedly bringing Tokyo into the class with Berlin, the Ruhr valley towns and the other German objectives of Allied strategic bombing.

It is making good the claim set forth Nov. 24, when the first B-29 raiders attacked Tokyo, that Japan was now in range, and no part of the Japanese homeland will be safe from American land-based assaults. It foreshadows for the capital of Japan an ordeal like that of London or some Rhineland towns.

Though the Japanese are said to have been hastily moving industrial plants of their islands to centers in Manchuria and the Chinese mainland, the homeland factories have continued in operation, and the repeated attacks from the air in the past weeks will help to make a total transfer necessary with all the difficulties and delays this means for Japanese war production.

FIRES IN TARGET AREA

Today's objective, according to the communique, was the Musashino plant of the Nakajima Aircraft Company, the same that was bombed in another daylight raid on Nov. 24. The weather was clear, permitting precision bombing, and one of the squadrons participating in the attack reported that 75 per cent. of its bombs fell within the area of the Mushashino plant. The last squadron to arrive above the target was reported to have observed several large fires in the bombing region. The fires were being fanned by an unusually high wind, the United States observers reported.

This plant is 11 miles northwest of central Tokyo, and has suffered three assaults by two different groups of Fortresses on Nov. 24, and by the successive waves of today's attack.

Other industrial targets in the Tokyo district were bombed in an-

(Continued on Page Two)

11-MILE GAIN BY RED ARMY

Rail Center Above Budapest Taken

LONDON, Monday, Dec. 4 (AP)—Three Russian armies yesterday toppled Miskolc and Satoraljaujhely, last big German stronghold northeast of Budapest, pushed closer to the Hungarian capital along the west bank of the Danube, and drove to within 72 miles of the Austrian frontier.

Marshal Rodion Y. Malinovsky's Second Ukrainian Army stormed the great rail center of Miskolc, 85 miles northeast of Budapest, and elements of his troops, together with Gen. Ivan Petrov's Fourth Ukrainian Army, captured Satoraljaujhely, on the Slovak frontier 45 miles northeast of Miskolc.

80 PLACES ENGULFED

Marshal Feodor I. Tolbukhin's Third Ukrainian Army, in a five-mile advance, captured Dunafoldvar, on the Danube 43 miles south of Budapest, in the drive to take the Hungarian capital from the rear.

In the push toward the Austrian frontier Tolbukhin's troops seized the important rail junction of Tamasi, only 21 miles below Lake Balaton, guardian of the strategic approaches to Austria.

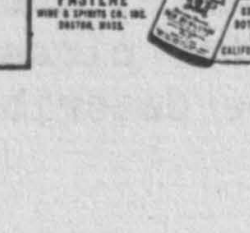
Tolbukhin's smashing success engulfed more than 80 places, including Kaposmero, 5½ miles west of Kaposvaar, taken Saturday. Kaposmero was the closest approach to the Austrian frontier, 72 miles beyond, and put the Russians within 38 miles of Nagykanizsa, junction

(Continued on Page Eight)

Relief from Cold Predicted Today

Relief from the cold wave was promised today as the weather bureau predicted that the temperature around Greater Boston would rise to 34 degrees this afternoon with moderate winds and fair weather. The temperature generally throughout New England was expected to moderate today.

The mercury dipped to 15 degrees in Boston last night and early this morning and to as low as 5 degrees in the suburbs. Near zero temperatures were reported in many eastern Massachusetts towns, while northern sections of New England reported below-zero weather.

PASTENE SUPERIOR SONOMA RED BURGUNDY

PASTENE WINE & SPIRITS CO. INC. BOSTON, MASS.
ESTATE BOTTLED IN CALIFORNIA



(AP Wirephoto from Signal Corps Radio)
FRENCH TROOPS AT RHINE—Machine gunners and riflemen of the First French Army lie in street under enemy fire as they shoot at German positions across the Upper Rhine. Directly across river is Switzerland. Beyond lies German territory.

Greek Police Fire On Demonstrators

15 Die, Scores Wounded in Athens As EAM Protests Disarmament

ATHENS, Dec. 3 (AP)—Greek police fired on a group of left wing EAM demonstrators in this capital today—killing 15 and wounding 148 persons by EAM account—and a pitched battle broke out in an Athens suburb between Royalists and EAM army members. (EAM is National Liberation Front.)

(Prime Minister George Papandreou in a broadcast to the Greek nation, heard in London by the Associated Press, charged "leaders of the extreme left are preparing the way to civil war.")

The crowd of EAM sympathizers turned back by police guns this morning in Constitution Square included women and children.

DEFENDS ORDERS

A crowd was demonstrating against Papandreou's orders that all guerrillas be disarmed and disbanded.

In a suburb in the shadow of the Acropolis, Royalists and men of the Elas—the EAM army—battled openly, and the conflict had lasted five hours by tonight.

Papandreou said his proclamation disbanding the Communist EAM militia and other guerrilla organizations was in accordance with a "declaration of policy" to which all factions had agreed unconditionally.

Then, he continued, the Leftists demanded disbanding of armed

(Continued on Page Six)

COL. ROOSEVELT TAKES BRIDE ON CANYON RIM

GRAND CANYON, Ariz., Dec. 3 (AP)—Col. Elliott Roosevelt and movie actress Faye Emerson were married in a glass-enclosed observation station on the rim of the Grand Canyon today in what the bride called "probably the most beautiful wedding there ever was."

The President's 34-year-old second son and the 27-year-old coppery blonde graduate of little theatres recited their vows at 9 A. M. before a large window overlooking the magnificent chasm. Blankets of snow and swirling mist partly concealed its famed hues. The temperature outside was 29 degrees.

"Our marriage means so much to us both that we wanted to begin it as beautifully as possible," the bride told reporters afterward.

The Rev. Roger Sawyer, pastor of a Williams, Ariz., Methodist church, performed the eight-minute ceremony as a few friends stood by.

Miss Emerson was attended by Mrs. Joseph P. Livengood of Los Angeles, a granddaughter of the late opera star, Mme. Ernestine Schumann-Heink.

Maid of honor was 10-year-old Ruth Chandler Roosevelt, daughter of Col. Roosevelt by the second of his two previous marriages.

Best man was Jack Frye, president of Transcontinental and Western Air, Inc. Miss Emerson was given in marriage by John Meyer, a mutual friend who introduced the bridal couple at a dinner party in his Los Angeles home in September, 1943.

Miss Emerson wore a blue doeskin suit, a mink bandeau with matching coat and muff, and brown alligator

(Continued on Page Seven)

MONDAY, WMEX, 7 P. M.
Subject: "JUGGLED" ATTY. GEN. FIGURES
Speakers: Chairman Wm. H. BURKE
Former Lt.-Gov. Francis E. KELLY
Meeting: Summit workers Sen. State Comm. Hotel Bellevue, Monday, 7 P. M.

Tactfully timely . . . next Sunday's picture section—and a Geneva Wrist Watch, now advertised in Metropolitan Group Sunday pictorial sections. —Advt.

2500 PLANES AID PO DRIVE

Nazis Lose Last Grip On Bank of Montone

ROME, Dec. 3 (AP)—British Eighth Army troops, advancing through the Po valley on a broad front northeast of Faenza, have driven to within two miles of Russi, junction city astride the main Ravenna-Faenza highway, the allied high command announced today.

Supported by more than 2500 planes of all types and strong tank formations, the British drive started yesterday, and the Germans were forced back toward Russi between Albereto and the Montone river. The retreat cost the Germans their last footholds on the west bank of the Montone. The allied communique said the Germans were trying to establish a line along the Scolo Via Culpa canal, just south of Russi.

The German news agency DNB, in a Berlin broadcast, admitted British troops attacking on a large

(Continued on Page Seven)

Airborne War Show to Spur Bond Drive

A spectacular demonstration of the part played in the war by airborne troops will be staged Wednesday and Thursday at Logan International Airport to spur the sale of bonds in the Sixth War Loan drive.

Two 15-passenger combat gliders arrived yesterday at the airport from the First Troop Carrier Command in North Carolina for the airborne attack show. More equipment is on the way, and it will include a B-17 Flying Fortress, a CG-13 large cargo glider and four C-17 troop carrier transports.

The demonstrations are many and varied. Cargo attached to colored parachutes will be dropped on the airport and a plane in flight will "snatch" a glider from the ground and bear it aloft in flight. A demonstration of the double tow—two gliders behind a single aircraft—will be staged.

An air evacuation team of the Army Air Forces from Randolph Field, Texas, will stage a demonstration of air evacuation of wounded men. The "patients" will be loaded in specially designed hospital aircraft with specially trained flight nurses in attendance.

In addition to the flying exhibitions, there will be a demonstration of unloading artillery and military vehicles from gliders and troop carrier airplanes on the ground.

(Continued on Page Eight)



Hodges Captures 4 Towns--British Thrust into Venlo

PARIS, Dec. 3 (AP)—The U. S. Third Army smashed organized resistance in most of the factory city of Saarlautern and broke across the Saar river into the Siegfried line today as the First Army seized four towns in triple assaults west of Cologne that rolled back the Roer defenses a mile or more.

The tempo of the Allies' winter offensive rose furiously. The British Second Army sprang to the attack in eastern Holland with a dawn assault that swept up to 600 yards into the stout Maas river defenses at Venlo, last German bastion on that front short of the Reich.

Hundreds of American and British fighter bombers swarmed up in support of the new drives in the north, and the German air force met the challenge with the biggest show of strength in weeks, sending at least 75 jet-propelled planes against the British.

The Third Army's 95th Division boldly seized a bridge over the formidable Saar and sent infantry and armored tank destroyers racing across in the first attack on this front against the Siegfried line.

(Continued on Page Four)

Yanks Outwit Huns to Take Saar Bridge Wired for Blast

By GENE CURRIVAN
(Boston Herald-N. Y. Times Wireless)

WITH THE THIRD ARMY IN GERMANY, Dec. 3—In a surprise maneuver that caught the Germans completely unawares, elements of the 95th Division crossed the Saar at Saarlautern in the darkness this morning and joined with other forces in the city to capture the important bridge intact. The span was mined but the enemy never got a chance to blow it up.

The German technique of mining bridges reached a new high in this case. There was a varied assortment of demolition explosives, all wired together and ready to be detonated from one central point. Among the mines was a large aerial bomb also hooked in on the circuit.

But the Germans, who always follow the book, were expecting an attack from the south and not the north, so, according to their rigid schedule, the time had not arrived to throw the switch at the bridge. But, while the Americans were making the river crossing and working their way around to the bridge, another force was fighting its way through the city streets toward the southern end of the bridge where a rendezvous had been pre-arranged.

This feint from the south worked beautifully and so completely that the other force on the far side of the river had little trouble in capturing their end of the bridge.

(Continued on Page Four)

BIG MOTHER HEN TYPE OF GI DOTES ON SAVING UNGRATEFUL MIDGETS

By CATHERINE COYNE
(Wireless to The Herald)

PARIS, Dec. 3—In nearly every fighting outfit there is a mother hen, a man who forms a deep and protective affection for a buddy for whom he not only risks his life but, sacrificial to the extreme in the army sense, he even takes on extra duty.

On a 48-hour pass from Metz, where he stormed the forts as a 95th Division rifleman, C. R. "Munn" Owens of Beacon street, told me today about the mother hen in his platoon.

"He is a big blond guy, a bartender from Milwaukee," he said. "He's a good soldier, one who knows the value of caution, but he took under his wing a scrappy little guy from Detroit who doesn't look bigger than five feet. It's strictly a one-sided affection, of course. The big guy probably would lose interest if Bitsy, the little one, were to go soft and reciprocate a kindness.

"They'd draw guard duty at night, during which they were supposed to alternate two hours on and two hours off. When his two hours were up, the big guy would go in to wake Bitsy, but usually if he were sleeping he'd fix the blankets and go out and take over Bitsy's trick, too. I don't believe he ever drew a 'thank you.' That didn't bother him.

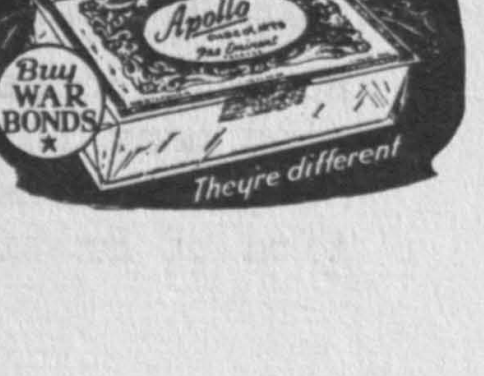
"He's an easygoing guy. You'd never imagine his doing anything rash, but he did. There's nothing to compare with the German machine pistol we call a burpgun for scaring the living daylights out of you, the first few times you hear it, but I've never known it to hit a man except Bitsy.

"It was when we were trying to take those forts. We were in foxholes, Bitsy and the big guy together. I guess Bitsy had slept; at least he was lively early in the morning when, routinely, Jerry came out of the fort and began to spray us with the burpgun. We did the sensible thing: we ducked.

"That little guy is absolutely fearless. He began to yell, 'Let's go and get the lousy so-and-so.' He crawled out of his hole, dragging his M-1 rifle, which was nearly as big as he was. The big guy tried

(Continued on Page Five)

Town House
100 Warrenton St., Boston



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D810.S2.T78. A War Diary, 1944-45. John G. Trump, 1973.

Monday
December 4, 1944

Arrived at Le Bourget at 8:15 a.m. Took off in a C-47 at 9:15, arriving at Northolt 2½ hours later after a fairly rough flight. Ernie Lyman, Lieut. Barta and Lieut. Scott of 12th TAC, and Capt. Cummings of 1st TACAF accompanied me to London, where we left Capt. Cummings to proceed to Burtonwood to scrounge a 3/4 ton ambulance for the 12th TAC radar siting set. The rest of us went on to Malvern by Pontiac, arriving at 6:30 p.m. Spent an hour at the lab and some time after supper discussing the proposed ASB set-up and local BBRL problems.

An interesting incident occurred in the morning in Paris. I missed Ernie's ambulance transport to St. Augustin mess and stumbled through the dark streets with my heavy bag to La Place de l'Opera, where I approached what appeared to me to be a taxi. It turned out to be a private car, but the French driver, recognizing my American uniform, volunteered to take me to St. Augustin. On arrival, he refused my proffered bank notes (which in the darkness had somehow reached a total of over 100 francs), but finally, on my insistence, exclaimed, "Just one American cigarette!" Fortunately I was able to give him a K-ration package of Old Golds which I was carrying in my pocket.

Tuesday
December 5, 1944

Spent the day at Malvern. In the morning talked with Dr. Lovell and Mr. Rowe, who dropped in to discuss the performance of their H2K-equipped Lancaster, which carries a 6-ft. dish. They showed excellent photos taken at 1000 ft., with clear resolution of field hedges, rivers, railroads, and other landmarks. A comparison with American H2K photos with 42-in. dish showed approximately the same resolution, with slightly better photography. Mr. Rowe is anxious to find some good radar jobs on which to concentrate TRE energies. The RAF Bomber Command, apparently flushed with success, is holding itself aloof from TRE and plans to win the war on its own.

Wednesday
December 6, 1944

General Pete Quesada, whose visit had been deferred from Sunday to today, failed to appear. Without any fuss, we had prepared an interesting program--in addition to general radar and operational discussions--which included the possibility of visiting the nearby British GCA training site, flying in the H2K-equipped Lancaster, and watching the SCR-584 track a beacon-equipped aircraft.

In the evening, a number of us (Halpern, Tape, Lyman, Davidson, Jeffries, Dennison, O'Kane, and myself) entertained General Quesada in absentia and Mr. A. P. Rowe in person at the British Camp Hotel. It was an excellent dinner. Mr. Rowe brought out all of his old "stories" and some new ones, which were enjoyed by all. After dinner we discussed a good many things, including field service in the Pacific, the early beginnings of radar in England and America, and the need for closer coordination of British and American radar efforts. Mr. Rowe described the first

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D810.S2.T78. A War Diary, 1944-45. John G. Trump, 1973.

radar demonstration in England, in which he was the official government observer. At a range of 13 miles a just perceptible indication was observed from an aircraft--hardly enough to be promising except to the very imaginative. Sir Robert Watson-Watt's greatest contribution was to recognize the possibilities and to put himself willingly out on a limb by endorsing radar development as a sound program for air defense of Great Britain.

Thursday
December 7, 1944

Left Malvern at 9:30 a.m. with Gerry Tape and Dave Davidson. Met Dave Griggs at Pinetree, and in the afternoon we had a long discussion with Colonel Dolan with the following results: (1) The 8th AF has an urgent operational requirement for a small number of APQ-7 (Eagle) aircraft which would be used to bomb high-priority targets such as the oil refineries at Leuna and Politz. Three Eagles immediately--bringing the total to four--would help out in getting maintenance and operator training started. The 12 to 16 following in January could be used for the operational work, each Eagle leading a group. During the past months, 140 bombers have been used over Leuna, which has not yet been effectively bombed. It makes a difficult radar target because of the multiplicity of adjacent signals.
(2) Present results with the APQ-7 training plan indicate that navigation is exceedingly difficult because of the limitations of a 360° forward-looking sector. Better radar briefing and use of the API and other navigational aids would help. At the moment it is planned that the Eagles would fly as deputy planes in bombing attacks, taking over after the IP.
(3) Dave presented his arguments for the use of the MEW as a ground control not only for fighter groups, but also for bombers. It appears that the 8th AF is generally favorably inclined toward the suggestion, though at present eight PPI's are fully occupied with the fighter-control work. (4) The H2X requirement for 8th AF is now 18 H2X ships per group with an ultimate requirement for 24. It was agreed that H2X bombing is fairly unsuccesful due to high turnover of skilled navigators (after 35 missions); poor navigation, particularly in dead reckoning; failure to use operational flights for the training of H2X crews in subsidiary positions; and other causes.

Dropped in to see Lt. Col. Arps, Lt. Col. Scott, and Bailey Price--all of ORS. They have done a remarkable job on the so-called "Oxford Experiment", in which they tested the performance of standard H2X equipment on Oxford targets, using the SCR-584 for bomb assessment. Lt. Col. Scott showed some interesting superpositions of bomb folds on natural maps of various German target areas. In general, it appeared that a substantial number of the bombs fell around the designated target and within built-up areas.

ORS has prepared a brief analysis of H2X bombing accuracy under various conditions of cloud cover as against Gee-H, Micro-H, and official bombing accuracies.

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COMPARATIVE BOMBING ACCURACIES

Category	Average Distance Center Pattern from Aiming Point	1 mi.	2 mi.	3 mi.	4 mi.	5 mi.	Size of Sample
H2X 10/10	2.5 mi.	5	27	44	63	69	261
8-9/10	1.9	23	47	68	79	83	208
6-7/10	1.4	49	73	88	91	94	124
4-5/10	1.2	51	82	87	93	96	77
Gee-H	1.4	44	75	89	93	96	143
Micro-H	1.3	47	77	96	100	100	37
Visual	0.3	92	98	99	100	100	96

The four causes of H2X errors were described as (1) faulty bomb release, (2) H2X failure over target, (3) large-force problem (high traffic density, tendency to follow the leader), (4) education of group commanders.

After a trip to London in the dark, Dave and I had dinner at the general officers' mess with Archambault, Hotchkiss, Donohue, and Waring.

Friday
December 8, 1944

Spent morning at OSRD. Worked up memorandum on items to be taken care of by Dave Griggs on his mission to the States. In the afternoon attended the TT conference from UK Base.

At 11:30 p.m. on Tuesday an "incident" occurred on Duke Street, one block north of Oxford. The V-2--whose approach was observed by a number of people as a blue-green light--eliminated three small buildings, wrecked the adjacent portion of Selfridge's, and generally destroyed windows and property for blocks around. It was ironical to see the front store window display at Selfridge's with Christmas trees, tinsel, and packages surrounded by shattered plate glass. The debris and violence of the explosion was terrific, but did not harm the TT set-up 50 feet away in the sub-basement.

After a short session at the Mt. Royal Club, Morgan Gunst, Jim Dennison, Gerry Tape, Al Albrecht, Roger Dorr, Capt. Steve Stackpole of the USSTAF Historical Section, and I had dinner at the Etoile Restaurant in Soho.

Saturday
December 9, 1944

Arose at 6:15 a.m. and left at 6:45 for Pinetree for scheduled conference with General Doolittle at 9:30. General Doolittle discussed with Dave, Tome, and myself the more pressing radar problems of the 8th AF. He is anxious to get more H2X equipment, recognizes the problem in navigation, and believes that the scope movies should have an important influence in correcting operator and pilot procedure and in instructing group commanders.

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12-9-44 cont.

He is counting on getting the Micro-H Mark II equipment (air-borne delay units) and the production ground-station beacons (CPN-6). He endorsed the proposal that a small number of Eagle aircraft for top priority targets be secured with high urgency, and agreed to send through a letter which Tom Murrell is preparing. He was interested in the suggestion that MEW be used to provide navigational information to bomber as well as fighter groups. I was surprised at the completeness with which he understood the use to which the present 8th AF MEW was being put in fighter-group control. He agreed to take up at his commanders' meeting later that morning the question of using the MEW in this way, as well as the suggestion of obtaining MEW PPI movies as a means of studying bomber operations. It was estimated that 60 per cent of 8th AF targets during the past two months lay within the present range of the MEW.

Later we dropped in on General Todd, Director of Operations. Today's 8th AF bomber operation had a screen of six jammer aircraft to interfere with German ground stations and also jam out the VHF communications of our formations. The VHF transmitters are set at 6 watts and are not interfered with by our VHF jammers when they are at least 21 miles ahead. General Todd pointed out the complete dependence of the 8th AF on blind bombing aids by stating that they had had only one real visual day in the last seven weeks.

Drove with Tom to Malvern, stopping at Oxford, where between 3:00 and 4:00 in the afternoon, I had a glass of sherry with Mr. and Mrs. George Kelly at 15 Charlbury Road. Mr. Kelly is Managing Director of Press Steel, Ltd., and had interesting stories to tell about Lord Portal and the Portal Fabricated House (50 per cent of which are likely to made by Pressed Steel). They were very much pleased with news from home and with the attractive box of candy made by Martha Kelly in Winchester. I was urged to call on them again.

Drove out to the Essington to see John McCarthy, who had returned from Paris. John is soured on the Paris venture, badly needs a rest, and will probably remain in Malvern in something like his former capacity.

Sunday
December 10, 1944

Seminar at 11:15 by Dave Davidson on Gee, SS Loran, and Shoran. I spoke briefly about the ASB and its program of expansion.

At the afternoon Steering Committee meeting we discussed the 8th AF program on Eagle, H2X, and Micro-H; the SCR-584 CSB program; GCA; and arrangements for travel and expansion to the continent.

Monday
December 11, 1944

Left Malvern at 7:15 a.m. with Janet, Al Albrecht, and a Captain who was connected with the Strategic Bombing Survey Group of USSTAF. Left London at 12:45 for Biggin Hill, and at 2:30 took off for Paris, arriving two hours later. S/L Everitt and Janet were fellow passengers.

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12-11-44 cont.

Had short talk with Johnnie Faulkner, who reported that the SCR-584 CSB units of 19th TAC are becoming operational and doing very well in their preliminary jobs. The MEW has also been moved to a new advanced site. He is getting along well at HQ with General Weyland and the others.

Talked with Hugh about space problems of the ASB. It is still somewhat problematical as to whether we shall get the additional 2000 sq. ft. which we have requested from SFR. A complicated interchange with Citroen, the French Army, and the U. S. Army is being attempted. A variety of personnel problems also seem to exist.

Tuesday
December 12, 1944

Spent morning at ASB, which now has very fine office arrangements. In the afternoon we went out to St. Germain, where the ASG has been allotted five enormous rooms on the second floor of Building F. Since our plans are now to concentrate the ASB effort at SFR, this space is far beyond our requirements, is located remote from the Director of Operations, and, being in a secondary building, is still dirty, cold, poorly equipped, and generally unsuitable. Telephone communications for the entire USSTAF set-up are completely inadequate. The Headquarters is located at the former "Ecole Normale", which was at one time occupied by Field Marshal von Runstedt. The gleaming white limestone which characterized the six large buildings has been painted a muddy brown. Access to the buildings is via muddy paths with rosebed borders. In short, it is a hell of a place.

Wednesday
December 13, 1944

Dave Griggs returned late in the evening from 9th TAC, where General Quesada had discussed with him the plans for imminent heavy front-line bombardment as the opening move in a new ground offensive. The 8th AF and RAF heavies will be used continuously in this work, which will be second only to the occasional hammering of top-priority oil refineries. Apparently the November 16 bombardment was exceedingly effective, but for insurance reasons was placed a sufficient distance behind the actual front-line crust of German resistance to result in this crust's never being overwhelmed by the advancing ground forces. It is now proposed to retire the principal elements of our front line a distance of two or three miles, leaving strong points well dug in to prevent the enemy front from advancing. The zone of security will therefore be held by only a small number of troops, who will run the considerable risk of front-line bombing errors. The heavy bombardment will be placed squarely on the enemy front-line positions.

Thursday
December 14, 1944

Spent the morning at SFR. At noon Dave and I had luncheon with General Spaatz and General Curtis at Park House. A general discussion of the importance of radar in the present air war over Germany ensued at the table,

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and the high operational value of a small number of the latest radar equipments was emphasized by Dave and myself. This was a good preliminary to bringing up the usefulness of a dozen operational Eagle equipments for bombing high-priority oil targets such as Leuna and Politz and at the same time securing theater indoctrination on this new gear. General Spaatz requested that we draft a letter on this subject to Bowles for him to be carried back by Dave. (This letter was subsequently rewritten and addressed to General Giles.) The interest of the 8th AF in investigating the utility of ARC equipment for use with the Mark XIV computer on fighters so as to increase the accuracy of deflection shooting on enemy jet planes was mentioned. We also discussed the superior air control which the 8th AF and the two TAC MEW's are providing over Western Germany and mentioned the possibility of extending this coverage by use of wider radiators. Lt. Col. Bender, Director of Operations Section, and Colonel Bowman, formerly 8th AF Group Commander and now Personnel Relations Officer, were among those present.

In the evening we saw Colonel Ranger, who is plugging a virtual-image method of superimposing three-dimensional contour lines on PPI scope presentations.

Friday
December 15, 1944

Discussed with Colonel Maxwell the imminent front-line bombing program, particularly with reference to the technique which would be employed this time and to the safeguards against bombing errors on friendly troops, also other items such as the MEW program and the urgent Eagle requirement on which he appeared to be passively in accord. Expressed to both Colonel Maxwell and Colonel Snider the high desirability of ASG's acquiring a minimum of two rooms in Building C.

Back at SFR discussed with Major Stammerjohn of 9th AF and Major Burr of 29th TAC the requirements for siting sets for each of the TAC's. It was agreed to discourage Ernie Pollard from sending over a sidewise-mounted Little Abner for this purpose and to use the available CPN-1's, of which 9th AF has nine in storage.

The 6:00 p.m. TT conference was attended by most of our crew plus Majors Stammerjohn and Burr and Captain McGinty of USSTAF. Among items of note were the offer of the Radiation Laboratory to send over at once two sets of Block III equipment with synchronizer to perform the relay-radar function for MEW, the departure of two beacon-receiver kits for use on MEW, and the departure by ship of three GCA equipments. At the Louvois that night, the USSTAF cable expressing the requirements for the entire MEW program in this theater was coordinated.

It appears to be a good idea to have a representative from USSTAF, 9th AF, and 1st TACAF present as regularly as possible at our Friday teletype conferences, and invitations are being extended.

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Saturday
December 16, 1944

Luncheon with Sam Goudsmit and Fred Wardenberg of the ALSOS Mission at Hotel Monceau. Sam reported being exceedingly busy and handicapped by a transient OSRD personnel which flits away as soon as things become inactive. The present technical staff is down to six. I gathered that there is growing evidence, confirmed by papers and personnel located at Strasbourg, that the Germans are working in a somewhat desultory way on the "big" project. Very little information of real interest in the radar business is being obtained. It seems that the Germans have had a big infra-red program, but that the performance of infra-red equipment is not particularly promising.

In a trailer behind the Trianon Palace, I located F/O Eprile and discussed with him the SS Loran situation, particularly the low signal strengths of the North African station at Appolonia experienced in northeastern Germany. I was informed that this station is already functioning at optimum technical efficiency and is equipped with the directional antenna. Since northeastern Germany is a high-priority region for heavy bombardment, it would appear desirable to remove this fundamental propagation difficulty by locating the station more favorably--perhaps in Sicily, southern Italy, or Greece. I will investigate with Dave Davidson and, if necessary, make recommendations to Air Ministry on how this situation can be improved.

Dropped in on Colonel Lack to discuss General Bull's interest in radar reconnaissance with Eagle-equipped aircraft to locate enemy armor in the woods. I discouraged Colonel Lack from expecting that Eagle would be able to distinguish enemy armor in the woods and pointed out that only with real difficulty could they be seen even in open country with normal background of land echoes. I agreed to send him a brief report on this after I had accumulated the necessary information. We agreed also to hold up field tests of Window-filled mortar shells as a means to front-line identification until we are advised by the States as to the availability of the 500 60 mm. special shells requested some time ago. If they cannot be quickly procured, however, we will undertake a field experiment using the 19th TAC SCR-584 sets tied in with Army Corps.

Sunday
December 17, 1944

Spent the morning at ASB looking over correspondence and analyzing the Shoran War cables. Called Jules Halpern at Malvern. After lunch at the mess, Louise and I visited the Madeleine, walked along the Rue de Rivoli, and made a rapid excursion through the Louvre.

In the evening talked once more with Jules at BBRL--the radio connection being established in three minutes and coming in very clearly. Hodgson, Jeffries, and Garfield arrived at last--Dick having been delayed almost a week by bad weather. Steve, Hugh, and I discussed the business set-up at

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12-17-44 cont.

ASB, the desirability of bringing over Norman Leavitt and Bill Schwann, and requesting an able business administrator from the Radiation Laboratory to handle the dynamic situation here. It was pointed out that the complete dependence of ASB on Army-provided services requires continuous and skillful attention, and we decided that Abe Collier was well qualified to do this job.

Monday
December 18, 1944

Left at 9:00 a.m. with Capt. Cummings and Gordon McCooch for 1st TAC at Vittel. Vittel is a thermal spa town replete with hotels and baths located two hundred miles east of Paris and about 60 miles south of Nancy. Conference on Shoran program with Col. B. Stern, Major Don Hill, and Capt. Collar, who has just recuperated from two weeks' illness at 1st TACAF. I agreed to insure that the two sample CPN-2's and two APN-3's originally requested for 9th BC would be diverted to 1st TACAF because of their higher priority. Need for a qualified energetic officer to head up 1st TACAF's computer group was pointed out and arrangements made to train this officer on selection in the computing techniques worked out by Gordon Danielson's group at Pinetree. Shoran will be used by the 42nd Bomb Wing, which consists of two groups of B-26 mediums. They have had thus far no experience with radar, but are currently acquiring Gee equipment. All are agreed that it is essential to base the Shoran computer group at either Group or Wing Headquarters. It will not be possible to have a common computer group serve both 9th BC and 42nd Bomb Wing. The status of other radar items such as GCA and SCR-584 CSB were discussed.

Further conversations and dinner with Colonel Stern and General Schramm, Deputy Commanding General. General Schramm is now keen on acquiring Shoran. Spent the night at Hotel Lorraine.

Tuesday
December 19, 1944

Left Vittel with Captain Collar at 9:00 a.m. for 64th Fighter Wing. This is located at Loudres, a few miles south of Nancy in a typical peasant village, with its geese, chickens, manure piles, washerwomen at the pumps, and the Countess' chateau. An hour's talk, followed by dinner, with General Barkus and Captain "Skippy" Schiff ensued. General Barkus was the same amiable person whom I had met in a wheat field in Italy five months ago. He has since become completely sold on radar and discussed avidly the possibilities of MEW which should reach him sometime in February. The 64th Fighter Wing, as before, handles all the ground radar for 12th TAC, and they are still using the 270's, 297's, and fill-in radar brought up from Italy. These radar, however, are now sited in clusters so as to avoid the difficult communications problems which completely ruined their radar network in Italy. The filter room has been eliminated, and navigational control for both offensive and defensive purposes is now on a fairly satisfactory basis.

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General Barkus recounted the story of how they had bagged a lone Nazi transport which for weeks had been making nightly low-level runs from Strasbourg through the Belfort Gap, presumably to Spain. Although regularly picked up by their early-warning and GCI radar, the Beaufighter night-fighters of 12th TAC had been unable to catch up with this plane. Accordingly, General Barkus requested the loan of several P-61's from 19th TAC, and the hunt was on. General Barkus stationed himself at the A-270 site. The plane was picked up shortly after it left Strasbourg, and a P-61 was vectored toward it. The hunt got close. The two aircraft signals merged into a single double-plane signal on the scope. Then the operator reported single signal, single plane. The location was pin-pointed, and General Barkus went on a personal reconnaissance. Villagers pointed out the location of the still-burning plane, which apparently had carried about 10 passengers and was loaded with Nazi propaganda. material. The pilot was a regular German transport pilot about 41 years of age, whose log showed that he had left that morning from Berlin for Stuttgart.

The 64th Fighter Wing is now using unmodified SCR-584's for close-support bombing from the PPI scope. They are therefore much interested in obtaining the SCR-584 CSB units, six of which are scheduled for them plus another six for French TAC. General Barkus expressed interest in obtaining GCA equipment. Twelfth TAC has a total allocation of six GCA's, the first two being from among the first seven coming to this theater.

Once again I heard the story of project "Horsefly" which General Saville had expounded on the extraordinary value of using a cub spotting plane for locating suitable ground targets. General Barkus explained how the cub picks up fighter bombers and actually indicates to them the designated target by diving toward it.

General Barkus had had no further word about B. J. Thompson.

Left the picturesque village of Loudres at 2:00 p.m. and drove on to Nancy, stopped at 19th TAC. Major Dixon was interested in the possibility of utilizing Shoran in the A-20's of the 10th PRG, and we supplied him with information regarding this possibility. Gee has been found inadequate in part because the accuracy is marginal for flare-bomb photography and inadequate for flash photography. Gee stations are sited so far behind the front lines that the range is inadequate for low-flying planes. Shoran offers the desired precision, and its ground stations presumably could be kept sited well forward. The 19th TAC will place a requirement for air-borne equipment only, relying on the ground-station beacons of either 9th BC or 1st TACAF. Major Dixon stated that the two SCR-584's were both operational and being used primarily as navigational aids with much enthusiasm by both TAC's. However, some level bombing is being done with them.

Left Nancy at 3:30 and proceeded through fog-bound roads, arriving in Paris at 8:45 p.m.

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Nazis Smash

Monday, Dec. 18, 1944

Back Across Border; Luftwaffe Aids Drive on Hodges Line

The Front as Counter-Attack Opened



Re-Enter Belgium, Luxembourg at Three Points

German troops, supported by tanks and the Luftwaffe, smashed at American First Army lines on a 70-mile front from Duren to Trier yesterday and drove back across the German border into Belgium and Luxembourg at three points along the invasion route the Nazis took in 1940.

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Crucial Battle On in West

'All Now at Stake,' Nazi Troops Told; First Strikes Back

American First Army troops yesterday struck back at the mightiest enemy counter-offensive since D-Day. Spurred by the German High Command's proclamation that the Reich's "great hour" had arrived and that "everything is now at stake," Nazi armored and infantry columns smashed on along the old invasion route into Belgium and Luxembourg.

December 19, 1944

The Battle Area



Nazis Open Big Push in South

December 20, 1944

Rundstedt Striking on 60-Mi. Front

Reports from SHAEF last night said German blows against U.S. positions in the Saar Valley had assumed the proportions of a full-blown offensive — the second mounted by Field-Marshal Gerd von Rundstedt within three weeks—and the German High Command, claiming their troops were on the move between Sarreguemines and the Upper Rhine, said Nazi forces had broken through the Maginot Line at points along a 25-mile front and had captured more than 100 localities in 24 hours.

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Wednesday
December 20, 1944

At SFR started Captain Collar off on resolving the Shoran frequency allocation at Air, SHAEF. Discussion with Bennett Archambault, Gene Hotchkiss, John Chase, and Steve Jeffries on L/Q arrangements for contractors' and OSRD London Mission personnel. Discussion with Lyman, McCreary, and Herb Hall on a computer program for close-support bombing, in which it was agreed that McCreary would write a streamlined SOP on the Norden bombsight computer for close-support bombing, then proceed to Malvern to assist in setting up and testing the X-Y plotting board per se, and undertake to adapt the Norden or Lyman's impact-predicting computer to the X-Y plotting board. We have agreed that McCreary is to return to the US in about one month's time. Proceeded to USSTAF for the afternoon.

On the Western Front a serious crisis has developed as the result of a powerful German counter-attack backed by seven armed and ten infantry divisions. This attack developed last Saturday from the Monschau Forest somewhat south of Liege in the 1st Army area. It is reported to have penetrated more than 20 miles into Belgium in the first 48 hours and has strong air support, which is, however, handicapped by the weather. This attack was timed to just precede the planned large-scale offensive, is directed at a lightly held section of our front, and apparently has come as a rather complete surprise due to German ingenuity and the present difficulties of aerial reconnaissance. A serious view of the situation is reported to have been taken by SHAEF.

Discussion with Steve Jeffries and Hugh Kendall on the business functions at ASB in which general agreement was reached on the responsibilities of all concerned, including Abe Collier, for whom an urgent request to DuBridge was coined.

Thursday
December 21, 1944

Discussed with Major Marjorie Onthank her planned return to the United States in view of our mutual decision that ASG did not have a job which matched her capabilities. Marge has arranged with the Personnel Officer at USSTAF to be listed as an officer with legal training and qualified for contract termination work, for which there is a large demand in the States. Marge will investigate the prospects of raising the status of Sgts. Caldwell and Carlson to that of 2nd Lieut. Mr. Anderson, RCA design engineer on Shoran, who has just completed three months in Italy with 12th AF, arrived in Paris with Major Don Hill. We discussed briefly the results of the Shoran trials in Corsica and the general equipment and personnel picture. A Shoran meeting has been called for Friday at 10:00 a.m. to discuss general features of the 1st TACAF and 9th BC programs.

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Friday
December 22, 1944

Conference at ASB to determine the Shoran program for the northern European theater. It was attended by Earl Anderson, Major Don Hill of 1st TACAF, Lt. Kligman of 9th AF, Captain McGinty of USSTAF, Captain Collar of ARL, Major Osgood of Air SHAEF, Captain Hoefer of CBI, Charlie West, Morgan Gunst, Dick Hodgson, and myself. The 9th Bomb Division delegation consisting of Captain Kyte, Lt. Col. Green, and Major Dave Williams were unable to attend because they had been alerted to move before the advancing Germans.

Our deliberation recognized that there would be a great scarcity of both air and ground equipments during January and February and that the first two air and ground sets would be allocated to 1st TACAF for 42nd Bomb Wing because of their complete lack of blind-bombing equipment. It was further recognized that only a handful of trained Shoran personnel were available, including the crew of the Shoran-equipped B-17 now down at MAAF, consisting of Major Dickson and Captain Winn plus Mr.Alexander of RCA. BBRL is to assist by assigning Charlie West to the Shoran program to work alongside Alexander on air and ground maintenance training and on the siting of ground equipments.

Since 1st TACAF proposes to use its first two ground stations as a training system established on the south coast of France, with one station on their principal air base near Marseille, it was recommended that these training facilities be likewise made available to 9th BD on an allocated schedule. A determination was made of the minimum number of air and ground sets which would be required from the States in order to meet a fairly tight but realistic training program for both Air Forces. This minimum number was well within the production and shipping capabilities of the States if they really got behind it. It would permit 1st TACAF to be operational with two pairs of ground stations and about 16 planes by the end of March, and 9th BD to be operational with two pairs of ground stations and a slightly smaller number of planes by the same time. A tentative allocation of the air and ground sets between 9th BD and 1st TACAF was made, and Captain McGinty pledged USSTAF to establishing this on a firm basis.

The urgency of Shoran for the two air forces in the ETO, the training and operational schedule, and the required equipment from the States was spread upon the teletype, addressed to General McClelland, General Craig of OC&R, and Colonel Metcalf. Captain McGinty agreed to get out an official USSTAF cable covering the same material by Tuesday of next week.

The teletype conference was quite lengthy, particularly from our end, and the Washington conferees proposed that henceforth the Paris teletype be extended to 90 minutes with London reduced to 60. Lt. Florsheim and another officer will arrive early in January.

Saturday
December 23, 1944

Called on Colonel Art Warner for luncheon at the Petit Ecurie in Versailles. We discussed the status of the mortar-location work which has been done by both the British and Americans. Warner has written an excellent report

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pointing out the usefulness of the SCR-584. For this function, the SCR-584 uses sector scan, narrow gate with 15,000 yd. maximum on both range unit and PPI. Fairly exhaustive tests were made on 3-inch mortar bombs, almost every one of which was detected when within 6,000 yd. range. The automatic tracking feature is essential for accurate location. The preferred technique is to take three simultaneous readings of azimuth, elevation, and range. These are then plotted as a ground track which can be extrapolated through the mortar target. It is desirable to indicate on this track the maximum range at which the shell was observed. A correction is then added to take care of the front end of the trajectory and for the variations in terrain. This method permits the source of mortar fire to be located within a box about 100 ft. sq. In Italy 85 per cent of the casualties are reputed to be due to mortar fire, and on occasion the artillery of an entire corps is directed at the area of a single mortar in order to eliminate it. Efforts are now being made to divert a dozen or more SCR-584's in the U. S. Army Commands for mortar-fire location.

Incidentally, the report stated that the screening of permanent echoes could be accomplished with 1/4-inch mesh screening placed at least 30--and not more than 50--yards away and at an angle of 30° with the vertical, with the bottom farthest away from the 584.

Met Major General A. M. Cameron, head of Passive Air Defense of SHAEF, and in charge of Art Warner's section--also Cameron's deputy, Colonel Carter. We discussed briefly the SCR-584 close-support program, Willie Orphan, and VT-2 (American diver).

Colonel Lack advised that 500 3-inch chaff-filled mortar shells would be available for air shipment to the ETO on January 15.

Returned to ASG and left shortly for Paris, stopping for wine en route. Purchased a hand-wound phonograph and disks in anticipation of Christmas Eve party. Ed Worth arrived with an ambulance full of equipment, heaters, and Christmas packages. He succeeded in getting aboard an LST without difficulty and enjoyed thereon all the comforts of home.

Hugh, with the aid of Lt. Pardon, Real Estate Section of the French Army, has succeeded in securing SFR's carpenter shop, thereby adding 2200 sq.ft. to the 1700 sq. ft. we now occupy. This should adequately meet the requirements of ASB for the foreseeable future.

Talked with Ray Herb about the required technical personnel for ASB. We agreed that Logan Belleville and Bill Smith would fill out the present lack of competent components people, Belleville to handle indicator and receiver work and Smith to cover this field as well as beaconry and RF. The Radiation Laboratory in recent cables has turned down our request for a considerable number of people--including Howard Schultz and a test equipment man.

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12-23-44 cont.

General Patton, 1st Army, has launched a counter-attack on Von Runstedt's flank. During the day the weather has cleared, and subsequent reports state that there have been 3,000 sorties, with 160 enemy aircraft shot down. The German spearhead continues to advance, but the flanks are claimed now to be held firm.

