THE FOLLOWING INFORMATION HAS BEEN OBTAINED FROM P/W AS THE STATEMENTS HAVE NOT AS YET BEEN VERIFIED, NO MENTION OF THEM SHOULD BE MADE IN INTELLIGENCE SUMMARIES OF COMMANDS OR LOWER FORMATIONS, NOR SHOULD THEY BE ACCEPTED UNTIL COMMENTED ON AIR MINISTRY INTELLIGENCE SUMMARIES OR SPECIAL COMMUNICATIONS.

WASSERMANN (KLEIN HEIDELBERG) AT ABBEVILLE/VAUDRICOURT.

1. The following information has been obtained from a 20 year old Obergefreiter of 14/Flugm-Mess/Ln.Regt.(Mot)52, who had been at the Radar site at Vaudricourt from April 1943 until August 1944. During the greater part of this period he served as a Würzburg operator, but in June 1944 he was transferred to a specially adapted Wassermann Gerät which had been erected some distance away on the same site.

2. This special apparatus, known as "Klein Heidelberg", was manned by 14 men. According to a previous P/W from Vaudricourt the present P/W, who was responsible for routine servicing, was the most knowledgeable of this squad. This does not mean as much as it implies, however, since none of the men had been given more than perfunctory instruction in the operation and servicing of the apparatus, and such knowledge as they had gained was acquired mainly haphazard from engineers who visited the site from time to time. P/W's knowledge, therefore, was not very comprehensive, but he ultimately became a willing subject for interrogation, and the information which he has given is considered to be reliable.

3. P/W states that the apparatus at Vaudricourt was equipped with receivers only. It had no transmitter, and its operation depended upon reception of the echo from air targets of British ground radar transmission. The distance between the British transmitter selected and the station at Vaudricourt was known, and the length of the path from the transmitter to the aircraft and thence to the Klein Heidelberg receiver could be determined. Once this had been done, the position of the aircraft on this path could be established by taking a bearing.

4. To this extent the information obtained from a previous P/W from Vaudricourt is confirmed, but the present informant emphatically denies the previous P/W's statement that it was possible to measure height.

HISTORY OF KLEIN HEIDELBERG AT VAUDRICOURT.

5. On his arrival at Vaudricourt in April 1943, P/W saw that a Wassermann aerial array and the component parts for the chimney were lying at the site. During November 1943 the chimney components were cleaned, painted and assembled, and by the end of that month the chimney had been erected. The Wassermann aerial array was never fitted up, and was still lying on the ground when the site was evacuated in August 1944.

6. In May 1944 a special aerial array, which is described later in this report, vas mounted on the chimney. At the beginning of June an

A.E.G. Steuerungs-Gerät (Control Box) was installed in the Wassermann bunker, and about mid-June a so-called "Klein Heidelberg Gerät" was installed. The latter consisted of a presentation screen (referred to as the Wächter Gerät), two V.H.F. receivers, a Synchronisation-Gerät (locking unit) and a Netz Anschluss Gerät (Power Pack).

7. About the middle of July the present P/W was promoted to the job of servicing the apparatus and after he had been given two days training under the supervision of a Flieger Ingenieur and a civilian engineer from the Reichspost, he was also made chief operator. He was told that the Reichspost engineer concerned (whose name he did not know) had been mainly responsible for the development of the Klein Heidelberg Gerät.

8. During June and July 1944, when the first tests were being made with the Klein Heidelberg Gerät, transmissions were used from a number of British Radar stations strung out along the S.E. coast of England, but when operations started in earnest at the beginning of August the number of British stations used was confined to three, which were on bearings of 306°, 325° and 348° respectively from Vaudricourt.

9. After a few days of operations it was found that the station on a bearing of 325° gave unsatisfactory results - largely because the zero blip could not be firmly locked - and its use was discontinued; of the remaining two stations, that on 306° was mostly used.

10. P/W believes that the reason for using only these stations was merely one of operational convenience, since they were geographically very suitably placed for the plotting of the air activity between the South of England and the battle area.

