Directory of the Palestinian Photo Holdings of the Bavarian War Archive

Andreas Evaristus Mader
S.D.S.

Translated from German by
Carol Khoury

Figure 1. Pater Evaristus Mader (1881–1949) in 1936. He was born in Bavaria, Germany, and joined the Societas Divini Salvatoris (S.D.S.) in Berlin-Waidmannslust at the age of 14. In October 1911 he went to Jerusalem to research ancient Canaanite sacrificial sites and to prepare a multivolume topographical and archaeological description of the Holy Land. In 1917, he became a field chaplain during the First World War. His grave at Waldfriedhof cemetery in Munich, where the Salvatorians are buried, bears the inscription he requested: "For the sake of Sion I will not keep silent. For love of Jerusalem, I do not rest." Online at (salvatorianer.de) tinyurl.com/vxvjrqo (accessed 19 January 2020).–Trans..

Editor's Note:
The excerpts below are from the "Directory of the Palestinian Photo Holdings of the Bavarian War Archive" in Gustaf Dalman's *Hundert deutsche Fliegerbilder aus Palästina* (One Hundred German Aerial Photographs from Palestine) (Gütersloh, Germany: C. Bertelsmann, 1925).

Introduction

Although the World War had a devastating effect on Palestine, it nonetheless greatly promoted the exploration of the country, with cartography receiving the lion's share. While studies on geology, meteorology, archaeology, epigraphy, topography, settlement, and habitation science have already been published, we can still expect more.[1]

But warfare has given to Palestine studies a treasure of outstanding value that

would otherwise not have been available so recently: an archive of aerial photographs of almost all parts of the country. The German Air Force divisions 300–305 have taken many thousands of aerial photographs on the Palestinian front. There are 2,662 photographs by the Bavarian Air Force division 304 (Squadron 304) alone, which this Directory discusses. According to statements by the officials, only a remnant of those photographs could be saved during the retreat; the bird's-eye view photographs show us the remarkable country. At my instigation, das Bayerische Kriegsarchiv in München [Bavarian War Archive in Munich] has generously decided to open up this treasure trove of photographs, and to make it accessible for Palestine studies.

Until now, we have toured the Holy Land on horseback or by carriage, travelled by ship along the Mediterranean coastline, by rail from Jaffa to Jerusalem and from Haifa through the Jezreel Valley and the Jordan Valley to Damascus, and climbed by foot uphill and down dale across the deeply torn valleys and gorges of the Palestinian mountains. But now, as air pilots, we are privileged to see the country from a bird's-eye perspective without the risk of a crash and with the advantage of a serene image captured on the plate. It is a rare, mysterious magic to look at these photographs in plain view at the study table with a magnifying glass in hand and, free of earthly challenges, to float in sublime solitude over the Holy Land.

Compared to ground photography, the disadvantages of aerial photography do not weigh heavily. For natural reasons, the aerial photograph has no foreground. The average distance from which a photo was taken is several thousand meters; in photographic terms, this equals infinity. At times, we would have liked to look at the terrain from a lower altitude in order to see the details more clearly, but because of the counteraction of the enemy's defensive guns, the pilots had to go to these heights. For that, the stratum of air between the object and the camera impaired the clarity of the photograph by inducing loss of brightness, but this was offset by the clarity of the oriental atmosphere itself. The main impact of all these flaws is that the distinction between light and dark of distant points, so-called contrast, is significantly reduced, sometimes even disappearing completely.[2]

The Value of Aerial Photography for the Various Branches of Palestine Studies is Nevertheless Still Very Big

1. **Geology** is now enriched in a unique way. Aerial photographs have a particular advantage over ground photographs, especially here. Due to the greater altitude from which the photographs are taken, they show a larger field of view, and thus a wider overview of the terrain; only photos taken from summits could provide a comparable view. Aerial photography clearly emphasizes the landscape forms, thus the relief-like character of the photographed Palestinian mountains. The morphology of the mountainous desert of Judah appears vividly (three dimensional). The character of a limestone mountain range, sloping down in horizontally layered terraces, often seems surprising. We glance down at the maze of magnificent cone-shaped mountains and hilltops, as well as the labyrinth of its curved valleys without vegetation, and are amazed at the erosive power

of water, which in ancient times carved out and often washed smooth the wild gorges and unreachable heights. A fantastically rich hilly landscape stares up at us from the Jordan Valley. We notice here and there two different riverbeds running next to each other, and now realize why no map can reproduce their bizarre and obviously constantly changing turns. The river turns and writhes beneath us like a mortally-wounded giant snake until it eventually finds death in the Dead Sea. On the west coast of the Dead Sea and on the East Bank, we can even decipher the geological contour lines at the canyon-like carved out rock walls and terraces, and discover volcanic formations here and there.