For the week ending December 17, Antwerp has continued to be the main target for divers; a few fell on Liege; about six Big Ben rockets per day continue to fall on Antwerp and London.

Sunday
December 24, 1944

Morning at ASB. Put through several calls to BBRL. Talked with John Faulkner about 19th TAC's radar program. Faulkner endorses the idea that a light-weight beacon would be useful as a means of calibrating an MEW or SCR-584 set and that there is no error introduced because of difference between radar and beacon frequencies.

In the afternoon a number of us ascended to the second platform of the Eiffel Tower about 450 ft. up. It was a cold, slightly hazy December day, and Paris with the winding Seine and boulevards was spread out like a map below us.

Our party began at 8:30 p.m. in the breakfast room of the Louvois. Herb Hall had secured seven cases of champagne for the occasion. Most of our men had come in from the field, and about 30 people in all were present, counting the few officers who wandered in attracted by the enthusiastic, but not very melodious carol-singing. The considerably outnumbered, but thoroughly adequate gals included Louise Winston, Janet DeSaulniers, Brenda Palmer, Major Marjorie Onthank, Capt. Clare Hall, and Louise--plus two French lassies of undetermined origin.

Monday
December 25, 1944

Capt. Collar, Johnnie Faulkner, and I finished buying some roses at 50 to 65 francs apiece as Christmas presents "for the gals from the fellers". We all enjoyed a fine turkey dinner at the mess, where we had reserved the big family table and three "four-seaters" in the small dining room.

Spent the afternoon at ASB. Agreed on an allocation of beacon production among the UPN-1's and -2's and the APN-19's (Rosebuds) and -29's. Jim Cunningham reported on the progress of the SCR-584 beacon program at Air Strip A-78. The P-61 is now beacon-equipped, but no test flights have been possible because of the German counter-attack and scarcity of P-61's, several of which were recently lost, one in attempting to find the base. Jim has set up a BUPS beacon to aid the SCR-720-equipped night-fighter in locating its base.

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12-25-44 cont.

After supper, on the way back to the Louvois, Louise and I detoured past the Madeleine--which stood out against the black sky white and beautiful, bathed in December moonlight.

Tuesday
December 26, 1944

Left Paris at 9:30 for Rheims with Captain Collar. Harold Striggow, ASG Command Car driver inherited from D. K. Martin, was at the wheel. En route to Rheims we passed through the frosted countryside, including well-known towns such as Chateau Thierry.

After luncheon at the Bombay mess, Dick Hodgson, Captain Collar, and I called on Colonel W. M. Talbot, Chief Signal Officer, Lt. Col. Green, and Captain Bill Kyte. I presented the proposed Shoran program, the requirements from the States, and the USSTAF allocation of equipments. They were impressed with this proposal, and after some consideration agreed to recommend it to General Anderson. Major Dave Williams was called in, and after some light opposition he too expressed general agreement. We then visited General Sam Anderson, who agreed to the program without any reservations. General Anderson plans to contact the 42nd Bomb Wing in order to secure their consent to the joint use of the Shoran training facilities in southern France. It was further agreed that 9th BD would state a requirement for additional airborne Shoran equipments so that the first pathfinder phase of the Shoran program could pass into a full group function. Lt. Col. Green is scheduled shortly to visit the US to expedite Shoran equipment, and his mission is now to expedite the total requirement for the theater.

Everyone was completely pleased with the proposed Shoran program as decided upon in the meeting last Friday. General Anderson discussed briefly the present war situation. It appears that the Germans have consolidated five divisions in an advanced pocket and disregarded the ancient concept of maintaining a continuous and broad supply line to their home area. This pocket constitutes a formidable threat, particularly since there are massed reserves available either to provide periodic reinforcements or to threaten other sections of the front which may be in weakened condition. My general impression was that the Western Front situation is still critical and that the return of bad flying weather might have a determining influence. General Anderson expressed great concern over the possibility of 9th BD's finding itself without a blind-bombing system--one of the four Oboe stations having been forced to withdraw and the German tank column being within 11 miles of another. Should this also have to move, it would mean that there would be no Oboe blind bombing for a period of about four weeks because of the difficulties in resiting, reestablishing communications, and debugging the apparatus. About 85 per cent of 9th BD's present missions are blind bombing.

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Wednesday
December 27, 1944

I spent the day on general activities of ASB. Scanning of the Intelligence Reports provided interesting information on a large number of current items. A fairly complete and accurate description of the German A-4 (V-2) rocket is now available. The A-4 is a streamlined projectile about 46 ft. long by 5 ft. 6 in. maximum body diameter with a sharply pointed nose, and carrying four external fins at right angles to each other at the rear. In the outer shell there are contained from front to back (1) a conical warhead, (2) a control compartment, (3) two main fuel tanks, (4) an auxiliary gas generator operating a turbine to drive two separate centrifugal pumps which supply the main fuel through a series of jets to (5) the combustion chamber and Venturi, and (6) control veins.

The warhead is conical in shape, about 6 ft. in length, and is filled with a high explosive cast yellow filling of 2,150 lb. weight. The control compartment is about 4½ ft. longer, divided into four sections--one of which contains pressure bottles probably filled with nitrogen for pressurizing the alcohol fuel tank. The control equipment proper includes gyro-stabilizing means plus,in the more recent models, an acceleration integrator which determines the proper fuel cut-off point. The two main fuel tanks are contained in a bay 20 ft. long so arranged that the center of gravity of the rocket is unaffected. The forward tank contains about 7600 lb. of alcohol. A liquid oxygen tank provides a total weight of about 11,000 lb. of liquid oxygen. The total main fuel load is about 8.3 tons. The two separate centrifugal pumps driven by a turbine transfer of two main fuels from the tanks to the combustion chamber at the required high rate. The turbine rudder is driven at 5,000 rpm., develops from 600 to 650 hp., and delivers liquid oxygen at 158 lb. per second at 300 lb. per square inch and alcohol at 115 lb. per second at 375 lb. per square inch. The acual propulsion unit is a large steel Venturi, double-walled for liquid-cooling and closed at the forward end by 18 Burner-cups. It is estimated to produce a maximum of 68,500 lb. gross acting for 65 seconds.

The rocket is launched in a vertical position, is powered for the first 51 seconds of its flight, and follows a predetermined, approximately circular trajectory toward the target. During flight, it is held on its course by an azimuth gyro. Range is controlled by shutting off the fuel at a predetermined point in the trajectory. The rocket attains a maximum speed of about 5,000 ft. per second, and, after the power has been cut off, it follows a parabolic path rising to an ultimate height of 60 to 70 miles. Rockets fired against London have shown an average range of 190 miles, the maximum being 220 miles. During its descent through the atmosphere, the rocket is slowed down to about 2,500 ft. per second; it becomes heated in this process and has often exploded due to the overheating. Damaged caused by the rocket has been consistent with a warhead of 2,150 lb. weight. An instantaneous detonation fuse is employed. The average crater depth is 6 to 12 ft.

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12-27-44 cont.

The disposition of German Air Forces on the Western Front in Germany and Denmark included 230 single-engine fighters, 780 twin-engine fighters, 95 fighter-bombers, 190 long-range bombers, and 110 reconnaissance aircraft. It is reported that the morale of captured German pilots, if not exuberantly high, is at least determined and unyielding.

During the month of November, the 8th and 15th AF's, operating on 18 and 19 days, dropped a total of 56,000 tons of high explosives, incendiary and fragmentation bombs. Twenty-five thousand bombers were air-borne, with 14,000 fighters escorting the bombers or operating on independent strafing missions. The main weight of the strategic bombing effort was directed against German motor fuel production. Of 75 plants, 36 are considered to be in full or partial production, 29 are temporarily or indefinitely inactive, and the status of 9 undetermined. There were 25 attacks on 11 synthetic plants with an estimated November output of 112,000 tons, resulting in heavy damage to 2, moderate damage to 4, no damage to 1, and damage not yet determined to 4. There were 25 attacks on 11 natural refineries with an estimated November output of 114,000 tons, resulting in severe damage to 1, slight damage to 2, and damage to 8 as yet not assessed.

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Allies Battle New Thrusts

Wednesday, Dec. 27, 1944

Gaining on Flank; Two Nazi Armies Near Meuse River

Field Marshal von Rundstedt neared what is thought to be one of his prime objectives—the banks of the Meuse—as powerful German forces, now estimated at two armies or more, unleashed new westward thrusts which ripped to within four miles of the Meuse and seven miles of the Franco-Belgian frontier.

Hospital Hit in First Paris Raid in 4 Mos.

Paris had its first air raid since August last night when two German planes dropped bombs, hitting a hospital and other targets, and causing damage and casualties, the Ninth AF Air Defense Command announced.

Air raid sirens sounded shortly after the planes flew over, around 11 PM, an anti-aircraft guns opened up immediately. Thirty minutes later the all-clear was sounded.

December 26, 1944

Yanks Reach Bastogne

Nazi Drive Is Blunted Once More

BULLETIN

American forces attacking the German south flank established ground contact with beleaguered U.S. troops in Bastogne, whose garrison has made one of the epic stands of the war, according to late official reports last night.

December 28, 1944

Where Battle Rages in West



Ground contact is made with beleaguered Americans in Bastogne (B), encircled by Germans' advance from inside the Reich (A) 55 miles to the Celles area (C).

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Thursday
December 28, 1944

To Park House at 1:00 p.m. for luncheon with Lt. Gen. Spaatz. This proved to be a very lucrative meeting since Maj. Gen. Knerr, Deputy Commanding General of USSTAF; Brig. Gen. Curtis, Chief of Staff, USSTAF; Major Gen. Ralph Royce, First TACAF; Major Gen. Vandenberg, 9th AF; and Brig. Gen. Fred Anderson were all present. I told General Spaatz and several of the others of the now fairly well coordinated Shoran program for 9th BD and 42nd BW. General Spaatz was pleased with the arrangements which had been made, agreed to the urgency of getting Shoran in view of the possible loss of Oboe. He felt that the several steps already taken to apprise AAF HQ of the urgency of Shoran for this theater were adequate. General Knerr felt that the air shipment of Shoran air and ground sets would not make too serious an inroad on the total air trans-Atlantic capacity, which he stated averaged about 150 planes were month, with cargo loads up to 500 tons per ~~plane~~ month. Vandenberg and Royce were both interested in the progress which had been made in defining a definite Shoran program for their Commands.

Talked with General Anderson regarding the use of MEW control of heavy 8th AF bombers. I indicated that in addition to providing excellent navigational aid the MEW could be used for defining the actual bomb-release point, with expected accuracy considerably greater than that now being achieved with H2X bombing under 10/10 cloud cover. I described the Nosmo attachment which provides automatic link between H2X radar and the Norden bombsight as the biggest instrumental advance in increasing the accuracy of H2X bombing.

General Vandenberg described the work which the 9th AF has been doing in stemming the German counter-attack. The medium bombers have been working over the projects and communication links in the rear of the German advance. The fighter-bombers during the past five clear days have been doing an exceedingly effective job in shooting up motor transport, tanks, railroads, and ground troops. There was some discussion on the desirability of returning the 8th AF from their present tactical missions to the strategic bombings of Nazi oil refineries. There has been considerable criticism regarding the failure of Allied intelligence to detect the large concentration of enemy ground troops and armor for the current counter-attack. Colonel Whitlock of A-2, USSTAF, described to me how it had been observed for some time that refitting and reassignment of Nazi divisions was taking place. While this was regarded as a sure sign of some major effort, it was impossible to predict from the assembled information the exact point at which this energy would be expended. He stated that in every military operation there was always a residual element of surprise available for the offensive forces.

To Widewing, where I had a long talk with Colonel Odom regarding Shoran, MEW control, as well as the desirability of better space for the ASG. On returning to SFR in the late afternoon, we stopped to upright a jeep which had skidded on the icy road into a stone wall, with the three occupants escaping injury miraculously. Talked by radio-telephone to Jules Halpern at Malvern.

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After dinner at the Officers' Mess had brief talk with Major Ross, Operations Officer of the 422nd Night-Fighter Squadron of 19th TAC, regarding landing aids. Walter Pree is modifying and truck-mounting an SCR-720 to serve as an improvised landing system. The use of microwave ASV sets for this purpose was first found feasible in Africa more than a year and a half ago, and it was tested in Florida and recommended by ACO as a satisfactory interim landing aid. I added my endorsement of this device for Ross's squadron, which has recently suffered the loss of two planes through landing mishaps which might easily have been avoided had some ground direction been available. I mentioned the forthcoming arrival of GCA equipment, which will do a more complete job, but should not be expected for his squadron for another three months.

In the evening talked with Bob Tobey regarding the personal difficulties which have developed between him and Colonel Garland of 9th TAC.

Friday
December 29, 1944

Conference in the morning with Ed Miller; Lt. Bereon, 9th TAC MEW controller; John Faulkner; Lt. Switzer, 9th AFSC; and Bob Tobey regarding the MEW spare situation and MEW spare policy. It was agreed that Tobey would draw up a list of the spares which are yet required in order to make the three ETO MEW's reasonably self-sufficient. It was further agreed that all spares now in the theater would be itemized and placed under the controller for distribution by 2nd ADA of 9th AF. The States have been asked to set up an adequate supply of spares for both the additional MEW's and the CPS-1's which are to come to ETO, with the understanding that these would be set up separately in 2nd ADA in order to establish the requirements of 8th AF, 9th AF, and 1st TACAF. Miller reported that the 19th TAC MEW was suffering an increasing number of shut-downs due primarily to failure of certain basic mechanical parts for which no replacements exist in the theater. The high danger of battle damage to the three MEW's was also pointed out.

John Faulkner reported that redisposition of our air force due to Von Runstedt's attack, 19th TAC is now the largest tactical air force in the theater, controlling eight fighter-bomber groups, one fighter reconnaissance group, and one night-fighter squadron. The need for more PPI indicators and B scans for the 19th TAC MEW, which is seriously overloaded, is evident.

The teletype in the evening contained a further report on the Shoran developments, including the information that a USSTAF cable stating the official requirements and establishing air priority had been sent. Only vague indications were received from McNary as to whether or not the two initial ground and air-borne Shoran sets were being shipped. Dave Griggs reported difficulty in getting Eagles for 8th AF because of the program of 100 per cent equipping of the 315th Bomb Wing of 20th AF. We also answered General McClelland's request for a reply to his cable on microwave air-borne beacon requirements. The official USSTAF reply has just gone out stating the preferred distribution of the production effort among UPN-1's and -2's and

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12-29-44 cont.

APN-19's and -29's. Hodgson is making a circuit of 9th AF Commands and will ascertain the 9th AF requirements for microwave beacons which have not yet been officially expressed. Abe Collier indicated that he would come to ASB as soon as a replacement for him had been found. We urged that he get here by February 1 at the latest. Talked with Louise Winston regarding her job. It seems desirable that she relinquish secretarial duties and concentrate on handling the cable and TT work exclusively. This seems to be an agreeable arrangement all-round. Kay Downing will work for Ray Herb on her arrival.

Ray Herb returned from BBRL after a two-day wait in London because of weather.

Saturday
December 30, 1944

To St. Germain for a talk with Col. Maxwell regarding several continental programs including Shoran, MEW control of heavy bombers, the Willie Orphan project, etc. Among other things, this talk settled for once and all the possibility of immediately getting more favorable space in Building C at USSTAF.

Left Paris at 1:00 p.m. for a flight to England with the Troop Carrier boys. On arrival at Orly, however, it was found that their plane had not been unloaded, and they would be unable to get off. Secured passage for Louise and myself on a regular ATC flight to Bovingdon. Arrived in London at 8:00 p.m. after a hold-up at Bovingdon due to shortage of motor transport. Arrived at OSRD to find a New Year's party in full swing. Dinner at the Connaught.

Army Air Forces reported on the developments of the American JB-2 (diver) program. An exact reproduction of the German diver bomb has been made, and a program calling for an ultimate production of 100 JB-2's per day has been proposed. This program would use up 4.4 per cent of artillery ammunition, would require 10 cargo ships per month to supply the theater, and could be handled by a small number of specialists plus personnel already available. There are 2000 JB-2's now on order. Without priority, production of 100 per day could be accomplished in 10 months. With priority, this rate could be established in 6 months. The theater has been requested to indicate the value it attaches to such a program.

A cable from MAAF, presumably from Henderson, states that the maximum CSB effort using McCreary's single SCR-584 unit was 16 sorties against 9 targets in one night.

The 15th AF reports the following H2X sorties:

Month	B-17	B-24
July	166	140
August	216	267
September	234	211
October	290	343
November	397	624

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12-30-44 cont.

During this period, 1500 training sorties were also run.

An Air Ministry cable states that the Gee-H station at Florennes was completely jammed by Jackal on December 28. Jackal is the 8th AF VHF air-borne jammer.

Sunday
December 31, 1944

Left London at 12 noon with John Hibbert, Louise, Mr. Borer, and Mr. Wagner. The latter two had arrived yesterday from the States--Borer to work on the X-Y plotting board computer, and Wagner to represent the NDRC Engineering and Transition Board.

I was impressed with the smallness of the BBRL Steering Committee, which for the first time showed the inroads which the Advanced Service Base is making on local personnel.

We agreed to initiate immediately unofficial and official recommendations for the production of Nosmo tie-ins to cover the requirements of the 8th AF and 15th AF. So far, only a handful of Nosmo units are being made for test purposes, and apparently no active steps toward production have been made--in spite of the evident value of this device in improving H2X bombing accuracy.

A discussion took place on the adverse influence of large-force bombing on bombing accuracy. The high traffic density is evidently resulting in increased bombing errors due to bomb groups getting in each other's way. The desirability of a good analysis of this problem by OAS was recognized. It is doubtful whether the same over-all bombing result could not now be achieved by the more effective employment of smaller forces. I agreed to discuss this question at 8th AF and to sound out at USSTAF levels the policy considerations on large-force bombing.

Gordon Danielson reported on the current Micro-H bombing situation. The first Micro-H mission was on November 1, and there have been 17 missions during the months of November and December. These missions involved 4,000 aircraft, which dropped 10,000 tons. Of these aircraft 70 per cent bombed successfully by Micro-H on primary targets. Gordon painted a rather dark picture regarding Micro-H Type 2, which utilizes the air-borne delay. Apparently Radiation Laboratory's air-borne delay unit has a number of moderately serious technical disadvantages. The air-borne tests of Micro-H Type 2 under the direction of Bob Leachman have suffered an unusual amount of woes for reasons beyond our control.

It was agreed that we would soon call a meeting of all interested parties of 8th AF to settle upon a suitable air-borne beacon program. The use of air-borne beacons with the MEW to control both fighters and bombers was discussed. There was some discussion also of the problem of front-line identification and bombing safeguards. I reported on several continental programs and the status of the ASB set-up. I noted with appreciation that our BBRL group were generally glad to see me back and had a number of problems on the fire on which they wanted my help.

Received a large Christmas box from home with jam, candy, fruit cake, coffee, etc.

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Monday
January 1, 1945

This day was spent in discussing the several radar programs and the general problems of operating BBRL.

We reviewed John Faulkner's request for a UPN-7 beacon to be used for orienting the MEW by adjusting the beacon's gain control so as to just receive the MEW's signal. The azimuth information becomes independent of frequency. It is planned to spread the beacon code to about 60 microseconds in order to extend the range of the signal. A precision delay to move the beacon signal out of the permanent echoes was considered not necessary, particularly since the delay will vary with receiver gain.

Talked with Mr. Wagner about the BBRL radar program and some of the general radar problems in the theater. He mentioned the work which is going on in the States on guided missiles. It appears that no satisfactory radar or telephone control has yet been developed. A thermal control called "Felix" appears to offer considerable degree of promise. Azon and Razon are apparently reasonably available. Divergent opinions have been received from the Mediterranean, and the ETO does not seem to regard these missiles as promising. I must investigate this matter further since such missiles would in all probability be useful against the Rhine bridges which so far have withstood bombing attacks.

We learned with terrible shock that Wallie Caufield of ABL-15 had died this morning from wounds received in a strafing attack while he was driving with John Chase along the road from Luxembourg to Nancy. Details of the 'incident' are lacking.

Tuesday
January 2, 1945

I note that the APS-10 is getting to the point where theater requirements would be useful. Five thousand sets have been ordered; production starts in March; field tests at AAF Board on the H bombing attachment which goes with it are scheduled. This set has an over-all weight of 150 lb., gives good radar for navigational use, provides H2X bombing facilities, accepts the Micro-H bombing attachment; works with the AN/APN-40 beacon (light-weight X-band). Realistically, this equipment should not be expected to be available for the theater until the middle of the summer. It would be extremely useful in practically every type of air operation. Except for Troop Carrier, however, most of the required functions will have by that time already been met by other equipment.

In a conference on TCC radar equipments, Gerry Tape pointed out the new philosophy of location which is now accepted by the pathfinder people. It is believed that the usual pathfinder technique in which a small force is dropped thirty minutes before the main force in order

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to set up beacon and markers is not feasible on the Western Front because of the high concentration of enemy troops and the acute dnager that the pathfinder boys would be eliminated before they had performed their function. Dropping aids should therefore depend on reference points in friendly territory. The possibility of applying a range marker to the SCR-717, of which there are about 120 operational aircraft in 9th TCC, was discussed. This would permit Micro-H dropping. This solution was not regarded as feasible because of the complexity of the instrument change, as well as because of the difficulty of flying the approximately 15-mile maximum radius which the 500-ft. operating altitude necessitates. I proposed using ordinary beacons to establish a track in friendly territory which is extrapolated to the dropping point by dead reckoning. It was agreed that some such scheme is the only method available to 9th TCC for the next three months. We shall probably investigate the provision of multichannel beacons operated through the use of tuned cavities and a selector switch. Ultimately the APS-10 with Micro-H attachment is the best answer.

Jules Halpern and I discussed the SCR-584 beacon program which appears so far not to have been badly thought out. Tunable magnetrons have arrived, and it is proposed to immediately modify one of 9th TAC's SCR-584's. At the moment, we contemplate only two tunable magnetron SCR-584's in 9th TAC unless the frequency band permits three channels. In this event it is expected that one tunable magnetron SCR-584 would be placed in each of 9th TAC's three pairs, thus providing maximum beacon CSB coverage. Ed Brazell will be assigned to work on the SCR-584 tunable modification, and Cunningham will have over-all supervision of the beacon-584 program.

John Warren of TRE dropped in for a chat about H2X bombing, Schnorkel, German morale, and other current topics.

The big news item of today was the surprise attack by 300 German fighters on Allied airfields in Belgium and France. It was claimed that at least one-half of the attacking force was shot down, with the loss of four Allied planes. The loss of a considerable number on the ground was admitted. It was further reported that a strong attack was being made by von Runstedt against the 7th Army positions on the southernmost flank.

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Wednesday
January 3, 1945

Spent the day at Malvern. In the afternoon we had a conference on the 8th AF MEW and air-borne beacon program in which the essential lines of our proposal at tomorrow's 8th AF meeting were established. Tom Murrell, Gerry Tape, Jules Halpern, and Gordon Danielson attended.

Thursday
January 4, 1945

Left Malvern at 9:00 a.m. with Tom, Gerry, and Gordon. After preliminary discussions with Colonels Dolan and Geerlings, the full-fledged meeting developed at 1:30 in General Doolittle's conference room. Eighth Air Force personnel included Colonel Byrnes, A-3; Colonel "Bid" Dolan, Colonel Gerry Geerlings, Colonel Graul (who as of today replaces Colonel Sullivan in Signals), Lt. Col. Osborne, Major Schroeder, Major Hartbrodt, Captain Peak. I discussed the variety of operational functions to which the MEW had been put by the 8th AF, pointing out the capabilities and limitations of the instrument in its present form in each case. Among these are the use of the MEW for

(a) Control of fighters for interception and rendezvous. This now actively in process, makes use of 8 PPI's and 16 controllers for the 16 fighter groups, is handicapped by the difficulty of identifying the fighter group under control and the bomber group with which rendezvous is being made. Colonel Graul showed a recently prepared MEW covering map which shows average ranges on 20,000 ft. height-finders to be 150 miles toward the East and almost 200 miles toward the west.

(b) The recording of bomber tracks. Since December 19 a record of the tracks of the 1st, 2nd, and 3rd Divisions has been copied from the plotting board and forwarded to Headquarters for analysis. These tracks have shown some of the remarkable excursions which result from high traffic density and poor navigation, and account to a considerable extent for poor bombing results.

(c) Navigational aid to bombers. It was emphasized that the bombers could profit by accurate ground control in the same way as the fighters. Only the availability of PPI's was necessary to perform this function. It was the sense of the meeting that this was an important objective, that some of the additional PPI's being secured for fighter control should be diverted to this purpose, that these might be located in a separate control room provided with plotting board fed by the B-scope radars in the present set-up. Three PPI's at this time would enable the control of three divisions. Ultimately, when beacons have been provided among the wings and groups, a larger number of scopes would be required to permit independent wing and group control.

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1-4-45 cont.

(d) Control of fighter-bombers. The 8th AF has been investigating this possibility in the somewhat mistaken belief that the MEW with Miller's accessories (more accurate B scope, plotting board, and computing device) would permit highly accurate bombing. After pointing out some of the errors inherent in MEW performance, including particularly the 30-second time interval between data, I suggested that the circular error could not be smaller than that of Gee-H or Micro-H and was likely to be twice as great. No strong disagreement with this estimate was made. The 8th AF will now conduct a number of experimental flights to determine by PRU's the accuracy of this method.

(e) The control of heavy bombers to the IP and to the bomb-release point. It was pointed out that the heavy bombers could be led with quite reasonable accuracy onto the IP and that gross errors in reaching the IP could be avoided by MEW control even if the IP were beyond range of the MEW. The track of the bomber formation could be extrapolated so that an indication of direction and time to go could be provided. It was further pointed out that, when the bomb-release point occurred within the range of the MEW, this might be provided as discussed in (d) above. In this case, the large pattern of the bomber formation would justify bombing under a control system of MEW accuracy. The difficulty of performing this function when the group signals merged with one another or when the entire formation was masked by Window was discussed. In this case only the leading edges of the bomber formation could be so controlled.

In discussing the advantages of the use of beacons in both fighters and bombers, it was pointed out that beacons (1) would assist in the identification of individual groups even under conditions of Window or close formation, (2) would extend the range on individual fighters and fighter groups, (3) would assure a return signal on every sweep, (4) would tell what part of the pattern is being tracked. The 8th AF was represented as having requested Rosebud (APN-19) beacons for P-51 fighters and APN-29 beacons for the bombers. A beacon modification kit for the MEW which permits beacon reception on spot frequency has been received at BBRL. There are 27 Rosebuds already available, with production units expected in May. A program of beacon installation was quickly agreed upon: four installations to be made in each of six fighter groups, one officer and two men* to be trained by BBRL staff in maintenance, and one officer and two men from the MEW to be sent to BBRL for information and training on the beacon modification kit which is to be operational by February 10. In February, 20 UPN-2's (AC BUPS) are expected and will be installed in a similar way in bombers in accordance with a program to be defined later.

*per group

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1-4-45 cont.

This meeting fully established the air-borne beacon program of the 8th AF and may be considered a prelude to an important operational advance for radar beaconry.

Talked with Colonel Pierce of 8th AF Technical Planning regarding AZON, Aphrodite, and Willie Orphan. AZON was rejected by 8th AF because of the very low probability of good visibility conditions during a large part of the year. Aphrodite is just being terminated, in part because of the complexity and marginal military value of drone-control systems. Willie Orphan is being awaited with some interest and concern. The 8th AF feels that the development work should be fully completed in the States.

In the evening talked with Colonel Dolan, who has recently been flying operationally with the 3rd Division, regarding 8th AF radar problems. We agreed that Jack Buck should be returned to the States in view of DuBridge's assertion that no Eagles would be forthcoming until March. General Orville Anderson has raised the question of triggering German IFF as a means of locating fighter groups for fighter-attack purposes.

Friday
January 5, 1945

Talked with Colonel Arps of the Operational Analysis Section regarding the Micro-H program, and agreed to leave Mersman and Hosier on Micro-H until the developmental phase is completely over. Talked with Colonel Geerling regarding H2X intelligence and bombing results. He feels that radar bombing accuracies are not being accurately reported. He indicated that the morale of Mickey navigators and of all participating in radar bombing would be greatly enhanced by an order of the day, with General Spaatz pointing out the value of this work and making a call to greater effort.

Spent an hour with Dr. Price and Lt. Col. Scott looking over bomb-fall analyses under visual, radar-visual, and radar conditions. During the past month, their work seems to be excellent, but is often given in such a way as to present the results of radar bombing in an unfavorable light. Colonel Scott agreed to work up some notes on the usefulness of radar bombing to 8th AF which might be used in the proposed order of the day.

To London with Gerry Tape. While the teletype machine was being debugged, Morgan Gunst and I visited with Sir Robert Watson-Watt. Morgan had just arrived in the UK at General Spaatz's suggestion. USSTAF appears to be highly concerned over the repeated reports that the Germans have developed a radiant beam which interferes with aircraft ignition and instruments. Sir Robert had not heard of this evidence, but suggested Dr. R. V. Jones of ADI (Science) as a proper source for British technical intelligence.

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1-5-45 cont.

We also discussed some of the high-spots of the American radar program. Sir Robert mentioned that RAE had performed experiments of this type in 1938, but had discontinued their work on his recommendation after obtaining definite results at 600 yards.

Saw "Sweeter and Lower" with John Hibbert, Morgan, and Louise, after which we went to a Chinese restaurant for supper. I'm afraid the revue was "low", but not "sweet".

Saturday
January 6, 1945

Called on Lt. Col. O'Mara, Director of Technical Intelligence, USSTAF. Discussed the accumulated intelligence on the purported aircraft-interfering beam. There have been a variety of conflicting reports from isolated pilots on ignition failure, knocking, and missing. Intelligence has also intercepted a German warning against aircraft flying over two regions three miles in diameter: one near Strasbourg and one near Freiberg, indicating that certain death would ensue at altitudes less than 3,000 meters. Many of the isolated pilot reports have been investigated by Griggs with negative results. Fraenckel and Dyer had conspired to provide a "droop-snoop" P-38 with detecting apparatus consisting of an oscilloscope for very low frequencies and a series of search receivers extending up to 1000 megacycles. No checks have yet been made with this plane on the areas in question. Colonel O'Mara stated that the plane had recently been damaged in landing and had been out of service for a month. He stated that during his visit to the USSR last summer the Russians reported ignition interference which they had solved by shielding the distributor. He indicated that two other devices were claimed by the Germans which might have the same reaction on aircraft. One was a pro-knock gas, a very slight concentration of which might remove the engine heads. The other was an ice-forming gas.

Lunch with Lieut. Sherman, Gerry Tape, and Morgan Gunst. Lieut. Sherman agreed to process a theater request for Comdr. Packard of the Navy Air Coordination Group and a representative of the Radiation Laboratory Navy Liaison Office (to be Lieut. Picker).

Left London at 2:00 p.m. with Gerry Tape, Dean Post, Charlie, and Louise. Stopped by at Pinetree and talked with Tom Murrell, who had just spent an hour with General Orville Anderson discussing a requirement for the AEW for fighter-rendezvous and interception work. General Anderson, probably triggered off by Colonel Dolan, with whom I had discussed the AEW the night before, has stated that a definite requirement exists both for an AEW-equipped B-17 and an AEW Mosquito. This presumably would fly at altitudes

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1-6-45 cont.

below that of the bomber formation with an upward-directed beam to avoid land echoes, and give early warning and direction on forming and approaching fighter groups. This is of course precisely the requirement which we appreciated last summer and upon which no progress had been possible because of the limited range of the air-borne radars then available. This function for AEW in the 8th AF had been indicated a month before in a teletype to DuBridge (PW-16), and no answer has as yet been received on our questions regarding its technical feasibility. Murrell will prepare a cable to General McClelland and DuBridge reopening this matter.

Arrived at Malvern at 6:30 p.m

Sunday
January 7, 1945

At 9:30 a.m., Gerry Tape, Jules Halpern, B. J. O'Kane, and I visited Professor Dee in House 8. Professor Dee discoursed for almost two hours on his recent investigation of the use of H2S equipment in RAF Bomber Commands and on the British policy of not turning on H2S until 5° East because of the German S-band df-ing receiver, NAXOS. The British policy is to deny enemy early warning by the use of Mandrel screening, radar silence, and other means. One-hundred Group, the jamming and spoofing section of the RAF, performs this function. Among other items of interest which came out of Dee's talk was his belief that within one year it will be "absolute death" to have air-borne radar equipment which transmits continuously. He feels that in the case of RAF Bomber Command it is good sense not to use H2S in the approach to enemy territory since GEE provides adequate navigational information and since dead reckoning is now substantially better than it was in the days of 1940. Dead reckoning is better because (a) a 200-mile GEE run provides good wind data, (b) the PFF groups report wind information over Germany which gets broadcasted to the main force, and (c) the API is proving to be a big help in D-R navigation. He estimated that one could navigate with D-R from a known position 5° to 8° East to within 15 miles of a desired position at 8°. Since present RAF PFF technique involves establishing a 5-mile square illuminated area of a target region, this navigation is sufficient to bring the main force within sight of the illumination. RAF 5 Group under Air Vice Marshal Cochrane operates as a separate striking force with separate PFF. RAF 8 Group under Bennett is equipped with H2X and has ignored the H2S restriction. Dee reported that German AI is now being successfully defeated with long Window.

During this talk, Vic Fraenckel called from Paris and stated that General Spaatz, after conversation with A/C Hart of SHAEF, was disturbed over the conflict between the RAF policy on H2X

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and NAXOS and that of the 8th AF which ignores NAXOS.

Seminar by Serge Golian on air-borne beaconry and the air-borne beacon programs.

The first part of the afternoon Steering Committee meeting was concerned with the use of Eagle equipments by the 8th AF. In last Friday's TT, Griggs had reported success in his mission of securing a small number of Eagle equipments for special priority work. The indicated schedule was 8 equipments to be shipped immediately, 4 B-24's to leave modification centers by 15 January, 12 B-17's to leave modification centers by 1 February. This information was in complete conflict with DuBridge's cable requesting Jack Buck's return. Captain Bob Saxe was present at this discussion. We agreed that a conference should be held at 8th AF in which we would recommend that the 12 operational Eagles be set up in two selected bomb groups which are to be used for special high-priority purposes and relieved of other duties. The 4 B-24's would be used for training and radar reconnaissance, and the operational use of the B-17's would be expected to begin during March. A special reconnaissance briefing and training should be performed before each mission. Such a program would go far toward utilizing the high identification factor of Eagle equipment, would avoid the difficulties of traffic, inadequate training and briefing which characterize general H2X bombing work. If this idea could be sold top-side to 8th AF and USSTAF, it would constitute an important contribution to radar bombing. Jack Buck is to stay until a definite program is realized, whereupon he is to return to the States.

We agreed to initiate theater requests for NOSMO in advance of tests in this theater. Tests in the States indicate 30-mil accuracy on Egg Rock Island in Boston Harbor. It is estimated that this is two to three times better than can be obtained on the average with H2X equipment. Our last Friday's teletype stated to McClelland and DuBridge that NOSMO was being officially requested and constituted the most important instrumental improvement remaining for H2X radar bombing.

In a discussion of the Loran program with Dick Woodward, the objections of the RAF to the long time consumed in taking SS Loran fixes were mentioned. We agreed to point out this operational experience to the Radiation Laboratory. It is quite practical to develop a dual receiver so that one could get simultaneous readings or drift down along a Loran line in a fashion similar to GEE. Woodward pointed out the possibility of using a triplet and putting both legs on a single repetition rate to accomplish this same purpose. This is possible only when station siting permits it and with the APN-4 Loran receiver. Danielson summarized an OAS report by Dr. Taylor of the 3rd Division on the first month (November) of Micro-H bombing. Of a total of 117 squadrons on Micro-H missions, 86 (or 73½ per cent) bombed by Micro-H with a circular error of 1.2 miles. It was interesting to note that during August 26 per cent of all 8th AF formations did not succeed in bombing the assigned targets. The 8th AF is required to attack a larger number of targets in the tactical

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support of ground armies. This places a heavy requirement on Gee-H and Micro-H. Recently "cat" courses have been used in Micro-H bombing with several targets selected along the same circle. Micro-H Type 2 is needed because of its inherently higher target capacity. As an interim measure, it was proposed to make all Micro-H spare ground-station equipments active in order to increase target capacity.

Dinner with the John Warrens. John is scheduled to visit the USA, primarily to secure some AEW's from the Radiation Laboratory for plane-launched diver detection. He, like others at TRE, is very much concerned that the Germans are on the ascendancy in a new cycle, that further development work in radar is not likely to meet this situation should the war continue, and that his efforts would be better invested in other longer-range activities, such as the Montreal project. We discussed among other things the changing TRE organization which seems more mixed up than ever. Some of the old-timers like Professor Dee are withdrawing somewhat. Dee is doing operational analysis at the moment. Others have gone to Canada. There is a half-executed tendency to consolidate a group on basic (components) work. John walked half-way back with me under the black star-strewn sky, and I arrived at the County about 1:00 a.m.

Monday
January 8, 1945

Talked with John Dyer about his knowledge of German ignition-interfering radiations, regarding which he was a complete skeptic. ABL-15 has calculated that a prodigious amount of copper would be required to produce a DC magnetic field of sufficient magnitude to slightly affect the magneto or ignition systems of aircraft. He was unaware of any work by RAE in this field. The equipment placed by ABL-15 in the P-38 is quite straightforward and devised mainly in anticipation of negative results rather than to indicate the precise nature of the radiation should it be found. We discussed the variety of "alarums" which are now current, including the pink cloud, the myriads of crystal balls, and the pro-knock gas. Vic Fraenckel apparently personally investigated the pink cloud which was found hanging over the front-line a while ago for a period of about one hour. It was observed by many and believed to be a new German weapon. It disappeared without any untoward effects being noticed. Undoubtedly it was a pink cloud. The myriads of crystal balls were observed by a number of fighter crews, and were described as transparent and the size of a man's head or several times larger. It is believed that they were individual or small accumulations of Window dropped by a bomber formation which had passed by a short time before. The pro-knock gas may be more of a reality and is stated to be under investigation in the United States.

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Yesterday John Chase reported to me some of the circumstances of Wallie Caufield's death. He and Wallie had been enroute from Luxembourg to Nancy a few hours when, near Metz, they passed a convoy proceeding in the opposite direction. Suddenly they found themselves in the midst of a strafing attack by a flight of four aircraft which made a number of passes, or by three flights of four. The attack came without warning, included bombing and machine-gun fire and immediately froze the convoy. Wallie was hit in the first attack. John managed to drag him severely wounded under the vehicle, but he was hit again in subsequent passes. It seemed to John that no square inch of the road and roadside escaped bomb fragments and machine-gun fire. The attack was made by American-marked P-47 aircraft firing American ammunition. The 9th AF has denied that American planes were in this region or, for that matter, that any P-47's have ever been captured by the enemy. It is reasonably safe to conclude that these were enemy-flown aircraft since several attacks well behind our lines have previously and since been reported. The Germans are also flying Mosquito aircraft.

During the past several weeks the German counter-attack in the region of Monscheau has been stalled after a German penetration of approximately 35 miles. General Bradley, using General Patton's 3rd Army and a portion of Hodges' divided 1st Army, has counter-attacked from the south and is now slowly closing the base of the wedge, which is still about 12 miles away. Montgomery has been given command of the northern portion of Hodges' 1st Army and the 9th Army, and with his English and Canadian Army is beating down from the north. A week ago a second German counter-attack developed in the southern section of the Western Front. The enemy has penetrated 15 miles into France is now nearly encircling Strasbourg. The Germans are also now counter-attacking to relieve the defense of Budapest. It is known that the German fighter force on New Year's morning caught many of the RAF fields in Belgium unawares in their large-scale low-flying attack, which is reported to have been made by nearly 1000 planes led by enemy manned Mosquitos. Over 300 of our planes were destroyed on the ground. A smaller number of enemy planes were later destroyed in the air by British and American fighters from rear fields which had been tipped off. During the past three weeks the entire war has assumed a distinctly grimmer aspect. There is considerable uneasiness concerning the great strength which the German military machine can still display, and the prognosis for an early finish has become definitely less favorable.

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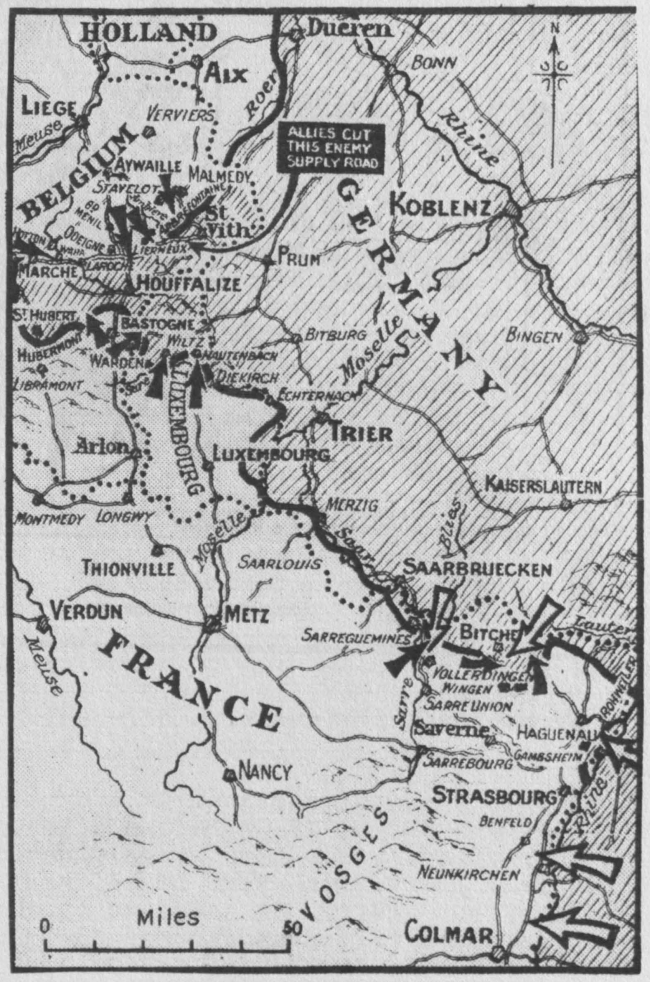
LONDON, MONDAY, JAN. 8, 1945

GERMAN SUPPLY ROAD IN ARDENNES CUT

3-PRONGED DRIVE BY ALLIED TANKS

NECK OF SALIENT NOW ONLY TEN MILES



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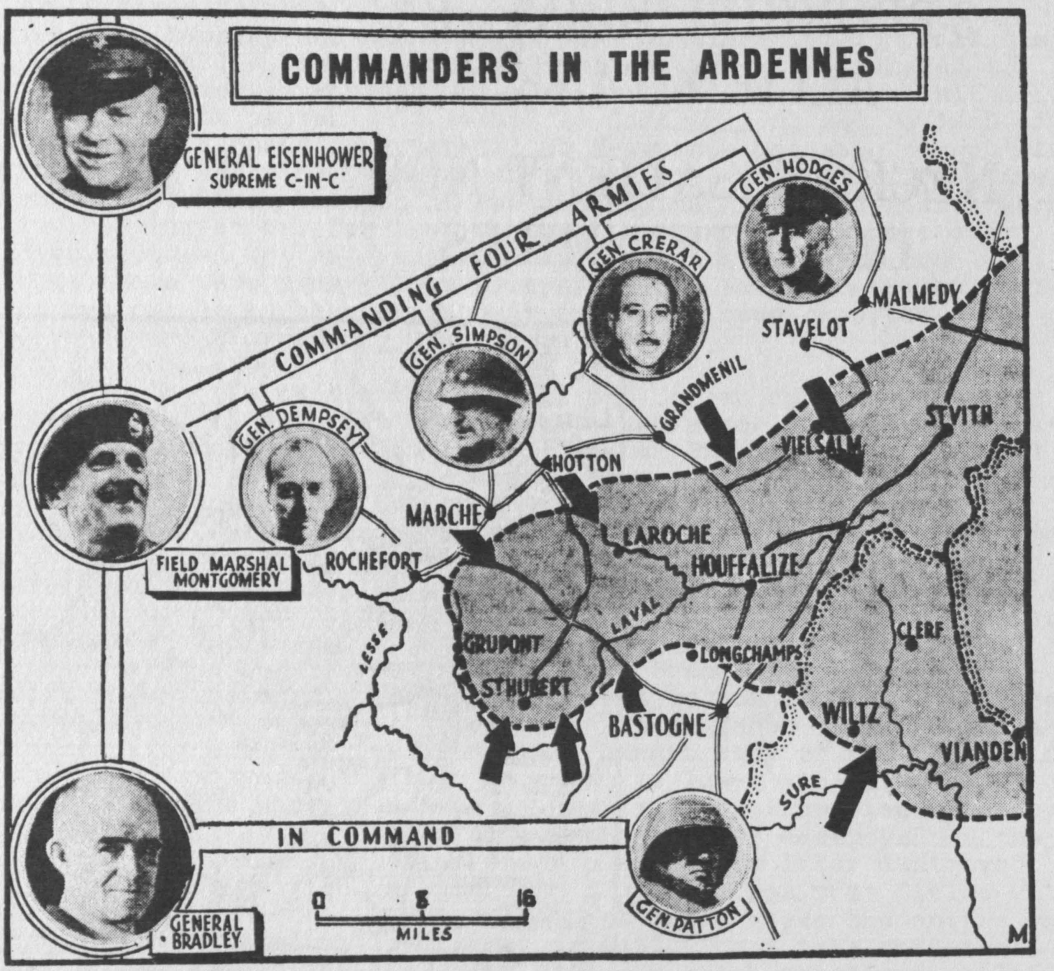

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Tuesday
January 9, 1945

Spent day at BBRL.