11. The impression given by P/W is that the apparatus was still under development, and that although it was in the later stages used operationally, its activity was to a large extent experimental. He believes that two other apparatus operating on similar principles were in existence, but he did not know where they were situated.

12. It appears that it was originally intended to have aerial arrays for both Klein Heidelberg and Wassermann mounted on the same chimney, and the necessary apparatus for both types of search equipment installed in the bunker. Had this intention been carried into effect, P/W had been told that the Wassermann would have been used under normal conditions, and a transfer made to the Klein Heidelberg if the Wassermann were jammed or gave unsatisfactory results.

13. On August 27th orders were received to dismantle the Klein Heidelberg at Vaudricourt and to blow up the chimney and bunkers. These orders were duly carried out; such equipment as could be moved was loaded on lorries, the rest was destroyed, and the site was abandoned at the end of August.

DESCRIPTION OF APPARATUS.

14. The general layout of the Wassermann site is shown in Sketch I. Sketch II gives an impression of the aerial array, while Sketches III and IV and their accompanying keys show details of the apparatus installed in the underground bunker, with the exception of the A.E.G.

Steuerung (Control Box), which was of standard design and has, therefore, been omitted.

15. The arrangement of the different pieces of apparatus within the bunker followed no fixed plan and was altered from time to time. The units were interconnected with loose cables of sufficient length to enable them to be moved about freely.

Aerials.

16. An impression of the special aerial array mounted on the Wassermann chimney appears in sketch II. It consisted of three vertical aerials mounted in front of a reflector, some 35 x 19 metres in size, of 20 cm. square tire mesh. Each of the three vertical aerials consisted of a pair of 3 mm. gauge copper wires, held approximately 6-7 cm. apart by means of horizontal porcelain rods at intervals of about 50 cm., and forming a spiral by being twisted through 180° about once every 6 metres of their length.

17. In addition to this main aerial mounted on the chimney, there was a supplementary aerial a short distance away, consisting of a dipole slung between two posts some 20 metres apart and 7-8 metres high. This latter aerial was used to pick up the pulses from English stations for the locking receiver.

Wächter Gerät.

18. The presentation unit, known as the Wächter Gerät, is shown in detail in Sketch III and its accompanying key. It was contained in a rather primitive box, the front panel of which was about 80 cm. high and 60 cm. wide, and included two Cathode ray tubes, about 12 cm. in diameter, side by side. These tubes were identical in appearance, but the right-hand tube was 20 times more sensitive than that on the left.

V.H.F. Receivers.

19. There were two V.H.F. receivers placed one above the other in the bunkers (sketch IV). They were exactly similar in every respect; the upper receiver was connected to the special frame aerial on the chimney and was referred to as the "Peil Empfänger" (D/F Receiver), while the lower receiver, the locking receiver, was connected to the auxiliary aerial.

20. When changing over from one English station to another, it was necessary to tune both receivers in to the new frequency. There was a separate calibration graph for each receiver, showing vertically the range of frequencies used by English transmitters and horizontally the divisions on the scale of the receiver itself.

21. A map of Southern England was marked with the positions and frequencies of the British Radar transmitters, and when the Klein Heidelberg operator wished to tune in to a given station he obtained its frequency from the map, and by means of the curve on the calibration chart he was able to read off at a glance the requisite setting for the V.H.F. receiver.

Synchronisations-Gerät.

22. The Synchronisations-Gerät (Locking Unit) was contained in a small box depicted in Sketch IV. This piece of apparatus was never touched by the operators, and the pointer (8) remained permanently turned to "Mit", i.e. "with synchronisation".

METHOD OF OPERATION.

23. The sector through which the Klein Heidelberg at Vaudricourt normally searched was between bearings of 250 and 360 degrees, and was referred to as the "Sea Sector". When contacts were made inside this sector they were followed beyond it as far as possible unless the operator received orders to the contrary from the controlling officer in the central "A" (interpretation bunker). It was forbidden to turn the aerial through more than 360° in order to avoid undue strain on the cable connections.