2. **Meteorology** derives a great deal of knowledge from many photographs, not only by letting us study cloud formations at a certain day of the year (hour and day of recording are usually indicated on the photos). We also can understand that the leeward side of the mountains facing away from wind and rain has much less precipitation and consequently less vegetation and habitation than the windward side facing the wind and rain. These principles of meteorology are most strongly affirmed by the photographs of the Judean Desert, which lies on the lee side of the West Bank. Sometimes the cloud photographs taken from an airplane appear magically beautiful; from the smallest cirrus to the thunderstorm promising cumulus clouds, to the flimsy stratus cloud, and the impenetrable ceiling, all details of meteorological phenomena can be explained by a cloud photograph.

3. **Transport Geography** receives special appreciation through aerial photography. The dust-covered roads and paths of the country often shine dazzlingly white, and illustrate how their lines are causally connected with the surrounding terrain, with the economic exploitation of the land, and with their significance for the villages along the wayside. This is where the value of the photographs stands out the most. As most photographs were taken for strategic purposes, particularly scouting out the advance of enemy reconnaissance, almost every picture shows some Palestinian road or path. Hence the delight that most of the country's main traffic arteries are almost completely covered by the aerial photographs: Jaffa-Jerusalem, Ramla-Gaza, Jerusalem-Jericho, Jerusalem-Hebron, and Jerusalem-Nablus.

4. **Settlements Studies** find multiple applications from aerial photographs. The settlements and the surrounding landscape are closely connected; the exigency of their location is usually recognized at first sight; valley crossings and crossroads, or peculiar shapes of the landscape, caused the settlement to be established in that particular place. Ground photographs will not, or only rarely, be able to illustrate such geographical facts, due to their coverage of smaller areas. Maps, at most, could have a similar result, but in this case the naturalness is missing because everything is just codes and symbols, image and drawing. On the other hand, an aerial photograph acts as three-dimensional and displays things as they are. On its own, the aerial photograph also clearly shows the characteristic features and the construction of a European settlement (a German Templer Colony in Haifa, in Sarona, or in Jerusalem), a Jewish colony (of Tel Aviv and Jaffa, and Rishon leZion), a German row village (German ribbon-built village of Wilhelma), or even a Circassian settlement (Suwala, on the East Bank). A striking contrast to all these

types of construction is the practice among Arabs of building houses close together which is most prevalent among Palestinian communities. From the aerial photograph, we can see at first glance whether the settlement was a planned one, designed by an architect with a ruler and T-square, or whether it represents a randomly occurring pack of huts, where each hut embodies a personal need and the whole settlement embodies the poverty of the inhabitants. Even the historical development of the settlement, especially of the towns and larger villages, can be studied from the aerial photographs at the various groupings and locations of the house and hut complexes. A special mention is needed here of the numerous pictures of Jerusalem, Jaffa, Hebron, and other cities. Completely new city plans can be produced based on these aerial photographs, plans that can surpass in perfection and richness of detail all previous ones. Even Goethe wanted to overlook from the church tower the city which he wanted to get to know. For the same reasons, and for objective and educational considerations, Professor Felix Lampe introduces his educational film about the Alps with a balloon flight. In many cases, aerial photography also gives a general overview of the landscape, displays the soil conditions and the partitioning of the fields with paths, groves, trenches, and separating hedges etc., and thus provides documentation for the execution of agricultural work and the construction of irrigation systems and paths.[3]

5. Even **archaeology** gets its money's worth with the photographs. Overviews from the bird's-eye view of Baalbek or Jerash have their own spell, and compared with the existing buildings plans, are highly informative. At Jerash, the aerial photographs show the buried rampart of the old city wall no less clearly than the edges of the Roman Naumachia. In Amman, the strategic importance of the old citadel can be seen directly from the photograph. In Hebron, the old city hill, the likely location of Davidsburg, appears vividly into the apparition. At Caesarea, the remains of the jetties can be seen under the water.