Gerry Tape and Jack Buck returned from Pinetree with news on the Eagle program which had been agreed upon in conference with Colonel Dolan, Colonel Byrnes, and others. Twelve B-17 Eagles will go in one group of the 1st and one group of the 3rd Divisions. The four B-24 Eagles which arrived first will be used at Alconbury for training and radar reconnaissance. Alconbury will train 18 navigators and 18 mechanics. It is hoped that by 1 April the Eagles will be operational. The Eagle aircraft will lead their groups with an H2X ship flying as deputy. In this way a few Eagle ships can lead an entire wing in each of two Divisions. Colonel Dolan is to return to the States for a two-weeks period to expedite the Eagle program.

Worked out with Jules Halpern the additional personnel required at BBRL and dispatched a cable to Lee.

Wednesday
January 10, 1945

To London by 11:30 train, arriving at 4:30. Worked up outline of a letter to Lee. Enjoyed the five hours of smooth riding through the English countryside.

At OSRD met Ernie Lyman, who had just arrived from France. Proceeded to Air Ministry, Monck Street, for a meeting with Dr. R. V. Jones, ADI (Science). Jones reported that the British were taking no serious view on the occasional reports of penetrating enemy radiation capable of downing aircraft by interfering with their ignition. Such reports, he stated, had been recurrent since 1938, and a simple explanation had always been found. In 1938 espionage reported that German motor vehicles often came to a stop at a point in the road. A soldier would appear and inform the occupants that he would tell them when they might proceed. The explanation accepted by the British was that these motor vehicles were interfering with German radio and telephone transmission, and under the Nazi regime it was possible to stop all vehicles in the affected area. The reported stopping by invisible means was simple exaggeration of the actual facts. Nevertheless, in 1938, the RAE performed experiments to determine the effectiveness of a radiant beam in interfering with motor vehicles using an IF source of power. Jones stated that they succeeded in stopping an ordinary motor engine with relatively unshielded ignition system at a maximum distance of 15 feet.

We discussed the enemy use of centimetric means of detecting and homing equipment, which is called KORFU in the case of ground sets and NAXOS for air-borne. Jones said emphatically that an S-band KORFU system was established over Germany and that recorded enemy plots were known out to at least 150 miles. He believed that the X-band type equipment was not generally available, though sets existed in lab form and probably in small quantities. He was of the opinion that H2S silence on the part of the RAF was absolutely essential until the boundaries of Germany had been reached

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in order to avoid disclosure of the RAF track. Dr. Jones stated that the Germans had an S-band AI equipment in production and had produced a 100 kw. magnetron.

In the evening, with John Hibbert, Barbara Caldon, and Louise, went to see Noel Coward's "Blythe Spirit". This light-hearted play, which concerned one, and later two mortal ghosts, was the most enjoyable play I have seen in London this trip. Had dinner afterward at the Lansdowne Restaurant.

Thursday
January 11, 1945

Called on G/C Foss at Air Ministry. On the subject of SS Loran, Foss reported that the RAF has used it successfully on all deep raids so far, with 85 percent of the equipped planes reporting good to excellent results. An ORS report has been prepared which indicates that on the average the target can be located within two miles. This is is more than accurate enough for the RAF flare-marking method of target location.

In order to overcome the weak signals in the northeastern Germany area, the Apollonia station will be moved to the heel of Italy. This will be done by leap-frogging the spare equipment to the chosen site. It is expected that this transfer will be completed by April 1.

In anticipation of renewed submarine activity in the Bay of Biscay and along the Atlantic coast of Europe, it has been decided to install a new Loran chain. At the moment the proposal is to have the N-S pair of stations at Worthmatravers in England and Casablanca, and the second pair of stations at Oran and the Azores.

With S/L Burnett, G/C Foss showed me the present situation on the continental Oboe coverage. Two stations have been moved because of Rundstedt's offensive: the one at Laroche in the north and the one at Mulhouse in the south. Foss claimed the coverage was still reasonably adequate, but was neglecting in this the fact that American planes fly at less than 12,000 feet. The situation looked, however, slightly better than I had anticipated since there are now actually five Oboe stations on the continent. Of these, however, three are in the rear.

Foss was interested in the developing Shoran program. The fact that the British did not order Shoran computers was stated to be due to over-rigid interpretation of their requirements for 1200 air-borne sets which did not specifically mention including computer equipment. This he will rectify.

Wrote letter to Colonel Dolan on the H2X bombing program.

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These Are the Key Men Who Helped Unlock the Gates to Luzon







These are Gen. Douglas MacArthur's lieutenants — key leaders throughout the Pacific "road back" battle. From left—Lt. Gen. R. L. Eichelberger, commander of the 1st Army Corps, part of the 6th Army; Lt. Gen. Walter Krueger, 6th Army commander; Vice-Adm. Thomas C. Kinkaid, commander of the U.S. 7th Fleet;

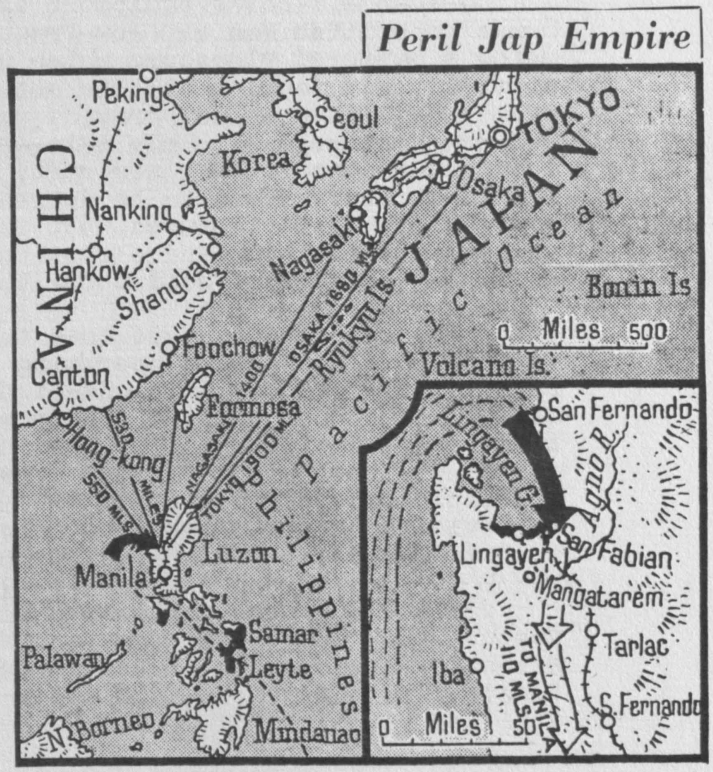


Lt. Gen. George C. Kenny, air chief in the Southwest Pacific,



and Rear Adm. Daniel E. Barbey, head of the 7th Fleet amphibious flotilla.

January 11, 1945



The invasion of Luzon imperils Jap communications to their island conquests in the Southwest Pacific and places the China coast and Japan's home islands within still closer striking distance of Allied sea, air and land power. Map shows the distances northward from the Lingayen Gulf beachhead.

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Friday
January 12, 1945

Told Lt. Col. O'Mara, Technical Intelligence Division, USSTAF, the results of the investigation of enemy radiation.

Stopped off at USSTAF Historical Section, where Capt. Stephen Stackpole showed me their interesting set-up--located in one of the houses along Bryanston Square. All of these houses are now connected internally, forming one large HQ group. It was here, about a year ago, that the Germans dropped with what may have been considerable accuracy a high concentration of incendiaries during one of the last of their "piloted" air raids.

In the afternoon visited S/L Cecil at ADI(Science). Some of the additional information concerning German centimetric homing follows: The Germans have a separate track-plotting organization known as the "Hoch Dienst" or the "Flugzeugwegberfolgung". This organization transmits its radar and ground plots in the open, thereby providing Allied intelligence with good information on their early-warning facilities. The ground centimetric listening equipment is known as KORFU. KORFU 812 apparently covers the 8 to 12 cm. band, while KORFU 274 covers the 2.7 to 4 cm. band. KORFU S-band plotting has been observed proceeding comfortably at 150 miles. The equipment is probably capable of giving direction within 1° and provides an idea of the number of participating aircraft in the case of RAF raids.

German air-borne equipment is of two types: The Flensburg homes on British Monica (low-frequency TW gear). W/C Jackson, using a captured Flensburg which unwittingly landed on a British airfield, has found that this set permits excellent interceptions even though it does not provide range. NAXOS refers to the H2S and H2X homing gear. Only twin-engine fighters, and usually only lead and reconnaissance aircraft, carry NAXOS. The number of fitted aircraft seems to be decreasing. No NAXOS air-borne equipment has yet been captured, but is believed to provide both an indication of altitude and elevation. It is believed that NAXOS would not be very effective for the interception of H2X aircraft.

S/L Cecil pointed out that the British now have about 50 AI-equipped night-fighters operating on German night-fighters. They patrol the known German night-fighter fields and along the edges of the RAF bomber stream. Their effect has apparently been extremely disconcerting. The Germans have gradually increased the number of their night-fighter crew to four and are suffering considerable losses. Cecil believed that the Americans could profit by having a separate spoofing force (such as 100 Group) and by shortening the length of our bomber stream.

Talked over the phone with G/C Bryer, Director of Air/Sea Rescue, Bush House, NE Wing, and W/C Belman of British Air/Sea Rescue. They are now investigating the stowage of the corner reflectors on the single- and multi-place rafts. The British have

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placed an order for 98,000 corners. My impression was that they are not sympathetic to the use of corner-reflectors. One ASD-1 has been installed in the Warwick and is undergoing trials. Their radar program contemplates the installation of ASD-1's in all air/sea rescue planes. With more enthusiasm, they are proceeding with the installation of Walter.

From Major H. J. Hardy, 8th AF Air/Sea Rescue Section, we learn that their first plane is en route, and five more are ready. They will install both ASD-1 and 729's for Walter.

Attended London Teletype Conference. Had dinner with the gang at the Connaught.

Saturday
January 13, 1945

Up at 5:30 and reported with Louise to ATC at 6:30. On to Bovingdon, where at noon it was announced that the flight had been scrubbed because of weather. Spent the rest of the day at the London office.

Sunday
January 14, 1945

Up at 5:30 and reported with Louise to ATC at 6:30. On to Bovingdon by bus, taking off at 10:30 a.m. At last we were on our way back to Paris! Enjoyed the beautiful sunny day above the clouds. Watched the south coast of England recede. Within easy spitting distance of Le Bourget, we turned back and landed at Bovingdon at 1:05, cold and hungry. On returning to London, we checked in at the Connaught, where we enjoyed afternoon tea before the fire in the lounge.

Hundreds of people have been help up for one solid week by adverse flying weather, either in England or in France, and have been milling about each day at ATC and ATC hoping to get away. Weather in this part of the world certainly is not conducive either to air travel or aerial warfare. (Profound remarks by Dr. Trump.)

Monday
January 15, 1945

Showed up at 7:15 a.m. at ATC. Flight canceled because of weather. Called Colonel Crouch, C/O of 9th TCC PFF. He said he would be delighted to lay on a flight to Paris for us. He later reported that the weather was socked in over Paris, and we scheduled a flight for Tuesday.

Talked with Tom Murrell and Colonel Dolan by phone. Colonel Dolan has his orders and is ready to leave to expedite Eagles for 8th AF. On Sunday a heavy 8th AF force bombed targets

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February 15, 1945

Reds Smash Open Polish Line

Five Armies 74 Mi. From Nazi Silesia

BULLETIN

The Russians last night announced in a communique that Soviet troops yesterday cut the important Kielce-Cracow railway and crossed the Nida River along a 40-mile front. Red Army troops also captured the town of Pinczuk and 2,000 other inhabited localities.

In Czechoslovakia Russian troops captured Lucenec and the railway station of Pleszewiec. Forty other localities also were captured.





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in Germany under visual conditions. They encountered stiff fighter opposition and knocked out 195 enemy fighters with moderate losses to us.

Lunch at the Senior Officers' Mess with Dr. Grimmett, former physicist at Hammersmith Hospital, who is now at the Royal Institute on post-war rehabilitation. Hammersmith Hospital has 15 grams of radium which during an air raid and when not in use they conceal in a bore 50 feet deep into the ground. The electrostatic x-ray generator for 2000 kv. (tank 4½ feet in diameter, 11 feet high) is still uncompleted. Grimmett worked for over a year on securing the grant of £3000 for this project and succeeded in stilling last-minute opposition of the approving committee by quoting from my Physical Review paper on the MGH generator, a manuscript copy of which had been sent him by mail. Dr. Grimmett expressed the desire to come to America to work with me for a year or two, and thought he could secure a fellowship for this purpose.

Evening headlines screamed, "Entire Soviet Front Aflame!" The great Russian winter offensive has begun, striking first in the direction of Krakow, where an advance up to 25 miles on a 40-mile base was made in the first day. This offensive is raising new hopes. After some three weeks' experience with the offensive in the Ardennes, Rundstedt has decided to withdraw under strong pressure from both north and south sides of the salient. This withdrawal is being carried out in good order and is assisted by the continued unfavorable weather.

Tuesday
January 16, 1945

Drove to Croydon for trip to Paris in TCC plane. Our party has now grown to include Capt. Collar, Lieuts. Vollmer and Saint, and four enlisted men, as well as Louise and myself. Lieuts. Vollmer and Saint have completed indoctrination in Shoran computing at Pinetree under the guidance of Bill Mersman and Bill Hosier. At Croydon, the mission was scrubbed because of the closing down of weather over Paris. Returned to the Symond's House, where we managed to get rooms once more (in fact, the last two), and spent the rest of the day working on reports.

Wednesday
January 17, 1945

Our party, plus the TCC crew, including Lieut. Mackintosh, pilot, and 2nd. Lieut. Ott, co-pilot, drove to Croydon in a USSTAF bus. After some delay due to British red tape, we took off at 2:45. The navigator, who impressed me as a very capable lad, turned on his SCR-717, took repeated Gee fixes en route. The plane was also equipped with Rebecca-Eureka. Visibility through haze was less than 2 miles over England, was good over the channel, and then low clouds developed over the snow-covered continent. On the 717 screen, we watched the coast of England approach and recede. Took action to avoid a convoy skirting

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1-17-45 cont.

the English coast long before it came into visual sight since convoys have the distressing habit of shooting at aircraft flying over them. Flew blind on final part of trip. Near Paris we were warned that Le Bourget and Orly were closed down. Decided to continue on to a 9th BD field 20 miles south of Paris, which had the possibility of being open. Our navigator flew down a Gee line and broke through a 500 ft. ceiling directly over the airport. After more than two hours' delay in securing transport, we were driven in a 6 x 6 truck along the icy roads to Paris, arriving at 8:30 p.m. Supper on doughnuts and coffee at the Red Cross.

A short meeting was held at the Louvois on Shoran. Capt. Romero has just arrived with a plane-load of Shoran equipment from the States. Major Cook and Capt. Rockwell of ASC, D/Maint., USSTAF, Capt. McGinty, Major Don Hill, Ray Herb, Harlan Collar, and I were present. The next steps to the immediate implementation of the Shoran program were discussed and agreed upon.

Discussed the properties of the X-Y plotting board for CSB with McGinty. He has agreed to proceed with a statement of the theater requirements.

Thursday
January 18, 1945

Talked by phone with Colonel Lack and agreed to set up a small field program between 19th TAC and an appropriate corps for investigating the use of mortar-filled shells for front-line marking. John Faulkner returns to his HQ at Luxembourg today and will get this organized.

Talked with Lieut. Dick Florsheim and Lieut. Vic Schreckengost, ASN, on the RPD program. Agreed to investigate at USSTAF how and where this should be set up.

At USSTAF lunched with Lt. Col. Elwell, formerly with ORS in Washington under Colonel Leach, and with Major Bijour of USSTAF Aircraft Recognition Service. Major Bijour stated that no P-47 or other American aircraft were being flown by German fighter pilots. While it is true that our ground equipment has been captured and used by the enemy, there is no authenticated evidence that aircraft have ever been used for such a purpose, nor--because of the difficulties involved in spare parts and servicing--is it believed to be practicable to make such use of our planes. Major Bijour has been combatting such rumors which have obvious disorganizing effect on American ground fire.

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1-18-45 cont.

Talked with Major Rand about the Willie Orphan project. As now established, five B-17's will be stripped and prepared for use on Phase II of Willie Orphan. In this phase, the aircraft is controlled by the 584, and after the pilot bails out the radio link provides the left-right and dive indication.

It is thought that a 9th TAC 584 would be used, and General Quesada and Colonel Cowart were reported interested in getting the Willie Orphan project within their Command. Phase III is similar except that it will use APN-7 beacons in the aircraft and a Hammond selector operating on changes in the pulse-repetition rate.

At 4:30 dropped in at Park House to report to General Spaatz. Discussed the information available on the enemy use of ignition-interference radiation and wound up by recommending that the concern over this be relaxed. In the course of our discussion, however, I got the impression that he is seriously concerned that the enemy will come along with some device which will prevent further heavy bomber raids over Germany. Discussing this more general question, we touched on the possibility of atomic source of energy and the use of guided missiles. General Spaatz asked me to see General McDonald, A-2, and to get cleared to receive information on German nuclear work. I reported also on the German use of KORFU and NAXOS, the RAF policy with regard to them and the possible influence of these devices on 8th AF operations. We then proceeded to discuss briefly the status of MEW ground control of 8th AF missions, Eagle, and Shoran. I described briefly the RPD device, and General Spaatz asked that USSTAF organize it. This interview, which lasted a full hour, took place in General Spaatz's trailer, and I considered it very satisfactory. As I left the trailer, General Spaatz asked me to come around more often and to come for lunch.

In the evening a number of us had a bull session on German countermeasures for heavy bombing raids. I have the feeling that the most feasible approach by the Germans to this problem is the use of a guided missile. They have already developed the aerodynamics of rocketry and have some proficiency in homing devices. In both these respects, they are well ahead of us.

Friday
<u>January 19, 1945</u>

Spent an hour and a quarter with Colonel Fred Maxwell. He was very much interested in the possible use of AEW for the detection of approaching enemy fighters in raids deep over Germany. He also inquired as to Loran and suggested that the two night-fighter squadrons of 8th AF would be good candidates for

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using it. Lieut. Florsheim was called in, and the RPD program was authorized, Capt. McGinty to take the necessary steps.

In the evening, attended the teletype conference at COM Z. The schedule of arrival for the MEW's was perhaps the most interesting item. MEW #6 will come on the 20th of January, #66 on the 9th of February, #67 on the 1st of March, and #68 on the 15th of March.

Late in the evening talked with Hugh Kendall regarding his return to the States. We agreed that he could leave very shortly after Abe's arrival, that his stay should be about 6 weeks, that he should concern himself there with those aspects of the ground radar program which are likely to affect the ETO. Hugh is to return to serve as Ray Herb's deputy.

Saturday
January 20, 1945

A very heavy snowfall in Paris during the day--making everything look very peaceful and beautiful.

Spent the day at ASB catching up on correspondence, etc. The lab is in the throes once again of absorbing the additional space assigned to it (2200 sq. ft. this time), in which the shop is already operating, with Jack Coomber and Frank Bidwell on hand. John Garfield is erecting his photographic dark room. Carpenters are setting up stock shelves on the far wall. Two lavatories are being installed. Frenchmen are all over the place. It really is going to be an excellent set-up. Across the street we are acquiring a fairly large space of about 2000 sq. ft. for use as storage and overflow.

On the American diver, SHAEF has indicated its requirement for JB-2. They believe that 300 launchings per day, 10 days per month, would be useful, but cannot accept any reduction in artillery production or in shipping. The biggest bottleneck in organizing even this JB-2 program is manpower. Any manpower found in the US should be added to the ETO troop list rather than to a special program such as this. If these requirements can be met, however, they would be interested in the JB-2.

Notes on RCM from Bulletin No. 15 covering the period from December 1 to 15: During this period 2,500,000 units of Window were dispensed by 8th AF on 22 missions. These were cut for frequencies up to 600 mc. In this same time, 146 missions were protected by Carpet-barrage jamming. Dual installations are in all 8th AF aircraft except PFF. A mixture of spot and barrage jamming over the 450 to 650 mc. will become policy. Thirty spot jamming missions were laid on in one week.

Eight screening operations with both Mandrel (113 to 148) and Mark III (150 to 200) and with Dinah equipment were laid on to cover the very high frequencies during forming-up operations.

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Sunday
January 21, 1945

Awoke late and walked through the snow with Louise up to Sacre Coeur. It is a beautiful church and from afar looks over Paris like an ethereal thing. Inside the stained-glass windows and the brilliant mosaics give it a warm friendliness. Morgan and Dick, with Louise Winston, drove by and brought us to the mess. In the early afternoon we arrived at ASB.

Al Rawcliffe has come in from St. Dizier. The A-20 on which he had installed the APN-7 beacons has crashed. With Ray, we discussed the beacon program for 19th TAC. In the evening, with Gordon Danielson, who has just made a tour of the Micro-H ground stations, we concluded that we should cancel the APN-7's and proceed with the installation of APN-29's, two of which are to be immediately acquired from 9th TAC allotment. We will make the MEW beacon modifications as soon as that of the 8th AF and 9th TAC is completed.

Current intelligence reports sum up some of the happenings on the war fronts. The Ardennes offensive cost the enemy 90,000 killed, wounded, and prisoners. Our losses were 40,000 total. The enemy lost 600 tanks and assault guns, and the Alsace offensive has added an additional 100. There are now 82 enemy divisions on the Western Front. The Ardennes bulge has now almost completely deflated, and the two uncommitted enemy armored divisions are moving in the direction of Alsace. A German prisoner stated that Hitler at a December 10th conference gave as the objective of the offensive the seizure of the Meuse in two days, Antwerp in three weeks, cutting off 38 Allied divisions. The offensive has fallen far short of that, and it is now to be determined what move will be made to recoup the prestige which the Germans have lost. The Alsace offensive has caused us to give up all the German territory and fall back on the Maginot Line defenses between Bitche and the Rhine.

A strong German drive to the relief of Budapest has failed and is now threatened by the southernmost Russian drive toward Bratislava. The situation on the Italian front is unchanged. Kesselring is restored in health and has returned to the front. The Russian advance on all sections of the Eastern Front continues as a major break-through reminiscent of the Allied sweep across northern France.

Monday
January 22, 1945

To USSTAF. Talked with Colonel Weicker, Deputy to General McDonald, A-2, to request authority for learning of German work in the atomic-nuclear field from the ALSOS Mission. He later phoned me that he had spoken to Colonel Eckman and all was in order. Talked with Major Rutherford and Captain Gray of Personnel

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regarding the commissioning of Sgt. Caldwell and S/Sgt. Carlson, RADAR Magazine correspondents.

A summary of MAAF radar as obtained from their November report follows:

1. MAAF has a total of 7 AI night-fighter squadrons, which during the month had moderate activity, totaling 841 hours.

2. They have 11 ASV squadrons.

3. The two CXEH X-band beacons set up by Lt. Dutton last summer were discontinued after tests with the 15th AF showed high maintenance difficulties. Ranges of 180 miles were easily obtained, but the navigational situation in Italy is too favorable to justify these beacons.

4. The 15th AF had on November 15 a total of 203 operational H2X PFF planes. These averaged 40 hours per failure. The 15th AF is following the 8th AF in using the SCR-584 for bombing assessment. During the month of November not one high-priority target was bombed by visual means alone. H2X is more essential than ever in 15th AF history.

5. B-17 and B-24 H2X-equipped aircraft are used by 15th AF in single-ship bombing missions.

6. The 15th AF has 281 Gee installations. The 51st TCC has requested Gee in all aircraft.

7. Rebecca-Eureka is proving valuable for special operations with TCC particularly in flights for the removal of the wounded and for Allied and partisan freight deliveries.

8. SHORAN: The two Shoran ground stations are sited to cover Poe Valley targets and "back targets" for training. Experience indicates each ground station should consist of two CPN-2 sets with three power units. The 310th Bomb Group of 12th AF has requested 80 APN-3's and 6 CPN-2's in addition to the 10 and 2 already on hand. The Desert Air Force is to get 60 APN-3's. Ten hours of crew training are required for Shoran.

9. At that time 180 sets of APS-13 with two TS-189's and 32 TS-184's were en route to the 15th AF.

10. APG-8's (ARO) were canceled because night radar reconnaissance is now being done with the "droop-snoot" P-38 instead of single B-17's.

11. Twelve Loran sets were expected on January 1, 1945.

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Soviets Gain on All Fronts

At the Helm of Four Armies in Huge Russian Offensive



Marshal Koniev
. . . leads the First Ukrainian Army striking across the Silesian frontier toward Breslau.



General Chernikovsky
. . . commands the Third White Russian Army driving deep into East Prussia.



Marshal Zhukov
. . . he heads the First White Russian Army on the central part of the Eastern Front.



Marshal Rokossovsky
. . . his Second White Russian Army is sweeping across north Poland, southern East Prussia.

Reds Drive To 165 Mi. Of Berlin

Scoring sweeping gains on all fronts and crushing every German attempt to stabilize their shattered defense lines, the Red Army plunged to within 165 miles of Berlin yesterday after capturing two important enemy defense bastions—one in western Poland and the other on the southern approaches to the Polish corridor.

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Tuesday
January 23, 1945

To the ALSOS Mission near Place de L'Etoile. Talked with Col. Ekman, Major Ham, Fred Wardenberg, and later with Dr. H. J. E. Reid (aerodynamics expert of NACA) and Major R. A. Fisher. They were unable to clear me for disclosures on German atomic research, stating that this could be done only by Washington and that only three people, including General Eisenhower and General Smith, were cleared in this theater.

With Dr. Reid discussed the various possible new defensive measures which the Germans might take against heavy bombing raids. Reid felt that short-range rockets carrying large explosive charges were feasible and could be easily realized. Our general conclusions were, however, that the high-speed jet planes could more easily be adapted to air-to-air bombing.

The 9th AF intelligence report covering the first week in January gave the real facts on the Germans' New Year's day attack. The GAF attacked with 500-600 fighters and succeeded in destroying or seriously damaging 201 British and American aircraft. The cost to the GAF was a total of 98 aircraft destroyed in the air, 38 damaged; plus 237 destroyed by anti-aircraft, 10 possibly destroyed, and 81 damaged.

In three days, 9th AF TAC's claimed 916 motor vehicles destroyed, 219 damaged; 162 armored vehicles and tanks destroyed, 133 damaged; 559 railroad cars destroyed, 305 damaged; 50 aircraft destroyed, 4 probably destroyed, and 11 damaged; 21 aircraft lost.

Flak was stated to be the most potent cause of aircraft loss to the TAC's. One aircraft is lost per 250 sorties. Fighter-bombers have the highest rate of loss, escort missions the lowest. Armed reconnaissance, area support, and fighter sweeps are twice as hazardous as escort, two-thirds as hazardous as bombing.

Wednesday
January 24, 1945

To Widewing, where I talked with Colonel Sparrhawk, recently arrived from the States and in charge of communications under D/Ops. Colonel Sparrhawk will handle the communications and radar work of Operations, thereby relieving Colonel Dixon of this responsibility. As such he absorbs Major Gallou and Captain McGinty and various other people with whom we are dealing. I discussed with him the functions of ASG and the work of BBRL, tracing out developments such as Micro-H, GCA, Oboe, and Shoran. Colonel Sparrhawk was not familiar with the radar program in this theater, but I have the impression that his influence is likely to be favorable.

Talked with Major Gallou regarding the 8th AF Eagle program. He is in agreement with the 8th AF desire to have the 24 Pathfinder aircraft per group made up of 18 H2X- and 6 Eagle-equipped ships. Enroute to ASB dropped in at the USSTAF garage and had D. K. Martin's car assigned to me, with Harold as driver.

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Thursday
January 25, 1945

In the morning a B-17 load of 15th AF people, including Bob Davis, Colonel P. T. Cullen, Major V. T. Wilson, and Lt. C. S. Perry, dropped in at ASB on their way to USSTAF. They are en route to the States via 8th AF to discuss their VISAR project. VISAR is a modification of the Norden bombsight which permits the bombardier to crank into the H2X PPI a range-direction cursor. Although few tests have been made as yet and these largely unsatisfactory, 15th AF believe the development does show a means of improving H2X bombing. The device is described as an ultimate successor to Nosmo, which is aimed at performing the same function. VISAR requires the bombardier to make use of both a remote scope and PPI scope in the nose and the Norden bombsight in a bomb approach. This would appear to be the outstanding projection. I recommended that they discuss this thoroughly with Tom Murrell and Gerry Tape, and cabled the latter to advise the Radiation Laboratory of their estimate of the value of this device. My own impression is that Nosmo is superior because it contains the full services of the skilled Mickey operator for navigation and target identification. Nosmo makes use of a Norden rate attachment which moves the PPI range circle and transmits continuously to the bombardier on a meter a"setting-difference" indication

In the evening, Bob Davis, Ray Herb, and I discussed the radar development within the 15th AF. Davis stated that intelligence showed the Germans preparing to use jet-propelled collision aircraft. These are believed to have a wing span of about 12 feet. The type of control is not known, but may be drone, ground-directed, or homing--most probably drone.

Intelligence reports for the week ending 21 January showed that the Russian spearhead had advanced 175 miles from the starting line within 8 days. Half of the German armor--already fairly thin--which had been left on the Eastern Front, was attempting to relieve the situation at Budapest and therefore in the wrong place for the Russian offensive. The situation has the appearance of a general collapse. It is certain that the Russians have broken through and carried far beyond the principal defense lines. One thrust is progressing fast along the mail railway line to Danzig and may isolate East Prussia. The other larger one is doing due west toward southern Silesia. Warsaw, Lodz, and Krakow are left far behind.

On the Western Front, the withdrawal in the Ardennes continues slowly and with skill as a major operation. A number of divisions are being transferred to the east, but the Western Front total is about 82, amounting to approximately 1,500,000 men--one-quarter of the whole German army. The German offensive in the south is continuing to receive reinforcements. There is increasing evidence of enemy supply difficulties, particularly in the matter of fuel. Reports have been received from all parts of the western salient of dug-in, immobile, fuel-less tanks, self-propelled guns being towed, small groups of supply vehicles being pulled to the rear, unit shortage of

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Russians Smash Into Oppeln, Reported Entering Koenigsberg

Land Route to China Open—Mountbatten

SOUTH EAST ASIA COMMAND, Jan. 24 (Reuter).—Adm. Lord Louis Mountbatten, Supreme Allied Commander in Southeast Asia, has sent the following message to the Combined Chiefs of Staff and President Roosevelt and Prime Minister Churchill:

"First part of orders I received at Quebec have been carried out. The land route to China is open."



Nazis Claim Stand Made Near Posen

Tank spearheads of Marshal Ivan Koniev's First Ukrainian Army, brushing aside desperate German Home Guard resistance, yesterday stormed into Oppeln, capital of Upper Silesia, then gained a bridgehead across the Oder River and smashed north toward Breslau, Marshal Stalin announced in Moscow.

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1-25-45 cont.

ammunition and supplies; and excessively high rate of tank failure due to mechanical reasons is ascribed to inadequate running in time in an effort to save fuel.

The Russian advances are a dangerous threat to German oil reserves. The refineries next to Krakow have been overrun; oil fields northeast of Vienna are threatened. Overrunning the heavily industrialized section of Silesia will result in cutting down the enemy's crude steel capacity.

Submarine operations in northern and home waters are making increasing use of one- and two-man midget subs. A summary of merchant shipping losses in millions of tons is listed as follows:

1940 - 4.5 1941 - 4.7 1942 - 8.3
1943 - 3.7 1944 - 1.4

Friday
January 26, 1945

The following is quoted from Jackson Laslett's recent letter to the Radiation Laboratory (Jan.15) concerning TRE work on K-band: "Experimental aircraft installations in operating condition consist of the Lancaster with the 6 ft., low-level, leaky-feed antenna, and a Lancaster with the Mosquito 28 in. antenna installed. This latter aircraft has had the high-level, antenna in it, and this scanner will probably be reinstalled as soon as the 28 in. low-level one is removed. Some encouraging tests were carried out recently against tanks and other vehicles. It was found that as few as four tanks could be detected on snowy fields although not when in wooded areas. It is planned to continue these tests now that there is no snow, but it is of course a question of whether confusion from clumps of trees and the like will not be extremely serious. For the moment Flight Lt. Richards' aim is to push the development and installation of the equipment and let the squadrons explore its applicability, which they--after all--can probably do best. Although an aircraft is being fitted out for the Mark VII equipment (GPI, etc.), the complete array of boxes is not yet ready and it could be questioned whether the Mark VII design could not be applied to X-band equally as well as K-band."

The teletype tonight contained a short note from Dave Griggs saying that DuBridge and Comdr. Berkner were interested in testing an AEW mounted in a B-17 and provided with a larger spinner. Tom Murrell and I were asked to investigate if a B-17 could be diverted to the Radiation Laboratory from the 8th AF. This development is not likely to materialize in time to benefit the 8th AF in its European operations, but does represent an important investigation for future air force use. The present AEW with its 3 ft. x 8 ft. dish can see a single-engined plane 250 ft. over the water over a range of 60 miles when it is 100 ft. up. This range increases to 70 to 80 miles when the AEW is at 5,000 ft.

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1-26-45 cont.

Jim Cunningham and Ed Brazell returned from A-78, where they had been working on the UPN-2 tests with P-61 night-fighters and P-38's operating against the 584. Jim reported the P-61 performance fairly satisfactory, though it may benefit by the use of skin-back antennas which should avoid loss of signal when the plane is changing aspect. The P-38 work is still not satisfactory because of the difficulty of locating the tiny dipole antennas. The larger skin-backs may cure this and will be tried next week. Apparently the beacon performance against the 584 and the P-61 has pleased everyone who has seen it, and the tracking is reported to be very precise. Saturation signals were observed out to the limit of the 584 (50 miles). Jim confirmed Gordon Danielson's report of the difficulties of working at A-78. It appears, however, that the tests have gone far enough so that the end is in sight. The installation of beacons in the additional planes will be handled by Service teams under BBRL supervision.

Saturday
January 27, 1945

Talked with BBRL, Malvern, by phone. Gerry Tape reports the 8th AF willing to request the diversion of a B-17 to the Radiation Laboratory for AEW tests. I asked him and Jules to get 8th AF started on setting up a separate 8th AF MEW Ops Room for bomber control, indicating that one PPI was available and two more could probably be secured from the 9th TAC.

Drove to Versailles and spent two hours discussing radar with Air Commodore Hart, Colonel Cary King, and Wing Comdr. Ewing at SHAEF Headquarters in the Trianon Palace. It was a beautiful snowy morning, and the drive along the tree-lined avenues and snow-covered landscape was very enjoyable. Air Commodore Hart was interested in the account of the 8th AF program of controlling bombers and fighters by MEW and the application of microwave beaconry. In discussing Shoran, he indicated that the British would hold off in requesting this equipment. They will experience considerable relief when they are no longer required to supply Oboe service to the Americans and will carry on with Oboe until the present peak load on Shoran equipment has eased. We discussed the RAF and American policies regarding German NAXOS equipment. He agreed to the reasons why the 8th AF should for the moment ignore the existence of German H2X df-ing equipment.

Drove to Widewing in the early afternoon. Talked briefly with Colonel Maxwell, who agreed to the diversion of a B-17 to the Radiation Laboratory for AEW work. Confirmed this further down the line with Major Gallou and Captain McGinty.

Paris is once more filling up. Charlie West has returned in General Doyle's plane from Defford, where he had been scrounging Gee test equipment and supplies. Hugh is returning in a TCC plane with a 2½ ton of gear for ASB. Len Hartman, Bob Byers, Dick Hodgson, George Harris, and Capt. Collar have returned from the field.

The Russians are stated by the radio tonight to be 80 miles from Berlin.

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Sunday
January 28, 1945

At 8:45 a.m. left Paris for 42nd Bomb Wing, Dijon, in the command car (Harold Striggow at the wheel) with Capt. Collar and Bill Hosier. Paris was overcast with a scattering of snowflakes in the air. The route lay through Fountainebleau, Sens, and Tonnerre. The roads were icy and snow-covered, and we made about 100 miles of the trip through a blizzard. Two skids while I was driving--one at 90° and the other 270°--enlivened the trip. The country presented a succession of interesting snowscapes with typical French towns, streams, and canals. We arrived at Dijon at 4:30 p.m.

Talked briefly with Capt. Bernard, SC, and Major Berge, who is heading up the Shoran project. Then had a half-hour session with Brig. Gen. John P. Doyle. He is fully behind the Shoran and Gee programs and anxious to get them operational even if only with two ships. At present his two medium bomb groups are mostly grounded. They had five operational missions in December, eight in January--four of which aborted. The 42nd Bomb Wing did unusually good visual bombing in Italy, 70 per cent of the bombs falling in a 400 ft. diameter circle--the result of full crew cooperation and competitive work. General Doyle believes that their bombing effort can be tripled by Shoran, and the discouraging effect on crews of returning with full bomb loads or sitting about can be avoided.

Held a meeting on Shoran and Gee after supper. Present were Lt. Col. Lyle (Signal Officer), Lt. Col. Knerr (A-3), Major Berge, Capt. Aldrich, Capt. Bernard, Capt. Romero, Capt. Collar, Lt. Paradise, Lt. Scheuter, Charlie West, Bill Hosier, and myself. The following points were made:

1. Request should be made that BADA supply Group A parts (brackets and cables) for 40 Shoran installations in B-26F's. The first four or more installations would be made by 42nd Bomb Wing.

2. Two B-26 installations are now about complete. One APN-3 will be put in either the MAAF or the 8th AF B-17. The fourth will be set up on the bench.

3. Some seven men have been trained by Romero and Paradise in air and ground maintenance.

4. Beginning about February 5, Romero and Paradise can handle 12 students in APN-3 maintenance on two-week schedule. Alexander and Brookshire can handle at least 12 on CPN-2 maintenance every two weeks. These might come 50-50 from 42nd Bomb Wing and 9th Bomb Division. The training will be done in southern France.

5. The two ground stations in the south of France should be operating by February 5, the first at Marseilles by February 2.

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6. The computer organization would be based at Wing HQ. Bill Hosier was properly introduced and will be relied on to get the training and operational organizations going.

7. Gee training will be done at 42nd Bomb Wing, and the 8 navigators will be sent to 9th TCC next week for training.

After the meeting, I became better acquainted with Lt. Col. Lyle and adjourned to the General's guestroom. The HQ is in a monastery and orphanage at Longvie near Dijon. It is out in the open country--a long rambling building with a vineyard in front of it.

Monday
January 29, 1945

After breakfast left for the airport, where we climbed over the B-26 in which the first Shoran installation is nearly complete. The radar shack for Gee and Shoran is a windowless, wooden affair built under a bombed-out hangar. Met Sgt. Brookshire of ARL. With Charlie West drove to one of the group sheet-metal shops. This proved to be inadequately housed in a tent, with brackets made from metal salvaged from crashed planes.

To Headquarters, where I enjoyed a glass of beer with General Doyle and Col. Smith, Chief of Staff. At lunch reported to Col. Smith on the Shoran and Gee set-up as it appeared to me--that very good progress had been made, with Gee and Shoran installed in the same aircraft. Also told him about the MPN-1 program. We discussed the general war situation. The one o'clock briefing reported that the 7th Army is holding the German attack in the Haguenau region. No progress on Western Front--only the 8th AF, a very small RAF force, and 186 planes of 9th BD bombed yesterday. The Russians--according to meager reports--were consolidating their positions.

One training station is to be south of Marseilles, the other at Montelimar, 100 miles north on the Rhone River. The target is a lake in the Rhone delta--45 miles from one station and 85 miles from the other. The 42nd Bomb Wing will do secondary bombing with 12th TAC's 584 CSB units until Shoran is available.

Left at 1:30 p.m., driving through snowy country to Vittel, arriving at 5:00 p.m. Found that measures agreed upon last night were already in process. Met Colonel Stern and Colonel Hayden after supper. Stern is anxious to get personnel to staff Gee and Shoran programs--an early-warning company from USSTAF. Talked with Hill and Cummings until 10:00 p.m. about radar, new weapons, etc. Finally adjourned to Hotel Tilleuls just across the street.

As the result of organizational changes, General Royce has been replaced by General Gordon P. Saville, while General Barcus is to head up 12th TAC.

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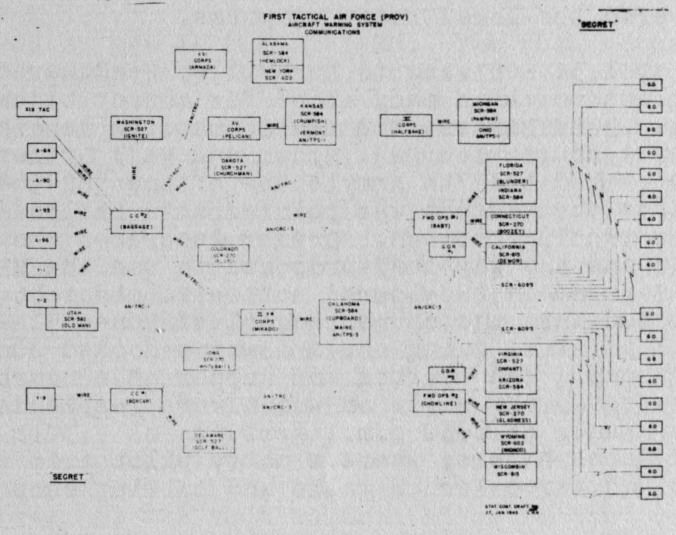
1-29-45 cont.