24. The display was switched on by means of the on/off switch on the Wächter Gerät (Sketch III, No. 3), whereupon a circular trace appeared on each of the two Cathode ray tubes.

25. The indication on the tubes consisted of radial blips deflecting outwards from the circular trace; far more blips appeared in the left-hand than in the right-hand tube. The blips, which were those of British transmitters, wandered round the tubes mostly in an anti-clockwise direction.

26. The knob marked "Stärke" on the D/F receiver (Sketch IV, No. 6) was turned back until only one blip remained in the left-hand tube. this remaining blip was allowed to wander round the tube until it reached zero whereupon it was locked by means of the coarse adjustment knob (Sketch III, No. 17), after which the left-hand tube was no longer used.

27. It sometimes happened that two blips of almost equal size appeared in the left-hand tube. When this occurred the "Stärke" knob on the D/F receiver was manipulated in the usual way, but on occasion considerable difficulty was experienced in eliminating the smaller blip. It never occurred that two blips were of exactly the same size.

28. Once the blip in the left-hand tube had been locked at zero, the corresponding blip in the right-hand tube should also have been at zero, but in practice there was always some discrepancy between the coarse and fine readings. The operator, therefore, waited until the fine reading blip also reached zero and then locked it by means of the fine adjustment knob (Sketch III, No. 18), the apparatus was then ready for searching, the right-hand tube being used for this purpose.

29. When a contact was first obtained, the target blip was usually very short, sometimes standing up not more than a few millimetres from the circular trace. As the aerial was turned in the direction of the target the blip gradually lengthened until at maximum, and when the target was not too distant, it ran off the tube.

30. The length and width of the blip were also dependent upon the size of the target, and if the latter consisted of only a small number of

aircraft it was difficult to obtain a blip of reasonable size. Short blips could be lengthened by means of the knob marked "Stärke" on the V.H.F. receiver (Sketch IV, No.6), but if this was overdone considerable "grass" appeared on the screen.

31. It frequently happened that the target blip was broader than that shown in sketch III, and on occasion a blip was obtained which completely covered a large sector of the tube from say 10 to 20. When this first occurred, the operators assumed that they had picked up a very large formation of aircraft, but this proved to be incorrect and the phenomenon was attributed to some form of disturbance for which no explanation was ever found.

32. Once a contact had been obtained, the operator's greatest difficulty was to hold the blips steady. It frequently happened that before a reading could be taken the zero blip, followed by the target blip, would begin to wander round the tube; when this occurred, the operator had to wait until the zero blip was back in the vertical position and locked again before he could once more attempt to take a reading from the target blip.

33. One of the main causes of blips wandering was small variations of voltage. Attempts had been made to cure this by means of a voltage regulator, but without success.

34. When the target aircraft were in what P/W called the "dead" area directly between the British transmitter and Vaudricourt, the Klein Heidelberg operator switched over to the second British transmitter used. It took an efficient operator about 4/5 minutes to effect the switch-over and be ready once more for operations.

I.F.F. and Window

35. P/W had never seen any I.F.F. signals on the presentation screen and he knew nothing of the effect, if any, of window.

PLOTTING.

36. A number of 1:300,000 maps were available in the operations bunker, one for each British station used. On each map were marked the positions of the transmitter and of the Klein Heidelberg at Vaudricourt and 40 ellipses, one for each division on the Cathode ray tube; the largest of the ellipses, P/W believes, crossed the English coast near the Humber and passed in the vicinity of Nancy. A pointer was affixed to the map with its centre at Vaudricourt.

37. When the target blip became steady in the C.R. tube and had been brought to its maximum length, the operator called out the bearing, read from the scale on the A.E.G. Steuerung, followed by the reading from the scale on the C.R. tube.

38. The plotter then turned the pointer centred at Vaudricourt to the appropriate bearing, and the point at which the pointer intersected the ellipse corresponding to the number read off the C.R. tube was the position of the target aircraft. This position was passed through to the

"A" Bunker by telephone, the normal aircraft reporting grid being used for the purpose.

PERFORMANCE.