6. **Cartography**, as mentioned above, receives the lion's share in the utilization of aerial photography. By rectifying the photographs with the help of the latest photogrammetric methods and through true to-scale conversion, the aerial photograph becomes a map without further ado. As is generally known, translating of the three-dimensional form of the earth into an understandable two-dimensional map is most challenging, and can actually only be overcome by the aerial photograph. The map is an abstraction; it is the representation of the three-dimensional shape of the earth's surface through planimetric drawing; it works with conventional, often quite unnatural symbols which, taken literally, do not reveal anything about the connection between reality and interpretation. Thus the map becomes the symbol of a multiplicity of elements characterized by symbolic drawing. It is the transformation of space into surface. The manifold world becomes a surface of which even the shadowy outlines of real living forms are missing.[4] Photo-topography from aircraft, this most modern of all geodetic mega-processes, significantly reduces these shortcomings, and enables the map to speak and tell a story in a way that the previous map-drawing could not.

I. Types of Aerial Photographs

Aerial photographs fall into horizontal, vertical, and oblique views, depending on the angle that the optical pivot of the aircraft camera, or also the photographic lens, has with the object.

1. The **horizontal view**. In this case, the axis of the apparatus is horizontal; the plate is vertical as in the case of ground survey. Since the flight altitude is generally only a few hundred meters, it is the closest it has ever come to capturing the earth, though it provides a far greater overview of the terrain, and allows observations of terrain forms, location designation and settlement, road and river courses, which the usual plan view is not able to show. Since the field pilots had to stay at an average altitude of 3,000 meters in order not to be easily exposed to the projectiles of the defensive guns, they could only take a few horizontal shots; only during take-off and landing, or in secure terrain, did they succeed in taking photographs from an altitude of 200–1000 meters, which of course provide stunning details of the terrain photographed, for example of Lebanon, Sidon, and al-Majdal [Palestine].

2. The **vertical view** shows a different image. In this case, the optical axis is perpendicular, while the plate is horizontal; the conditions are therefore the reverse of the horizontal view. In flat landscapes, such as the Palestinian coastal area, this view often produces an image that can be directly used as a map. For example, the angles at which the paths cross are the same; all distances appear in the same ratio, so that with a proper scale that takes the reductions into account, exactly the same measurements can be made as on the map. The reduction of the photograph is done in the ratio of focal distance to flight altitude, both of which are usually indicated on the copies of the photographs. If, for example, the focal distance (f) is 50 centimeters, the flying altitude (h) is 3,000 meters, and (a) equals 1 centimeter is the unit of measurement of the photograph, then the formula f:h = a:x ; 0.5:3,000 = 0.01:x ; 30:0.5 = x:60 meters represents the actual altitude. The size of the part of the ground's surface depicted can also be calculated; it increases with altitude, but decreases with increasing focal distance.[5]

Vertical photography often allows us to look with a magnifying glass in hand into the most hidden corners of the valley canyons or the maze of houses in the settlements, producing a map whose content and character cannot be matched by any geometric drawing. If the terrain is uneven or particularly hilly, it is difficult to compare the aerial photograph with the map. Due to the elevations and depressions, distortions would be expected: higher-lying points must appear farther, and lower-lying ones must appear closer when projected onto the map. The deviations from reality will be all the greater the farther away the points are from plumb dropped from the aircraft. That is why mountains appear compressed.[6]

Among the vertical views, special mention should be made of the series of photographs taken in quick succession in the same flight with the same camera; these

are the aerial film shots. If the altitude changes, or if more photographs were taken on another flight, everything must be brought to the same scale by re-photographing, before composition. Such "film shots" exist in large numbers in the collection; entire stretches of the country, especially the major traffic routes, for example, Jaffa-Jerusalem and Jerusalem-Hebron, are shown in shots that often continue each other and which I have also referred to as "continuation" in the Directory. It should be noted, however, that many of these recordings are not always absolutely vertical, and therefore initially require a partial correction.