The use and disposition of 12th TAC's radar is shown by the following sketch:



Tuesday
January 30, 1945

Discussed the following items with Col. Stern, Capt. Cummings, and Maj. Hill:

(a) Front-Line Identification. First TACAF is interested in making a field test itself, and I agreed to get 50 shells, plus pertinent information, for such tests.

(b) GCA. No. 9 goes to 12th TAC, No. 5 to 42nd Bomb Wing. The technique of taking off, landing, and CSB-controlling small flights was discussed. I expressed the belief that the MPN-1, subject to limitations of traffic-handling capacity, would be able to take care of flights on 90 per cent of the days. This was on the assumption that at least 100 ft. ceiling and sufficient visibility to take off was available this fraction of the time.

(c) Emphasis of the desirability of Gee and Shoran being in the same plane.

(d) Maj. Hill agreed to put in requirement for four X-Y plotting boards immediately, and seven ultimately.

(e) Pointed out that, contrary to Dick Hodgson's assertion, no UPN-2 or APN-29 beacons would be available until about May, also that BBRL would not be in a position to assist on beaconry and the MEW beacon kit for 12th TAC until about that time.

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1-30-45 cont.

Lunch with Gen. Schramm, Col. Stern, and the rest of the staff. Gen. Saville, however, was away at a conference with Gen. Devers, Commanding General of 6th Army Group. In addition to much general discourse, we covered the local radar programs.

Left Vittel at 1:30, driving to Luneville, Headquarters of 12th TAC, through a snowstorm, with many stops for convoy blocks. Arrived at 4:00 p.m. Gen. Barcus, the new Commanding General, was away. Spent several hours with Maj. Nyhen and Maj. Ortner, Radar Officer. They described the 7th Army's use of the SCR-584 for road watch. In one place the SCR-584 was pointed at a railroad station and detected trains running through. Ortner described the radar set-up in 12th TAC and the way they proposed to use the MEW. Twelfth TAC moved out of Saverne on two hours' notice at midnight and again on short notice moved into the church school at Luneville during the night. School is still going on, and white-hooded nuns with black capes flit about. Had bourbon and supper at a nearby private house--in the game room, the walls of which were resplendent with antlers. Left for Nancy at 8:30 p.m., arriving at 9:30. Had a good room at the Grand Hotel Thiers, where a noisy pilot trio were awkwardly "entertaining" three French galls and talking shop at the same time.

Wednesday
January 31, 1945

To 64th Fighter Wing--now housed in a large modern building in Nancy. Lt. Barta, Lt. Scott, and Capt. Bixby described their plans for using the SCR-584 GSB for controlling flights of 42nd Bomb Wing's mediums. The 42nd calls them every day to learn how things are coming. The first of the TAC's SCR-584's is now at Saverne, and successful GSB missions have been reported. It is the second unit which will be used for the mediums, and test flights are scheduled during the next few days. Called ASB and arranged to have George Harris out to assist.

Col. Nelson P. Jackson, new Commanding Officer of 64th Fighter Wing, invited me to his 10:00 a.m.briefing. The Russians have drawn up on a 150-mile front facing Berlin, some 90 miles distant. The northern end has pinched off East Prussia, which is now half overrun. The Germas are admitting the possibility of losing Berlin, but intend to fight for every bit. On the west, small advances have been made by all armies, and evidence of the withdrawal of enemy troops to the Eastern Front increases. It is expected that a new offensive will be mounted on the Western Front as rapidly as possible.

Talked with Col. Nelson about the use of MPN-1's and SCR-584's to permit operations under conditions such as prevail today: 800 ft. ceiling to the Vosges, hardly clearing the hills, broken clouds over the Rhine Valley. During November and December, 12th TAC with four fighter-bomber groups averaged 160 missions per day. Their maximum sustained effort would be about 400 missions per day. Nelson is a good candidate for radar indoctrination.

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1-31-45 cont.

Told the radar officers about X-Y plotting boards, Window-filled mortar shells, TPS-10, CPS-4, and AEW. Left at 11:30 for Bar le Duc.

Arrived at Bar le Duc at 1:30. The 90th General Hospital is in a former insane asylum on the outskirts of town. While awaiting Maj. Sahler's return, had lunch in the improvised mess hall with Harold, surrounded by chattering French workers. It was very relaxing to see old Otto again, to look over his fairly extensive X-ray set-up, hear accounts of his cases: the psychological "GI's", the method of locating foreign bodies in tissue, etc. The 90th is one of three hospitals in Bar le Duc, has about 1,150 beds. The buildings, now that they have been deflea-ed, are very suitable. Otto will apply for home leave on February 6, and I hope he gets it. Turned down regretfully Otto's invitation to spend the night and left at 4:00 p.m. in light rain. Through Verdun, arriving at A-82 near Etain at 6:00 p.m. Back to Etain and found Al Albrecht, Bert Fowler, and John Garfield at the 425th Night-Fighter Squadron's officers' mess. Met Capt. Bryant, who has arrived with three enlisted men as an MPN-1 team on temporary duty from Bradley Beach. After supper, drove out to the GCA, which is all set to go, but awaiting its crew. Al and Bert instructed me in the operation of the gear, which is a very fine job. Bert believes the GCA can land close-flying flights by talking down the leader. This same thought was presented by Gen. Doyle and others. Returned to Etain at 10:30 p.m.

Thursday
February 1, 1945

Rose at 7:15 a.m., dressed in dark in order not to disturb my two night-fighter friends, whose room I had shared, put off shaving in view of absence of water (running or stationary). With Bert and Al had an excellent breakfast at the mess of the 2nd Night-Fighter Squadron in the well-to-do French house down the road.

Drove to A-82 and had a half hour's chat with Lt. Col. Bradley, C/O of the 19th TAC day fighter group (three squadrons of P-47's). He is watching the MPN-1 work with interest and looks forward to using it with the realism of a man who knows he must count on getting along as before until it has been proven otherwise. The combination of GCA control at the base and SCR-584 CSB and MEW control to the target appeals to him. He estimated his group is only 25 per cent effective now because of the weather. He described the method of counting enemy vehicles. Those on fire are considered destroyed; the balance damaged, though they may in fact be equally destroyed by bullets through the engine block, etc. In a recent error in ground strafing, the controller said they were enemy vehicles--no colored panel or white star being visible. The pilots claimed two vehicles destroyed, while the 7th Army declared seven vehicles had been destroyed.

Col. Bradley informed us that the Russians were within 35 miles of Berlin on a 50-mile front and that the Berlin government had evacuated.

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2-1-45 cont.

Left A-82 at 10:00 a.m., arriving in Luxembourg at noon. John Garfield, having sweated out transportation delays and the weather still being unfavorable, decided to go along with me. Met Johnny Faulkner, Major Dixon, McNeil, and Smith. The two SCR-584 CSB sets (and Turpentine) are doing much better under Mac's guidance. Answered Johnny's questions on air-borne beacons, V-beam, mortar-shell identification, etc. At lunch met Lt. Col. Allen of Operations. He indicated that weather was holding 19th TAC to about one-third effectiveness. He lauded the way in which fresh pilots from the States (particularly night-fighter pilots) handled planes under conditions which would have kept them soundly grounded at home. They land with 200 ft. ceilings, one-half mile visibility, on a single strip under cross-wind, etc. The intruder work of the P-61 night-fighter is rated the more valuable. P-61's carry two 500 lb. bombs, eight 5 in. rockets, four 20 mm. cannons, and can easily devastate a small town.

The ORS Section of 19th TAC is to be headed up by Col. Moeller, an old Army liaison man with lots of practical experience. Looks like a good deal.

After a half hour of wandering about Luxembourg, which impresses all as a beautiful city, we left for 9th Bombardment Division at 3:00 p.m., arriving at 7:30. Mess with John Garfield and to bed at Hotel du Nord.

Friday
February 2, 1945

Talked with Col. Talbot, Lt. H. E. Pond, and S/L Hart regarding Shoran, Gee, and Oboe programs. The 9th Bomb Division is waking up to the tremendous value of Gee as a navigational aid and has become strict in its navigator Gee training. On several occasions, when the mouse Oboe signals failed, the bomb-release point was determined by Gee. On a few occasions bombs have been released entirely on Gee information.

Later in talking with Major Williams I learned that during the past few weeks Oboe performance has been singularly good, and some photos were shown in which several groups had gotten almost 100 per cent of their bombs within a 400 ft. diameter circle. Around the first of the year, however, Oboe bombing hit an unusual low, and 9th BD expects that oscillation of performance must be expected. For this reason, they are keen on going forward with their Shoran program rapidly. They also are looking forward to making use of their SCR-584 CSB unit as soon as the X-Y plotting board has arrived.

Spent an hour before lunch walking about the town, visiting the Rheims cathedral. This impressed me as a beautiful structure, particularly because organ music could be heard echoing through the open doors.

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Friday, Feb. 2, 1945

Nazis May Rely on Oder Wall



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2-2-45 cont.

Left for Paris at 1:00 p.m., arriving at 5:00. Several people from the SC Technical Liaison Office, including Major Brazee, were on hand, and we agreed to design and construct a recorder for use with the SCR-584 in locating the source of mortar fire.

The teletype stated that more Shoran equipment could be delivered by air from the States because of the generous freight allowances which had been provided. Eighteen air and eight ground sets are to come in this way, and the whole schedule is more favorable than we had counted on.

Dave Griggs has returned from the States chuck-full of information from AAF and the Radiation Laboratory. Among items of news interest is the address which General Arnold made to his staff, in which he stressed that the thinking of his headquarters should be directed toward the air war of the future and not toward the detailed operational problems of the present. He pointed out that the future air war would be around aircraft such as the B-29, that B-14's and B-17's were washed up, that in the future aircraft would be pilotless or at any rate the pilot would not be the key figure as is now the case.

Saturday
February 3, 1945

Talked with Larry Taylor. Ninth Bomb Division is encountering very little flak loss, about 0.7 per cent, with about the same loss for other hazards. This is partly the reason why Tom Kuhn has come up with the recommendation that no Carpet jamming is needed by 9th BD.

Asked Hugh Kendall to take the job of getting the mortar fire recorder design started. Our plans are still for Hugh to leave in about three weeks.

In the afternoon dropped in with Louise on Dick Florsheim, who has been ill at the Royal Monceau. His RPD project has been going smoothly, and a demonstration to representatives of all interested commands is scheduled for next Tuesday. Walked along the Seine to Place de la Concorde. It was a beautiful spring-like afternoon. We watched the fishermen and admired the buildings about us. In the evening went to see the Barber of Seville with Hugh and Janet at the Opera Comique.

Sunday
February 4, 1945

Coffee and doughnuts at the Red Cross with Louise and Ray. Then to the Madeleine, where we sat through the mass. Long walk after mess. In the late afternoon talked with Gerry Tape, who informed us that General Doolittle had received a personal letter from Jules suggesting that the 8th AF consider Shoran for tactical bombardment.

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2-4-45 cont.

Had a general discussion on the desirability of this, in which we finally concluded that Shoran could not be taken on by the 8th without jeopardizing the other high-priority Shoran programs and at the same time hampering the development of Micro-H. We decided that in any event Shoran should be introduced into the 8th on a complete scale if at all, which would mean that it could only become operational in about ten months. Discussed also such radar projects as the photo projection PPI, the MTI, and relay radar.

Monday
February 5, 1945

Devised a cable to Tom Murrell and Gerry Tape summarizing the Shoran situation and our opinion. Later at Widewing, Col. Geerlings called to ask for permission to have Tom Murrell make a quick trip to the US to represent the 8th AF opinion on VISAR and to expedite the arrival of NOSMO.

In the afternoon drove to the Engineer Model Section on the outskirts of Paris with Dick Florsheim, Ray Herb, and Dave Griggs. The scale models of front-line terrain are proceeding apace.

Returned to Park House for a conference with General Spaatz. Dave had prepared a summary of the JB-2 development (American pilotless projectile) with the recommendation that a requirement be placed by USSTAF in order that this development in the States might go forward. Two new points brought out in this presentation were that JB-2 could not become available before the fall of 1945 and that the SCR-584 close control makes it a fairly accurate long-range, all-weather bomb rather than an area projectile. General Spaatz agreed to discuss this with Eisenhower and place a requirement.

We discussed also the status of the Shoran program at 42nd Bomb Wing and the 9th Bomb Division, the developing SCR-584 GSB program, the possible German countermeasures against heavy 8th AF bomber operations, and the possibility of AEW control.

General Curtis joined the group later in the evening when the conversation generally concerned the effectiveness of radar in the European theater. We were invited to come in as soon as we had returned from our projected trip.

Tuesday
February 6, 1945

Off at 10:00 a.m. via command car with Dave Griggs. The day was overcast with a fairly continuous drizzle. Nevertheless, B-26 flights were roaring out overhead. The French towns looked particularly squalid and uninspiring today. Shortly after passing through one of them, what we thought to be delayed-action bombs went off. They might well have been dropped by a single intruder aircraft which we had noticed shortly before. We stopped at the side of the road to practice with the carbine rifle.

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Monday, Feb. 5, 1945

1st Cuts Main West Wall

Second Belt Of Defenses Is Broken



BULLETIN

The U.S. First Army has penetrated the last main barriers of the Siegfried Line, eight miles east of Monschau, and is now fighting in the secondary defenses of the German fortified zone in that sector, the Associated Press reported from the front late last night.

A Reuter dispatch said forces of Lt. Gen. Courtney Hodges' Army had "passed through" the second and main belt of the Siegfried Line.

This is the Siegfried Line which forms the western wall of Germany for more than 500 miles from Holland to the Swiss frontier. One of the mightiest fortified zones of modern times, the Siegfried Line has been breached at Aachen by the U.S. First Army. That Army has now torn a new 12-mile gap in its outer defenses where the line is double-tracked south of the Aachen breach, and has penetrated the inner defense line. Southward in Alsace, Franco-American forces are reducing the Colmar salient.

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2-6-45

At Soisson we messed with two Canadian light infantry officers, who had been in Europe for a long time and had participated in the Dieppe raid. The very nervous one of the two described the opposition which they had run into in considerable detail. They had been briefed to expect an easy raid. They spoke of the current German use of rockets for bombardment of front lines and towns and mentioned the British and Canadian use of radar for mortar-fire location.

Through Laon along the bank of the Meuse. This was very pretty country with rocky hills, the swift stream overflowing the banks, and fine French and later Belgian houses on the other side. Arrived at the headquarters of the 9th AF at Namur at 6:00 p.m. Made an appointment with General Vandenberg for the next day.

Spent the evening at the Part Hotel with Dick Hodgson, Col. Cody, Lt. Col. Lotz, Col. Reed, Lt. Col. McCurdy, and Lt. Col. Philbrick. Colonel Cody believes the land line and radio communication system for 9th AF is well in hand. He actively wants more TCR-1's, of which an estimated 8 to 10 are in the theater, and 14 more are required. In a discussion of night photo-reconnaissance work with Col. Reed and Lt. Col. Philbrick, it was emphasized that there is available to 9th AF only one squadron of 16 operational planes. Three more night photo-reconnaissance squadrons have been requested. There are about five tactical day reconnaissance squadrons. Night aircraft watch roads, bridges, ferries, and marshalling yards for troop movements. These planes now use Gee, but would like more accurate navigational radar. The MEW and SCR-584 close control are regarded as too limited in range, though valuable.

Wednesday
February 7, 1945

Further discussions with Col. Hall and Lt. Col. Philbrick, who showed us night flash bomb photos and Edgerton flash photos. We were surprised at their excellence. Direct observation of armor in woods is not possible, but trackage shows up particularly in the snow. They stated that night reconnaissance played a considerable part in determining that St. Vith was the center of the German communication system in the break-through. (General Quesada later stated that this was determined by looking at the map.)

Discussed briefly with Maj. Gen. Hoyt Vandenberg several radar items, including MEW's, beacons, APN-1's, etc. Dave reported on JB-2 program in the States. We then led off into a general discussion of the war. Off the record, Vandenberg felt that an American air commander in the break-through would have succeeded in annihilating the Germans. Ground operations proceed too cautiously. The November 18 offensive was slowed down when 35 tanks, plowing through a mine field, had their treads blown off. We had 1500 tanks against the enemy's 600. He mentioned the imminent ground offensive to which maximum air support would be given. If that failed, a ruthless fighter and fighter-bomber war all over Germany would ensue. He believed German economy was bogging down. At the moment there are 100 German tanks in a group on the Western Front out of fuel which the air forces are planning to hit as soon as the weather lifts. The Germans were unable to retreat before the present Russian offensive because of fuel

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2-7-45 cont.

deficiencies. It seems impossible for Germany to get its economy fully underground, but the Germans have no machinery for giving up and will fight on fanatically. A great need for more fighter aircraft was stressed.

Went on to the Eagle TAC for interview with Lt. Gen. Omar N. Bradley, C/G of 12th Army Group, which includes the 1st and 3rd Armies. This headquarters was in a luxurious red-carpeted building. A guard with cocked Sten gun watched out of the window overlooking the courtyard. Gen. Bradley is tall, lean, scowly, and courteous. We introduced ourselves as members of the Office of the Secretary of War, working with Dr. Bowles, whom he knew. We discussed the JB-2, mortar-fire location with the 584, road-watching, Window-filled shells for front-line identification. He felt that JB-2 would be useful if the war continued until next winter. He had heard of mortar-fire location from Col. Warner. We provoked a general discussion. Bradley believes a little conservatively that the war will end next fall or the end of summer. U. S. Armies have been tying up 82 German Divisions on the Western Front and 25 in Italy. The Russians have 150 Divisions against 150 on the Eastern Front. Von Rundstedt's counter-attack slowed up our progress by just one month. Bradley has no concern over new German weapons except possibly some unknown gas. We discussed the technique for making a parachute landing across the Rhine. The interview lasted about an hour.

At Gangway talked with Major Gerry Stover regarding air-borne beacons. Convinced us that he should ask for APN-29's as well as -19's. Col. Cody showed me his recommendation that Wallie Caufield be awarded post-humously the Oak-Leaf Cluster.

Left at 3:15 and drove along the Meuse to Liege. Convoys, tanks, muddy roads, dark and dirty streets, people standing to watch, slanting rain, Liege factory workers, devastation by Allied and robot bombs. Arrived at Verviers at 6:00 p.m. Dave proceeded to General Quesada's headquarters, while I went on to the officers' club to see the BBRL boys, including Carroll Zimmerman, Jim Cunningham, Abbie Abbiati, Rolly Larson, Ed Brazell, and Walter Pree.

During the past two weeks Jim has been unable to obtain any further P-38 beacon flights due to bad weather and plane difficulties. A P-38 and P-47 have been assigned to Defford for one month, where the air-borne beacon work, mainly on antenna patterns, will be completed. When this has been resolved, the installation will be continued at A-78. Jim, Abbie, and Ed have been sweating out transportation to BBRL for four days. They took off yesterday in a C-47 and, because of wrong wind information, flew over Dunkirk, where they encountered enemy fire. A hole was knocked in their plane, and they had to return to Verviers.

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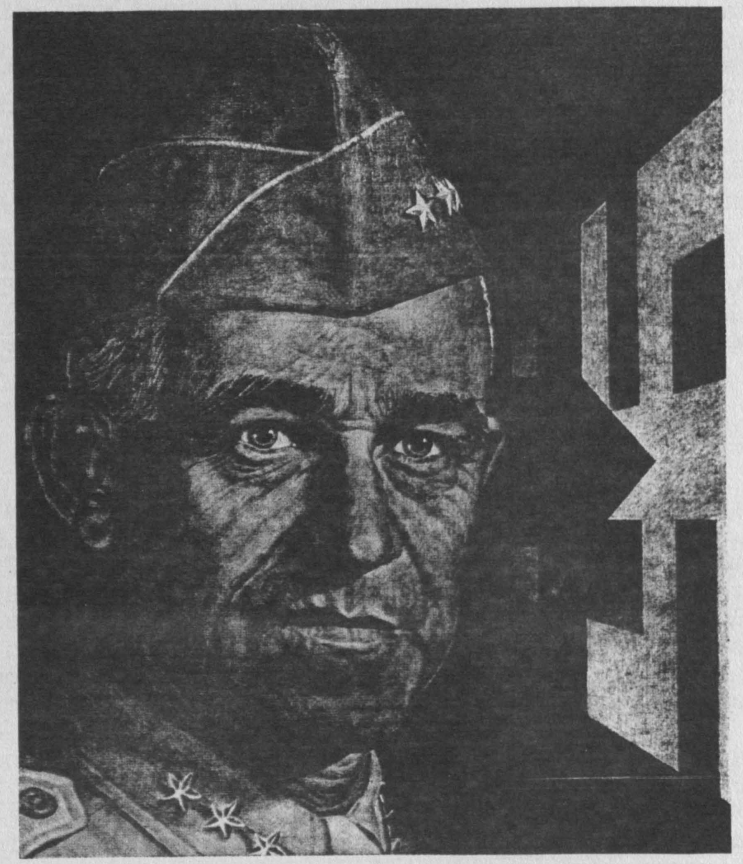

LIEUT. GENERAL OMAR BRADLEY was getting ready for D-day when *Time* ran his picture May 1, 1944. The battle of long, crucial training had been finished. The great blooding was about to begin. Bradley's job was to be the American field commander in France. The "doughboys' general" is primarily an infantryman, stubborn, loving weapons, informal and clearheaded. A Missouri schoolteacher's son, he entered West Point in the class of 1915, which has produced other generals of this war: Eisenhower, McNarney, Stratemeyer.

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2-7-45 cont.

Carroll Zimmerman reported briefly on 9th TAC's MEW performance; pointing out that considerable integrity of control had been established at the MEW, but that a certain amount of FCC and FDP antagonism still existed. Rolly reported on the SCR-584 CSB program. They have had, he estimated, about 50 level-bombing missions among the six units since January 1. No PRU's yet. Over-all performance is much improved.

Talked with Pree and Capt. Harvin, R/O of 422nd NFS under Col. O. B. Johnson. Harvin has generally been described as one of the most cooperative Radar Officers. Pree's SCR-720 landing set is working out fairly well, but the field is looking forward to receiving the MPN-1. SCR-720 equipment is still confused by supply snarls which he hopes to straighten out when he returns to the USA.

The Russians today are reported to be over the Oder River in strength at two points 150 miles apart. The German radio has declared that the zero hour for Berlin has arrived. Nearest Russians are 32 miles away. General Bradley has resumed command of the 1st Army, temporarily assigned to Montgomery last December. The 1st Army has penetrated almost through the Siegfried Line at the region east of Aachen.

Thursday
February 8, 1945

To 9th TAC HQ after breakfast with Dick and walked about Verviers. Talked with Col. Blair Garland regarding microwave beacons, MEW, CPS-4, X-Y plotting boards, and relay radar. To Gen. Pete Quesada's office, where some of the above items were once more discussed. There is general agreement that relay-radar would be extremely helpful. The proposed MEW operations room arrangement was shown to us in which a secondary FCC is built adjoining the usual MEW operations set-up. Gen. Quesada proposed to transfer considerable executive decision to the MEW, but must maintain the FCC and over-all supervision at his headquarters. Today 9th Bomb Division had planned an unusual part-Oboe, part-MEW mission in which the dropping point would be given by the MEW and the direction by one leg of the Oboe. This mission was scrubbed because visual conditions prevailed. There is considerable interest which could be further developed in the means of enhancing MEW range either by using a big dish or by higher power.

To Liege with Gen. Quesada for lunch at the former FCC headquarters in the "Ecole pour Jeunes Filles". Quesada discussed his theory of high-power brutal break-through in which a high concentration of tanks, air-borne troops, and infantry with heavy air-force bombardment out in front would romp through the German front-line with high initial losses, but negligible losses later on. Ground-force policy is now dictated by old men dedicated to slow pace, minimum daily losses, and other conservative, but ultimately costly techniques. The air force is more willing to take high initial losses, as exemplified by the first Ploesti raid.

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2-8-45 cont.

Proceeded on to the MEW, where we met Maj. Godfrey, C/O, and Capt. Miller, Chief Controller. The site is out in an open field and has been attacked by two aircraft. The two Type 13 height-finders are very conspicuous. A general atmosphere of alert effectiveness prevailed. Four B-scopes are on the lower beam, one PPI on the upper. Seven PPI's are used for controlling. Ninth TAC has 8 groups now, including one night-fighter and one photo-reconnaissance unit, and has some 29th TAC controllers who are providing interim aid to the two groups of 29th TAC.

In a recent MEW exploit in which six enemy fighters were shot down, the MEW controlled a squadron of our fighters which were flying between cloud layers. The enemy flight was proceeding unconsciously along underneath. Our fighters were vectored into position, told to drop through, and came out 4000 ft. behind them with a 3000 ft. altitude advantage.

The MEW is their best navigational aid, gets them to the target, directs additional planes to large targets, and gives them good vectors back to the airport. During the break-through, navigation was exceedingly difficult because of the snow-covered terrain. The break-through region could be traversed by plane in five minutes Typical MEW conversation: "Am I over friendly or enemy territory?" "You are over friendly. Go ten miles on heading 260." "I see trucks and tanks, but cannot tell whether they are ours or enemy's." "They are enemy." etc.

One of the pilots had developed an exaggerated idea of Marmite One's abilities. He was on a level-bombing mission, and the controller said, "You'd better watch out for flak." At that moment - BANG! BANG! There was the flak!

Drove back to Spa, arriving at 6:30 p.m. General Quesada lives in the sumptuous former residence of a French collaborator. Met Fulton Lewis, radio commentator, and William Randolph Hearst, Jr. Excellent dinner. Discussed Eliot Roosevelt's "woolly dog" incident, the Henry Wallace affair in which FDR nominated Henry as Secretary of Commerce in place of Jesse Jones, German's will and ability to wage war, the American attitude toward the war and production capacity, the lack of fighter planes, etc. Among humorous items which developed during the evening was Lewis' story about the negro preacher in the Dust Bowl who prayed for rain. The story finishes: "Lord, it is true we had a drought. Lord, it is true that we prayed for rain. Lord, it is true that you sent us rain. But, Jesus Christ, Lord, this is ridiculous!" General Quesada's story about his mother's negro maid was also amusing: "Hallo, yassum, it sho' am," turned out to be the maid's answers to the operator's "Hello, is this Mrs. Quesada's home? New York, long distance." General Quesada's story of the time of the Stalin-Churchill-Roosevelt peace conference also brought some laughs. Anthony Eden, pale-faced and serious, proposed that, in order to insure an enduring peace, the Pope be invited to attend. Stalin grunted, "Pope? Pope? How many divisions has he got?"

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Friday
February 9, 1945

Further talk with General Quesada in which he expressed appreciation for BBRL assistance, without which he said 9th TAC could not have gotten along. He affirmed his willingness to try out Window-filled mortar shells, though with the present limitations to under 3,000 ft. altitude, it does not appear as though they could contribute much in this hilly country with an advancing front.

With Rolly Larson went out to the SCR-584 site two miles from Verviers. There is a 50 sq. ft. extension on the van. The IFF (SCR-184) is not being used to any real extent; it would be more effective with a selsyn tie-in to SCR-584 antenna. The VHF DF set has proved best for location and identification of the controlled flights. Larson reports little difficulty with identification now. Ninth TAC has run about 50 level-bombing ("pickle-barrel") missions, about 300 navigational-aid missions with SCR-584. General Quesada declared he will keep SCR-584 close to front line in any advance. The set, however, has become more unwieldy. Larson estimates six hours required to take down and put up the unit, exclusive of moving time.

We were held up by a convoy midway between Eupen and Aachen en route to the 8th AF MEW. Roads are badly torn up by a combination of heavy traffic moving toward the new offensive and the spring thaw. It was raining and sleeting. The 8th AF flew over Verviers at noon over the overcast on a bombardment mission to Frankfort, Leipzig, etc.

We arrived at the 8th AF MEW site between Aachen and Maastricht at 3:30. Major Rohnstedt, Capt. Jim Loving, and Logan Belleville were there. The oustanding news was of the first Rosebud beacon flight against the newly installed MEW beacon kit. This program is one day ahead of the schedule set up at the Pine-tree meeting last January. The beacon test was successful: A Rosebud-equipped P-51 was tracked at 24,000 ft. to 185 miles in a relatively unfavorable direction. The beacon shows up as a 5° arc. All the 9 PPI's are wired for video mixing of the beacon and radar signals--or separate. It was stated that all of the 6 fighters to be outfitted for Rosebud are completed. The only difficulty was interference from the Type 13. This was subsequently eliminated by replacing the magnetron. Major Rohnstedt described the method of controlling fighter groups on escort, free-lance, and armed reconnaissance work. On ground-strafing attacks, the planes under control often disappear because of low altitude and reappear 75 miles away. The beacons will help in relocating and identifying them. Eighth AF regards bomber direction as of high priority, and plans are to enlarge ops rooms for PPI control of the bombers. Beacons will be necessary because of Window.

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2-9-45 cont.

To Maastricht to visit 29th TAC HQ. Met Colonel R. C. Maude, Colonel Dyke Meyers, General Nugent, and Major Burr. Attended evening briefing. The Canadians and English have made small advances, and there is general pushing along the entire front, with no maximum effort as yet. The Russians have increased their bridgeheads over the Oder. The GAF now has 725 single-engine fighters and 150 jet planes. Manila in the Philippines has been cleared of Japanese.

Colonel Meyers--the last to get an SCR-584 CSB unit--is the first to get a PRU of level bombing. We will see the photos tomorrow.

Coffee and doughnuts with Dick and Major Burr, while we discussed Harvard business school for later and general post-war plan. Was billeted at the Hotel de la Bourse.

Saturday
February 10, 1945

Breakfast with Colonel Maude and others. Discussed with Maude and later with Major Burr the X-Y plotting board, CPS-4, and air-borne beacon program. Drove with Dick to Verviers, arriving at 12 noon. Many convoys were passed, and large food and ammunition dumps crowded the roadside. Enjoyed a steak dinner in a "brown market" restaurant with Bill Cowart, Dave, and Dick. At Frontier, HQ of the 516th SAW Battalion, Bill Cowart discussed the extensive use of the SCR-584 CSB units which 9th TAC is making. There have been 300 controlled-squadron missions since October. About one-half of these were level-bombing operations. With Dave drove from Verviers through the counter-attack country passing through Houfaliz and Bastogne. This entire region was thoroughly devastated. The pinetree forests were shredded of their branches, and dead animals, burnt-out tanks, and--I was later told--dead Germans were still abundantly scattered about. The desolation in the forests was an example of the greater effectiveness of the low-bursting proximity-fused artillery fire.

Arrived at Spitfire HQ at Luxembourg about 6:00 p.m., and said "hello" to Colonel Brown and Major General O. P. Weyland. After dinner Johnny Faulkner took us to billet at the private home of the Beaujens, where he had stayed for some months. Their hospitality, stories of the German occupation, their little daughter Irene, the chance to talk German (which they preferred to Luxembourger or French)--all were very enjoyable, and we chatted until 11:00 p.m. The next day was Fastnacht, and a big yeast form cake was served with wine. Mr. Beaujens told of the German political course which he was compelled to take because he held a government office. In Luxembourg the food situation is fair during the occupation. No taxes were levied, but a large variety of miscellaneous collections were substituted. They were greatly relieved to get rid of the Germans and delighted with the arrival of the Americans, who came in one week after the Nazis evacuated.

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D810.S2.T78. A War Diary, 1944-45. John G. Trump, 1973.

Action Explodes on West Front as Canadians Move Into Reich



The Western Front yesterday: Canadians renewed the Allied offensive southeast of Nijmegen. First Army forced the West Wall southeast of Aachen and between Schleiden and Gemund. Third Army attacked from Prum to Echternach. In Alsace, German resistance collapsed south of Strasbourg and Franco-American troops closed up along the Rhine.

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Sunday
February 11, 1945

To 19th TAC HQ, where we talked with John Faulkner, and then had an hour-and-a-half session with Major General O. P. Weyland. He described 19th TAC's activities in the battle of the bulge, their present methods of radar control, the shortage of fighter and fighter-bomber planes, and his impatience with the conservative progress of the Army. Von Rundstedt's offensive on December 18 resulted in the cancellation of the offensive in which Weyland and Patton were to figure prominently and which had been scheduled to begin on December 20. Weyland was interested in the JB-2 program, which he thought would be useful next fall if the war lasted that long--which he doubted.

Dave and I then went on to "Lucky", 3rd Army HQ, for an interview with Lt. Gen. George Patton. In a manner which was reminiscent of my visit to Russia, we had to run a gauntlet of aides and the chief of staff, finally ending up before "Blood and Guts" himself. After a half hour's discourse, we were invited to Sunday dinner. Drove in his machine-gun-equipped jeep with the characteristic "burp" horn through the drizzly streets to one of the finest homes in Luxembourg, which had been the German embassy. The dinner was preceded by cocktails and finished with cigars. Our visit lasted until 3:00 p.m. I was impressed right down to the ground. General Patton was older than I had thought, very much alive, a soldier-philosopher. He has studied the ancient wars of the Greeks and Romans, and has the largest Napoleona in the Army. His conviction that wars must be won by infantry did not prevent him from paying tribute to General Weyland's magnificent air support. He told of how General Weyland had protected his 450-mile flank during his end run through France last August. His "sixth sense" then had told him the enemy would not attempt to cross the Loire. Patton is anxious to get going. "An army of 350,000 loses 8,000 men a week through normal attrition." At the present moment the offensive is delayed entirely by the problem of supply. Roads in Holland and Belgium are bad, but the German roads with better base are in good condition. A short spell of dry weather will be sufficient to get things started. Patton stated that AAF claims are exaggerated by a factor of 5 to 1. He believes the next war will come soon. "I won't tell you whom with, but I think you know."

To 19th TAC HQ, where we had a short talk with Major Dixon and Lt. Col. O'Hara. Later, in a discussion with Col. Ferguson, A-3, he admitted that AAF claims are high, but pointed out the difficulties: On being strafed, the Germans immediately throw a smoke pot on the vehicles, which gives the impression that they are burning fiercely. In bombing railroads, dirt is often thrown over the tracks by near hits, giving the appearance of a rail cut. Ferguson described the passive defense measures which were recently tried out at A-82 in anticipation of another enemy raid like that of January 1. Smoke pots placed up-wind covered the field in four minutes. The search set on the MPN-1 gave the first warning in the practice maneuver.

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LIEUT. GENERAL GEORGE PATTON set the unprecedented record of being *Time*'s cover twice in four months, April 12 (*above*) and July 26, 1943. The reason was the U. S. hunger for a conquering American general. Whatever his faults, Patton became that. He almost made it at Kasserine Pass and Faïd Pass, and certainly was the conqueror in Sicily. Later he was to fall from grace and into obscurity. But his real professional ability was untarnished. Suddenly he came out fighting in the Battle of France to win a brand-new military reputation.

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2-11-45 cont.

To Longwy, where we looked over 19th TAC's MEW. Ed Miller was on hand. It is a good site with excellent low cover and moderate dispersed permanent echoes. At the time, cloud echoes were shown out to 60 miles. Ed showed us his close-control gadgetry including plotting board, timer, precision B scope, VPI attachment to give range in azimuth extrapolations.

Left at 7:30 p.m., drove 220 miles through sheeted rain and winds to Paris, arriving at 4:30 a.m.

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Big 3 Talks End With Vow To Smash Nazi War Staff

Conferees Met at Port In Crimea

The Stars and Stripes U.S. Bureau

NEW YORK, Feb. 12.—Comprehensive plans for the final defeat of Germany, her occupation and disarmament, including a vow "to break up for all time the German general staff," were announced last night by the "Big Three" in a communique from Washington.

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Text of Big Three Statement

The following statement is made by President Roosevelt, Prime Minister Churchill and Marshal Stalin on the result of the Crimea conference:

We have considered and determined military plans of three Allied powers for final defeat of the common enemy. Military staffs of the three Allied powers have met in daily meetings throughout the conference. These meetings have been most satisfactory from every point of view and have resulted in closer co-ordination of the military effort of the three Allies than ever before.

The fullest information has been interchanged. Timing, scope and co-ordination of new and even more powerful blows to be launched by our armies and air forces into the heart of Germany from east, west, north and south have been fully agreed upon and planned in detail. Our combined military plans will be made known only as we execute them, but we believe that the very close working partnership among the three staffs attained at this conference will result in shortening the war.

Meetings of the three staffs will be continued in the future whenever the need arises. Nazi Germany is doomed. The German people will only make the cost of their defeat heavier to themselves by attempting to continue hopeless resistance.

Each of Three Powers To Occupy Part of Reich

We have agreed on common policies and plans for enforcing unconditional surrender terms which we shall impose together on Nazi Germany after German armed resistance has been finally crushed. These terms will not be made known until the final defeat of Germany is accomplished. Under agreed plans, the forces of the three powers will each occupy a separate zone of Germany. Co-ordinated administration and control has been provided for under the plan through a central control commission consisting of the supreme commanders of the three powers, with headquarters in Berlin.

It has been agreed that France should be invited by the three powers, if she should so desire, to take a zone of occupation and to participate as a fourth member of the control commission. Limits of the French zone will be agreed by the four governments concerned through their representatives on the European Advisory Commission.

It is our inflexible purpose to destroy German militarism and Nazism and to ensure that Germany will never again be able to disturb the peace of the world. We are determined to disarm and disband all German armed forces; break up for all time the German General Staff that has repeatedly contrived resurgence of German militarism; remove or destroy all German military equipment; eliminate or control all German industry that could be used for military production; bring all war criminals to justice and swift punishment and exact reparation in kind for destruction wrought by Germans; wipe out Nazi party laws, organizations and institutions; remove all Nazi and militarist influences from public offices and from the cultural and economic life of the German people; and take in harmony such other measures in Germany as may be necessary to the future peace and safety of the world.

It is not our purpose to destroy the people of Germany, but only when Nazism and militarism have been extirpated will there be hope for a decent life for Germans and a place for them in the comity of nations.

Damage Commission Will Be Established

We have considered the question of damage caused by Germany to the Allied nations in this war and recognize it as just that Germany be obliged to make compensation for damage in kind to the greatest extent possible. A commission for compensation of damage will be established. The commission will be instructed to consider the question of extent and methods for compensating the damage caused by Germany to Allied countries. The commission will work in Moscow.

We are resolved upon the earliest possible establishment with our Allies of a general international organization to maintain peace and security. We believe that this is essential both to prevent aggression and to remove political, economic and social causes of war through close and continuing collaboration of all peace-loving peoples. Foundations were laid at Dumbarton Oaks. On the important question of voting procedure, however, agreement was not there reached. The present conference has been able to resolve the difficulty.

We have agreed that a conference of the United Nations should be called to meet at San Francisco, in the United States, on April 25, 1945, to prepare the charter of such an organization along the lines proposed in informal conversations at Dumbarton Oaks.

France, China to Get Invitations to Conference

The Government of China and the Provisional Government of France will be immediately consulted and invited to sponsor invitations to the conference jointly with governments of the United States, Great Britain, and the U.S.S.R. As soon as consultation with China and France has been completed, the text of proposals on voting procedure will be made public.

We have drawn up and subscribed to a declaration on liberated Europe. This declaration provides for concerting policies of the three powers and for joint action by them in meeting political and economic problems of liberated Europe in accordance with Democratic principles.

Seek to Solve Problems By Democratic Means

The Premier of the URSS, the Prime Minister of the U.K. and the President of the U.S. have consulted with each other in the common interests of the peoples of their countries and those of liberated Europe. They jointly declare their mutual agreement to concert during the temporary period of instability in liberated Europe policies of their three governments in assisting peoples of Europe liberated from domination of Nazi Germany and peoples of former Axis satellite states to solve by democratic means their pressing political and economic problems. Establishment of order in Europe and rebuilding of national economic life must be achieved by processes which will enable liberated peoples to destroy the last vestiges of Nazism and Fascism and to create democratic institutions of their own choice.

This is the principle of the Atlantic Charter: "The right of all peoples to choose the form of government under which they will live, restoration of sovereign rights and self-government to those peoples who have been forcibly deprived of them by aggressor nations. To foster conditions in which liberated peoples may exercise these rights, the three governments will jointly assist the people in any European liberated state or former Axis satellite state in Europe where, in their judgment, conditions require: Firstly, to establish conditions of peace; secondly, to carry out emergency measures for relief of distressed people; thirdly, to form interim governmental authorities broadly representative of all democratic elements in the population and pledged to the earliest possible establishment through free elections of a government responsive to the will of the people, and fourthly, to facilitate where necessary the holding of such an election.

'Big Three' to Consult Other United Nations

The three governments will consult other United Nations and provisional authorities or other governments in Europe when matters of direct interest to themselves are under consideration. When in the opinion of the three governments conditions in any European liberated state or any former Axis satellite state in Europe make such action necessary they will immediately consult together on measures necessary to discharge joint responsibilities. By this declaration we reaffirm our faith in the principles of the Atlantic Charter, our pledge.

In issuing this declaration, the three powers express the hope that the Provisional Government of the French Republic may be associated with themselves in the procedure suggested.

We came to the Crimea conference resolved to settle our differences about Poland. We discussed fully all aspects of the question. We reaffirmed our common desire to see established a strong, free, independent and democratic Poland.

As a result of our discussions, we have agreed on conditions in which the new Polish provisional government of national unity may be formed in such manner as to command recognition by the three major powers. The agreement reached is as follows: A new situation is created in Poland as a result of her complete liberation by the Red Army. This calls for establishment of a Polish provisional government which can be more broadly based than was possible before the recent liberation of western Poland. The provisional government which is now functioning in Poland should therefore be reorganized on a broader democratic basis with the inclusion of democratic leaders from Poland itself and from Poles abroad. The new government should be called the Polish Government of National Liberation.

Molotov, Harriman and Sir Archibald Clark Kerr are authorized as a commission to consult in the first instance in Moscow with members of the present provisional government and with other Polish democratic leaders from within Poland and from abroad, with a view to reorganization of the present government along the above lines.

This Polish provisional government of national unity shall be pledged to the holding of free and unfettered elections as soon as possible, on the basis of universal suffrage and the secret ballot. In these elections, all democratic and anti-Nazi parties shall have the right to take part and put forward candidates.

When the Polish provisional government of national unity has been properly formed in conformity with the above, the government of the USSR, which now maintains diplomatic relations with the present provisional government of Poland, and the government of the United Kingdom and the government of the United States will establish diplomatic relations with the new Polish provisional government of national unity and will exchange ambassadors, by whose reports the respective governments will be kept informed about the situation in Poland.

The three heads of government consider that the eastern frontier of Poland should follow the Curzon Line, with digression from it in some regions of five to eight kilometers in favor of Poland. They recognize that Poland must receive substantial accession of territory in the north and west.

They feel that the opinion of the new Polish provisional government of national unity should be sought in due course on the extent of these accessions and that the final delimitations of the western frontiers of Poland should thereafter await the peace conference.