39. The theoretical range of the Klein Heidelberg is 600 km. but P/W maintains that the most distant contact which he had measured with any success was at a range of 345 km.

40. A report had to be rendered to the "A" Bunker at 1700 hours each day giving the maximum range achieved during the preceding 24 hours, and as far as P/W can recollect, the figure was on average between 300 and 350 km.

41. The results obtained left much to be desired in point of accuracy, and P/W quotes numerous instances in which the operator had obtained a contact and passed a position through to the "A" bunker only to be told a few minutes later that there were no aircraft in the area concerned.

42. P/W maintained that the accuracy of the Klein Heidelberg in azimuth was not greater than ±10°. The size of the target was also difficult to estimate, and it was only seldom that estimates of size of formations made by the "Heidelberg" operator agreed with those obtained by other means.

ALLIED ATTACKS.

43. According to P/W, Allied attacks on the Radar site at Vaudricourt commenced on 24th April with a high-level bombing attack which damaged telephone wires, including those of the one Freya. Subsequent attacks with cannon fire completed the destruction of the Giant Würzburg, but no other significant damage was caused. A number of M.G. strikes were scored on the chimney but these in no way affected its operation.

44. As far as P/W knew, no damage had been caused by rockets and in his opinion cannon fire was the most effective method of attack against ground Radar targets

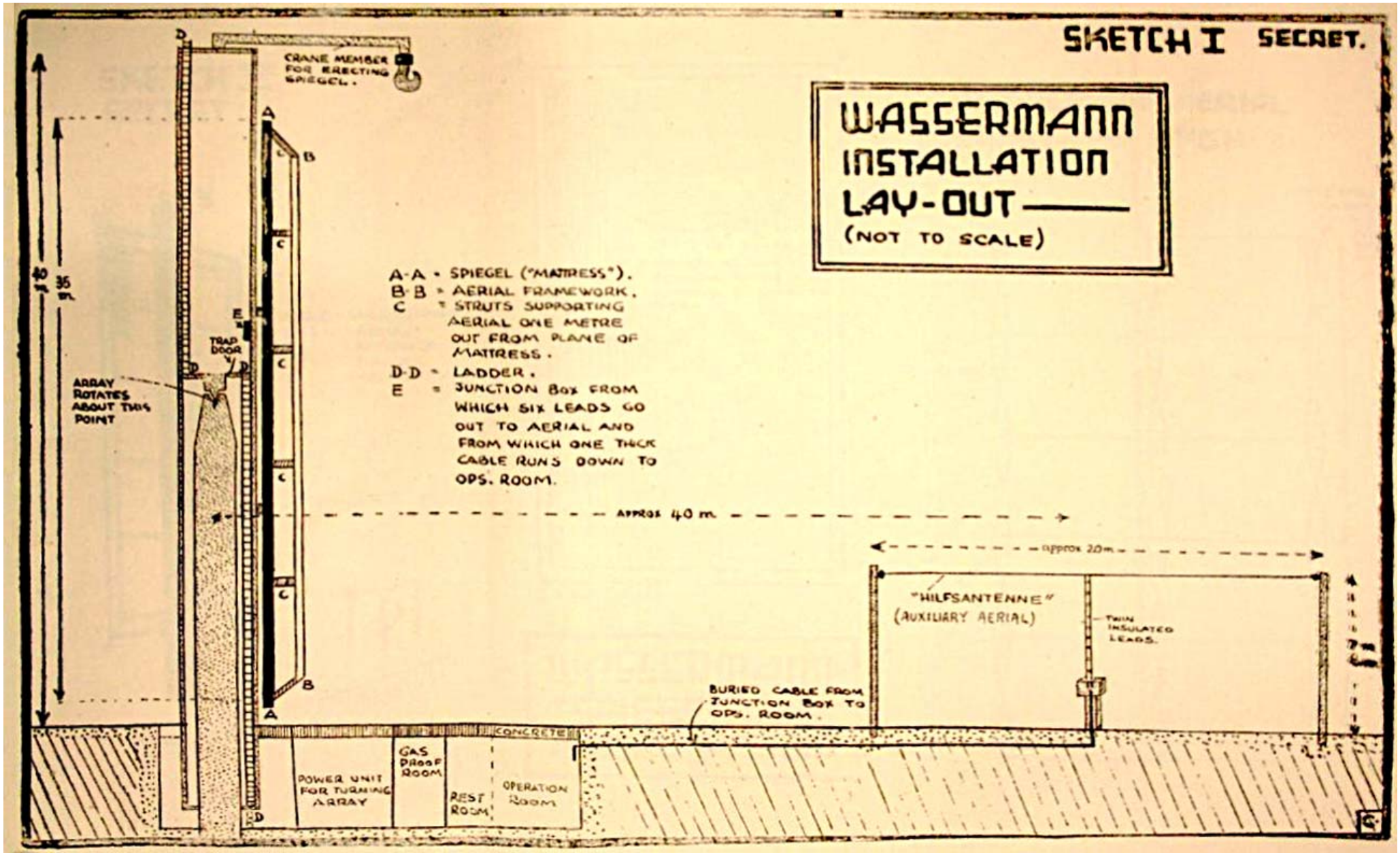
A.D.I.(K) and
U.S. Air Interrogation.
20th December, 1944.