To a certain extent, the vertical view replaces the map and greatly clarifies its markings through nature itself; for example in the cityscapes of Sidon, Haifa, Jaffa, Jerusalem, Hebron, etc.; the different parts of town, the nucleus, the course of streets and alleys, the construction of entire quarters, all clearly stand out. Studies on the origin and development of cities can usually be better carried out using aerial photography than by using the city map, especially since the natural conditions remain recognizable and are not replaced by dead symbols as on the map. In the photographs of Jaffa, Jerusalem, and Hebron one can easily see the oldest nucleus of the settlement, around which the more outlying houses were later grouped. The striking differences of a planned colony settlement in contrast to the Arab hut clusters, for example, Bayt Fajjar, have already been pointed out above. Important questions of the study of settlements emerge, and can be answered much better with the help of the true-to-nature, vertically-view aerial photographs, than with the city plans available to date. Based on the 66 aerial photographs of Jerusalem, for example, which are available in the archive's collection – though a number of them are oblique photographs – a city map can be drawn which surpasses all previous plans.

3. The **oblique view** is the third, and by far the most common type, of aerial photographs due to its ease of execution. Optical axis and plate are tilted; the image obtained depends on the position of the plane and on the tilt of the camera, thus allowing all transitions between vertical and horizontal shooting. If this tilt moves further away from the vertical position, more and more terrain is mapped towards the horizon, but the downsizing increases as well. Relief differences in the terrain cause displacements of the points projected onto the plain. Therefore, the oblique photograph will always give a distorted picture. The angles do not appear in their actual position; parallel lines in nature are here always straight lines converging to the rear; a square appears as a trapezoid. Therefore, the photograph can be used for map drawing only by careful calculations. On the other hand, the oblique view has its undeniable advantages: as a pure landscape photo, it allows the flown-over area to be seen in perspective from the bird's-eye view, making it especially beneficial to explain the geographic and topographic phenomena in these photographs. The photographs of the Palestinian Mediterranean coast and the Dead Sea, in particular, not only show, as oblique photographs do, the course of the coast itself with all inlets and protrusions, but also illustrate the shape and composition of the coast itself, and often include the topographic features of the hinterland.

II. **Practical Hints**

It must be emphasized that aerial photographs may disappoint the amateur at first, and are only intelligible to the expert after studied in detail with a trained eye. The comparison of the photographs with a map or a plan is a necessary prerequisite to learn what a map looks like in reality, and how both relate to each other. The best technical aid for the examination is a large, sharp magnifying glass with a magnification of about 2–4 times.[7]

The effects of light and shadow in the aerial photograph should be comprehensively used for reading; they support the graphic conception considerably. Here it is important to ensure that the light falls on the photograph the way it corresponds to the direction of the sunlight in reality; otherwise the photograph gives a completely reversed graphic effect in which, for example, bottoms of valleys appear as mountain ridges. The green of nature appears dark in the photographs. Accordingly, the coastal strips along the Jordan River are not to be interpreted as shadows but as vegetation. The season must also be taken into account. There is hardly any forest in western Palestine, so the dark patches and spots can usually be interpreted as tall trees, mostly olive trees. The gullies of the Palestinian valley floors are almost always waterless and therefore often appear in the photos like bright stripes that the European is inclined to think are paths. It should also be noted that water and marshes are marked as brightly shining surfaces in the oblique image due to the reflection, and as dark surfaces in the photos taken in the direction of sunlight.[8] In general, the headings of the photographs correspond to the direction in which they were taken; accordingly, the photo should be viewed in such a way that the large outstanding objects are in front. One must always be aware of the cardinal point to which the basis of the photo corresponds, if necessary, with the help of the shadow cast and the time of day indicated on the photo.

The photographs have an average size of 12 x 16 cm; for the few photographs of 8 x 10 cm that are taken with a handheld camera, I have specified this format in the Directory. The focal distance of the apparatus alternates between 21, 25, and 50. The Arabic name of places on the photographs (main locality) is not always perfect, sometimes even completely wrong, or confused with other names; here and there it is completely missing, as it was not always easy to identify the locality in the photograph. The white arrow, usually drawn in the corners of the photograph, indicates north. Often, however, this arrow, which was applied to the plate only later, is inaccurate; in some cases, the inverse is true; I have noted these cases in the Directory.