Will Recommend Placing Tito-Subasic Pact in Effect

Yugoslavia: We have agreed to recommend to Marshal Tito and Dr. Subasic that the agreement between them should be put into effect and that a new government should be formed on the basis of that agreement.

We also recommend that as soon as the new government has been formed it should declare that: firstly, the Anti-Fascist Assembly of National Liberation (Avnoj) should be extended to include members of the last Yugoslav Parlament (Skupshina) who have not compromised themselves by collaboration with the enemy, thus forming a body to be as a temporary parliament; and, secondly, legislative acts passed by the Assembly of National Liberation will be subject to subsequent ratification by the constituent assembly.

There was also a general review of other Balkan questions.

Meetings of the Foreign Secretaries: Throughout the conference, besides the daily meeting of the heads of governments and the foreign secretaries, separate meetings of the three foreign secretaries also have been held daily.

These meetings have proved of utmost value and the conference agreed that permanent machinery should be set up for regular consultation between the three foreign secretaries. They will therefore meet as often as may be necessary, probably about every three or four months. These meetings will be held in rotation in three capitals, the first meeting being held in London after the United Nations Conference on world organization.

Determined to Continue Unity of Purpose, Action

United for peace as for war: Our meeting here in the Crimea has reaffirmed our common determination to maintain and strengthen, in the peace to come, that unity of purpose and of action which has made victory possible and certain for United Nations in this war. We believe that this is a sacred obligation which our governments owe to our people and to the peoples of the world.

Only with continuing and growing co-operation and understanding among our three countries and among all peace-loving nations can the highest aspiration of humanity be realized—secure and lasting peace which will, in the words of the Atlantic Charter, afford assurance that all men in all lands may live out their lives in freedom from fear and want.

It is considered that victory in this war and establishment of the proposed international organization will provide the greatest opportunity to create in years to come the essential conditions of such peace. Signed: Winston Churchill, Franklin Roosevelt, J. V. Stalin.

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Monday
February 12, 1945

Tuesday
February 13, 1945

Spent both days at ASB. The Germans have blown the Rohr River dams, and the Canadian-English offensive is therefore checked for the time being. The Russians are reported to have amassed armies for new offensives.

Discussed rotation of ASB staff with Ray, in which departure dates and replacements for Ed Miller to return the end of March, for Bob Tobey to go to MAAF, and for Len Hartman and others. Ray Herb would stay until June, at which time I am urging him to return for six weeks' visit. Ray and Hugh left for a trip on Tuesday to 8th AF MEW and elsewhere, and I shall hold the fort at ASB until their return.

Wednesday
February 14, 1945

Presented to Gen. Curtis a request for a new blanket authorization to cover the facilities and services required for the operation of the ASB. This was spelled out in a well-considered memorandum and is intended to consolidate our present position, provide us with ten additional vehicles and increase our permanent billets from twelve to thirty. General Curtis agreed to implement this request.

Talked with Col. Maxwell about a T/O for the Army personnel of ASG. The main argument developed over the request for a 1st and 2nd Lieutenant in the T/O for the RADAR correspondent function. I indicated that this work required an officer rating and that it was my intention to recommend the promotion of Sgts. Caldwell and Carlson as a distinctly second step after the T/O had been set up. I also recommended strongly that the T/O proposed by Capt. Crawford, who heads up the new RPD program, be set up within the D/Ops rather than elsewhere. Finding that he was disposed to accept the recommendation of his staff on this point, I discussed the matter in a short meeting with Major Guillou, Capt. McGinty, Major Sherwin, and Capt. Crawford, and left them in full agreement.

In the afternoon at ASB, discussed the secretarial set-up and responsibilities, and wrote a memorandum on this subject in anticipation of the arrival of new members.

Last night the RAF dropped 4000 tons of bombs on the center of Dresden. Today was one of the biggest AF days, a total of 8500 sorties having been flown by the combined Allied AF's.

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Mighty Naval Forces Open Attack on Tokyo



Stars and Stripes Map by Baird

Driving within 75 miles of Berlin, Marshal Koniev's armies yesterday captured Sommerfeld. In his westward push toward Dresden, his units were reported at Goerlitz.

Planes Launched By Carrier Fleet Near Jap Coast

U.S. PACIFIC FLEET HQ., Guam, Feb. 16 (Friday).—The American Navy today opened its first full-scale attack of the war on Japan with carrier planes, Adm. Chester W. Nimitz announced in a communiqué this morning.

A powerful task force, moving boldly into Japan's home waters, sent raiders against Japanese airfields and other military targets "in and around Tokyo," the communiqué said.

The text of the communiqué said that the "operation had long been planned and the opportunity to accomplish it has fulfilled the deeply-cherished desire of every officer and man in the Pacific Fleet."

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Thursday
February 15, 1945

Major Jim Rand, who is not busy at USSTAF because the CCB turned thrumbs down on the Willie Orphan project, brought in Leo Stanfield of the Remington-Rand Typewriter Company of Paris to discuss getting French company assistance on small model-shop jobs. I later proposed to Jim that he use his time by plugging the use of the 584 for mortar-fire location.

Friday
February 16, 1945

On the teletype spelled out the interest of the TAC's in relay radar, summarized the current situation on mortar-fire location with the SCR-584, and asked General McClelland for information on the availability of the APG-1 (AGL-1) for use in 1st TACAF night-fighters in place of the SCR-720.

Saturday
February 17, 1945

To Versailles in the afternoon with Major Rand. Discussed the mortar-fire problem with Col. Lack and Art Warner. Some reticence developed on Art's part toward having Rand on the mortar-fire problem, but it is agreed that he will expedite the production of the automatic recorders which ASB is designing. He will also proceed to 9th TAC with 100 Window-filled mortar shells to lay on a field experiment as has been agreed upon with General Quesada. Met Gen. McCroskey, Deputy Commanding General of the Passive Defense Section, G-3, SHAEF.

Sunday
February 18, 1945

To SFR in the morning. Worked on cables, got caught up on intelligence reports, etc. After mess returned to SFR with Louise, walking past the Bois de Monceau, Place de Trocadero, through La Musee Ancienne Francaise, along the banks of the Seine (Rue de Tokyo), where we noticed that the flood waters were fast receding. We were particularly intrigued by the Sunday-promenading Parisians, the patient "pecheurs", and other vignettes of Paris life on Sunday afternoon.

Monday
February 19, 1945

To Widewing for talk with Capt. Hagenbach, Countermeasures, D/Ops. For the past three weeks enemy countermeasures on Gee have been much more effective. For the first time, synchronized jamming, giving the effect of spurious signals, is being used. Information has been intercepted to the effect that the German Horchregiment is well aware of all radar which is used in TCC operations, including Rebecca-Eureka

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and SCR-717 and their frequencies. The latter was accurately catalogued as to wavelength, repetition rate, and other characteristics on December 5--more than six months after it was first used by 9th TCC.

Capt. Hagenbach is processing the new authorization for ASB, which is now revised slightly to include more adequately the ABL-15 requirements.

Talked with Major McGinty and Col. Snider on RPD. A very good job has been done of preparing a buck-slip recommendation that RPD be organized within D/Ops. Snider was provided with the background in order that Gen. Fred Anderson's approval may be assured. (Subsequently it was learned that this proposed T/O was some days later authorized.)

Tuesday
February 20, 1945

Our friend, Col. "Bid" Dolan, is among his gods. Returning to the ETO in the first Eagle-equipped B-24, he was in radio contact with Gander, Newfoundland, and approaching for a landing. After days of search no evidence of any crashed plane was found. A following plane stated it had seen a flash in the sky. Col. Dolan's energetic and forceful thinking about radar in the 8th AF has contributed so much during the past five months that it seems impossible to think of an adequate replacement. Dave Griggs has gone to Pinetree to discuss the Eagle and Shoran programs.

Talked with Ernie Lyman regarding the status of the CSB program. There is still an inadequate amount of information regarding the accuracy and operational usefulness of level-bombing missions. It was suggested that checks on SCR-584 CSB accuracy could be made at Malvern using one of 8th AF's SCR-584's for assessment. This problem, however, should not be undertaken lightly and perhaps can be best performed by initiating more effective PRU work in the theater and by referring this general problem to the AAF Board.

Al Albrecht called in from A-78, where he is setting up the GCA equipment and awaiting the crew. So far, the MPN-1 on A-82, operating with an improvised crew consisting of Al, Bert Fowler, Lt. Bryant, and his three corporals, has made a number of emergency landings.

Two P-61's and one flight of P-51's were landed using the search equipment alone. One C-47 in great extremity was landed with full GCA control. The other day, Fowler and one of the corporals, using search equipment, landed a B-26 through a 100 ft.ceiling with one-half mile visibility. We are advised that the three MPN-1 crews are due to arrive in the UK on February 25. The original arrival date was November 15.

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2-20-45 cont.

Dinner with John Chase at the Mess, during which we discussed a variety of subjects including steps to be taken on termination of the war. John has been endeavoring to make arrangements for the Signal Corps to take over all remaining property and materials of the two laboratories at that time.

Wednesday
February 21, 1945

Col. Art Warner arrived with Brig. Gen. McCroskey (SHAEF Passive Air Defense). In the course of our conversation, it was learned that Arnold's original cable to Eisenhower on the JB-2 program had been referred to the Air Defense Division, and the reply which put the quietus on the program had been framed primarily by Maj. Gen. Cameron. Dave Griggs' letter reopening the issue had gone down the same channel, and a reply which would have the same effect was in process. This reply would emphasize the present experimental nature and somewhat unsatisfactory state of the development, particularly with respect to launchings. Gen. McCroskey was impressed with both the forward-looking character of the JB-2 program and the impropriety of having a purely American development killed by purely British opinion.

Drove out to Widewing and talked with Sgts. Carlson and Caldwell regarding their RADAR Magazine program. Carlson will next take on the 8th AF MEW with air-borne beacon, and Caldwell will cover the SCR-584 CSB story.

In the evening, Abe Collier, Kay Downing, and Larry Henderson arrived in Paris.

Thursday
February 22, 1945

Discussed with Mr. Lower, Paris manager of LIFE Magazine, the possibility of securing a LIFE photographer for work with the RADAR Magazine correspondents. This will be put into effect on a temporary basis as soon as New York approval is obtained.

With Larry Henderson went over the manpower requirements in the MTO. After all the fanfare, including Lee DuBridge's letter on the subject which Larry had brought over, his requirements were modest. Bob Tobey is to go to MAAF to work with 22nd TAC on their MEW and other ground radar problems. This MEW is shortly to be moved to a site which overlooks the Poe Valley. Bob will assist in a general way on their SCR-584 CSB program, though we shall look about for someone to help more specifically on this. Arrangements are now being completed to send three APS-15 men from 8th AF to MAAF to be followed by two men. Philco APS-15 men are finally coming through from the States. A few other minor personnel arrangements were made. It was agreed that Larry would process his manpower requirements through BBRL and that we would keep in closer communication with each other by report, letter, and cable.

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FEBRUARY 22, 1945

Third Army Fighting in Saarburg, Gains 8 Miles, Takes 23 Towns; Resistance Stiffens on Iwo Jima

Third Marine Division Is Landed to Reinforce Beachhead on Island

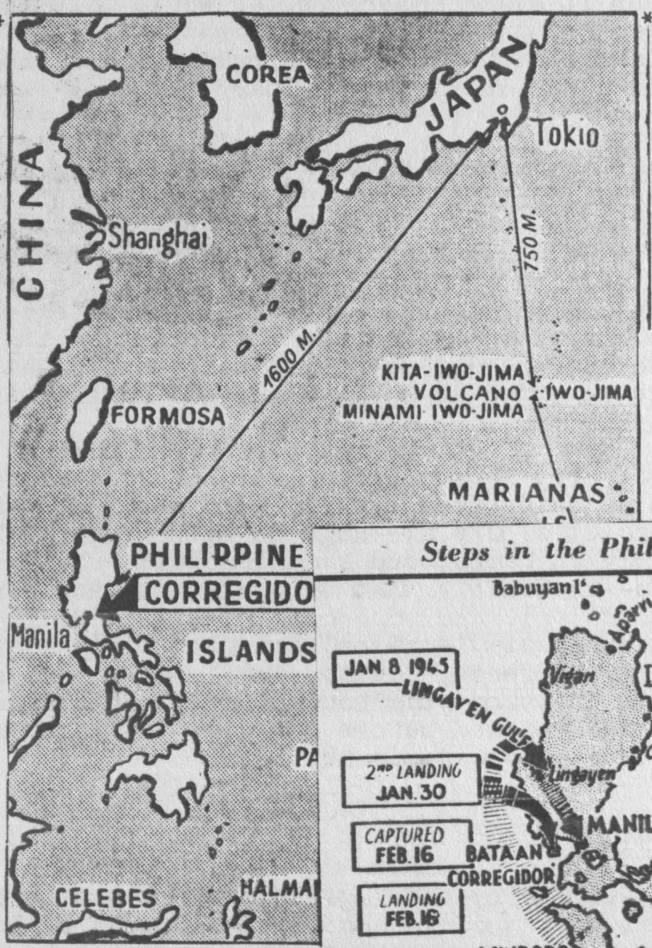
3,500 Americans Killed or Wounded

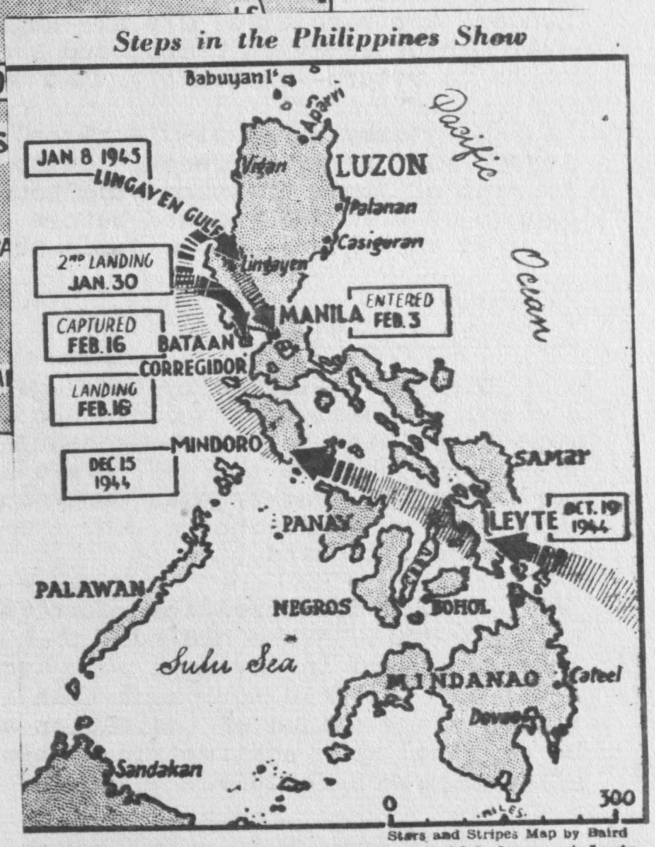
Japanese Exacting Heavy Toll in Airfield Battle

Patton's Troops Driving For Junction of Saar And Moselle Rivers

Industrial Center Of Trier Menaced

Nazis, on Run, Pounded By Heavy Air Attacks





Stars and Stripes Map by Baird

MacArthur's drive to free the Philippines, which began at Leyte last October, picked up speed with the start of the new year.

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Friday
February 23, 1945

Walked along the banks of the Seine with Dave, discussing the Eagle and Shoran programs. Dave is all fired with the desirability of 8th AF acquiring Shoran on a modest basis to hit tactical targets. In the long run, this would certainly be a good thing with the high operational phase of the war as close upon us as it is, but it is problematical whether Shoran is likely to help during the next four months more than it might interfere. I would like to see Shoran compared with Micro-H and Gee-H because for the first time a radar tactical system is almost devoid of instrumental deficiencies, leaving operational and human factors as primary cause of inaccuracies.

Yesterday Roger-Clarion was put into effect for the first time in air history. The 8th AF flew in low with a minimum of fighter escort and came out almost on the deck, strafing communication targets with machine-gun fire. The TAC's for the day practically abandoned their role of close support to the ground forces and roamed the length and breadth of Germany, striking at the communication network. This astounding tactical attack by all categories of aircraft resulted in no considerable losses, thereby revealing that the German air force could be regarded as having ceased to exist. In history this day may be regarded as marking the end of the war---certainly the end of the air war.

Drove with Larry Lawrence, Louise, and Hugh Kendall to Villa Coublay, where we said "good-bye" to Hugh and took off at 3:15 for London, arriving at 6:30 p.m. Hugh is returning to the US for several months early in March, and I am to spell out the job to which he is to return--presumably that of backing up Ray Herb.

Met Gerry Tape, Jim Dennison, and Dick Woodward at Symonds House. Gerry, Jim, Larry Lawrence, Louise, and I had dinner at a French restaurant of Jim's choosing--the Boulestin. We had a most excellent dinner of wild duck cooked before our eyes in flaming port, while we enjoyed the antics of one James Dennison.

Saturday
February 24, 1945

Discussed with Gerry the Eagle and Micro-H programs at 8th AF and the proposal to introduce Shoran on a modest scale. Eagle is rapidly falling behind the schedule which had originally been set up--partly because the B-17's are leaving the modification center early in April rather than early in March. A training program is being set up at Alconbury, and the situation in the theater is relatively well in hand.

We also discussed the relative merits of Shoran and Micro-H, agreeing that Shoran had much to offer in providing high resolution indication and in having a more accurate computer, as well as more generally reliable equipment than is now available for Micro-H. Ultimately the method of indication and the computer of Shoran should be combined with centimetric system such as Micro-H possessing the H2X navigation feature.

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2-24-45 cont.

Dick Woodward reported that during the past four days SS Loran has been jammed over a wide area extending from 8° to 13°. Woodward had pictures showing jamming consisting of 400 cycles with 10 kilocycles superimposed. Subsequently we learned from Woodward and Dyer that a German order had been intercepted to turn on a 1900 kc. station at Hamburgh in which a microphone was to be modulated by noise from a three-bladed fan. The jamming intensity is less than one to one over a considerable area, and it may be possible by improved operator training to read through it. Improvements such as the uses of Gee transmitters for greater power, changing the band width of the Loran receiver from 80 to 25 kc., etc., are being considered.

Walked with Guy Stever, who has just returned from the US. He reported briefly on their K-band program, which is directed primarily at radar bombing applications and on the X- and K-band mortar-fire location work which is being done by the Radiation Laboratory and Bell Telephone Laboratories, respectively.

Called on Dr. Frank of ADI (Science), who confirmed a slightly increased and more effective German jamming effort on Gee. He also stated that evidence of the German use of 10 cm. AI equipment was appearing.

Called on Sir Robert Watson-Watt and discussed the American-British radar programs. Nothing very startling developed out of our conversation. The British would be interested in having a V-beam set for study, and I suggested that one set was likely to come to the theater as a result of 19th TAC's request.

Left London at 1:30 for Malvern via Oxford, where Louise and I stopped by for tea with the Kelley's. We spent a very delightful hour and a half. Arrived in Malvern at 7:30.

After supper discussed the BBRL work with Jules, Jerry, and Gordon Danielson. Everything is moving along in satisfactory shape except the beacon program for 9th TAC. It has as yet been impossible to find suitable positions for the APS-29 antennas on the P-38 and P-47 which 9th TAC has provided. A variety of installations has already been made, and other ingenious ones are being planned. Those tested so far show pronounced sensitivity to aspect and tilt. This problem should have been recognized by the Radiation Laboratory and ARL long ago, and they should have worked out antenna designs for all aircraft in this theater: P-38, P-47, P-51, P-61, B-17, B-24, Mosquito, etc.

Jackson Laslett is now managing the Micro-H program since Leachman is ill. The TRE shop is now performing for BBRL as much work as we do ourselves. Jules sits in on the TRE shop priority committee meetings on Sunday mornings.

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Sunday
February 25, 1945

At BBRL discussed with Jules and Gerry the probabilities of the war and the method of continuing our organization to provide effective civilian radar assistance until the war is completely over. We agreed to plan on the basis of the war's continuing into next fall, and they agreed to carry on for this length of time. Each one, however, is to have a short visit to the States. Halpern is scheduled to leave on May 1, Gerry on June 15. Ray Herb has somewhat doubtfully agreed to this sort of proposition also, and it is the suggestion that he leave for his visit about June 15. It seems to me absolutely essential that Ray have more adequate technical and moral backing, and I have therefore asked that Walt Jordan return, with suggested arrival date of April 15. He would therefore cover BBRL during Jules' absence, and could then carry on for Ray at ASB. My own plans are to leave about April 1. The above has been conveyed in a letter to Lee written this afternoon.

Monday
February 26, 1945

Talked with John Dyer about the German jamming of Gee, SS Loran, etc. None of us is able to conceive why the Germans do not jam our VHF communications. It is understood that they are completely prepared to do this at a moment's notice and could seriously interfere with all of our close-control operations. Ninth Bomb Division has reported jamming of one channel of Oboe Mark II.

Gave a seminar in the Monastery on the general situation of the war and the influence of radar on it.

The afternoon Steering Committee meeting covered the Alconbury training program and the proposed post-graduate course on new gadgets such as Nosmo, Eagle, and Micro-H Mark II; the Micro-H bombing results; Stever's report on K-band policy in America and mortar-fire location developments; etc. Gordon Danielson is concerned over Micro-H. The record has grown worse since November as far as percentage of mission failures is concerned. The figures are roughly as follows:

Period	Failures Due to Micro-H	Other Failures
November	20%	8%
December	28%	10%
January	30%	18%

In the afternoon wrote a letter to Walter Jordan.

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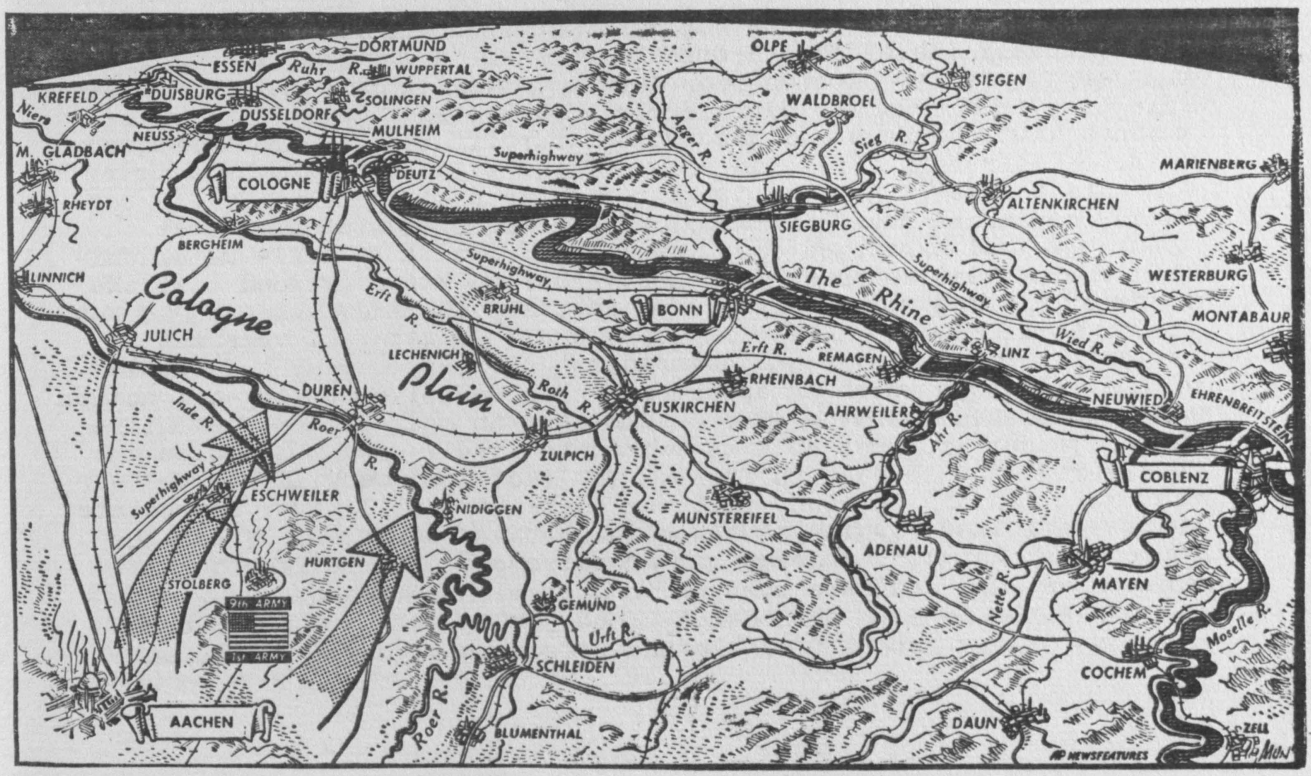
Americans On Plains Of Cologne

Two Armies Open Attack On Fortifications Along Rhineland Approaches

9th Scores Gains Of One to Two Miles

February 24, 1945



February 26, 1945

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Tuesday
February 27, 1945

Left at 8:30 a.m. with Gerry Tape for Pinetree.

With Dave Griggs talked with Gen. Doolittle regarding Shoran. Dave gave an enthusiastic, energetic statement of Shoran accuracy and simplicity. I backed his position, but pointed out some of the limitations and costs of introducing Shoran. Gen. Doolittle stated that he desired a more accurate radar bombing system which could be introduced on an entire air-force scale. He was inclined to view seriously the possibility of Shoran's conflicting with the radar systems already operational. His final decision was to personally fly a Shoran-equipped aircraft down at the Marseilles training base next Thursday.

A meeting was held with Col. Graul, Col. Geerlings, and their associates in which the Shoran program, requirements, capabilities, etc., were discussed. The program at the moment contemplates 40 air-borne and 20 ground equipments. This is sufficient to set up three stations on the western and two on the eastern front and to provide for two combat wings on the basis of six sets for each of six groups. Drove Gerry Tape and Harlan Collar to Oxford since Gerry is to fly down to Marseilles with the Alconbury group for a Shoran inspection tomorrow.

Wednesday
February 28, 1945

Talked with Dave at breakfast in Bid Dolan's room regarding BBRL organizational plans, including my scheduled return.

To the hospital to see Maj. Gen. Orville Anderson. For three hours, mainly one-sided conversation ensued on the operational planning of the 8th AF battles over Germany. Gen. Anderson is convinced that the Germans made a basic error in directing their fighter attacks against bombers and not against our fighters, which were never up to the strength which had been originally conceived necessary for this theater. Had the Germans been able to destroy our fighter cover they could have worn away our bombers by making passes at them until they had exhausted one minute (800 rounds) of tail-gun ammunition which these ships carry. Gen. Anderson was convinced that the Germans lost the war in the air on February 22, and that even on the ground it is now in the mopping-up stage. He was most vehement in his criticism of the ground commanders' strategy during the battle of the bulge, in which an opportunity for decisive cutting-off action had been missed in favor of the squeezing-in operation. The entire German panzer army was able to extricate itself from this melee and be diverted to the eastern front. The fact that we will win the war will mean, in his opinion, that our commanders will never appreciate or be criticized for the mistakes which have been made. I got the impression that Gen. Anderson was an extremely capable fighting man whose heart and soul are steeped in operational tactics and who on the whole had done an exceedingly good job in making the large and unwieldy 8th AF into a flexible and effective fighting instrument.

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2-28-45 cont.

Our conversation was terminated by the appearance of Gen. Doolittle, who propositioned Gen. Anderson before our eyes to return for ten days to the USA to answer Congressional criticism of the 8th AF bombardment of German cities.

I discussed with Gen. Anderson the manner in which EBRL was to work with the 8th AF, suggesting the desirability of Tom Hurrell's reporting directly to him as originally set up, with our other men assigned to the section in which they are most directly concerned. Gen. Anderson agreed to this arrangement and asked that I confirm it in a memorandum.

Dave and I also pointed out the desirability of more dynamic analysis of radar operations, including particularly Micro-H and MEW. We proposed to try to supply a man (Harold Balmer) for this purpose.

Drove Dave to Bovingdon and continued on to London. Talked with Major Sullivan and Col. O'Mara of Technical Intelligence, USSTAF, on current enemy efforts and on post-war intelligence work in Germany on target areas.

During the evening talked by phone with Malvern and Paris, and later with Archambault, Woodward, and Lees.

The ground offensive which opened about ten days ago is continuing at a slow pace. Ninth Army, under Gen. Simpson, is reported 9 miles from Cologne. German troops seem to have less will to resist and are surrendering in small squads. Gen. Patton's forces, pressing toward Bonn, have scored corresponding advances. The ground movement does not yet have the appearance of a break-through, rather that the Germas are withdrawing to the east bank of the Rhine, leaving behind inferior forces to be mopped up.

Thursday
March 1, 1945

To Pinetree to talk with Col. Arps of OAS and Dr. Bailey Price. Col. Arps made a strong bid to have all of EBRL personnel assigned to OAS. This question happily was already disposed of through my talk with Gen. Anderson. I informed him, however, of the effort we were making to have Harold Balmer come to this theater for analysis work.

Price and Lt. Col. Scott gave me some of their accumulated four months' statistics on the contribution and accuracy of radar bombing. (See attached table.)

In the afternoon talked with Maj. Hartbrodt and Col. Geerlings. Col. Geerlings stated the last 12 days have seen the heaviest bombing effort in the history of the 8th AF and that most of it was dependent on radar. Drove to Malvern, arriving at 6:00 p.m., simultaneously with Lt. Comdr. Birkenhead of the Air-Borne Coordinating Group, who has come to make a brief survey of EBRL activities.

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EIGHTH AIR FORCE BOMBING

1 Sept.1944 - 1 Jan.1945

	H2X Sightings				Visual Assist Sightings		
	10/10	8/9	6/7	4/5	8/9	6/7	4/5
Systematic Error							
Range	.08S	.07L	.04L	.47S	.03L	.23S	.38S
Deflection	.34L	.18R	.12L	.56R	.04R	.08R	.09R
Average Error							
Range	1.74	1.13	1.03	1.08	.73	.62	.56R
Deflection	1.25	1.38	1.43	1.08	.73	.69	.36D
Circulation	2.36	2.04	1.91	1.77	1.15	1.04	.74
Percent over 5 Miles	26	17	10	5	5	4	0
Number of Cases	86	151	43	20	69	66	43

Visual Bombing

Forty per cent of attacks fall in "mission failure" class, i.e., less than 5 per cent of bombs of entire force are within 1000 ft.

In these mission failure cases:

34% of squad attacks fall in 3000 ft., AE 0.28 mi.
66% " " " " " " " " 1.75 "
Out of 870 visual missions, 56 (or 6½ per cent) were over 5 miles.

Sixty per cent of attacks were "mission success".

In these mission success cases:

71% of squad attacks fall in 3000 ft., AE 0.20 mi.
29% " " " " " " " " 1.17 "

Total Radar Bombings

3032 squad attacks by H2X
794 " " " G-H
186 " " " Micro-H
1275 " " " visual
5287 Total

Of 3032 attacks:

1864 (or 62%) were under 10/10 cloud.
746 (or 25%) " " 8/9 cloud.
(¼ of these were assists)
285 (or 9%) were under 6/7 cloud.
(½ of these were assists)
137 (or 4%) were under 4/5 cloud.
(2/3 of these were assists)

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EIGHTH AIR FORCE BOMBING (cont.)

BOMBS DROPPED - Jun.1944-Jan.1945

	Estimated Tons		
	Radar	Visual	
June	30.5	28.1	
July	22.7	22.7	
August	2.9	44.8	
September	25.9	14.6	
October	33.7	9.9	
November	39.5	.9	
December	28.0	13.2	
Total	183.2	134.3	317.5
	58%	42%	

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Nazis Crumbling in North

Feb. 28, 1945

Yanks 9 Mi. From Cologne, Nearing Erft River Barrier

By Robert L. Moora
Stars and Stripes Staff Writer

12th ARMY GROUP HQ, Feb. 27.—German resistance approached collapse on most of the Cologne Plain today and there was every indication that the enemy was in a state of rout. Spearheads of Ninth and First Army armor and infantry shot forward more than half-way across the plain. At one point the Americans were only nine miles from the outskirts of Cologne, and at another they had raced 10 miles northeast of the Roer to a point only 20 miles from the Rhine River where it passes Dusseldorf, the biggest city in the Ruhr Valley.



German resistance on the Cologne prain was collapsing yesterday. Yanks were nine miles from Cologne and 20 miles from Dusseldorf.

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1st Crosses

March 1, 1945

Erft at 3 Points

Allied Armies Aim at the Target



Stars and Stripes Map by Baird

Three Allied armies—the Canadian First and U.S. Ninth and First—threaten the Ruhr. Canadians drive southward from Cleve while Ninth forces spear toward Krefeld and Dusseldorf. First Army men are breaking through the last Cologne Plain defenses. The Third Army moves up the Mosel River valley.

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Friday
March 2, 1945

Spent the day in Malvern. Mr. Ratcliffe called to recommend that Dr. Lines be assigned to ASB as TRE liaison man. Lt. Com. Birkenhead was shown the laboratory facilities and was, I believe, impressed with the BBRL program and the value of a laboratory organization in the field.

A report has been received from the Signal Corps Technical Liaison Section on the use of APS-10 (ASD-1) for mortar-fire location. This has demonstrated a range of 40,000 yards on 105 mm. size shells. The way in which it is used to locate the mortar source is ingenious. The sector scan covers 60 degrees and "nod" is removed. The shell signal is therefore noted at a particular position on the Type B presentation, and return fire is so directed that the counter shells pass through the same observed position. It was estimated that this procedure could place counter-fire within 100 yards of the target. Although an approximation method, its speed and simplicity have much to speak for it. However, the range limitation is sufficiently severe so that with Jules Halpern we agreed to discuss the possibility of ASBL developing a large antenna for this application. It is understood that 6th Army Group is acquiring a number of unmodified ASD-1's for this purpose.

Saturday
March 3, 1945

Left Malvern about 10:00 a.m. with Louise for Coventry and Bramhall. Stopped en route at Anne Hathaway's cottage and had lunch at the William and Mary Hotel in Stratford. After dropping Louise off at Coventry, I arrived at Donald and Beryl's home at Bramhall about 5:30. A pleasant evening was spent before the fire after an excellent dinner. Turned in later at the Williamses'. An air raid alarm brought us all down again at 1:00 a.m. It was the first air-raid alarm since the buzz-bomb attack on Manchester on Christmas Eve. No bombs were heard, and the "all clear" was sounded an hour later. I spent the next few hours thinking up some postwar ideas. The air raid later turned out to be combined diver and piloted-aircraft attack on both southern and northern England. Six out of seven divers were shot down by AA fire over the channel. About 80 piloted aircraft participated and did minor damage. Fighter Command was caught napping as the signals were interpreted as divers, and no defense aircraft were sent up to meet them until too late. This renewed British interest in the use of Sambo discriminators.

Sunday
March 4, 1945

Spent a pleasant day with Don and Beryl and the Williamses. Left immediately after dinner for Coventry to pick up Louise. Had high tea with her relatives and then proceeded to Malvern, arriving at 7:50 p.m. Spent the rest of the evening talking with BBRL-ers.

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Monday
March 5, 1945

Conference with S/L Craig, W/C Kemp, and S/L Everitt in which we agreed to assist Fighter Command Training School in conducting SCR-584 tests against beacon-equipped aircraft. The one BUPS-equipped Wellington at Defford will be used, operating against the 100-mile SCR-584 CSB unit next to Building 7 at BBRL. These tests are for the purpose of determining the accuracy with which an aircraft can be positioned. A camera obscura on the ground, as well as aerial cameras, will be used. While awaiting General Pete Quesada's arrival at Defford, Jules and I discussed the problems which concern the termination of BBRL in this theater. These problems do not seem profound. It will be our policy to close down radar programs and return personnel as rapidly as possible as soon as the enemy has collapsed. In special cases, if agreeable, men may be assigned to commands for continuing in training or testing work if so desired or for counter-intelligence work in Germany, but no BBRL organization will be retained to supervise this work. Wrote a letter defining the responsibilities for BBRL termination to Halpern, Herb, Tape, Jeffries, and Collier. On my departure, Halpern will become Director of BBRL, with Tape as deputy and Herb as Director of ASB. Both Halpern and Herb will be made members of the ASG to work with Dave Griggs.

General Quesada, with his usual enthusiasm and vigor, arrived at 4:00 p.m. in a P-47. He was shown the BBRL set-up, its general program, the AEW and MTI films, and in the evening was entertained at the Westminster Arms Hotel. This proved to be a very animated and enjoyable session.

Tuesday
March 6, 1945

Breakfast with General Quesada at the County, during which we discussed the abundant evidence of the rapid collapse of German resistance. Quesada will leave for the States in about 45 days to take on a new assignment, probably with B-29's. I shall arrange to bring him up to the Radiation Laboratory.

General Quesada addressed the BBRL Seminar, at which a considerable number of TRE staff were present. He did a good job in revealing the usefulness of the MEW and SCR-584 in TAC operations. He mentioned what he thought was a decisive phase of von Rundstedt's offensive, in which a German armored column advancing toward Luxembourg, was stopped at Stavelot by repeated attacks from MEW-directed fighter-bombers. In the afternoon we saw a demonstration of SCR-584 control of a beacon-equipped P-47. The plotting was done both on an R,θ and on the X-Y plotting board for the first time. Fortunately, satisfactory tracking was obtained on the beacon, and it appears that a suitable location for the beacon antennas on an operational P-47 has finally been found. General Quesada was much impressed with the steadiness and quality of tracking.

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With Don Watson, new TRE liaison man at BBRL, we drove to Defford for a flight in the TRE K-band equipped Lancaster up and down the valley of the Severn. This K-band set has a 6 ft. dish. Very good mapping of the countryside to a range of 20 miles was observed, with excellent resolution on water boundaries and railroads. Towns did not stand out so well as expected. A motor vehicle park was clearly observed, as well as the crossed runways of an airfield. General Quesada left Malvern at 5:00 p.m.

In the course of his visit we had shown General Quesada new developments which will improve the performance of the MEW, such as MTI, electronic marker, etc., and also the work on higher resolution radar which will find its way into the B-29's. We discussed the rather poor performance in level bombing which his SCR-584 CSB units have shown in recent PRU's, and agreed to provide him with help in working out the proper siting, calibration, and operating procedures.

Talked with Steve Jeffries about the BBRL-ASB set-up and general problems, including his responsibilities in terminating the work of BBRL.

Wednesday
March 7, 1945

Spent the day in Malvern. In the morning talked with Mr. Rowe, Chief Superintendent of TRE. After cessation of European hostilities, he is interested in becoming associated in a secretariat position in future military planning, and political steps to make this possible are being taken. At that time he would be interested in visiting appropriate groups in the US.

In the afternoon talked with Taylor of TRE on MEW, SCR-584, and Shoran. Taylor now heads up the systems work of TRE.

In the evening Louise and I had dinner with B. J. O'Kane at the Swan Hotel in Tewkesbury. On return to the County, I spent several hours with Colonel Cody, Communications Officer of the 9th AF, who had arrived for a day at Malvern.

Thursday
March 8, 1945

Left at 8:30 a.m. for Troop Carrier Command at Chalgrove. Gerry Tape, Al Eicher, and I talked with Colonel Crouch and Major Derey regarding the imminent air-borne operation and our cooperative program. We agreed to complete during the next month one SCR-717 modification, including Eicher's range unit with aided tracking. This will be tested by TCC and compared with the Radiation Laboratory's similar effort in which an APS-15 range unit is used. On the basis of these tests an official request will be made to the States for retroactive procurement. TCC now has 150 SCR-717's operational.

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MARCH 7, 1945

Cologne Falls, Nazi Lines Crumbling

Third Army Scores Gain Of 25 Miles

Whole American Front From Cologne to Trier Makes Forward Move

Rhineland Capital Won in Two Days

Stiffest Resistance Put Up on the Wesel Front



Stars and Stripes Photos by Riordan

Officers of the Third take a look at the entrance to the famous Cologne Cathedral as the battle in that sector subsides. Hidden by the wrecked building at the end of the street, a Mark V tank stands knocked out by bazooka men of Company C, 36th Armd Inf. Regt.

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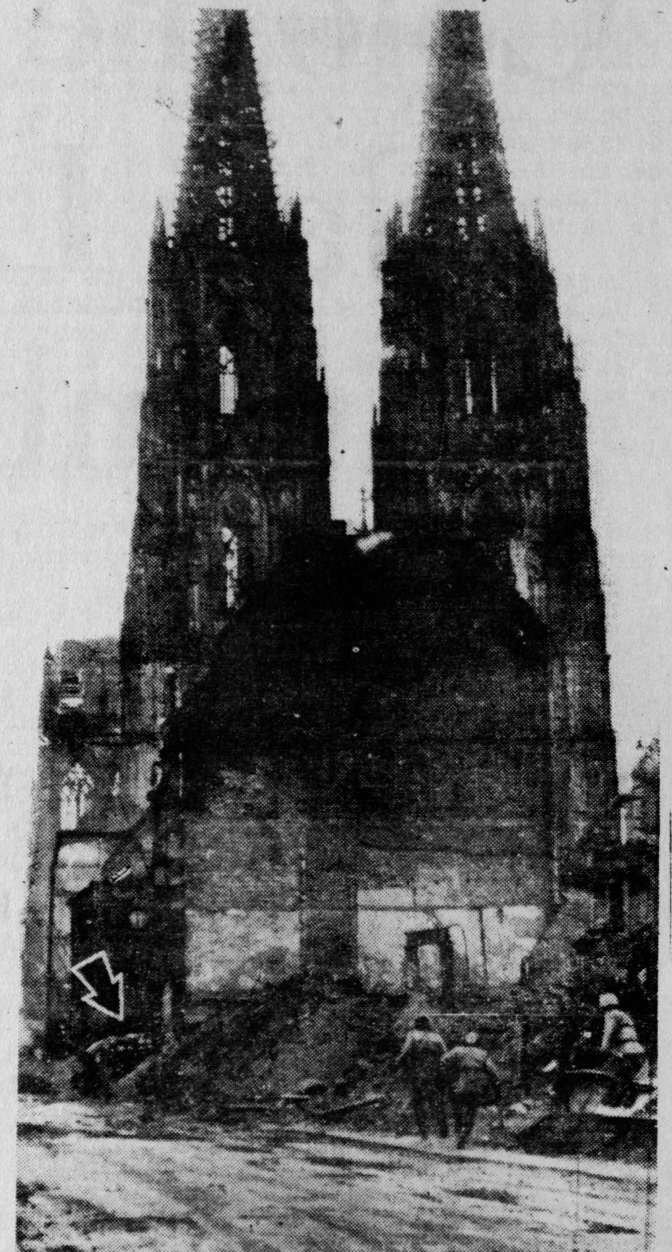
Combat Drama in the Heart of Cologne



Stars and Stripes Photo by Riordan

With Cologne's famous cathedral looming beyond wrecked buildings, First Army medics race cautiously down a debris-packed street to administer aid to stricken tankmen of the Third Armored Div. Moments before this picture was snapped, an American tank (arrow) was knocked out by a direct hit from a German 88.

(Other Cologne battle pictures on page four.)

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3-8-45 cont.