S.D.Felkin,
Group Captain.

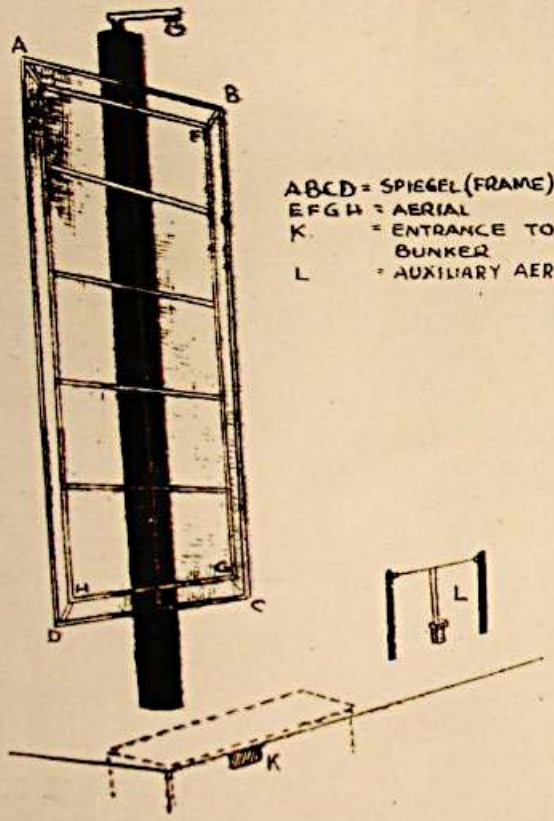
SKETCH I SECRET.

WASSERMANN INSTALLATION LAY-OUT

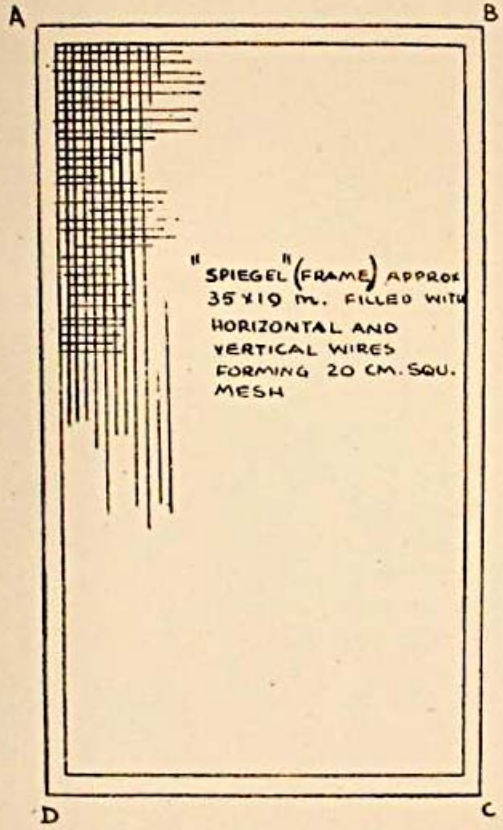
(NOT TO SCALE)