Once again, it must be emphasized that there are no purely vertical photographs; they are produced only in the rarest of cases, since the recording apparatus is subject to more or less pendulum oscillations due to the aircraft's own motion, even in the case of a gimbals mounting. In many photographs, one finds two degree-scales with

triangular marks on the right-hand edge. The upper one indicates the tilt (lateral deflection), meaning the angle that the long side of the plate forms with the horizontal plane at the moment of the exposure. Either the character "r" or "l" appears between each ten degrees to indicate whether the apparatus, as seen from the machine, tilts to the bottom right or left. In the same way, the lower mark "N," indicates the angle of tilt (vertical deflection), meaning the angle formed by the optical axis of the apparatus with the horizontal plane during the exposure. With the help of this information, the photographs can be rectified according to the rules of mathematical perspective, either mathematically or with the aid of an optical apparatus, meaning they can be transformed as if they were taken vertically from above (N = 90°). This method, however, is only suitable in flat or slightly undulating terrain. In mountainous terrain, the photographs can only be evaluated with stereo recordings by the stereo comparator or stereo autograph.

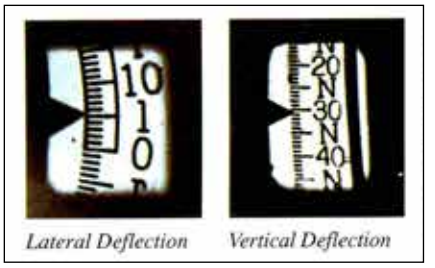
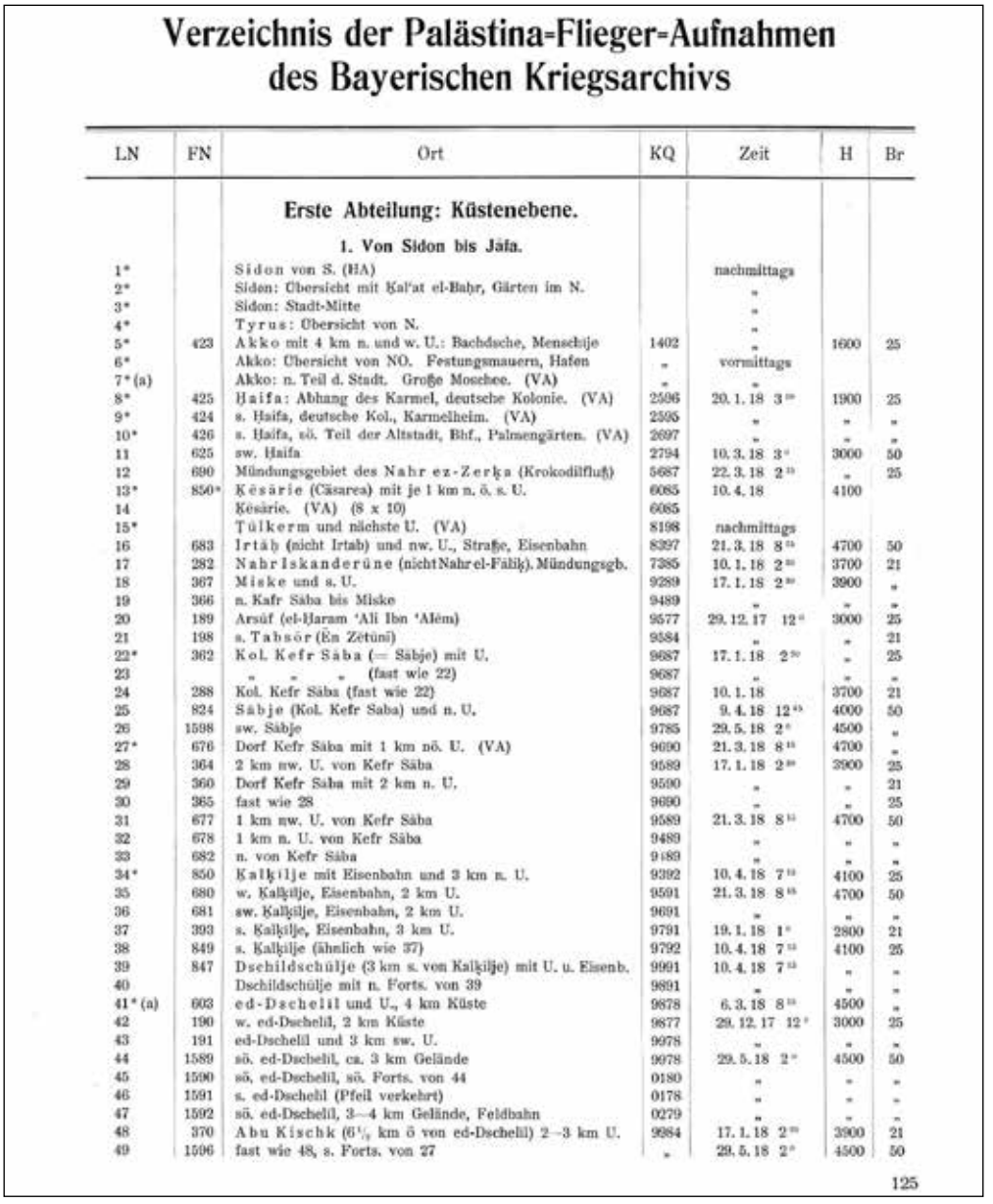