TCC requirements as visualized at this meeting—operational ranges of 400 miles and dropping accuracy of 400 yards—call for high-performance radar as well as high-performance beacon facilities. This combination is not provided by APQ-13, which is poor on beacons, nor by APS-10, which is poor on radar. As an ultimate equipment, it is thought that the APQ-13 with improved beacon facilities may be the right answer. Meanwhile, however, TCC would prefer to continue with the SCR-717 and incorporate the range-unit modifications being worked on at BBRL.

After lunch, we drove on to Pinetree, where a meeting was quickly called to discuss the 8th AF program on Shoran. Colonels James, Potts, Geerlings, and Osborne, Tom Carson, Gerry Tape, and I attended. The purpose was to lay out a definite schedule of requirements, with dates, for Shoran equipment and personnel in order that this might be ready as an official request on USSTAF when General Doolittle returned on Saturday. The basic requirements remain the same: 42 air-borne sets, 20 ground sets. It was estimated by Gerry that the 8th AF could be operational by 15th May. The meeting having agreed on the essentials, I left at 4:00 p.m. for London, leaving Gerry and Colonel Osborne to prepare the message.

In London shopped at Hatchard's (booksellers to the King and Queen) in Piccadilly, where I bought two books for Johnny and Christie from Don and Beryl Asquith.

In the evening Win Salisbury, Hugh Kendall, Louise, and I had dinner at Claridge's. Hugh, who has been sweating out Pan-Am delays, is now scheduled to leave for the US on Sunday.

Friday
March 9, 1945

Charlie Fitzgerald arrived from the MTO, where he had been on H2X maintenance with the 15th AF since July. His report on the MTO situation showed that H2X equipment performance over the target was 85 per cent successful, and thus not far behind that of the 8th AF. He stated the H2X bombing error under 10/10 cloud condition to be a mile and three-quarters without any supporting analysis. The 15th AF, probably prompted by Larry Henderson, is apparently considering the use of Shoran on Russian bases to bomb the oil complex. Fitzgerald reported that he had rarely seen Larry and had not benefited much from his presence at MAAF. Fitzgerald has done, in my opinion, a very excellent job for the 15th AF. He is being replaced immediately by two men, Linville and Smith, and they will be followed by three others in the near future.

Lunch with Dr. L. G. Grimmett at the Senior Officers' Mess. Discussed with him briefly my thought of producing 2-million volt X-ray generators commercially. He indicated that England would supply a considerable market, probably of the order of 30 or 40. I dropped him off at the Royal Institution, Faraday's old research laboratory, where he is now engaged in planning postwar education programs.

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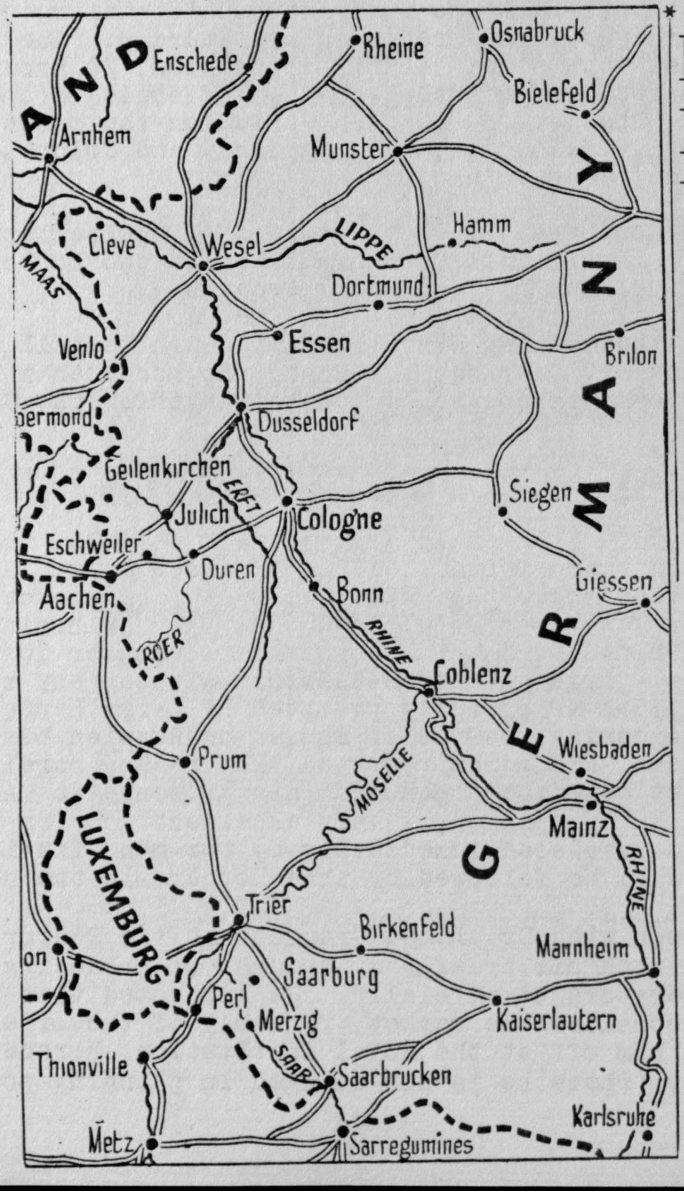
MARCH 9, 1945

1st Crosses Rhine South of Cologne



Bridgehead Holds Firm Under Fire

Hodges's Army on East Bank of Rhine Attacked By German Artillery

Bonn Half Cleared Of Enemy Forces

Ninth Air Force Bombs Communication Points

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3-9-45 cont.

Attended the TT conference for a short while, looked over books dealing with radiological physics at Lewis's, but found no new works of particular interest in this field. Had dinner at Prunier's.

Stan Livingston, my roommate at Symond's House, talked from 10:00 to 12:30 about many things, including the proposed electronics laboratory at MIT, the radioactive indicator program on which the 15 megavolt cyclatron is now engaged, John Cockroft's request to Van for the construction of a 5-million volt positive ion accelerator--which indicates that voltages of this order of magnitude are in his well-qualified opinion sufficient for precision nuclear research.

Saturday
March 10, 1945

Gerry Tape drove Bill Fletcher, Louise, and myself out to Chalgrove, where we met Jules and Don Watson. After an excellent steak dinner (which we ate while waiting for Dr. Waring of OSRD), Jules, Don, Louise, Dr. Waring, and I took off in a TCC Pathfinder plane at about 1:00 p.m., landing at Le Bourget at 3:15. Arrived at the lab at 5:00.

Ernie Lyman reported that the 9th TAC level-bombing results with the SCR-584 CSB unit were considered good. He is planning a trip to 9th TAC next week to look into the causes for the poor performance reported by General Quesada.

In the evening, to celebrate Jules' visit to the continent, eleven of us went to Le Bal Tabarin, a naughty nightclub.

Sunday
March 11, 1945

Spent the morning at ASB with Jules and Ray. Charlie West reported on the status of the Shoran program. The 42nd Bomb Wing has six operational planes and three training planes. Two ground stations are now on operational sites, and the first mission was run on March 10. These sites cover the region of the Palatinate and beyond. Gee equipment is now installed in about 20 aircraft. Ninth TCC trained 18 crews for 42nd Bomb Wing, while they themselves trained 15.

In the afternoon Jules and I went to the Opera to hear Moussorgsky's Boris Godounov. I dreamed and froze through two acts of this exotic and morbid Russian drama.

Back at ASB Captain Sennert of ARL, who will be concerned primarily with the APQ-7 program of the 8th AF, had arrived. In the evening we had a meeting in Room 206 at the Louvois, in which I persuaded Major Dickson, Captain Winn, and Lieut. Ladd (crew of the Shoran-equipped B-17) to stay on for work with 9th BD and 8th AF.

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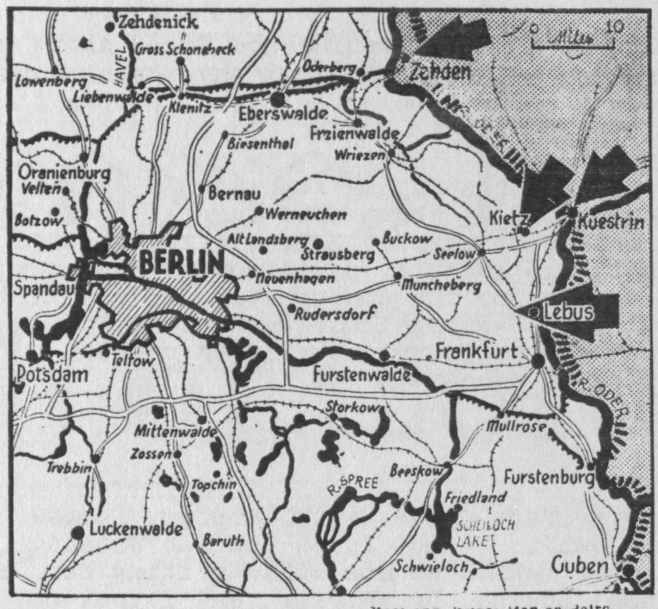

Stars and Stripes Map by Baird

Arrows indicate points where Soviets reportedly resumed their Berlin drive. Nazis reported them 28 miles from capital.

March 9, 1945



Stars and Stripes Map by Baird

East of Berlin, the Russians captured Kustrin. The Germans reported a heavy Soviet attack west of Kustrin. In the north, Russian troops moved closer to Gdynia and Danzig.

March 11, 1945

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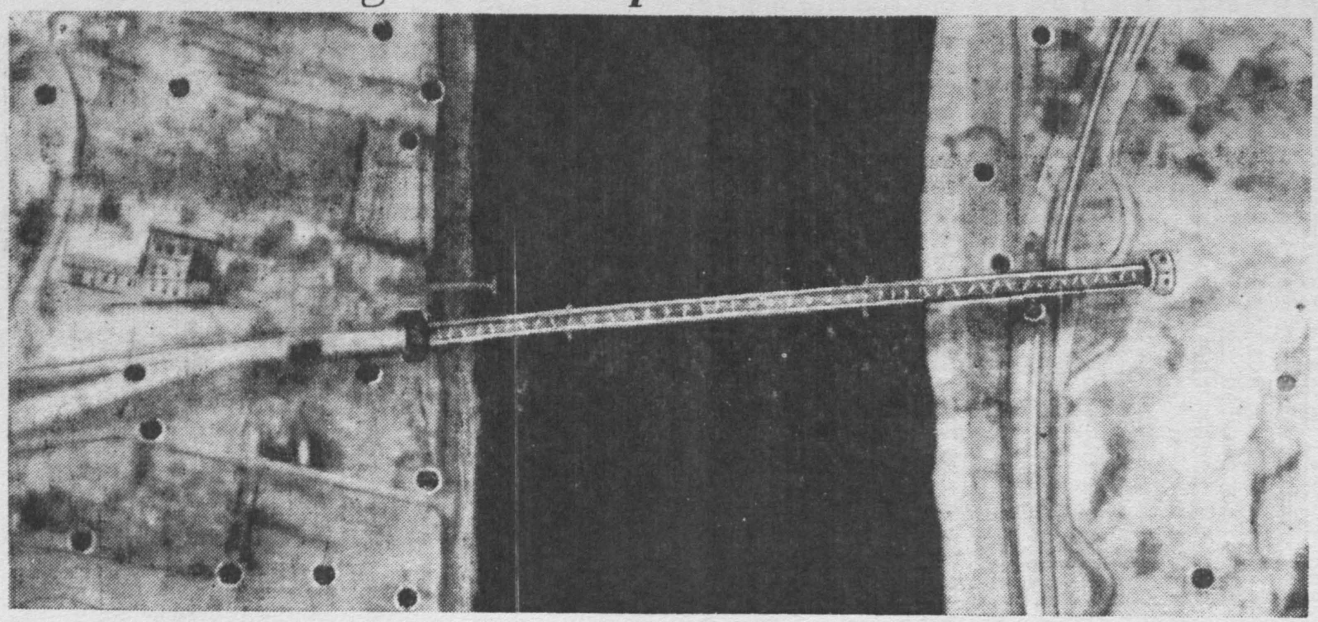
March 10, 1945

Widen Rhine Bridgehead

This Is the Bridge Which Opened Path to Heart of Reich



The Ludendorf railway bridge at Remagen, which U.S. troops captured intact to make their first crossing of the Rhine, photographed by a Ninth Air Force reconnaissance pilot. East bank of the river is at the right. The black circles on both sides of the stream are craters.

Third Joins With First Along River

BULLETIN

Five to six German divisions in the Eifel were trapped by the link-up of the Third and First Armies, it was announced early this morning at Supreme Headquarters.

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Monday
March 12, 1945

Drove out with Dave Griggs, Don Watson, and Jules Halpern to the RPD site. Capt. Jim Loving was on hand to pick out a site for their second MEW.

Four scale models are now available covering a region 200 kilometers on a side with the northeast corner at Koblenz. Six additional models to extend the northern and eastern sectors will be completed in a few weeks. Interest in the use of RPD for radar siting continues in the commands, and Captain Crawford has just succeeded in getting a sizable T/O (9 officers and 42 EM) set up under the Director of Technical Services.

In the afternoon Major Neal Crane discussed with us the status of the mortar-location work. The Germans use 50 mm. mortars with a range of about 550 yards on the basis of 50 mortars per Division. This was stated to be a not-too-much-feared weapon. The German 81 mm. mortar with a range of 2000 yards is distributed on the basis of 30 per Division and is regarded as most dangerous. In addition they have a 120 mm. mortar with 6000 yards maximum range distributed on the basis of 4 per Division. It weighs 685 pounds. The SCR-584 was said to get 10,000-yard maximum range on the 81 mm. mortar shell at its worst aspect. The APS-3 (ASD-1) gets 4000 yards under these conditions. It makes 70 50° scans per minute. One APS-3 is now going to the 7th Army with Captain Mannard. A second will soon go to the 1st Army, and ten more are being procured from the Navy for field use. BBRL agreed to investigate the redesign of the APS-3 mount so as to provide a larger dish for increased range and resolution. This dish would probably be a cut parabola about 40" x 18".

Tuesday
March 13, 1945

To ASG, where I talked with Major McGinty and Colonel Maxwell regarding Shoran. In the evening spent some time with Abe Collier discussing the general operation of the laboratory as well as Radiation Laboratory news. Among other things, I asked Abe to take on the responsibility of insuring with Steve Jeffries that termination of the business activities of BBRL was done on an adequate and timely basis.

Still later Jules, Ray, and I agreed to request the Radiation Laboratory to work aggressively on a complete relay-radar solution for MEW's, including the provision of sufficient radio and voice channels and intermediate links to handle the entire reporting job. Jules will investigate with TRE the possibility of a joint interim relay-radar program.

We discussed the idea that the BBRL staff on termination of the European war should be returned intact as an organizational entity to the Radiation Laboratory to work on some specific problem

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3-13-45 cont.

pending decision to base the laboratory in the Pacific. It seemed to me that BBRL at the Radiation Laboratory would be an effective means for handling Pacific field service work including all aspects from the time that a decision was made to prepare equipment for other fields until it had been delivered with accompanying civilian personnel to its operating site.

Wednesday
March 14, 1945

Drove to Rheims with Dave Griggs to see General Spaatz regarding my return to the States, the addition of Jules Halpern and Ray Herb to the ASG, the requirement for further BBRL field service, and the problem of deployment. General Spaatz seemed genuinely concerned that I was returning to the States and agreed to the addition of Jules and Ray. I recommended that Dave Griggs be regarded as his contact and senior member for ASG and subsequently confirmed this in a letter. It was arranged that the four of us have luncheon with him next Tuesday at St. Germain.

General Spaatz expressed the opinion that the European war would be essentially over by the end of June subject only to the diminishing possibility of the German employment of a new and effective weapon. He looks to ASG and BBRL to remain fully available in the theater until such a possibility no longer exists. He expressed the opinion that services such as BBRL has supplied were equally badly needed in the Pacific and hoped that they might be set up and administered there. As an interim measure he thought my proposal to set up BBRL at the end of the European war as the field agency of the Radiation Laboratory was sound.

During the first half of March, 30,000 tons of bombs have been dropped on Germany by USSTAF aircraft.

General Spaatz is nicely established in the residence of Mons. Mumm, the champagne dealer. At luncheon our conversation played lightly about General Spaatz' acquisition of a fourth star. One advantage of this is that he is now entitled to be transported in a ten-gun cruiser. He made a very strong argument for the continuation of development work on H2X bombing techniques in the direction of higher resolution and accuracy. He opposed the idea that Shoran with its dependence on ground bases was a sufficiently general solution to the high-altitude bombing problem and believed the development effort over the next five years should be aimed at securing Norden bombsight accuracy by H2X radar.

Dave and I drove over to 9th BD for a short session with Major General Sam Anderson. In the last 22 days 9th BD has bombed 19days with Oboe. Oboe bombing constituted 70 per cent of the

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3-14-45 cont.

effort in December and January. Recent enemy interference with Oboe was first on Channel 13 and more recently on all channels, when it was experienced by all aircraft for a 50-minute interval. Interference does not occur regularly and has been associated with the appearance of an unidentified high-speed enemy plane.

Returned to Paris via a C-45 plane from A-62, landing at St. Germain. Supper at the mess with Abe Collier.

Thursday
March 15, 1945

A balmy spring day in Paris.

In the afternoon drove out to St. Germain. Talked briefly with Colonel Maxwell about the T/O for ASG, the Shoran program for the 8th AF, my return to the States, and the addition of Halpern and Herb to ASG.

In the evening saw "Gaslight" at the ENSA Marigny Theater on the Champs Elysees.

Friday
March 16, 1945

Spent the day at the laboratory. Attended TT conference in the evening.

Saturday
March 17, 1945

In the afternoon went to Widewing to see Major General Fred Anderson, D/Ops, USSTAF. He stated that USSTAF has decided not to extract for the 8th AF any Shoran equipment from among the first two hundred production sets, 65 of which were arriving for 9th BD and 1st TACAF. On my strong argument that a very small number of sets provided now would permit an evaluation of the factors influencing the accuracy of tactical bombing by the heavies and at the same time save months in getting them started should Shoran prove superior to Gee-H and Micro-H, he agreed to recommend that 9 air-borne sets and 4 ground sets be diverted to the 8th AF for this purpose.

I told him of my intention to return to the US shortly, in part to discuss plans for the deployment of BBRL. He paid tribute to the work which BBRL had done in the European Theater, saying that their bombing effort would not have been possible without the radar and the assistance which we had helped them acquire. He expressed the opinion that a plan for preserving BBRL intact and making it available to other theaters was highly

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3-17-45 cont.

desirable. He did not feel that residual radar field work in the ETO after the general collapse of the German army could be justified in comparison with the reapplication of this field energy to other theaters. I mentioned the plan to have Jules Halpern and Ray Herb become members of the ASG. General Anderson restated the primary radar requirement of the Strategic Air Forces as a means which is independent of any land base for precision bombing under all conditions. The only answer to this is some form of H2X bombing, but present equipment is still inadequate both from a point of view of the precision which can be obtained and from the standpoint of the complexity of its operation. He urged me to develop in the States a more adequate appreciation of this problem and to stimulate development work toward its solution. He stated that, as a fundamental policy of the Air Force, each bomber must be capable of independent bombing. We touched upon the remarkable ability which the 8th AF has demonstrated in taking off and landing under terrible weather conditions. General Anderson said that over a year ago he had given the order to take off with visibility within 100 yards and argued that losses in take-off must be accepted as part of the battle cost, and that the commands and pilots had done an outstanding job in learning how to do this. In the first such operation take-off losses were 6 bombers--not so high as he had feared.

Supper with Sam Goudsmit and Dr. Solandt and others at the Royal Monceau. Sam feels that the ALSOS Mission is now getting extremely good data. The ultra-high secret project is giving interesting results which are, however, not disconcerting.

Sunday
March 18, 1945

At the lab in the morning. Walked with Louise through the Bois de Monceau and around the Montmartre in the afternoon, and finally stopped by at Bossier's on Boulevard des Capucines for tea in the afternoon.

Ray Herb and Jules Halpern returned from their field trip, and we talked about it late into the night. Both are impressed with the high priority of relay radar for the MEW's.

They reported on Colonel Cody's story that several months ago the Germans opened up on the Russian lines with V-1's. The Russians requested them to desist from this form of attack by 12:30 the following day or serious steps would be taken. When the Germans persisted in the V-1 attack, the Russians loaded 500 German prisoners into aircraft and dropped them on German territory. The V-1 attacks were stopped.

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Sunday, March 18, 1945

Most of Coblenz Cleared

Patton Driving Deeper Into Saar

American troops returned yesterday to Coblenz, the big German city at the junction of the Rhine and Mosel rivers where in 1923 Yanks of the Army of Occupation lowered the American flag and went home. Yesterday, however, Lt. Gen. Patton's Third Army forces didn't stand for much ceremony. After overcoming faltering resistance on the outskirts, the 87th Inf. Div. cleared nine-tenths of the city by yesterday

U.S. Forces Drive Prongs Into Saarland



Stars and Stripes Map by Baird

Nazis in Saarland catch blows from north, west and south.

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Where First, Third and Seventh Armies Are Pushing the Nazis Back



PM Map

Although the Ludendorff Bridge at Remagen collapsed, Yank Armies had a big day as First took bridgehead airdrome, Third reached Nahe River and took Merzig, and Seventh pushed Nazis out of Siegfried defenses in the South. Heavy lines indicate farthest points of advance.

March 19, 1945

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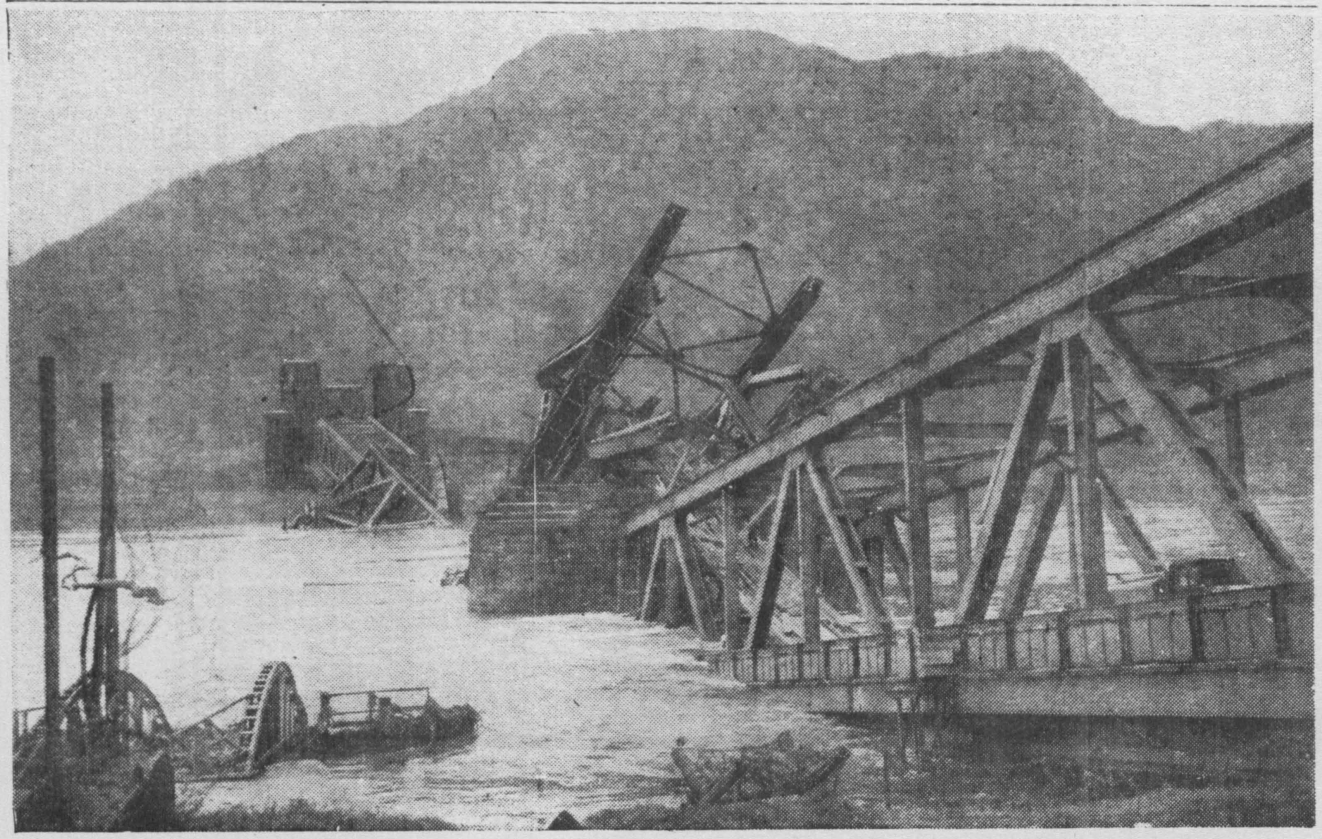
Nazis Retreat From Saar

She's Up: PARIS, March 19.—A magnificent job by First Army engineers has already restored the Ludendorff Bridge, leading into the Remagen bridgehead, after its collapse. It was announced here today that traffic is expected to be resumed "very soon."—*Marshal Yarrow, Reuter special correspondent.*

She's Down: AT SITE OF FALLEN LUDENDORFF BRIDGE, March 19.—If the Ludendorff Bridge is "already restored" and ready for use, I'll swim the Rhine with the Reuter special correspondent who wrote the story, on my back.—*Andy Rooney, Stars and Stripes Staff Writer.*



This is how the Ludendorff Bridge at Remagen, Germany, looked when an Army Signal Corps photographer reached the site shortly after the bridge collapsed last Saturday. The span was weakened by constant shelling and heavy traffic.—*(Other Pictures on Page 3.)*

Fleeing Foe Jams Roads To the East

A mass German daylight retreat from the western Saar choked the roads to the Rhine yesterday as Lt. Gen. Patton's U.S. Third Army swept down from the North to reach a point 20 miles behind German lines which were already bending under Lt. Gen. Alexander M. Patch's U.S. Seventh Army onslaught from the South.

Germans streaming toward the Rhine were pounded mercilessly by Allied fighter-bombers which swarmed over the Rhine-Mosel triangle in brilliant sunshine, bombing and strafing fleeing columns.

Third Army troops captured Bingen, important Rhine crossing and communications center, after clearing all of Coblenz, while the Seventh smashed back into Germany for the first time since it withdrew from the borderlands last December.

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Monday
March 19, 1945

Drove to Versailles with Jules and had talk with General McCroskey and Art Warner, followed by lunch at the Trianon Palace. McCroskey has asked for assistance by BBRL on the analysis of V-2 trajectories and counter-techniques. Walked about the Versailles palace gardens, which abounded with signs of spring.

Tuesday
March 20, 1945

At Widewing, Dave Griggs and I talked with Colonel Marion Cooper of General George Kenney's staff of the Far East Air Force. Cooper has come here to learn something of the bombing techniques and aids which have been of value in the European theater. I was surprised to see how completely new to him this information was on radar aids such as H2X, Shoran, and MEW. I would judge from this isolated experience that the Far East Air Force could greatly benefit by the availability of people who know the radar story and the experience in the ETO.

Our luncheon party at Park House in St. Germain, at which Ray Herb and Jules Halpern were to be introduced to General Spaatz as the new members of ASG to replace me, did not come off. General Spaatz had left St. Germain a day earlier, and Sally had neglected to let us know. Dave therefore made arrangements for a C-61 to take us to Reims. The four of us took off in this two-passenger plane (a single-motor job) from A-62 near Paris at 3:30. I piloted part of the way--in spite of which we landed at our destination an hour later. At 5:00 p.m. we were talking with General Spaatz and Fred Anderson. Spaatz had received my memorandum describing the proposed ASG set-up and gave it his approval. We discussed the plans for redeployment of BBRL. He agreed that its activities ought to be transferred to other theaters if possible as soon as German resistance has generally collapsed. Fred Anderson and he did not feel that BBRL would be nearly so effectively used if it remained in the theater to work on further improvement of radar devices for the post-hostilities air force and during the period of redeployment of others. On my suggestion, he agreed to write General Arnold, and I was delegated to prepare a letter. We left Reims at 6:00 p.m., arriving in Paris just after sundown. During the return flight I really learned how to steer a plane, keep it on course, and fly reasonably level.

Worked late that night on a draft of a letter from General Spaatz to General Arnold regarding BBRL.

Wednesday
March 21, 1945

Spent the whole day at the lab, catching up on cables, local problems, etc.

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Thursday
March 22, 1945

Left bright and early on this fine spring morning for Reims in a USSTAF car. General Spaatz improved the letter which I had drafted, and is reproduced below:

General of the Army H. H. Arnold 22 March, 1945
Commanding General, Army Air Forces
Washington 25, D. C.

Dear Hap:

I have discussed with Drs. Trump and Griggs the plans for the deployment of the British Branch Radiation Laboratory at the termination of the European War. This civilian field organization has had an exceedingly important influence on the operation of the Air Forces in this theater. Working with the Advisory Specialist Group of USSTAF, it has advised on the capabilities and assisted in the introduction of the new radar devices on which we have had to depend, and has aided the commands in improving the technical and operational performance of their equipment. I believe, when German resistance has collapsed, this organization should be applied as quickly and as directly as possible to the radar field work in the Pacific and other theaters.

Our experience here indicates that this civilian radar assistance can best be supplied if the organization, with its staff, laboratory, and shop facilities, is located adjacent to the operational area with close attachment to the Air Force headquarters and direct access to the commands and subordinate levels. In the event that such an arrangement is not feasible in the Pacific, I suggest that BBRL be deployed as a group to the States, probably attached to the Radiation Laboratory, to assist on radar programs scheduled for distant areas, to assign civilian personnel to accompany new equipment, and to work on technical problems which are returned.

This theater has had an unusual opportunity to acquire and to bring into effective operational use many types of navigation and bombing devices. Among these are the H2X equipment; the Oboe, Gee-H, Micro-H, and now Shoran tactical bombing systems; Gee and SS Loran for navigation; MEW and SCR-584 for the TAC's; SCR-720 for night-fighters; and others. For this reason, I would strongly recommend that senior staff representatives of the Pacific and Far East theaters be placed on temporary duty with us during the remaining months of the war to become acquainted with the capabilities of these devices and to profit by the problems and operational experience which we have had. It will probably be necessary to act quickly on this. Such officers, preferably representing both operations

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and communications, will be given a full opportunity to obtain first-hand information on the radar experience and techniques in this theater.

Sincerely,

/s/ CARL SPAATZ
Lieutenant General, USA
Commanding

This letter is to be carried to the States by General Ira Eaker, who leaves in a few days. We enjoyed a pleasant luncheon in company with General Curtis and Dr. Bruce Hopper, USSTAF Historian. Dr. Hopper discoursed eloquently on the lessons in avoiding wars which are to be learned from history, with General Spaatz contributing ironical comments. He evidently feels deeply that man has not improved much and in this war has barely escaped completely destroying himself.

At the luncheon General Spaatz and I discussed again the purpose of my return to the States, the need for a re-examination of the H2X bombing technique. He thanked me very warmly for my help, and I departed.

Called on Major General Sam Anderson, C/G of 9th BD, who was examining the results of bomb falls on German towns in the Palatinate. The last four days have been visual. One plot showed a small Palatinate town burning vigorously after bombardment by high explosives followed by incendiaries. This business of burning towns, done at the request of 12th Army Group, bothered General Anderson. He was preparing to make a personal examination of such a burned-out town now within our lines in order to decide whether incendiaries had any military value.

I spoke to General Anderson very plainly about our interest in getting the SCR-584 into rapid operational use or terminating our effort on this program. He declared that they were checking the equipment on every visual day in order to work out the few remaining difficulties and were then planning to use it operationally, primarily in order to be sure that it would be available in the event of the failure of Oboe or Shoran. I also discussed with him the assignment of Herb Hall to 9th BD as radar consultant.

Talked briefly with Colonel Bill Talbot. He expressed great interest in getting the SCR-584 into operational use. Saw the Shoran computer group headed by Major Rosenberg. There are 14 men on the computer team. It is hoped that the first operation with Shoran in 9th BD will come off next Sunday.

Drove back to Paris, arriving about 8:00 p.m. Supper with Louise and Harlan Collar at the Mess. Later in the evening had a long discussion with Jules, Ray, and Dave.

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Third in

Thursday, March 22, 1945

Ludwigshafen

Germans' Retreat Turns Into Rout

BULLETIN

United Press reported late last night that Patton's troops have entered Ludwigshafen, the big Rhine River city of 143,417 pre-war population, which was one of the last principal escape goals for Nazi troops fleeing the Saar. Mannheim is across the river.



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Friday
March 23, 1945

Wrote a newsletter to Larry Henderson and drafted a letter to General Anderson assigning Herb Hall as radar consultant to 9th BD.

Drove Jules to Villa Coublay for his return flight to Malvern. We shook hands, thinking we would next see each other in the USA.

To St. Germain, where a meeting on H2X bombing accuracy called by the Director of Armaments was in progress. Dr. Bailey Price presented a summary of the bombing results of the 8th AF during the four months of September to January. These are reproduced below:

H2X Bombing of 8th AF - Sept.44 to Jan.45

Type of Bombing	Percentage Bombs Falling Within -- 1000'	0.5 mi.	1 mi.	3 mi.	5 mi.	% of Effort
H2X 10/10	.2	1.2	5.6	39.8	58.5	35
8/9	1	7.3	22.5	67.4	82	15
6/7	2	12.5	36.5	84	90.5	5
4/5	4.4	22.8	48.5	89	96	3
Micro-H	5	25.7	52.4	78.2	88.5	3
Gee-H	5.8	29.8	60.6	90.5	94.1	15
Visual (poor)	9.4	34.4	58	85	91.4	10
Visual (good to fair)	30	64.3	82.4	91.5	92.2	14

Dr. Taylor of the 3rd Division reported on the accuracy of Micro-H bombing, of the observed falls (about 1/3 the total) -

23% are within ½ mile
52% " " 1 "
68% " " 1½ "
79% " " 2 " s
93% " " 3 "

With radar aiming alone, the average range error is 0.7 miles, and average deflection error is 1.1 miles. With Micro-H plus visual aiming these figures are 0.5 and 0.6 respectively.

Several interesting comments were made by Captain Cunningham of the 1st Division and Captain Pendleton of the 3rd. Micro-H is harder to manage than H2X, which accounts in part for the tendency to abandon Micro-H for secondary H2X bombing. Of Micro-H missions, 35% are completed as H2X. With more than 4 Pathfinder planes per group, the problem of H2X interference begins to get serious.

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3-23-45 cont.

Micro-H II seems simpler in practice. Everyone likes the pulsed-doppler method of killing drift. I commented on the need to analyze H2X and other bombing by the individual-mission method rather than by the statistical approach which ORS is using. This, I stated, conceals the factors which account for good or bad performance and makes it difficult to determine what steps should be taken to improve equipment performance, operational procedure, and air force factors such as density of formation flying.

Lee DuBridge was present at the Washington end of the evening teletype conference and opened up with the following request:

> "Have only recently received and studied your proposals for the future management of BBRL. Have discussed them with Bowles and Steering Committee. We are concerned that the radical changes you propose will cause a serious discontinuity in the effectiveness of BBRL at a very critical time. Believe you under-estimate your own critical importance in the picture. We also believe that more talent from here may be required. I propose that I come over for a three-week visit to discuss the whole matter with you and the others on the spot. I could come with Bowles, leaving about April 10 and settle all matters including ASG. Will you agree to remain there until May 1 so that we can have three weeks together. All concerned here agree to importance of our settling this matter over there before you leave."

After some effort to indicate to him the greater desirability of my returning at once in order to get on with the problem of providing for the continuance of BBRL's effort and ultimately of insuring that this group would be available in other theaters--I agreed to stay on for an additional month so that he and Ed Bowles can discuss these matters with me here.

Visited Abe Collier at the 365th General Hospital, where he is kept in bed with the grip.

Saturday
March 24, 1945

After debating with myself and others whether or not I should depart for the States about March 28 as I had planned or to await Lee DuBridge and Ed Bowles here, I finally sent a cable to Lee asking him to come immediately and stating that I would stay here until 25 April.

Talked with Art Warner. BBRL is requesting two X-band kits for the SCR-584 and a number of 8 ft. dishes. The 9th AF has sent in an urgent request for three electronic markers for MEW PPI's. We discussed the Shoran program for the 8th, which is going in on my proposed minimum basis of 10 air-borne and 3 ground sets, though

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Third

Saturday, March 24, 1945

Crosses Rhine

And Now the Ruhr



Reports from the front of a massing of Allied power for a drive across the Rhine focus attention on the industrially-rich Ruhr—once a major arsenal of the German war machine. From Brunswick, Essen, Dusseldorf, Wuppertal and Duisburg and other cities came iron and steel, chemicals, plastics, munitions and synthetic oils.

Nazis Fear New Drives Over River

BULLETIN

Troops of Lt. Gen. George S. Patton's U.S. Third Army crossed the Rhine at 2200 hours Thursday night and established a bridgehead on the eastern bank, it was officially announced early today. The point of crossing was not disclosed.

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3-24-45 cont.

the number of air-borne sets may be increased.

The Allied Armies having completed extensive preparations, and after days of intense bombardment of German communications east of the Rhine--are crossing the Rhine in many places. General Patton has slashed southward along the Rhine through the Palatinate and overrun Worms, Ludvigshafen, and Mannheim. He is stated to be across the Rhine north of Mannheim in considerable force. Montgomery is crossing the Rhine near Arnhem under cover of what is described as the greatest smokescreen in history. The resistance of the Germans to Hodge's 1st Army bridgehead at Remagen has diminished. In general it appears that the opposition to this offensive is relatively mild. With the Russians firmly established in their newly won territory on a line running north and south and passing within 31 miles of Berlin, it seems clear that Germany has lost the war, and only final mopping up remains to be done. Because of the peculiarities of the Nazi regime, which has left no machinery for peace overtures, and because of their intention to fight to the last German--it may be, however, that this will be a long-drawn out affair.

Sunday
March 25, 1945

Dictated notes and letters in the morning. In the afternoon two carloads of ASB-ers drove down to Fontainebleau. On the return trip, we diverted into many interesting little French hamlets which proved extremely interesting.

Mike Chaffee arrived fresh and rested from the States, and is my roommate for two nights. Ground radar at the Radiation Laboratory apparently has been languishing under a bushel. They have been working on the MEW improvements for us under a D-250 priority. This includes the MTI, big dish, high power. Mike will head up our MEW program as soon as Bob Tobey leaves. He is planning a trip to 12th TAC's MEW #66. This will be set up near Ludwigshafen.

Monday
March 26, 1945

Left A-62 in a C-78 at 9 a.m. with Dave Griggs and arrived at Defford at 11:45. Jules Halpern's seminar on the future program of BBRL was finishing just as we arrived. Jules and I walked part way up the hill while I explained and discussed Lee DuBridge's request that I stay on until May 1st. At the Steering Committee meeting that afternoon I talked over my plans and reasons for the return of the BBRL staff promptly at the end of the European war to serve as a separate division of the Radiation Laboratory in charge of field service. There was general agreement, and even enthusiasm, over this idea. I also discussed the H2X bombing problem, and it was agreed that a committee of three: Gerry, Tom Murrell, and Dave Griggs, would prepare a recommendation to General Doolittle calling for a special H2X bombing analysis within a single operational bomb group.

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Into this group BBRL and OAS would put sufficient of its best people so that each mission could be analysed as to the factors which contribute to the bombing performance. Nosmo would also be introduced complete into this group as soon as available in order that the analysis could show resultant improvement. The end result of such an effort should be a fairly quantitative appraisal of the influence of a variety of factors on H2X bombing accuracy. These factors include not only equipment performance and capabilities, but also contributions of training, effect of heavy-formation density, and general AF bombing policy. It seems to me, in view of the limited specialized personnel available to assist the 8th AF in such a study, we should have concentrated our energies long before this on a small group than the 8th AF as a whole. It would be important for the future of H2X work that a quantitative appraisal of what needs to be worked on next were made while this theater is still operational.

Tuesday
March 27, 1945

Talked with A. P. Rowe of TRE about the progress of the war. He indicated his belief that for reasons in part of national pride, but possibly also because of the location of V-2 sites--that the Germans had once again concentrated the preponderance of their armor on the British andCanadian front, thereby holding them to less spectacular advances than the Americans are now making. He told me that Dr. Taylor and forty TRE men are leaving shortly for India to set up a field service group there. Talked with Dick Anderson, Bob Byers, Jim Cunningham, and Jules Halpern.

Left Defford at 4:45, arrived in Paris at 6:45. Again I flew the plane, gradually acquiring a certain amount of skill and ease in level flight. Supper at the SHAEF mess. Talked in the evening with Mike Chaffee, who leaves for 12th TAC in the morning, and with Harlan Collar, who also leaves early tomorrow morning for the MTO en route home.

Wednesday
March 28, 1945

At Sam Goudsmit's office, Dave Griggs and I heard his urgent request for some good physicists immediately to work on counter-intelligence. The directive of ALSOS Mission, of which Sam is chief scientist, is to investigate the German work in the physical sciences wherever it may be found, particularly at the universities. He believes speed in getting into newly acquired areas is important since people tend to disappear and come back later to destroy records which they left in haste. Although Dave strongly recommended counter-intelligence now as the most important thing which BBRL top people might do, I pointed out that until the direct operational need for these people was over we could not release them for this type of work.

At Widewing talked with Colonel Sparhawk, Lieut. Col. Guillou regarding Shoran. This developed in a regular bull session on the radar problems which the theater has to overcome and on the value of a few

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3-28-45 cont.

equipments early. In the USSTAF War Room, Capt. Crawford and I traced the progress of the 1st and 3rd Armies in an effort to find where new RPD models should be planned. RPD is now left hopelessly behind by the rapid advance. We agreed, however, that the final region of German resistance would be the so-called "Redoubt", covering all of Bavaria, western Austria, and the Italian Alps.

Thursday
March 29, 1945

In order to improve the accuracy of the SCR-584 CSB units, Ernie Lyman proposes to organize a team capable of meeting all equipment, siting, orientation, and computing problems and doing an intensive job one at a time on a few SCR-584's in each TAC. For this purpose, Lyle Tiffany on test equipment and general SCR-584 performance, plus Bill Hosier on target computation, will be brought into the picture. This type of concentrated BBRL effort seems to be the proper way to utilize our energy in the final phase of the war.

Wrote a strong letter to Lee DuBridge about the lab's general effectiveness in dealing with BBRL's organizational problems, using this as a plug for setting up BBRL back at the lab as a field-service unit when the war in the ETO is over. Discussed our continental field commitments with Ray Herb. Dropped in to see Abe Collier in the evening.

Friday
March 30, 1945

Wrote a letter to Ernie Pollard. Polished up Morgan Gunst's buck slip to D/Ops, USSTAF, answering criticisms regarding BBRL's requests over the teletype and dissenting in the suggestion that an Army censor be present at the conferences. This little incident is a kind of evidence that the war fortunately is coming to a close.

Lee DuBridge cabled that his earliest departure date would be April 7 and that the trip would be canceled in the event of "sudden victory". In the afternoon Louise and I browsed through the Magasin "Au Printemps" and along some of the shopping streets of Paris. Paris looks animated and colorful today, in part because of the feeling of victory not too far away and in part because it is a nice spring day anyway.

Had an early supper, spent an hour and a half at an uneventful TT conference in which we reported on the operational use of MEW #66 five days after its arrival in port. General Nugent has written to the Director of the Radiation Laboratory a commendary letter on their efforts at bringing this unit to the theater, stating that in 20 days of its presence in the theater it has paid for itself operationally in covering 29th TAC's efforts during the offensive. Dave Griggs, Ray Herb, and I dropped in to see the movie "Air Force" on the Champs Elysees.