SKETCH II
SECRET



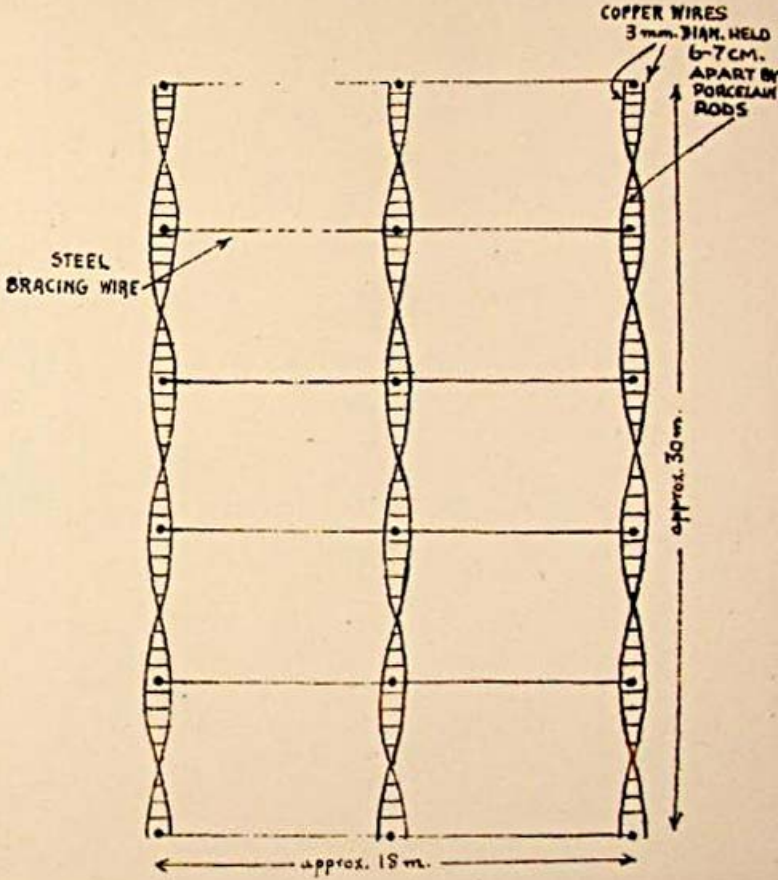
ABCD = SPIEGEL (FRAME)
EFGH = AERIAL
K = ENTRANCE TO BUNKER
L = AUXILIARY AERIAL