Figure 2. The two degree-scales with triangular marks that appear on the right-hand edge of some of Squadron 304's photographs. The mark on the left indicates the tilt (lateral deflection); the mark on the right indicates the angle of tilting (vertical deflection).

The entire photo inventory of Squadron 304, as far as it could be saved during the retreat, consists of 2,662 photographs. Since almost half of them have strictly strategic and historical wartime value, I have selected only 1,406 to include in the Directory; of these, 1,236 are aerial photographs, and 170 are ground photographs. Letters were added to the individual numbers (ordinal numbers), to indicate that further photographs from the same site are available and can be obtained from the archive for in-depth research.(*) The photographs are listed in the Directory in topographical order according to the four meridional strips of Palestine in four sections: coastal plain, mountains, Jordan Valley, East Bank. The first column shows the ordinal number (LN) of the photographs. Especially important or outstandingly beautiful shots are marked with one or two stars. The second column carries the flight number (FN), which, if available, is recorded at the top of the photograph. The third column [Ort, meaning place] is meant to indicate, in a few words, the main locality, and details of the photo. The fourth column contains the center of the map quad (KQ) of the photograph. A more precise designation of the quads according to the circumference of the photograph would often have required 2 to 4 four-digit numbers, and had to be omitted to simplify printing. The fifth, sixth, and seventh columns contain the hour [Zeit], altitude [H], and focal distance [Br] of the photograph, which are useful in their evaluation and assessment.

(*) This numbering system (ordinal numbering) is no longer the main numbering system used at the Bavarian War Archive. It is kept here only to show the diligence put into producing the Directory.–Trans.