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Frankfurt

Friday, March 30, 1945

Falls to Third

4th Armored Div. 90 Mi. Past Rhine

BULLETIN

Frankfurt-on-Main, Germany's ninth largest city, fell to the U.S. Third Army at 1600 hours yesterday. Troops of the Fifth Inf. previously were reported as having cleared most of the city. Emmerich also was taken by Allied forces after heavy fighting.

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3-30-45 cont.

Patton has nearly reached Nuremberg, hence is 90 miles east of the Rhine. The British have now finally broken through on their sector. It is reported that an average of 1000 prisoners are taken per hour. In the USA peace rumors throwing local citizens into great excitement are rife.

Saturday
March 31, 1945

Wrote letter to Sam Simmons. Johnny Faulkner called in to report on his five days with 9th BD investigating their Oboe Mark II jamming incidents. This jamming has turned out to be ground-station jamming, and the number of incidents has almost ceased. It appears that it can be counter-measured by using improved RF filters of the 166 type, and this is being investigated by TRE. So far, jamming has affected only three per cent of 9th BD's operations.

Johnny Faulkner also reported that 19th TAC's GCA has landed two more aircraft under emergency conditions. One reported breakthrough at 15 ft. and the other touched ground before he saw it.

Sunday
April 1, 1945

After mess at St. Augustin, saw Bennett Archambault. Discussed with him Sam Goudsmit's request for counter-intelligence personnel and agreed that I would work through him in supplying men for this sort of activity. He described the organization of CIOS, of which ALSOS forms a special part, and indicated his belief that this work need not be conducted as a sort of Arkansas land rush. Talked with John Chase regarding termination procedures. Charlie West reported that 42nd Bomb Wing has now had over 30 operational Shoran missions, that 16 planes are equipped, and that 55 per cent of their bombs are landing within a 400 ft. radius circle, with results regarded as 5 to 10 per cent better than their Norden bombing in Italy. Later walked to Notre Dame, where we listened to part of the Easter service, and then continued along the Seine.

The war news continues to be favorable. The British are now 90 miles east of the Rhine. The 7th Army has effected a Rhine crossing on a 10-mile front and has taken Heidelberg without a struggle. General Eisenhower has issued instructions to the German troops, giving them procedures for surrender.

Monday
April 2, 1945

Left the Louvois for Y-46 near Aachen at 6:45 a.m. with Jim Cunningham, Lyle Tiffany, Ed Brazell, and Bill Hosier, and with Harold Striggow at the wheel of the Command car. Drove through Soisson, Laon, and Liege. Had a K-ration lunch on the bank of the Meuse. Aachen again presented a scene of thorough devastation. Arrived at Y-46, the base of the 365 and 36 Groups of 9th TAC, at 6:00 p.m.

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4-2-45 cont.

Abbie and Norm Morrison were on hand. Telephoned through to Ray Herb and then had a bull session on radar beaconry and field service in general in a large tent called "Boffin HQ #2". Called Football, Football Switch, Forest, Frontier, Charlie Dog--to get in touch with Ernie Lyman, who promised to drive in early the next morning. Fran Magurn and Norm Leavitt arrived with two vehicles at 9:30 p.m.--24 hours overdue.

The 9th and 1st Armies are reported to have thrown pincers completely around the Ruhr. The advances of Allied forces into Germany continue, but a news black-out is apparently on. Endless convoys were seen on the roads leading to Germany. In Aachen few civilians are to be seen, and these mostly with sullen and disheartened aspect.

Tuesday
April 3, 1945

Conference with Ernie Lyman and Jim Cunningham on the SCR-584 beacon program. Ernie, just in from Charlie Dog (SCR-584 unit near Bruehl), reported the AF HQ and radar in general in a very fluid state. We proposed to install six beacons in one squadron of 365 Group and six in 36 Group, to fix up the two beacons in P-61's of the 422nd Night-fighters, and to install in the UK two in P-38's of the 76th Photo-Recon Squadron. Jim thinks that I can win my one-pound bet with Dave Griggs that six beacon-equipped P-47's will have flown two successful operational missions each by the first of May.

Walked through the battered town near Y-46 and had breakfast at the doughnut dug-out. Left at 11:30 a.m. for Bruehl. Duren, passed en route, was the most completely devastated town I have ever seen. Only masses of debris remained. Very few walls were left partially standing. Evidently this town had been churned and rechurned.

After dinner at Football, met General Pete Quesada and went with him to his HQ. Pete discoursed on the progress of the war. The enemy is offering little opposition. Our ground armies are not using up their ammunition and are able to maintain of themselves adequate fuel supplies. However, over one thousand air transport sorties per day are flying in gasoline to captured airfields to establish a reserve. Within the Ruhr pocket 6 to 10 enemy divisions are being supplied by air. German HQ are not informing their units of their situation in the hope that they will continue to fight. No divisions have as yet been diverted from the Eastern Front. Quesada believes the road is open to Berlin, which might be reached in two weeks.

Ninth TAC's MEW is now moving 125 miles to a site near Marburg. Ninth TAC HQ will move to Marburg in a few days. One pair of SCR-584's is being split up to serve Army corps in the control of escort fighters. These units will not report to TAC, will move with corps to assist in fighter-rendezvous and the location of targets. This is probably the most mobile use which can be made of the SCR-584's under

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these fluid conditions. The Charlie Dog SCR-584 and another pair now east of the Rhine will remain for operations over the Ruhr pocket. General Quesada was enthusiastic over the beacon program, and promised to make them operational at once. We hope the first operational missions can be on Saturday or Sunday.

In talking about the usefulness of BBRL, Quesada made a strong point for moving it into the Pacific, and indicated that he would espouse this cause when he returned to the States--about 15 April. He invited Ed Bowles, Lee DuBridge, Dave Griggs, and myself to be at his HQ at Marburg on April 13, when a special show will be put on.

To Colonel Blair Garland's with Ernie, where we confirmed the details of the air-borne beacon program. Then to Lt. Col. Gillardi's at Frontier, where I again confirmed the beacon program and introduced Hosier and Tiffany as the new members of Lyman's SCR-584 team. Later to Charlie Dog, where I met Capt. Byrum, Lt. McDonald, and Lt. Lincoln. Returned to Bruehl, where I introduced Bill Hosier to Carroll Zimmerman. Bill will stay on for two weeks or less to develop proper methods of target computation for the SCR-584's and will train two officers in this work.

Spent the evening with General Quesada, who is living in town at the home of a banker. We enjoyed a baseball catch in the garden before supper. Two Group Commanders were present at supper. Afterward Pete and I had a lively discussion on science and its contributions to the war.

Wednesday
April 4, 1945

Left General Quesada after breakfast and drove to Charlie Dog with Bill Hosier. Lyman and Hosier got to work briefing the first officer assigned to HQ computing section. Left Bruehl at 11:30 and drove to Cologne. I was shocked at the complete devastation of the city. The cathedral stood gaunt in the midst of the ruins. Most streets were not cleared. I saw now buildings which were not totally damaged. Reinforced concrete structures were torn assunder, with floor slabs dripping downward. It was impossible to visualize how any life could be sustained in these ruins, and actually not more than a scoe of civilians could be seen during our brief tour of the city.

Drove along the super-highway to Bonn, still a livable city though much damaged. Drove along the Rhine past the Drackenfels to Koblentz. Again much damage, though not so complete as at Cologne. The capsized Remagen bridge and the two pontoon bridges on the side were seen. We than accidentally diverted inland and drove along the Moselle Valley. The vineyards on the terraced hills were beautiful. Many of the smaller towns had suffered little damage. We finally took off from the secondary route and cut across the countryside for Idar-Oberstein, HQ of 19th TAC. This trip had the appearance of getting dangerous. The tertiary route became progressively narrower. I kept inquiring our way of the

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Eisenhower's Order of the Day: *The encirclement of the Ruhr by a wide pincer movement has cut off the whole of Army Grp. B and parts of Army Grp. H, thus forming a large pocket of enemy troops whose fate is sealed and who are ripe for annihilation. The most vital industrial area is denied to the German war potential. This magnificent feat of arms will bring the war more rapidly to a close. It will long be remembered in history as an outstanding battle—the battle of the Ruhr.*

Nazis Face

Wednesday, April 4, 1945

Holland Trap

Ninth and First Beat Back Foe Struggling in Ruhr



A second Allied trap was closing on the Nazis yesterday as British tanks sped across the waist of Holland to within 30 miles of Zuider Zee with apparently nothing ahead to stop them from cutting off two German armies in Holland from the Reich.

Frantic enemy attempts to break out of the Ruhr were smashed as Lt Gen Omar Bradley's U.S. Ninth and First Armies tightened their ring around the gigantic pocket where all of German Army group B and parts of Army Group H are sewed up.

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peasants. It did not appear that this remote region could have been thoroughly cleared in the few weeks that it had been over-run. Our route finally became a narrow trail which ended up with a tree block. We eventually emerged onto a highway after blasting our way through a narrow wooded trail for several kilometers. During this episode I found it reassuring to keep Harold Striggow's Colt handy, and we fortunately ran over no mines.

Idar proved to be a fine town, and undamaged. We found 19th TAC HQ located in a German barracks on the top of a hill. It was scheduled to move out of there in a few days. We called on Col. Ferguson of A-3. Col. Ferguson does not feel that the SCR-584's can be useful in this rapid advance. Soon 19th TAC will move its MEW far forward to Hersfeld, which is just now being cleared. Supper with Nick Smith of OAS and then to the War Room to examine the progress of the armies. Long talk with John Faulkner before and after the 8:00 p.m. briefing. Then talked with Col. Coleman, Communications Officer, until 11:30.

There is evidence that 19th TAC does not use the same imagination and energy in making its SCR-584 CSB units effective. MacLean of OAS has analyzed the results of 15 missions and found that their average circular error was 1900 ft. ±400 ft. MacLean, John Faulkner, and George Harris have done a good job in removing calculation and equipment errors. The technique of siting and orienting is now handled properly. The main remaining source of error appears to be in poor controlling. It was therefore suggested that during the fluid state of the war the SCR-584's be set up to run "portrait" missions, in which planes are vectored over a predetermined spot and the results analyzed either by a camera obscura record or by aerial photography at the "O" point.

Thursday
April 5, 1945

Breakfast with Johnny Faulkner. Spent an hour discussing the general war situation and the utility of MEW's and SCR-584's with Gen. Weyland and Col. Ferguson. Gen. Weyland maintained his continuing interest in the SCR-584's and stated he would use them again as soon as the front became more static. He is somewhat concerned lest the Germans succeed in breaking out of the Ruhr. Part of his concern is due to the fact that his HQ will lie in their path. I told him of Bowles and DuBridge's visit.

Left Idar at 10:30 a.m. Drove over the mountains past small towns, through open country, toward Ludwigshafen. Everywhere could be seen the evidence of recent destruction of German motor transport and field artillery. In some of the towns the civilians were being rounded up by GI's. Ludwigshafen was moderately damaged. Along the road to Bad Durkheim there were stretches in which the roadside was densely packed with burned-out German motor transport, wagons, dead horses, artillery, cook stoves, and other military paraphernalia. Bad Durkheim has been thoroughly burned, and most of the center of town is in ruins. Continued on through Ungstein to Kallstadt. The countryside was in bloom.

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4-5-45 cont.

Kallstadt looked lovely with its pastel-colored houses. After progressing once through the town, I stopped at Uncle Louie's. All in all, it was a wonderful day. The wondering I had been doing for years, the doubts which I had had as to the propriety of my going there--were resolved. Kallstadt and its people were unchanged. There joy at having me back was completely generous and spontaneous prompted by the affection of simple country folk. I saw them all---all that were left. Uncle Louis, Elise, Marie; Tante Elise, Wallie, and Ilsa; Uncle John still driving the bullock-drawn wagon, Tante Lanche, Hedwig and her little Anna Maria, and Annalise. That night by candle light I visited with Tante Lisette and her still extensive family. They were war weary and glad that Kallstadt was so quickly over-run. American armor had rolled in an hour after the Germans had left. Before this the civilians had pulled out the wooden road blocks, sawed them up and carted them home for firewood. A white flag was run up in the church steeple. Except for one block of bombs last December, which had burst in their Wissgasse, Kallstadt had gone through six years of war untouched. Only her young menfolk were missing.

Friday
April 6, 1945

Left Kallstadt at 8:00 a.m. and drove through Frankenthal, Saarbrucken, and Metz to Bar le Duc, where I spent two hours and had supper with Major Sahler. It was nice to see Otto again, and he read me a letter from Dr. Robbins describing the cathode-ray exposure incident at MGH. It looks now as though all five will escape any untoward effects, with the possible exception of one who was hospitalized because of infected skin regions and may have some residual scar tissue. This case is being closely observed and will some day be recorded in medical journals.

Left Bar le Duc at 6:00 p.m. Arrived in Paris, 150 miles away, at 9:45.

Saturday
April 7, 1945

Lee DuBridge was reported due to leave ATC, Washington, on the 6th. Ray, Dave, and I discussed a tentative itinerary. At the morning meeting at ASB Bert Fowler and Al Albrecht described the limitations in GCA training. It seems desirable that an AF observer be sent here soon to profit by theater experience on GCA, and a letter to this effect will be written to General McClelland. I argued that, rather than continuing to involve GCA operating techniques in the theater after the war, we should see that such studies are continued in the States with returned BBRL people to assist.

Leo Sullivan reported on the excellent results obtained by the automatic plotting unit for the SCR-584 mortar-locater. This has been tried out at the 15th Army Training School and evoked instant enthusiasm. The IBM program of producing some 36 units is proceeding--9 of them scheduled to be completed in two weeks.

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Sunday, April 8, 1945



Map shows area where Nazis, squeezed in by invading Allied armies, may attempt last-stand fight.

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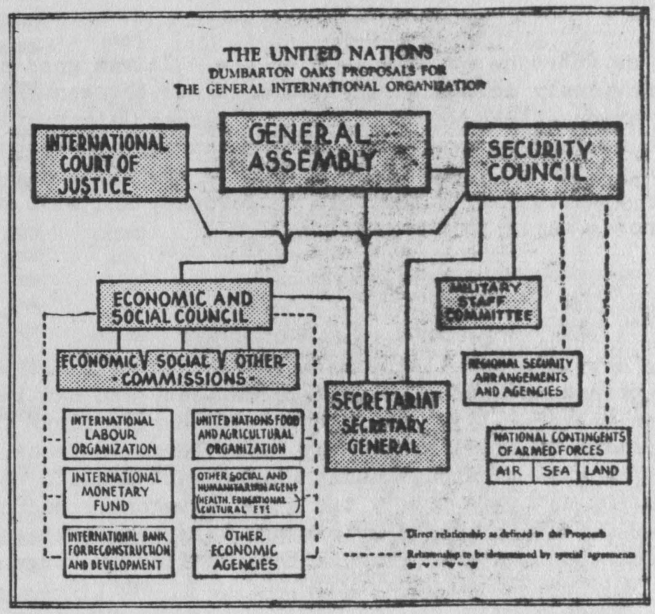
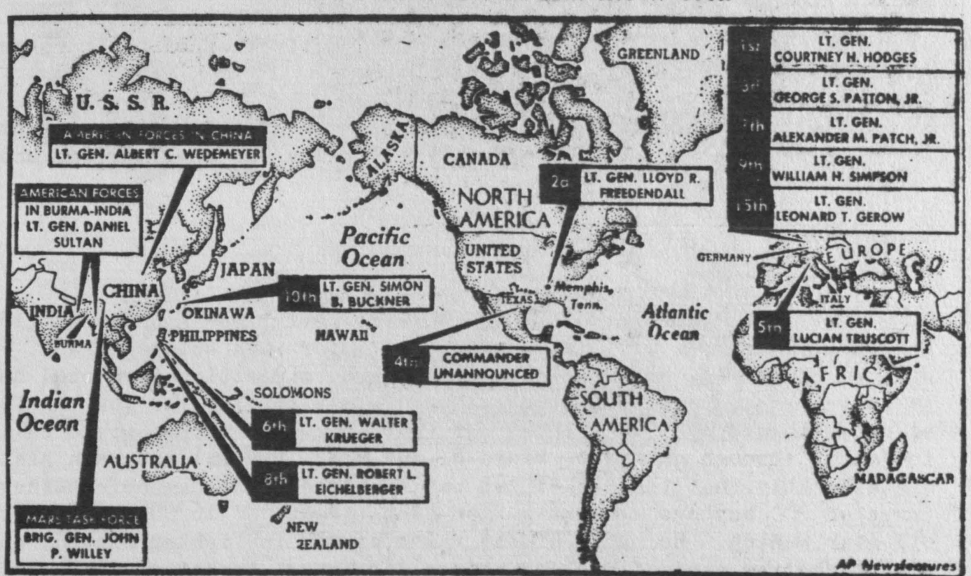


America's Armies Around the World



With the newly-announced U.S. Tenth Army in operation on Okinawa and the 15th on the Western Front, the nation now has nine identified armies on the fighting fronts and two at home. This map shows where the major American units are stationed and the names of their field commanders.

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Sunday
April 8, 1945

Met Lee DuBridge at Orly at 8:30 a.m. It was good to see him, and he was obviously delighted to see Paris and the continent. During the day at various times we discussed the war situation and the radar program, and he rapidly saw that the time had come to work actively on the deployment of BBRL from the theater. We spent the day seeing Paris, climbed over a Wurtzberg in the Bois de Bologne, and with Ray Herb took in the Casino de Paris in the evening.

Monday
April 9, 1945

Drove out to SHAEF in the morning, talked with Art Warner, walked through the grounds of the palace at Versailles, and had luncheon at the Petit Trianon Palace. In the afternoon left by TCC plane for Defford. In the party were the following: Ray Herb, Larry Lawrence, John Chase, Lee DuBridge, Louise Winston, Louise Goldie, and myself. Arrived at Defford at 6:30, and were met by two station wagons. Had dinner at the County, after which a group of us assembled in the smoking room for an informal discussion and beer, the latter provided by Serge.

Tuesday
April 10, 1945

Tackled the problem of BBRL deployment in the morning. We are all agreed that there is no longer time or need for any suitable radar assistance to the AAF from BBRL and that active deployment should be begun at once. Each radar program was discussed in detail, and a tentative schedule was set up in which only a dozen technical men remain after May 15, primarily to watch the final activities of their respective jobs.

In the evening there was a dinner dance at the Westminster Arms Hotel--a combination welcome and farewell party for Lee DuBridge and myself respectively.

Wednesday
April 11, 1945

Left for Pinetree at 8:00 a.m. with Gerry Tape and Lee DuBridge. Talked with General Orville Anderson and later with Colonel Graul, Signal Officer of 8th AF, and Lt. Col. Osborne. No opposition developed here at the suggestion thatBBRL be deployed fairly rapidly for the benefit of other theaters, We pointed out that a few key people would be left to follow through on Eagle, Micro-H, and H2X. General Anderson stated unequivocably that the 8th AF job was finished. The day before they had invested 300 bombers against a "ten-cent target" of 16,000 gallons of oil near Munich. He spoke of the value of MEW in fighter control and emphasized the need of air commanders for expert technical advisors.

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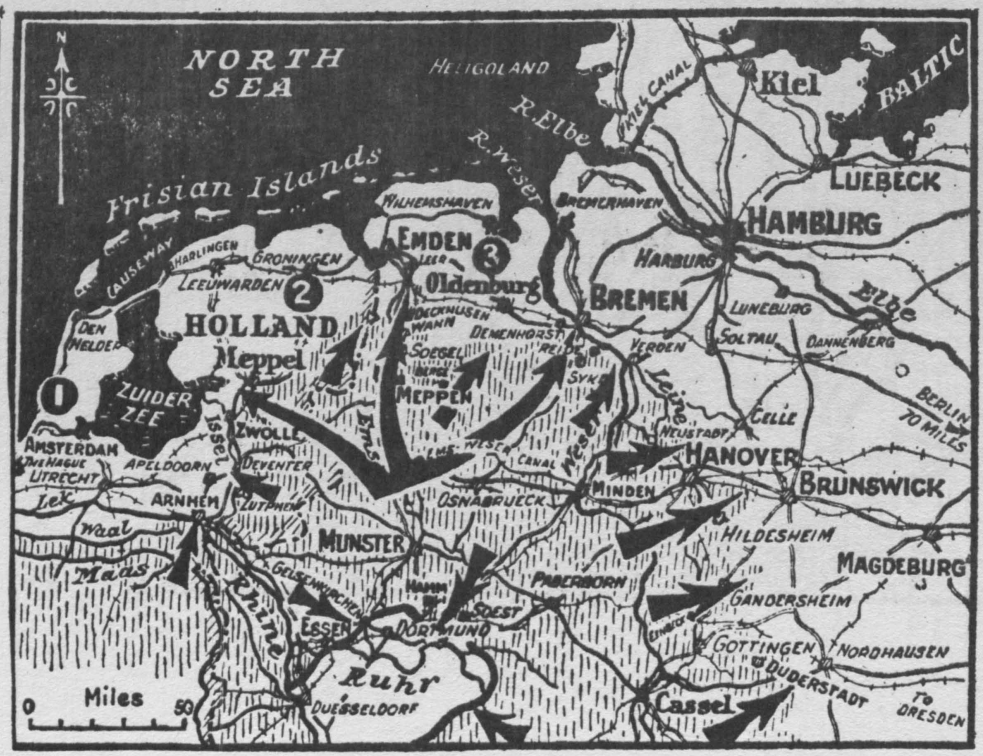
Hanover Is Captured in Ninth Army Drive; Patton's Tanks Now 120 Miles From Berlin; Russian Troops Hold 90 Per Cent of Vienna

Germans Battle Fiercely In Two of 21 Districts Of Austria's Capital

Koenigsberg Loss Costly to Enemy

150,000 Nazi Troops Are Killed or Captured



Six 3d Army Divisions Gain on 55-Mile Front South of Nordhausen

Weser Crossing Made Near Hoya

British Make Progress In Direction of Hamburg

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The Arrows Drive Closer to an Allied-Russian Linkup



Ninth Army reaches the Elbe River near Magdeburg, while pilots report Third Army columns nearing Halle, 14 miles from Leipzig. Russians have all but one-tenth of Vienna and menace Berlin from the east and southeast. Barely 125 miles now separate Allies and Russians. PM Map

Yanks 70 Mi. From Berlin, Reach Elbe River

April 12, 1945

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4-11-45 cont.

We developed a "flat" on the return trip and had supper at the Cottswold Gateway Inn. With us were Tom Murrell and Major Fred Hartbrodt. Tom is scheduled to leave 8th AF for General Kenney's staff in the Pacific shortly.

Thursday
April 12, 1945

Spent the morning at TRE and BBRL. Had lunch with A/C Leedham during which he spoke of his plans to combine ASE and TRE into a single lab of 1000 people, this program to commence about V-E Day. Left at 3:00 p.m. via TCC plane for Paris, stopping at Alconbury en route.

Lee DuBridge, Dave Griggs, Ed Bowles (who had just arrived from the States), and I had supper at the Ritz, followed by discussion of radar and counter-intelligence programs. It was tentatively agreed that Dave would go to the Pacific in Advisory Specialist Group capacity to General George Kenney's staff of the Pacific AF. Tom Murrell would be the second member of this team. We returned to the Louvois to find a small party developing in Room 211.

Friday
April 13, 1945

At breakfast we were shocked to read the Stars and Stripes headlines announced the sudden death of President Roosevelt yesterday evening. Everybody sincerely believes that, while the war is safely in hand, his loss is particularly serious at this time when decisions must be made for the future peace.

Ably assisted by my secretary--I purchased an oil painting at the "Tableaux" on Boulevard Hausmann. It is a colorful scene from inside the chapel of St. Etienne du Mond.

Later in the morning, Bennett Archambault, Ed Bowles, Lee DuBridge, and I discussed the counter-intelligence organization in the ETO.

On the evening teletype, Lee DuBridge summarized our plans for deployment and asked Wheeler Loomis to investigate space for a field-service division at the Radiation Laboratory.

Saturday
April 14, 1945

Drove Lee out to Widewing in a jeep. Had lunch with Bob Snider, Col. Graul, Col. Osborne, and others. Went to special briefing in the war room on air and ground situation. The 8th AF took time out to blast the Bordeaux pocket, three days after which it was over-run by the French Army. In the afternoon Louise and I drove out with Charlie to the flower market and then to St. Etienne to see the original scene of my new oil painting.

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ROOSEVELT DIES



FRANKLIN DELANO ROOSEVELT

Cerebral Hemorrhage Is Fatal at Warm Springs

WASHINGTON, April 12.—President Franklin Delano Roosevelt died unexpectedly this afternoon at Warm Springs, Ga., of a cerebral hemorrhage. He was 63 years old.

The 32nd President of the United States, the only Chief Executive in the country's history to be elected four times, died at his winter cottage at 1:53 P.M., Georgia time (8:53 P.M., Paris time).

Truman New President; Faces War, Peace Task

WASHINGTON, April 12.—Vice-President Harry S. Truman, once a Missouri farmboy, was sworn in as the 33rd President of the United States today a few hours after the death of President Roosevelt.



HARRY S. TRUMAN

Friday, April 13, 1945

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Saturday, April 14, 1945

Truman Takes Helm

Meets His Chiefs; FDR Rites Today

President Harry S. Truman took over Franklin D. Roosevelt's war problems yesterday, and issued a proclamation declaring today a day of mourning for the late President.

Funeral services will be held today in the East Room of the White House, and burial will follow on Sunday in Hyde Park, N.Y., home of the Roosevelt family.

Services Today In Washington

Truman Pledges FDR's Policies

The New President Takes His Oath of Office



Vice-President Harry S. Truman, left, being sworn in as President by Chief Justice Harlan F. Stone at the White House, Thursday night. This picture was radioed to Paris from the United States yesterday.

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Sunday
April 15, 1945

Left Paris in a C-45 with Ed Bowles, Lee DuBridge, and Dave Griggs for Reims, arriving at General Spaatz' establishment at 11:30 a.m. General Spaatz was ill; so we browsed about in the lazy sunshine until 1:00 p.m., when we had dinner with General Curtis and Major Svirsky, author of "Victory through Air Power". Svirsky spoke of his work with Walt Disney and generally reflected the opinion that his prediction on the value of air might has been realized.

After lunch we talked with General Spaatz in his trailer. He pointed out that the need for strategic bombing is over, and he saw no strong argument against the rapid deployment of BBRL. While asking for more accurate H2X bombing, he pointed out that a large part of the value of H2X bombing was that it caused the German fighter force to give battle and resulted in their destruction. I told him of our plan to keep Ray Herb and Gerry Tape on the job until approximately June 1, and suggested that he look to them for specialized advice should the need for it arise. Ed Bowles had previously asked him to release Dave Griggs for the Pacific, and he agreed immediately to this. I brought up the great value to the 8th AF of the Alconbury group in speeding the introduction and training on new radar programs and suggested that this group would be exceedingly useful if deployed to the States in close relation to the Radiation Laboratory. This matter was further discussed, and General Spaatz agreed to recommend it--which he subsequently did. I left his trailer feeling definitely that this was really the last time I would see him in this theater.

Our party proceeded to Reims cathedral, along with Ed Bowles' son, who works as a private in a nearby hospital. We then returned to the airport and took off for 9th AF HQ at Wiesbaden. The plane flew over Luxembourg and the Moselle River. Wiesbaden is badly damaged. We were met by Robert Lee, Deputy C/G of 9th AF; Colonel Cody; and a number of other officers and sat down to a steak dinner at 8:00 p.m. Colonel Cody and Major Stover discussed their radar program, agreed that most of our work for them had been done, but recommended strongly that RL keep a man with the Occupational Air Force to follow the utilization of radar during that period. Cody put in a plug for work on relay radar for the MEW.

We spent the night at General Vandenberg's house, the rather fine home of a temporarily dispossessed German doctor.

Monday
April 16, 1945

Attended the 9th AF briefing at 8:30 a.m. and then took off for the Eagle (12th Army Group) briefing at 10:00 a.m. After the Eagle briefing, we spoke a few minutes with General Omar S. Bradley, who stated that our movement to the eastward toward Berlin and Dresden was no substantially completed and that the 3rd Army would be directed southward toward the Redoubt. This is till top secret, and the army

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4-16-45 cont.

groups are only just now being notified. The Ruhr pocket is rapidly being eliminated--150,000 P/W's having been taken so far. The Canadian 2nd Army has broken through to the North Sea, thereby putting northwestern Holland into a pocket. The British are approaching Bremen with a thrust toward Hamburg. The 3rd Army is throwing pincers around Leipzig. Patton is closing in on Nuremberg.

Flew to Giessen, passing over Frankfort en route. A large part of the center of the city has been leveled to the ground, and the outlying districts are merely empty shells of houses. General Quesada met us at Giessen with three L-5 Cubs. Bowles flew with Quesada, Dave and I took the second, and Lee and a sergeant-pilt the third. We flew in formation to Marburg, where Quesada's HQ is located in a delightful wood--the place resembling a summer camp at home. After lunch our little formation took off for 9th TAC's MEW. This time our party included a fourth L-5 containing Quesada's successor, Brig. Gen. Ralph Stirley, flown by Lt. Col. Leghorn, C/O of the Photo Recon Group. Capt. Miller, chief controller, showed us the new ops room, which gave the appearance of even more orderliness and efficiency than before. The movement of this MEW closer to the front had been delayed in anticipation of our arrival, and the set was off the air by 6:00 p.m. that night. The 9th TAC MEW score to date is as follows:

	Destroyed	Probable	Damaged
Day Fighters	302	38	92
Night Fighters	58	3	6
On Ground	159	1	122
Totals	519	42	220

Returned to Marburg. At the ops room HQ we listened to the 8:00 p.m. briefing, which showed continued advances of all armies. The TAC's are doing a good job in immobilizing the limited amount of German transport moving south and southeast toward the Redoubt. We spent the night at General Quesada's house in town, also the home of a German doctor. This home, overlooking the beautiful Marburg Valley, was furnished in peculiar and morbid taste--many of the rooms decorated with the antlers and skull of deer and the furniture being heavy and unattractive.

Tuesday
April 17, 1945

After breakfast at camp, flew to 1st Army HQ at Bad Windungen. Spent a half hour talking with Lt. Gen. Courtney N. Hodges, who paid tribute to the technical aids which had been made available during this war both to the ground and to the air forces and to the splendid cooperation of 9th TAC and the heavy bombers. He was aware of the work on radar location of mortars, which he claimed would always be a serious ground-force problem. He indicated that 1st Army would soon be taking up defensive positions along the Elbe River in a line which I gathered runs approximately north and south about 35 miles from Berlin.

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4-17-45 cont.

This would permit the Russians to take Berlin and the area slightly west of it, and avoid the difficulty of two gigantic offensive forces coming into head-on contact.

Our party then flew to Fritzlar in time for lunch with Colonel Ray Stecker and the staff of the 365th Group, as well as with Colonel Moon of the 404th Group on the same field. After lunch we gathered again with the pilots of the 404th Group for a half-hour session led by General Quesada on the usefulness and limitations of MEW and SCR-584 radar control. Lee DuBridge was introduced as the "Director of BBRL in Cambridge". The pilots' reaction was about as before: strongly in favor of MEW, somewhat doubtful about the SCR-584, and somewhat concerned about becoming too dependent on radar aids.

Norm Morrisson and Abbie were on hand at the field. We saw an air-borne beacon installation in a P-47. The 404th Group work is now completed, with six planes equipped and some operations--particularly with the MEW--already carried out. We climbed over several German Messerschmit night fighters which had been captured on the field.

Flew to Kassel, first circling several times over the ruins of the city. Though not actually leveled as Frankfurt and Duren have been, the destruction of this city is complete. Landed at a nearby air strip and spent one hour driving in a jeep through the town. On our way I talked with a banker who was going to confer with the town major and with one or two of the other citizens. Kassel was first hit by the RAF at 8:00 p.m. in October. It was a city of 220,000 population, 30,000 of whom were killed in the first raid. The present population is estimated at 60,000--though I saw no place where these people might live. The roads around this city are full of displaced personnel: Italians, Poles, Russians, French, migrant Germans, and other straggling bits of unfortunate humanity.

Flew to an airstrip near Hersfeld, where we said "good-bye" to Pete Quesada. It had been a thrilling experience flying around the German countryside and catching some of his enthusiasm and belief in the usefulness of a tactical air force and the value of radio and radar aids in their operations. It is his hope to return to Washington and organize a tactical command with the necessary equipment for work in the Pacific.

Called on General O. P. Weyland at his headquarters. He showed us the new plan of Patton's 3rd Army and of his 19th TAC which had just been handed him. They are to drive along a front running southwest through Nuremburg and Munich into the "Redoubt" area. This team will obviously be given the last real offensive job to do against Germany. Weyland was enthusiastic about the assignment.

Supper at General Weyland's fine establishment in town. We enjoyed the luxury of table linen, full solid silver service, a superfluity of china, a Luxembourg chef, red and white wine, etc., which made this the most elegant dinners I had had on the continent.

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Monday, April 16, 1945

Foe Stands Before Berlin

One Bridgehead Lost, Other Gains

One of the two U.S. Ninth Army bridgeheads over the Elbe River crumbled yesterday under the continuous, concentrated blasting of German artillery as Nazis threw everything they had on the Berlin plain to hold the threatened capital.



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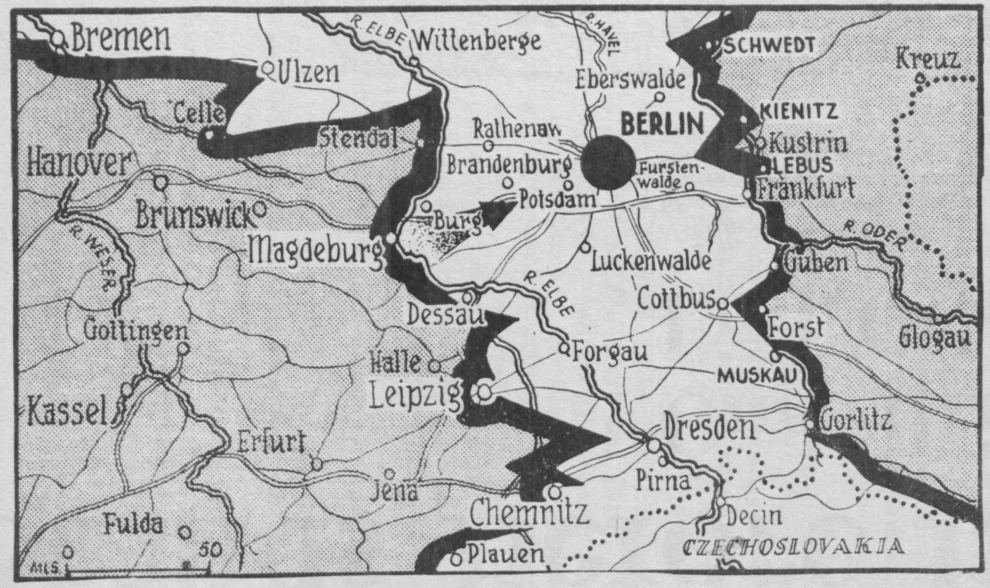
Wednesday, April 18, 1945

First Drives Into Leipzig

Nazis Say Reds Gain Near Berlin

German Corridor Dwindles as Link-Up Is Imminent



3rd Army Threatens Chemnitz

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4-17-45 cont.

Weyland spoke of his excellent relations with General Patton and the 3rd Army and made a point of his conviction that this team should be kept together when deployed to other theaters. After supper we attended the 19th TAC briefing which showed Leipzig nearly surrounded, the fighter groups getting a respectable score on locomotives, railroad cars, and motor transport, all headed south. The 19th TAC briefing is made amusing by the rivalry between G-2 Air and G-3.

Wednesday
April 18, 1945

After breakfast talked with Colonel Glenn Coleman, who is hopeful that air-borne beacons will come in time to 19th TAC and will then want aid from BBRL in modifying the SCR-584's and getting them installed. We left by road for Fritzlar, where we again had lunch with Colonel Stecker and then by C-45 to Y-59 near Cologne. We circled over Cologne several times and then circled Duren andAachen. We have devised a new category of destruction, as follows: "heavily damaged" - Wiesbaden, "destroyed" - Aachen, "obliterated" - Cologne, "pulverized" - Duren.

We were unable to make a good GCA landing and later found the GCA crew fairly inexperienced, unenthusiastic, and somewhat unhappy with conditions at the field. We were met by Colonel O. B. Johnson, P-61 night-fighter king, and by Captain Harvin, radar officer, and Larry Beitel. During the first few days of the Ruhr pocket the 425th Night-Fighter Squadron brought down 14 supply planes. Johnson is undoubtedly the best night-fighter man in the theater; his squadron has the finest record. This represents a kind of air effort in which the Americans are generally deficient.

Returned to Fritzlar and drove to Hersfeld, arriving in time for dinner and the 8:00 p.m. briefing. The 3rd Army has entered the eastern tip of Czechoslovakia. It is reported to have the happy slogan of "On to Czechoslovakia and fraternization!"

At dinner Lowell Thomas and Mr. Horsch were present. They were accompanied by another ten correspondents who dined elsewhere. Among them was Quincy Howe. Thomas told of visiting the recently over-run concentration camp at Ordruf, a camp for political prisoners who had been starved and many finally shot, their bodies lying about when the place was taken. General Weyland believes, after questioning German prisoners of war--particularly a German lieutenant general, that such conditions existed in German prison camps without the knowledge of the majority of them. The Ordruf horror, however, has since been superseded by the discovery of an even larger camp at Weimar, where a total of 50,000 are reported to have been killed.

Thursday
April 19, 1945

All of us, including Lowell Thomas and his associated correspondents, drove to 3rd Army HQ for a brief interview with General Patton, after which we attended the 3rd Army briefing. Our party returned with General

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4-19-45 cont.

Patton to his office and discussed the general war picture. Patton is convinced that another war--this time with Russia--will closely follow the present one, and that it is necessary to keep this continually in mind. He was pleased to have a clear directive to take the offensive toward the "Redoubt" and saw no serious obstacle, even in the natural terrain, in eliminating it in short order. He declared that American equipment, including tanks, was superior to German equipment in all respects, though he had considerable difficulty in convincing his officers of this. He was the same confident, dramatic, vigorous character that Dave and I had interviewed some months before, but this time I felt that the conditions of the interview were not quite so satisfactory. Patton has caused 1500 Germans from nearby cities to be brought in to see for themselves the conditions at the concentration camps at Ordruf and Wiemar. Lee and I, accompanied by a 3rd Army captain, drove out along the German Autobahn to Gotha, where we picked up Dave and Ed Bowles, who had flown in by C-45, and then drove in to the town of Gorgenthal to inspect the laboratory of Dr. Holman. Holman was reported by 3rd Army to be one of the leading German radar scientists. He and Dr. Engels, general manger of Telefunken, had been recently taken by the 3rd Army. The laboratory turned out to be a small garage-like building plus several rooms in nearby houses, all of which were under guard. No work relating to radar was seen. Holman had been active on high-frequency heating of laminated woods, on the hardening of metal surfaces, and other scientific-industrial applications of high frequency. My impression was that this represented a small-scale piddling effort of very little importance to immediate large-scale industrial processes. Lee and I returned to 19th TAC HQ after dropping Dave and Ed at Gotha for return flight to Paris.

After supper we interviewed Dr. Holman, who was being detained for 3rd Army by CAC in an inn in Hersfeld. It became clear that Holman himself was not in the radar picture, perhaps because he was not a good Nazi. He was, however, generally informed on what had been going on. His laboratory had first been in Berlin, but had been bombed out in May of 1943 and now as a private laboratory of about 10 men, mostly young half-Jews. He said German radar work begain in 1934. The first early-warning sets had been built by Gema in 1936. Telefunken, the RCA of Germany, produced the Wurtzberg anti-aircraft set. In general, Holman recognized that German radar had been poorly coordinated and was far inferior to the British and American effort. He declared that Allied radar had defeated the German U-boat war and that this had been so stated by Admiral Doenitz. The scientists were poorly tied in with industry, and the German military and naval mind did not appreciate the value of technical work. On the other hand, it also seemedclear that the scientists themselves felt no responsibility for following their efforts through development, production, and Service use.

It was too late to interview Dr. Engels, who was being detained in the same building.

Friday
April 20, 1945

Interview with Dr. Engels and Dr. Urtel. Urtel was a good technical man; Engels concerned only with administrative features of Telefunken's operation and did little talking. The conversation was in English. They

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stated that there had been no really effective exchange of radar technical information with the Japanese although Japanese military missions had come to Germany and reports of work and presumably samples of apparatus had been sent. The term for radar is "Ruchstrahl". The Germans decided about 1941 that they would stick to wave lengths of 50 cm. or longer since their primary interest was early-warning and anti-aircraft radar. It was not until 1943 after the effectiveness of Allied cm. equipment had been demonstrated in submarine search, H2X bombing, and night-fighter operations that the Germans decided to investigate the 10 cm. field. Telefunken's personnel increased by a factor of 10 in the course of the war, being doubled in 1944 when the Army finally returned physicists and engineers who had been fighting as common soldiers at the front. The Telefunken plants, which were mainly in Berlin, were badly damaged in May, 1943, and subsequently the development work was dispersed among twenty laboratories, the principal ones remaining in Berlin housed underground with a 15-foot thick reinforced concrete roof.

Dr. Engels and Mr. Urtel stated that it was common belief among German industrial and military circles that Allied radar had saved England from an invasion and had overcome the submarine campaign. They paid tribute to the effectiveness of the American H2X equipment as it compared with British H2S, the first set of which was brought down intact near Rotterdam in February 1943. The term "Rotterdam" was therefore applied to all H2S and X types of Allied bombing equipment. Urtel declared that the idea of Window (which they called "Dueppel") as an anti-aircraft countermeasure was known to the Germans a full year and a half before it was first used by the Allies. It was held, however, so top secret that the radar people generally were unaware of this possibility and were caught unprepared when Windowwas used by the Allied air forces.

The German jammers were the responsibility of Siemens and the German Reichspost. Apparently the same schism existed between the radar and jammping people in Germany as in America. Urtel said they knew nothing much about the jamming program or of its effectiveness. He believed it effective against Obce Mark I, which they called "Boomerang".

Industrial companies working on radar made little effort to utilize the physicist groups, Urtel explaining that these scientists did not have either the desirable training or the appropriate point of view. The scientists evidently work pretty close to their universities or in the private laboratories, coordinated somewhat ineffectively by the Reichsforschungrat. The last two years high-frequency work among scientists was coordinated by an agency headed first by Professor Esau and later by Dr. Prandtl. Industrial laboratories were apparently not well coordinated, but received their directive from technical members of the Luffwaffe. Just as there was a gap between German scientists and industrialists, there was also an even greater gap between both of these and the military. It was virtually impossible for a scientist or engineer to accompany radar equipment into combat areas to observe its performance or to assist in training. Although Telefunken was the manufacturer of the Wurtzberg, Urtel was one of the few engineers who ever succeeded in seeing it under operational conditions--this only during the last year.

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4-20-45 cont.

Dr. Engels stated that after Lee DuBridge and I had left on the previous night, the three of them had discussed the surprising closeness of American scientific and military effort as evidenced by our appearance in U. S. Army uniform.