"SPIEGEL" (FRAME) APPROX 35 X 19 M. FILLED WITH HORIZONTAL AND VERTICAL WIRES FORMING 20 CM. SQU. MESH

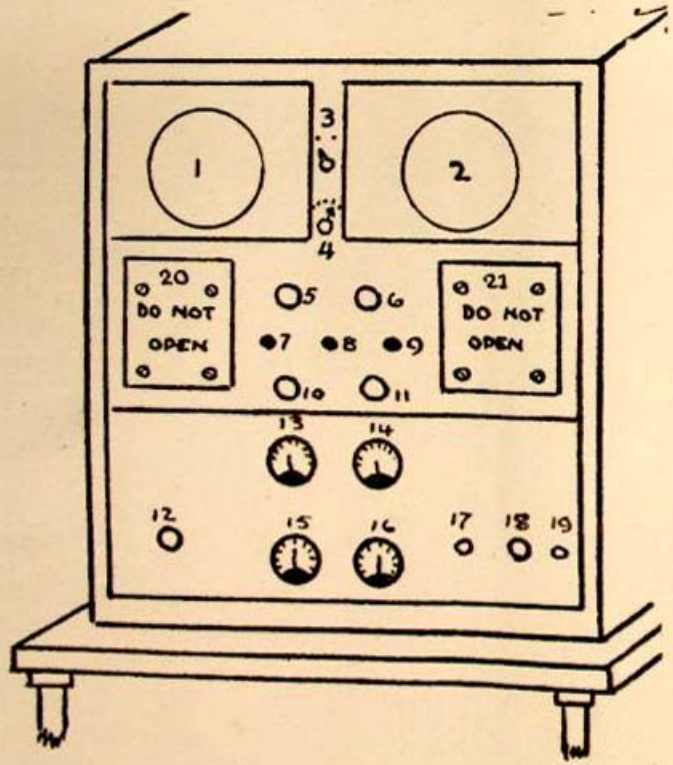
WASSERMANN "SPIEGEL" AND AERIAL SYSTEM

DETAILS OF AERIAL ARRAY — EFGH :



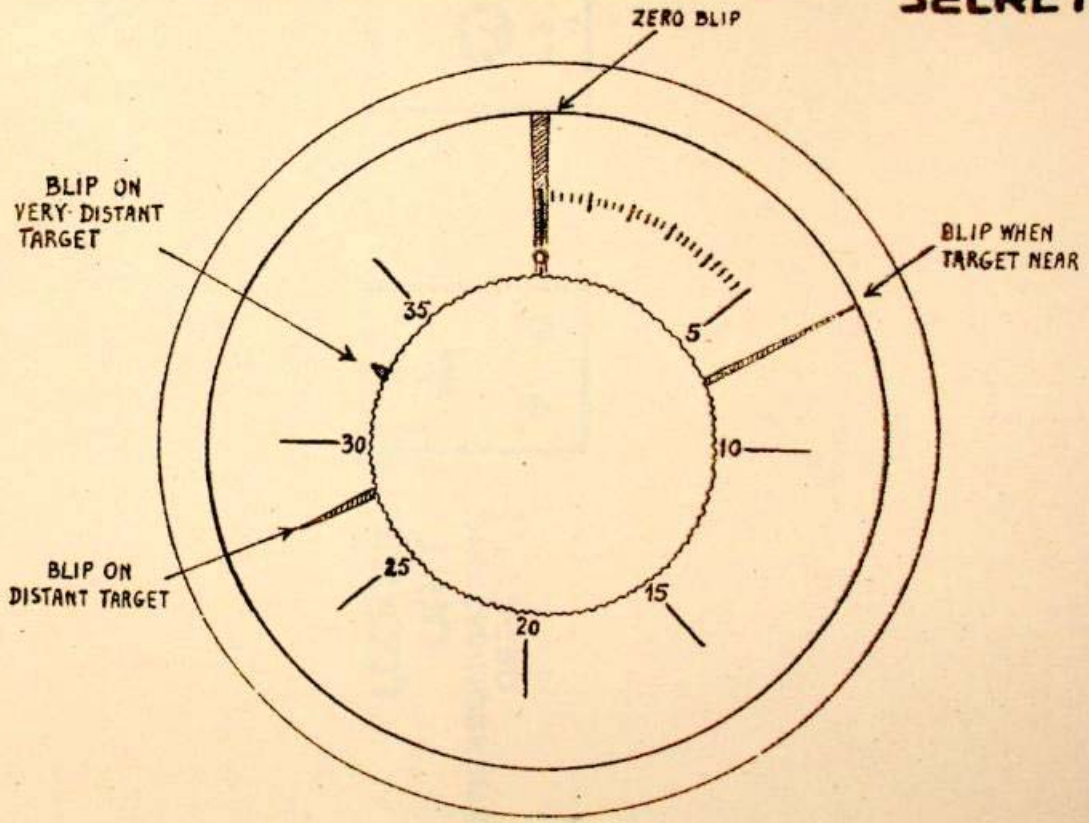
SKETCH III
SECRET :

WAECHTER GERÄT



PRESENTATION SCREEN

SKETCH III
SECRET.



KEY TO SKETCH III.

1. Cathode ray tube for coarse adjustment of zero blip. This tube was referred to as the "Übersichtsrohr" and was used only when the blip of the transmitter was being locked in the zero position prior to operations. No readings were taken from the tube during operations.