Verzeichnis der Palästina-Flieger-Aufnahmen des Bayerischen Kriegsarchivs

LN	FN	Ort	KQ	Zeit	H	Br
		Erste Abteilung: Küstenebene.				
		1. Von Sidon bis Jāfa.				
1*		Sidon von S. (HA)		nachmittags		
2*		Sidon: Übersicht mit Ḳal'at el-Baḥr, Gärten im N.		"		
3*		Sidon: Stadt-Mitte		"		
4*		Tyrus: Übersicht von N.		"		
5*	423	Akko mit 4 km n. und w. U.: Bachdsche, Menschije	1402	"	1600	25
6*		Akko: Übersicht von NO. Festungsmauern, Hafen	"	vormittags		
7* (a)		Akko: n. Teil d. Stadt. Große Moschee. (VA)	"	"		
8*	425	Ḥaifa: Abhang des Karmel, deutsche Kolonie. (VA)	2596	20. 1. 18 3^{30}	1900	25
9*	424	s. Ḥaifa, deutsche Kol., Karmelheim. (VA)	2595	"	"	"
10*	426	s. Ḥaifa, sö. Teil der Altstadt, Bhf., Palmengärten. (VA)	2697	"	"	"
11	625	sw. Ḥaifa	2794	10. 3. 18 3^{0}	3000	50
12	690	Mündungsgebiet des Nahr ez-Zerḳa (Krokodilfluß)	5687	22. 3. 18 2^{15}	"	25
13*	850*	Ḳēsārie (Cäsarea) mit je 1 km n. ö. s. U.	6085	10. 4. 18	4100	
14		Ḳēsārie. (VA) (8 x 10)	6085			
15*		Tülkerm und nächste U. (VA)	8198	nachmittags		
16	683	Irtāḥ (nicht Irtaḥ) und nw. U., Straße, Eisenbahn	8397	21. 3. 18 8^{15}	4700	50
17	282	Nahr Iskanderūne (nicht Nahr el-Fālik). Mündungsgb.	7385	10. 1. 18 2^{30}	3700	21
18	367	Miske und s. U.	9289	17. 1. 18 2^{30}	3900	"
19	366	n. Kafr Sāba bis Miske	9489	"	"	"
20	189	Arsūf (el-Ḥaram 'Ali Ibn 'Alēm)	9577	29. 12. 17 12^{0}	3000	25
21	198	s. Tabsōr (Ēn Zētūnī)	9584	"	"	21
22*	362	Kol. Kefr Sāba (= Sābje) mit U.	9687	17. 1. 18 2^{30}	"	25
23		" " " (fast wie 22)	9687	"	"	"
24	288	Kol. Kefr Sāba (fast wie 22)	9687	10. 1. 18	3700	21
25	824	Sābje (Kol. Kefr Saba) und n. U.	9687	9. 4. 18 12^{45}	4000	50
26	1598	sw. Sābje	9785	29. 5. 18 2^{0}	4500	"
27*	676	Dorf Kefr Sāba mit 1 km nö. U. (VA)	9690	21. 3. 18 8^{15}	4700	"
28	364	2 km nw. U. von Kefr Sāba	9589	17. 1. 18 2^{30}	3900	25
29	360	Dorf Kefr Saba mit 2 km n. U.	9590	"	"	21
30	365	fast wie 28	9690	"	"	25
31	677	1 km nw. U. von Kefr Sāba	9589	21. 3. 18 8^{15}	4700	50
32	678	1 km n. U. von Kefr Sāba	9489	"	"	"
33	682	n. von Kefr Sāba	9489	"	"	"
34*	850	Ḳalḳilje mit Eisenbahn und 3 km n. U.	9392	10. 4. 18 7^{15}	4100	25
35	680	w. Kalḳilje, Eisenbahn, 2 km U.	9591	21. 3. 18 8^{15}	4700	50
36	681	sw. Kalḳilje, Eisenbahn, 2 km U.	9691	"	"	"
37	393	s. Kalḳilje, Eisenbahn, 3 km U.	9791	19. 1. 18 1^{0}	2800	21
38	849	s. Kalḳilje (ähnlich wie 37)	9792	10. 4. 18 7^{15}	4100	25
39	847	Dschildschülje (3 km s. von Kalḳilje) mit U. u. Eisenb.	9991	10. 4. 18 7^{15}	"	"
40		Dschildschülje mit n. Forts. von 39	9891	"	"	"
41* (a)	603	ed-Dschelil und U., 4 km Küste	9878	6. 3. 18 8^{15}	4500	"
42	190	w. ed-Dschelil, 2 km Küste	9877	29. 12. 17 12^{0}	3000	25
43	191	ed-Dschelil und 3 km sw. U.	9978	"	"	"
44	1589	sö. ed-Dschelil, ca. 3 km Gelände	9978	29. 5. 18 2^{0}	4500	50
45	1590	sö. ed-Dschelil, sö. Forts. von 44	0180	"	"	"
46	1591	s. ed-Dschelil (Pfeil verkehrt)	0178	"	"	"
47	1592	sö. ed-Dschelil, 3—4 km Gelände, Feldbahn	0279	"	"	"
48	370	Abu Kischk ($6^1/_2$ km ö von ed-Dschelil) 2—3 km U.	9984	17. 1. 18 2^{30}	3900	21
49	1596	fast wie 48, s. Forts. von 27	"	29. 5. 18 2^{0}	4500	50

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Figure 3. The first page of the Directory (p. 125 in Dalman's *Hundert deutsche Fliegerbilder*).

The survey map (see figure 4) is provided with a grid, which is marked with four-digit or five-digit numbers on the right and left margins, and with two-digit numbers on the upper and lower margins. This designation is identical with the data of the aerial photographs and the Directory. The four-digit to five-digit numbers in the right and left margins are expressed in full hundreds, while the two-digit numbers in the upper and lower margins indicate tens and units. A zero precedes the single-digits. The

grid squares are read by reading the number of the right or left edge without the zeros and adding the corresponding addition to the upper or lower edge. For example, No. 161 (Lydda) is located in the row of grid squares marked 2,200 at the right and left margin, and 86 at the upper and lower margin; thus map quad 2,286.