Dr. Engels, who was evidently a Nazi--if not an ardent Nazi, was much concerned over our statement that the Russians, and not the Americans, were about to enter Berlin. He said--rather stupidly, I thought, and without giving any good reason--that the Nazis and Germany had no recourse but to fight on. To me this interview proved to be quite thrilling because we had long been deeply interested in the organization and thinking of the German radar people. It seemed clear, however, that the information which we are likely to get in this field will be primarily of historical importance and can be expected to contribute only an occasional technical detail to our own development effort.

Lee DuBridge and I returned to 19th TAC HQ, talked with Johnny Faulkner and Colonel Glenn Coleman. I then called on General Weyland to explain that it would be desirable to withdraw Faulkner in two to three weeks' time from his Command in order that he might continue work on Pacific radar problems. Weyland was agreeable to this subject to our providing general coverage for his MEW and SCR-584 programs and expressed his appreciation for all the help which BBRL, John Faulkner in particular, had given him. We drove up to Fritzlar, talked with Norm Morrisson and Abbie, and watched the fighter squadrons land and take off at a great rate.

We took off at 3:30 in our C-45 for Namur to pay a brief visit to General Sam Anderson. He pointed out that his Shoran equipment, consisting of three ground stations and fifteen air-borne sets, was being set up to cover the region of the "Redoubt". Oboe still covers some traget areas in northeastern Germany, and SCR-584 was disposed of so as to provide coverage if needed in a target due east of Leipzig. He is completely sold on Shoran although they have had some technical difficulties with it. He stated that their results to date showed a mean circular error of about 700 ft.

We arrived back in Paris about 9:00 p.m.

Saturday
<u>April 21, 1945</u>

Decided that Louise and I would depart for the States on Thursday, April 26, and the two of us went down to ATC to make reservations. At 10 a.m. had doughnuts and coffee at the Red Cross club with Lee and Ray.

In the late afternoon drove Lee out to Widewing. Spent the rest of the day in Paris.

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Saturday, April 21, 1945

East, West, South—Allies Tighten Squeeze on Germans



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Sunday
April 22, 1945

Coffee and doughnuts at the Red Cross Club with Lee DuBridge, Ray Herb, Larry Lawrence, Leo Sullivan, Tom Murrell, and Louise. Tom has come over from the UK to see if he can get a more prompt flight to the States via ATC. Apparently traffic out of the UK is very tight. Returned to the Louvois to get caught up on my daily notes.

After dinner at the mess, left via Pontiac for Chartres with Lee and the two Louises (pure junket). Visited the cathedral and drove about the town. On the trip back to Paris, the good old Pontiac developed peculiar symptoms and finally stopped altogether. Fortunately there were two garage mechanics from Paris in jeeps behind us, who tried to do a roadside repair job. After a few over-optimistic starts, the motor died altogether, and we had to accept a jeep tow all the way into Paris.

After mess, Lee and I held an informal seminar in Room 211 at the Louvois, with most of the ASB-ers present. I gave a short talk on the BBRL deployment plans, and Lee discussed some of the high spots in our recent visit to the TAC's in Germany.

Monday
April 23, 1945

Left at 9:30 a.m. in a C-45 for Malvern with Dave, Lee, and Ray.

In the afternoon our discussion with Jules and the others showed that deployment of BBRL could proceed fully as rapidly as we had plannned, with about 50 per cent of the personnel departing by the 15th of May. Ray Herb is to act as Director of BBRL during the remaining term, and Jerry Tape as his deputy in Malvern. Jules is to leave by the 1st of May. At 6:00 p.m. there was a seminar at which this general deployment program was announced. There was a dance in the evening at the County.

Tuesday
April 24, 1945

Conference in the morning with Gene Hotchkiss and business people of ABL-15 and BBRL at which we agreed on a program of turning over, if possible, all of the assets of the two laboratories to TRE. Walked around the lab in the afternoon looking things over for the last time.

Left from Defford at 5:00 p.m. in the C-45 and dropped Lee DuBridge off at Alconbury. Picked up Dave and returned to Paris at 8:45.

Dinner at the Ritz with Abe Collier and Ray Herb.

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Wednesday
April 25, 1945

Spent the day in Paris except for a few hours at Widewing in the afternoon for a teletype conference with Larry Henderson in the MTO. Our activities are being closed out there in the same way as in the ETO, the closing date being arbitarily set at V-E Day.

Talked with Ed Bowles about the problems of the Pacific and setting up a field service division at the Radiation Laboratory. He described the conflict between present plans of establishing a laboratory under General Kenney.

At 6:00 p.m. there was a cocktail party at the Louvois. After dinner at the mess Louise and I drove to the lab in a jeep along the Seine route. At the lab we assembled the courier package which I am to carry to the States, and cleaned up all unfinished business. Talked a short while with Dick Hodgson, who had just come in from Dijon.

Thursday
April 26, 1945

After various local activities about Paris, including shopping, getting a haircut, visiting the QM Sales Store, etc., drove with Louise over to the Musee Rodin. After a glass of wine at a local pub, we were picked up by Ray Herb, who drove us out to Orly in the jeep. After several hours waiting around at the terminal, we took off at 9:20 p.m. for Prestwick and the good old USA.

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B. J. Thompson, Radio Scientist, Dies on Mission

Killed in Flight on Special Assignment for Stimson in Mediterranean Area

Browder Julian Thompson, associate research director of the Radio Corporation of America laboratories in Princeton, N. J., an expert consultant in the office of the Secretary of War, since December, 1943, was killed during a flight in an Army plane in the Mediterranean area, according to a War Department announcement received yesterday at the R. C. A. offices, 30 Rockefeller Plaza. He was forty years old.

The announcement said that Mr. Thompson, who had been reported missing on July 8, died during the night of July 4 on a special mission for Henry L. Stimson, Secretary of War. The mission was described as of "direct and vital importance to the war."

Mr. Thompson was recognized in the radio industry as one of the nation's foremost radio research specialists, particularly for his contributions to the development of the vacuum tube. Since 1926 he did research and development on broadca' receiving tubes, ultra-high - frequency receiving and transmitting tubes, as well as electron tubes for industrial applications. He also directed work in the field of television tubes.

In 1936 Mr. Thompson was awarded the Morris Liebmann Memorial Prize by the Institute of Radio Engineers for his contributions to the ultra-high frequency field of radio. The acorn tube, extending the useful frequency range far beyond previous practical possibilities, was the result of his research.

Killed on War Flight



Browder Julian Thompson

A native of Roanoke, La., Mr. Thompson was graduated from the University of Washington, in Seattle, in 1925, and for another year he did post-graduate work in electrical engineering. He joined the research laboratory of General Electric at Schenectady, N. Y., and in 1926, where from 1929 to 1931 he was in charge of a group conducting research on radio receiving tube problems.

He was placed in charge of the research section of the research and engineering department of the radiotron division of RCA, in Harrison, N. J., in 1931. He was appointed associate director of the research laboratories in 1940 and when the RCA laboratories were opened in Princeton in 1942 he moved there.

Surviving are his mother, Mrs. Julia E. Thompson; a sister, Miss Marguerite Thompson, and a half-brother, Lieutenant Robert Pitman Thompson.

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Browder J. Thompson

1903–1944

Among the most unfortunate and sorely felt effects of the war upon The Institute of Radio Engineers are the inevitable casualties amongst its membership. Browder J. Thompson, killed in action during a special mission for the Secretary of War, is one of these. Mr. Thompson lost his life on the night of July 4–5, 1944, during a flight in an Army plane in the Mediterranean Theater, while serving as expert consultant in the Office of the Secretary of War and performing a mission described as "of direct and vital importance to the war."

Born on August 14, 1903, in Roanoke, Louisiana, Mr. Thompson received the Bachelor of Science degree in electrical engineering from the University of Washington, Seattle, in 1925. In 1926 he entered the research laboratory of the General Electric Company, where he was engaged in the design and development of vacuum tubes for radio and industrial use. In 1931 he was transferred to the RCA Radiotron Company, in Harrison, New Jersey, in charge of the electrical research section of the research and development laboratory. As a result of his outstanding work with that organization in the development of vacuum tubes of small physical dimensions for ultra-high-frequency uses, Mr. Thompson was awarded the Morris Liebmann Memorial Prize for 1936, with the citation "for his contribution to the vacuum-tube art in the field of very-high frequencies."

From 1942 until he accepted his Government assignment, in December, 1943, Mr. Thompson was associate research director of RCA Laboratories, Princeton, New Jersey. He was recognized as one of America's foremost radio research engineers, including amongst his contributions such important work as guiding the development of the famous "acorn" tube used in ultra-high frequencies, and advances in screen-grid tubes and power pentodes that became mainstays in broadcast reception.

Joining The Institute of Radio Engineers as an Associate member in 1929, he was transferred to Member grade in 1932, and became a Fellow of the Institute in 1938. His association with this organization was a very active one; he served on numerous committees, participated in Standards work, and was a member of the Board of Editors and of the Board of Directors from 1937 until his death. Mr. Thompson was also a member of the American Physical Society, Tau Beta Pi, and Sigma Xi.

As one who had a consistently outstanding record of service to his field and an upright and co-operative personality, Mr. Thompson will be sincerely missed by his friends and associates.

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Dr. Trump and Staff.

I should like to tell you, on behalf of TRE, that our thoughts are with you on Thanksgiving Day. We are not only glad for your sake but for ourselves that the Pilgrim Fathers survived their early ordeals to found a great nation. Perhaps only now do we realise the magnitude of the task which faced these islands when they stood alone in 1940 and I am certain that history will record the hope and inspiration we derived from the sympathy and practical help of the United States in those awful days. Since then the full weight of your supremely powerful country has been given to the common cause. Thus we British at TRE have our share in Thanksgiving Day and trust that God may keep the United States in happiness and prosperity.

A. P. Rowe

Chief Superintendent.

23.11.44.

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Know All Men By These Presents: That we the undersigned members of The Advanced Service Base Laboratory B.B.R.L. - A.B.L. - 15, situated in Paris, France, and extending its activities through all parts of liberated Europe, do hereby GIVE, GRANT and CONVEY to Dr. JOHN G. TRUMP all of our greetings, congratulations, and best wishes on the unqualifiedly successful completion of his appointed task, as Director extraordinary, profound Scholar, intrepid protagonist, leader and inspirer of men, gentleman and friend; intending also to convey hereby memorable of our corporate history at S.F.R., St. Augustin, and The Louvois with its notorious Room 212, together with our unfailing and unlimited loyalty, admiration and affection.

In Token Whereof we have hereunto set our hands and official seal this 25th day of April, 1945



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RESTRICTED

Office of The Area Provost
Marshal, Hq. Command, ETOUSA,
APO No. 871
Date 25 June 1944

SUBJECT: Report of Delinquency.

TO : COMMANDING OFFICER, British Branch Radiation Lab., [illegible]
(Commander, Division or Separate Organization of Offender, APO No.)

THRU :

This report is forwarded for your information and appropriate disciplinary action.

Offender: [illegible], John G. Doctor, (Civilian) As above.
(Name) (Grade) (Serial No.) (Unit)

Offense and circumstances under which same occurred Violation - A.C. 451/2 [illegible] Hq. ETOUSA, 24 January 1944, Sec. XXXIII, Par 3, by speeding at 40 MPH in built up area, in Ton 1937 Passenger Dodge #1827042. Passengers in vehicle were: Dr. [illegible] Street, BBRL, Dr. Ed Miller, BBRL, and Miss O.D. Goldie, Secretary - BBRL. Were enroute from London Office, 117 Park St. to BBRL Laboratory, St. Malvern Wor. BBRL is a civilian organization operating in the ETO at request of Gen. [illegible], [illegible].

Date of offense 23 June 1944 Time Occurred [illegible] Hours.

Place of offense Tewkesbury Road, Cheltenham Glos.

Witnesses Pfc's Leo D. Isom & Marvin [illegible] Hoffman, 255th MP Co., ETOUSA, APO 871

Action taken by Military Police Allowed to proceed.

Case Number 674

TPM FORM 2

John P. Feehan
JOHN P. FEEHAN
Captain, C.M.P.
Provost Marshal

RESTRICTED

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The United States of America

OFFICE OF SCIENTIFIC RESEARCH AND DEVELOPMENT

This is to certify that

J. G. Trump

has participated in work organized under the Office of Scientific Research and Development through the National Defense Research Committee, contributing to the successful prosecution of the Second World War.

On behalf of the Government of the United States of America, this certificate is awarded in appreciation of effective Service.

Office of Scientific Research and Development

James B. Conant
Chairman
National Defense Research Committee

Vannevar Bush
Director

Washington, D.C.

RADIATION LABORATORY MIT CAMBRIDGE MASS. 1940-1945

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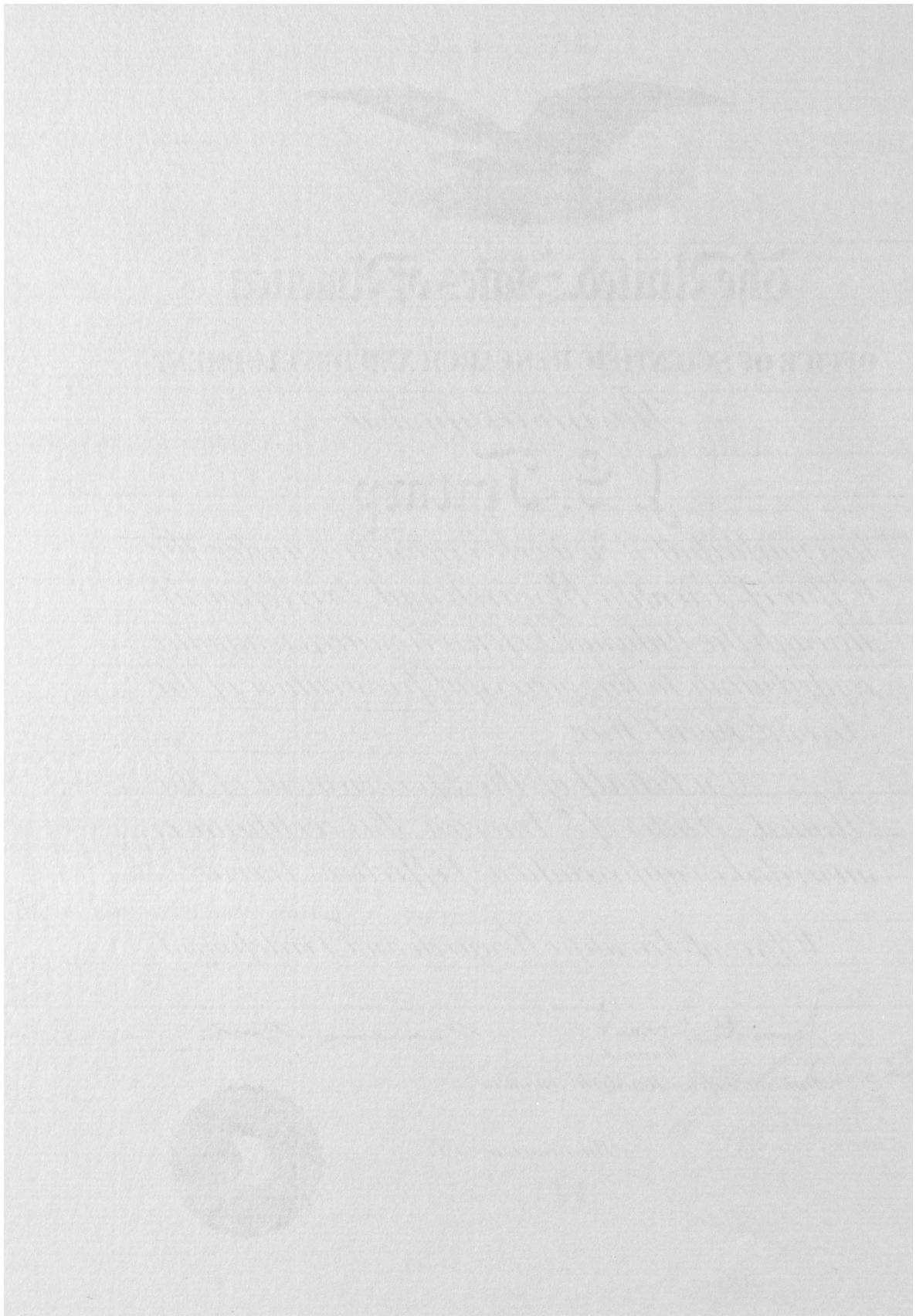

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November 9, 1945

Dear Radiation Laboratory Member:

I take pleasure in forwarding to you this official Certificate of Service from the Office of Scientific Research and Development, which in a small way recognizes the value of your service in the Radiation Laboratory. It does not and cannot express the thing I have always felt: a sense of gratitude for the loyalty and enthusiasm shown by each member of the Laboratory. It was this spirit, more than anything else, that made the Laboratory's contribution in the field of radar so important, and made the Laboratory itself a pleasant place to work and live. Speaking for the Laboratory, I should like to thank you personally for the part you have played and to wish you the best of luck in the years to come.

Sincerely,

L. A. DuBRIDGE,
Director

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NAME		ARRIVAL DATE	DEPARTURE DATE
Abajian, H. B.	✓		Apr. 9, 1944 - London
Abbiati, O.	✓	Oct. 17, 1944 - Malvern	May 23, 1945 - Malvern
Abrams, W. D.	—	Mar. 8, 1945 - Malvern	May 16, 1945 - Malvern
Ahern, C. R.	—	Dec. 16, 1943 - Malvern	June 5, 1945 - Malvern
Anderson, R. D.	✓	Dec. 16, 1943 - Malvern	May 26, 1945 - Malvern
Anderson, T. G.	—	Nov. 1943 - London	June 1944 - London
Bagg, A. G.	✓	Dec. 24, 1943 - Malvern	Aug. 29, 1944 - Malvern
Barnard, H. W.	—	Apr. 25, 1944 - Malvern	May 5, 1945 - Malvern
Beach, H. P.	—	Feb. 8, 1945 - Malvern	May 15, 1945 - Malvern
Belleville, L. M.	—	July 5, 1944 - Malvern	May 17, 1945 - Malvern
Bender, R. S.	✓	Apr. 9, 1945 - Malvern	Detached to May 21, 1945 - OSRD
Bidwell, F. A.	—	Apr. 6, 1944 - Malvern	May 15, 1945 - Malvern
Blackmer, L. L.	✓	Mar 17 1944 London	Aug. 1944 - London
Bohan, Mary F.	—		
Breazeale, W. M.	—	Mar 23. 1944. London	
Brazell, E. H.	✓	May. 25, 1944 - Malvern	May 24, 1945 - Malvern
Brooks, J. A.	—	June 27, 1944 - Malvern	Mar. 9, 1945 - Malvern
Buck, J. H.	—	Sept. 26, 1944 - Malvern	Jan. 11, 1945 - Malvern
Byers, R. C.	✓	June 8, 1944 - Malvern	May 5, 1945 - Malvern
Cave, E. F.	✓	Feb. 10, 1945 - Malvern	May 15, 1945 - Malvern
Chaffee, M. A. (two trips)	✓	Dec. 21, 1943 - Malvern Mar. 22, 1945 - Malvern	Nov. 5, 1944 - London June 4, 1945 - Malvern
Chapman, R. C.	✓	Feb. 8, 1945 - Malvern	May 10, 1945 - Malvern
Chaulk, L. W.	✓	June 18, 1944 - Malvern	May 15, 1945 - Malvern

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NAME	ARRIVAL DATE	DEPARTURE DATE
Christoffersen, A. P.	Feb. 11, 1945 - Malvern	June 16, 1945 - Malvern
Collier, A. T.	Feb. 18, 1945 - Malvern	June 4, 1945 - Malvern
Cook, D. C.	Apr. 20, 1945 - Malvern	May 25, 1945 - Malvern
Cooper, Elizabeth H.	Dec. 10, 1943 - London	Mar. 1944 - London
Cunningham, J. M.	Oct. 20, 1944 - Malvern	May 24, 1945 - Malvern
Dankelson, G. C.	June 8, 1944 - Malvern	Mar. 20, 1945 - Malvern
Davenport, L. L.	Apr. 22, 1944 - London	Aug. 1944 - London
Davidson, D.	Feb. 16, 1944 - London	Dec. 26, 1944 - London
Davies, R.	Mar. 6, 1945 - Malvern	June 5, 1945 - Malvern
Dawson, G. J.	Feb. 28, 1945 - Malvern	May 26, 1945 - Malvern
Dennison, J. T.	Oct. 14, 1944 - Malvern	May 26, 1945 - Malvern
DeSaulniers, Janet	June 8, 1944 - Malvern	Still at BBRL
Diver, B. J.	Feb. 5, 1945 - Malvern	May 17, 1945 - Malvern
Doersam, P. D.	Oct. 11, 1944 - Malvern	May 15, 1945 - Malvern
Dolbeare, Mary E.	Aug. 19, 1944 - Malvern	May 28, 1945 - Malvern
Dorr, R.	Oct. 17, 1944 - Malvern	
Downing, Katherine	Feb. 2, 1945 - Malvern	June 5, 1945 - Malvern
Dunbar, A. S.	Nov. 24 1943 - Malvern	July 12, 1944 - Malvern
Eicher, A. E.	June 19, 1944 - Malvern	On continent at present
Faulkner, J. E.	Nov. 24, 1943 - Malvern	May 21, 1945 - Malvern
Ferchaud, F. E.	July 1943 - London	Feb. 1944 - London
Fillmore, Marion C. (Mrs. Golian)	June 8, 1944 - Malvern	June 20, 1945 - Malvern
Fowler, C. A.	Dec. 12, 1944 - Malvern	May 29, 1945 - Malvern

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NAME	ARRIVAL DATE	DEPARTURE DATE
Freehafer, J. E.	April 9 1944 - London	June 7, 1944 - London
Garfield, J. F.	July 17, 1944 - Malvern	June 7, 1945 - Malvern
Gavriel, S. N.	Oct. 28, 1944 - Malvern	Apr. 23, 1945 - Malvern
Gildutis, Jean H.	Feb. 8, 1945 - Malvern	June 16, 1945 - Malvern
Gilleaudeau, Rebel A.	Apr. 3, 1945 - Malvern	June 5, 1945 - Malvern
Goldie, O. Louise (two trips)	Apr. 10, 1944 - London Nov. 9, 1944 - London	Sept. 3, 1944 - Malvern May 1945
Golian, S. E.	Apr. 11, 1944 - Malvern	June 9, 1945 - Malvern
Goudsmit, S. A.		
Granata, R. C.	Apr. 22, 1945 - Malvern	May 15, 1945 - Malvern
Gray, J. C.	Aug. 4, 1944 - Malvern	May 8, 1945 - Malvern
Guerlac, H. E.	Apr. 29, 1945 - Malvern	June 1945 - Malvern
Guiton, Helen	Apr. 3, 1945 - Malvern	Still at Malvern
Gunst, M. A.	July 19, 1944 - Malvern	June 5, 1945 - Malvern
Hall, H. J.	Nov. 24, 1943 - Malvern	June 5, 1945 - Malvern
Halliday, D.	Sept. 1943 - London	May 17, 1944 - London
Halpern, J.	Oct. 20, 1944 - Malvern	Apr. 27, 1945 - Malvern
Harding, T. M.	Feb. 5, 1945 - Malvern	May 14, 1945 - Malvern
Harris, G. B.	Oct. 30, 1944 - Malvern	May 22, 1945 - Malvern
Hartman, L. A.	June 8, 1944 - Malvern	Mar. 9, 1945 - Malvern
Hayes, W. D.	Mar. 17, 1945 - Malvern	May 29, 1945 - Malvern
Henderson, L. J.	Mar. 17, 1944 - London	Departed from MTO
Henson, C. E.	Jan. 28, 1944 - London	Mar. 13, 1945 - Malvern
Herb, R. G.	Oct. 11, 1943 - Malvern	June 4, 1945 - Malvern

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NAME	ARRIVAL DATE	DEPARTURE DATE
Hexem, J.	Dec. 13, 1943 - Malvern	May 26, 1945 - Malvern
Hibbert, J. J.	May 3, 1944 - Malvern	Jan. 2, 1945 - Malvern
Hillger, R. E.	Dec. 11, 1943 - Malvern	Aug 1944 - Malvern
Hird, R. M.	Dec. 16, 1943 - Malvern	Apr. 30, 1945 - Malvern
Hodgson, A. R.	May 30, 1944 - Malvern	June 5, 1945 - Malvern
Hosier, W. A.	June 12, 1944 - Malvern	May 13, 1945 - Malvern
Huff, G. D.	Apr. 7, 1944 - Malvern	Nov. 9, 1944 - Malvern
Hughes, H. F.	Jan. 18, 1944 - Malvern	Jan. 1944 - Malvern
Innes, I. Helen	Apr. 3, 1945 - Malvern	Still at Malvern
Jacobs, F. C.	Nov. 10, 1943 - Malvern	Dec. 21, 1944 - Malvern
Jeffries, S. P.	July 1, 1944 - Malvern	Still at Malvern
Jordan, Margaret M.	Feb. 16, 1945 - Malvern	Still at Malvern
Jordan, W. H.	Apr. 22, 1944 - Malvern	Nov. 21, 1944 - Malvern
Kelleher, A.	May 29, 1944 - Malvern	May 15, 1945 - Malvern
Kendall, H. C.	May 30, 1944 - Malvern	Mar. 6, 1945 - Malvern
Knight, E. S.	Apr. 10, 1944 - Malvern	May 7, 1945 - Malvern
Laslett, L. J.	Nov. 6, 1944 - Malvern	May 14, 1945 - Malvern
Latady, Joan F.	Sept. 26, 1944 - Malvern	Still at Malvern
Latady, W. R.	Dec. 16, 1943 - Malvern	June 22 1945 - Malvern
Lawrance, R. B.	Dec 9 1943 - London	July 1944 - London
Leachman, R. B.	July 24, 1944 - Malvern	May 22, 1945 - Malvern
Leavitt, N. L.	Jan. 18, 1944 - Malvern	May 26, 1945 - Malvern
Lees, W. A.	Feb. 8, 1945 - Malvern	May 2, 1945 - Malvern

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NAME	ARRIVAL DATE	DEPARTURE DATE
Lindgren, R. A.	Jan. 18, 1944 - Malvern	Oct. 28, 1944 - Malvern
Lyman, E. M.	Oct. 17, 1944 - Malvern	May 1, 1945 - Malvern
Lysell, G.	Apr. 22, 1945 - Malvern	May 15, 1945 - Malvern
Magurn, F. B.	Jan. 18, 1944 - Malvern	May 29, 1945 - Malvern
Mansur, L. C.	Feb. 19, 1945 - Malvern	May 16, 1945 - Malvern
Marshall, L. C.		
Martin, [illegible] R.	Jan 26, 1944 - London	June 6, 1944 - London
Martinelli, E. A.	June 21, 1944 - Malvern	Apr. 30, 1945 - Malvern
Mathison, [illegible] E.	Apr. 22, 1945 - Malvern	May 15, 1945 - Malvern
McCarthy, J. M.	Dec. 13, 1943 - Malvern	Still at Malvern
McCreary, R. L.	Apr. 10, 1944 - Malvern	Jan. 18, 1945 - Malvern
Merman, [illegible] A.	July 18, 1944 - Malvern	May 24, 1945 - Malvern
Miller, [illegible] E.	June 15, 1944 - Malvern	Mar. 24, 1945 - Malvern
Milley, F. C.	May 7, 1945 - Malvern	Still at Malvern
Milley, R. H.	May 29, 1944 - Malvern	June 16, 1945 - Malvern
Mitchell, A. K.	July 3, 1944 - Malvern	June 16, 1945 - Malvern
Moore, K. G.	Oct. 2, 1944 - Malvern	Still at Malvern
Morrisson, N. J.	Jan. 5, 1944 - Malvern	May 24, 1945 - Malvern
Moskey, J. A.	June 27, 1944 - Malvern	Feb. 21, 1945 - Malvern
Murrell, T. A. (two trips)		
O'Brien, J. E.	Jan. 2, 1945 - Malvern	May 15, 1945 - Malvern
Orpin, L. H.	June 8, 1944 - Malvern	May 23, 1945 - Malvern
Palmer, R. E.	Apr. 25, 1944 - Malvern	May 26, 1945 - Malvern

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NAME	ARRIVAL DATE	DEPARTURE DATE	
Platt, J. B.	Jan. 18, 1944 - Malvern	Sept. 24, 1944 - Malvern	
Pollard, E. C.	May 22, 1944 - Malvern	Sept. 21, 1944 - Malvern	
Pooler, Elizabeth	Dec. 15, 1943 - Malvern	Still at Malvern	UK
Preston, W. M.	Mar. 6, 1945 - Malvern	June 2, 1945 - Malvern	UK
Quinlan, J. J.	June 18, 1944 - Malvern	May 15, 1945 - Malvern	UK
Rawcliffe, A. S.	Dec. 1, 1943 - Malvern	May 29, 1945 - Malvern	Cont.
Reece, Bette M.	July 18, 1944 - Malvern	May 15, 1945 - Malvern	
Reeder, R. H.	Apr. 4, 1945 - Malvern	May 10, 1945 - Malvern	
Rupert, G. N.	June 12, 1944 - Malvern	May 28, 1945 - Malvern	UK
Sawyer, Mary F.	Dec 22. 1943 - Malvern	July 4. 1944 - Malvern	
Schneider, E. G.	Ma. 14. 1944 - London	Aug. 1, 1944 - London	
Schott, G. D.	Nov. 20, 1944 - Malvern	On continent at present	Cont.
Schwann, W.	July 18, 1944 - Malvern	May 18, 1945, Malvern	
Shaw, H. F.	Mar. 8, 1945 - Malvern	May 16, 1945 - Malvern	
Simmons, S. J.	Apr. 7, 1944 - Malvern	Oct. 9, 1944 - Malvern	
Smith, G. H.	Nov. 8, 1944 - Malvern	May 17, 1945 - Malvern	
Smith, W. R.	Nov. 30, 1944 - Malvern	May 14, 1945 - Malvern	UK
Smith, W. V.	Dec. 5, 1943 - Malvern	May 15, 1945 - Malvern	UK
Sterling, J.	Dec. 9, 1944 - Malvern	May 22, 1945 - Malvern	UK
Street, J. C.	Apr. 10, 1944 - Malvern	Oct. 30, 1944 - Malvern	
Sullivan, L. J. (two trips)			Cont.
Tape, G. F.	Oct. 11, 1944 - Malvern	May 30, 1945 - Malvern	UK
Temple, R. K.		June 14, 1944 - London	

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NAME	ARRIVAL DATE	DEPARTURE DATE
Thompson, W. S.	Apr. 9, 1945 - Malvern	
Tiffany, O. L.	Dec. 30, 1944 - Malvern	May 6, 1945 - Malvern
Tobey, A. R.	June 8, 1944 - Malvern	May 18, 1945 - Malvern
Trump, J. G. (two trips)		
Turner, E. H.	Apr. 4, 1945 - Malvern	May 15, 1945 - Malvern
Vissers, M.		May 17, 1944 - London
Watt, B. E.	Mar. 25, 1944 - Malvern	Nov. 8, 1944 - London
Webster, R. G.	Jan. 1944 - London	Apr. 29, 1944 - London
Weiss, H. G.	Sept. 1943 - London	
West, C. F. (two trips)	July 1943 - London	July 1944 - London
West, S. F.	Apr. 20, 1945 - Malvern	May 25, 1945 - Malvern
Whitmer, R. H.	Apr. 23, 1945 - Malvern	June 22, 1945 - Malvern
Winston, Louise G.	Dec. 15, 1943 - Malvern	May 26, 1945 - Malvern
Woodward, R. H.	Oct. 17, 1944 - Malvern	May 7, 1945 - Malvern
Worth, E. L.	Dec. 11, 1943 - Malvern	May 26, 1945 - Malvern
Zaffarano, F. P.	Oct. 1, 1943 - London	May 22, 1945 - Malvern

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COMPANY MEN ASSIGNED TO DEBL

NAME	ARRIVAL DATE - London	DEPARTURE DATE - London
Albrecht, A. F. (Gilfillan Bros.)	Sept. 25, 1944	May 8, 1945
Beitel, L. D. (Western Electric Co.)	Feb. 22, 1945	May 13, 1945
Bohstedt, R. B. (Philco Corp.)	Apr. 7, 1945	Jan. 14, 1945 - 1st trip May 21, 1945 - 2nd trip
Borer, A. J. (Western Electric Co.)	Dec. 30, 1944	May 5, 1945
Brower, H. (Philco Corp.)	Apr. 18, 1944	Nov. 8, 1944
Brashear, R. (Philco Corp.)	Mar. 6, 1945	May 21, 1945
Brost, R. (Philco Corp.)	Apr. 18, 1944	Nov. 8, 1944
Brown, W. (Philco Corp.)	Dec. 11, 1944	May 21, 1945
Cherry, R. B. (Philco Corp.)	May 29, 1944	Dec. 20, 1944 (about)
Crabb, T. G. (Philco Corp.)	Apr. 4, 1945	May 1, 1945
Dunn, H. O. (Western Electric Co.)	May 30, 1944	Dec. 2, 1944
Ebenhahn, G. (Radio Corp. of America)	Apr. 20, 1945	May 26, 1945
Fitzgerald, C. E. (Philco Corp.)	May 29, 1944	Mar. 13, 1945
Fletcher, W. B. (Radio Corp. of America)	Sept. 25, 1944	May 27, 1945
Foote, C. K. (Philco Corp.)	Mar. 4, 1945	May 1945
Gallegos, L. A. (Philco Corp.)	April 22, 1945	May 21, 1945 (about)
Greer, W. (Philco Corp.)	Oct. 9, 1944	Apr. 17, 1945
Haartje, R. J. (Philco Corp.)	Apr. 4, 1945	May 1, 1945
Kulp, R. (Philco Corp.)		Sept. 25, 1945
Kuyken, W. (Philco Corp.)	Mar. 6, 1945	May 13, 1945 (about
Lawrence, W. L. (Radio Corp. of Am.)	Dec. 25, 1944 (about)	June 3, 1945
Linville, D. B. (Philco Corp.)	Nov. 9, 1944	May 23, 1945
Matwijczyk, J. J. (Philco Corp.)	Feb. 24, 1945	May 22, 1945

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NAME	ARRIVAL DATE - London	DEPARTURE DATE - London
Meagher, J. (Radio Corp. of America)	Apr. 10, 1944	Dec. 22, 1944
Merryman, M. (Philco Corp.)	Oct. 9, 1944	Apr. 17, 1945
Newsom, H. V. (Philco Corp.)	Mar. 11, 1945	May 21, 1945
Odishaw, H (Westinghouse Elec. & Mg. Co.)	Mar. 29, 1945	June 24, 1945
Porter, W. (Gilfillan Bros.)	Mar. 30, 1945	On continent
Pollow, D. (Philco Corp.)	Apr. 4, 1945	May 1, 1945
Redmond, D. (Philco Corp.)		Nov. 23, 1944
Rich, H. (Philco Corp.)	May 6, 1944	May 26, 1945
Ruditis, W. (Philco Corp.)	Nov. 10, 1944	
Sanders, J. (Philco Corp.)	June 17, 1944 (about)	Dec. 2, 1944
Shank, R. J. (Western Elec. Co.)	Mar. 22, 1945	
Smith, W. J. R. (Philco Corp.)	Nov. 9, 1944	May 29, 1945
Tretter, . (Radio Corp. of Am.)	Feb. 1, 1945 (about)	May 27, 1945
Walker, C. (Philco Corp.)	May 7, 1944	Dec. 2, 1944
Wilson, C. (Philco Corp.)	Oct. 9, 1944	Apr. 25, 1945

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T. J. Keary

L. Hollingsworth

S. McGrath

G. Valley

D. Kerr

J. Pierce

W. B. Nottingham

D. H. Ewing

Leverenz

Danforth

Ridenour

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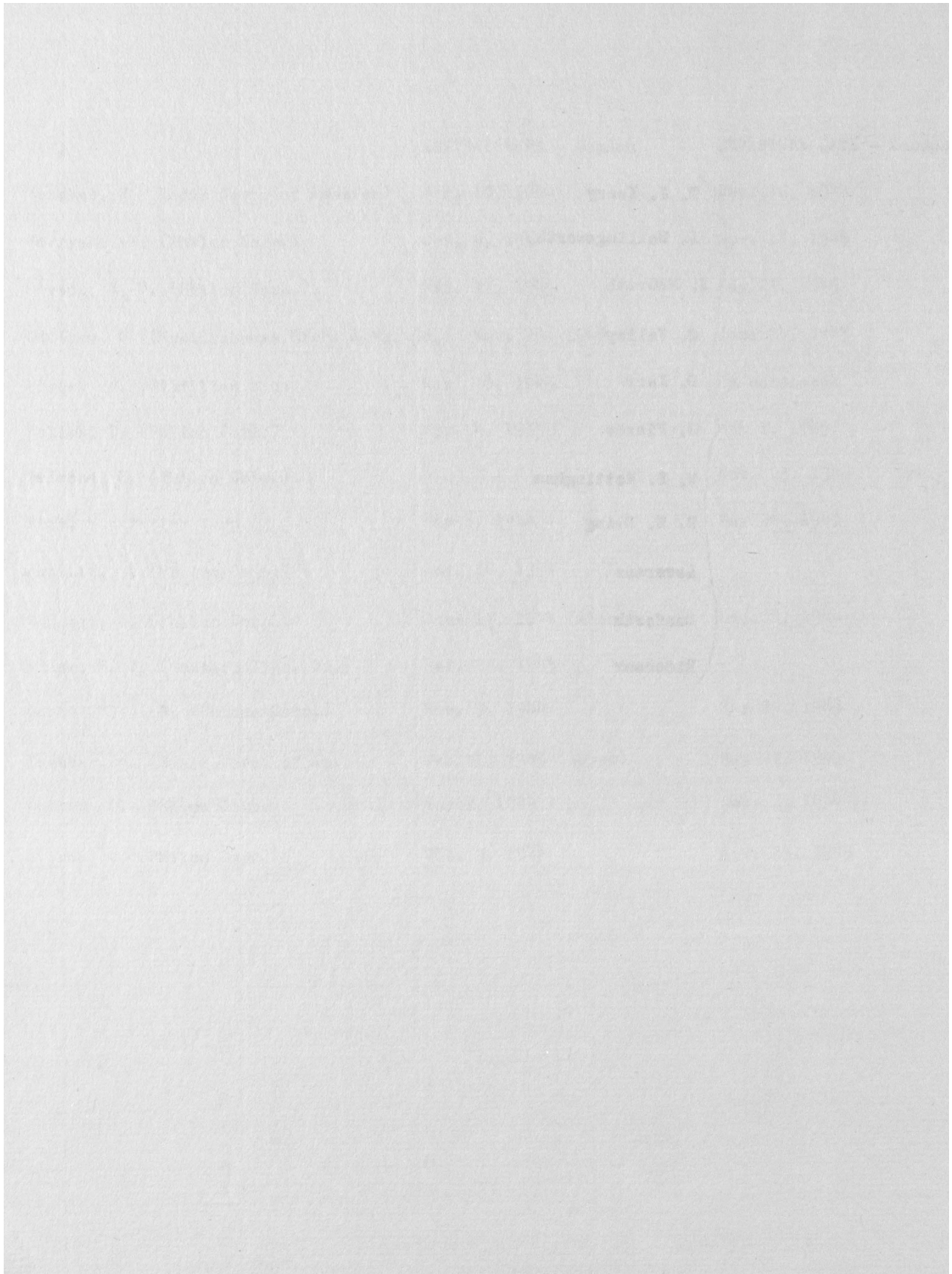

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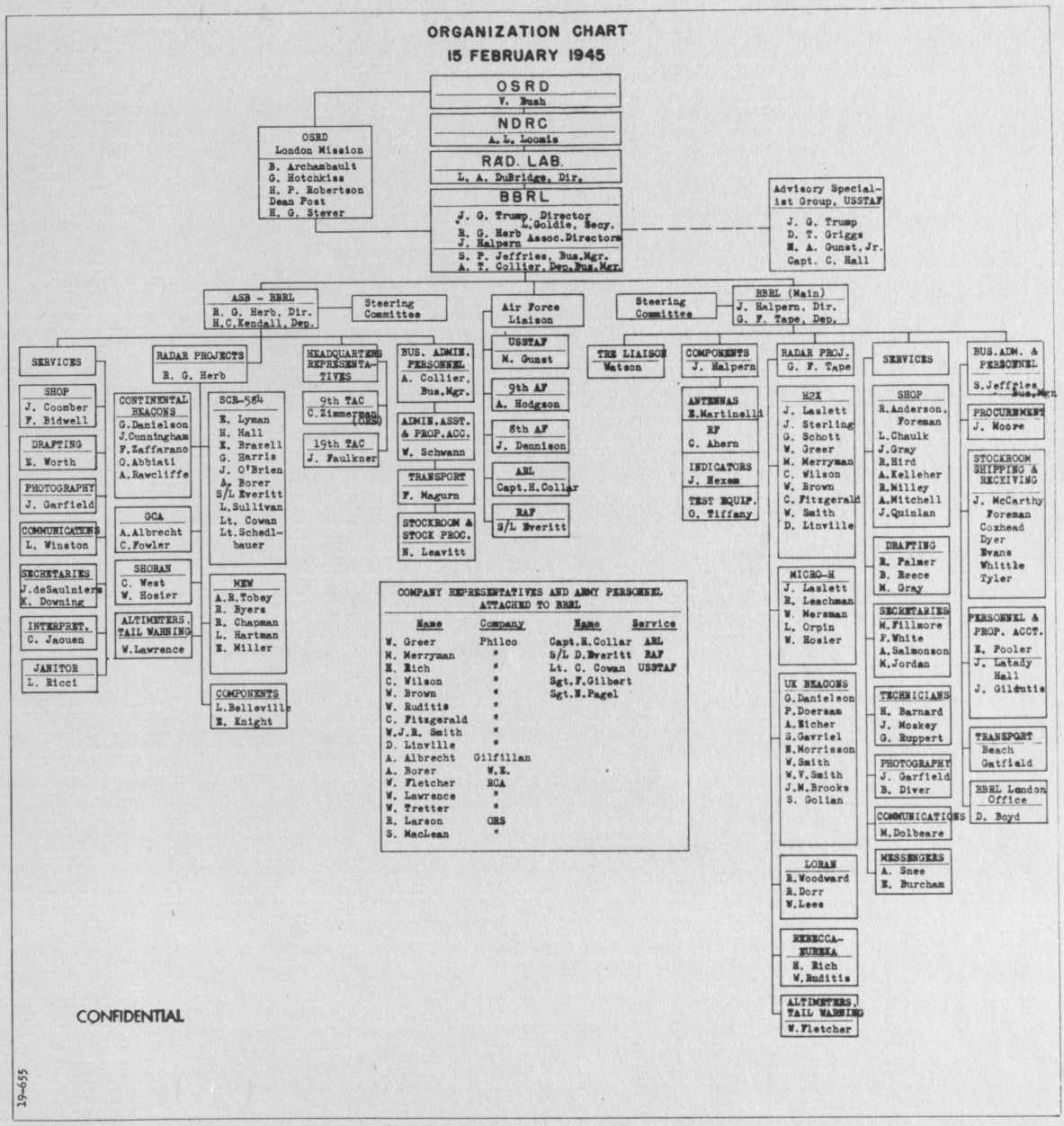

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