2. Cathode ray tube referred to as "Beobachtungsrohr". This tube was used for measuring targets, and was 20 times more sensitive than tube (1).

3. On/Off switch.

4. Scale and movable pointer. On the scale were marked some 6-8 positions, but when the apparatus was in use the pointer was turned always to the position on the extreme right of the scale, which was marked in red and was referred to as the Betriebsstellung (Operating position). Contrary to instructions, P/W had turned the pointer backwards and noticed that for each position on the scale a differently shaped trace was formed on the Cathode ray tube.

5. Control of Helligkeit (Brilliancy) on left-hand C.R. tube.

6. Control of Helligkeit (Brilliancy) on right-hand C.R. tube.

7.)
8.) Lights which glowed red when apparatus was switched on by means of
9.) (3)

10. Control of Schärfe (Blip definition) on left-hand C.R. tube.

11. Control of Schärfe (Blip definition) on right-hand C.R. tube.

12. This knob was marked "Phase" and was used only by visiting engineer when calibrating the apparatus.

13.)
14.) Metres for measuring electric current.
15.)
16.)

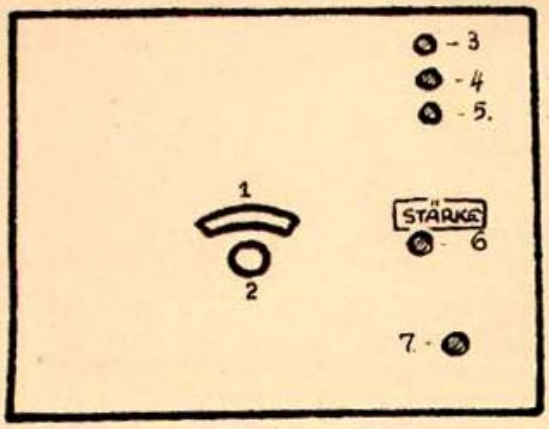
17. Knob for coarse adjustment of transmitter blip.

18. Knob for fine adjustment and locking of transmitter blip.

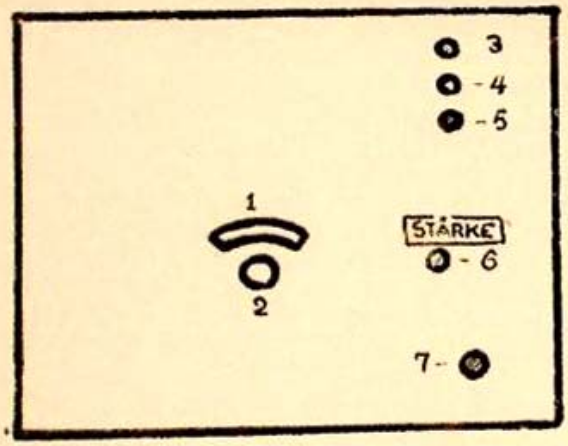
19. This knob was used only by engineer when calibrating the apparatus. P/W believed it was used in connection with knob (12).

20. Box on the inside panel of which were four screws as shown These screws were turned by means of a screwdriver to make the circular trace on the left-hand C.R. tube symmetrical and of the correct size.

SKETCH IV
SECRET :



V·H·F· RECEIVER CONNECTED TO AERIAL on CHIMNEY



V·H·F· RECEIVER CONNECTED TO AUXILIARY AERIAL

LOCKING UNIT: ("SYNCHRONISATIONS GERÄT")

POWER PACK:

SECRET.

KEY TO SKETCH IV

1. Movable frequency scale, adjusted by means of knob (2).

2. Knob for adjusting frequency.

3.)
4.) Cable connections.
5.)

6. Knob marked "Stärke" (Size) which controlled the size of the blips on both C.R. tubes.

7. Cable connection.

8. Switch for "with" and "without" synchronisation. This switch was permanently turned to "with", i.e. with synchronisation.

9.) Knobs which were never used and the function
10.) of which was unknown to P/W.

11. Voltmeter.

12. On/Off switch.