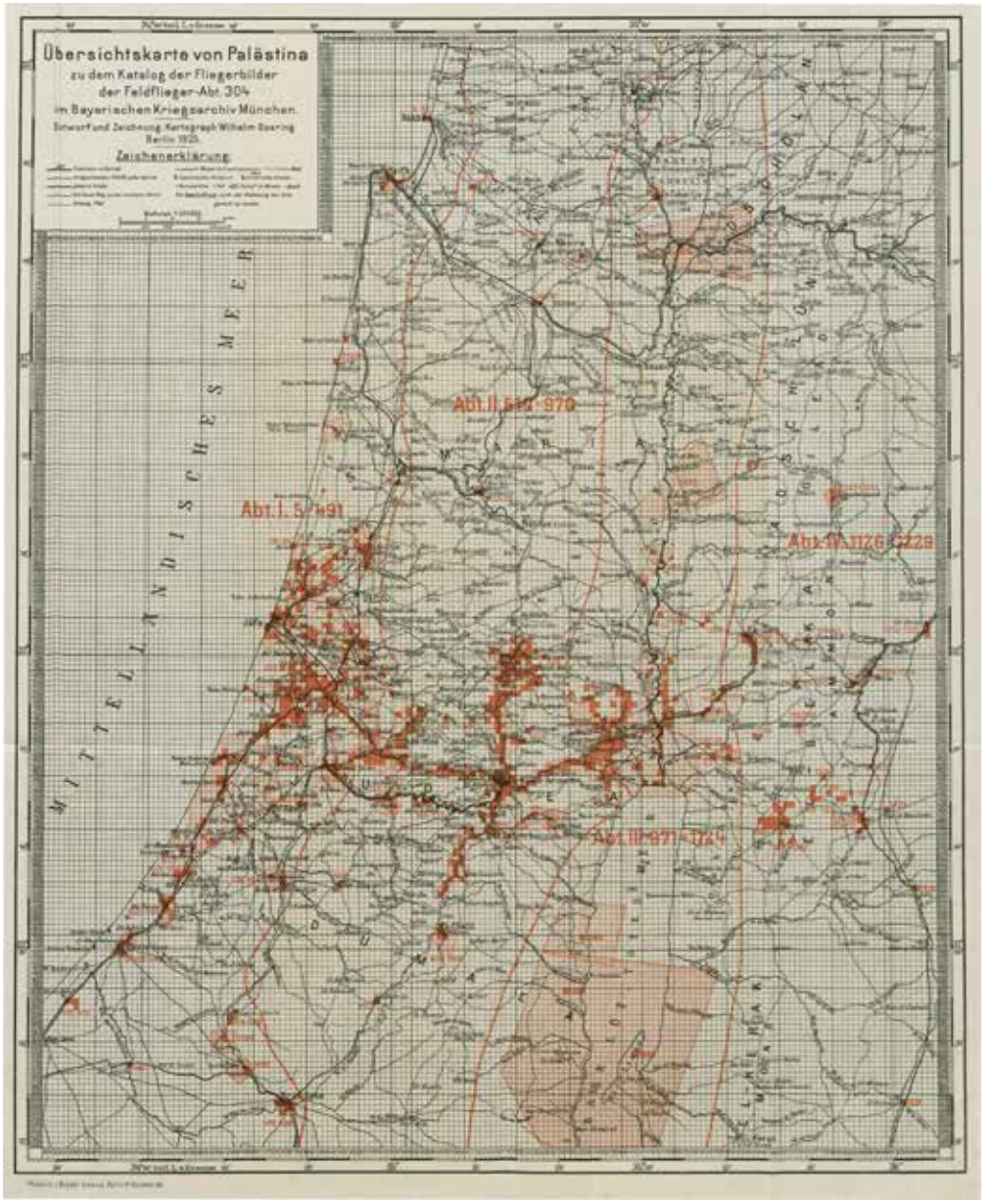

Figure 4. The Palestine Map prepared by cartographer W. Goering, published in Dalman's *Hundert deutsche Fliegerbilder aus Palästina* as an attached folded sheet (50 x 55 cm).

Figure 5. Detail of the Palestine Map prepared by cartographer W. Goering. Notice the very fine print of the four-digit to five-digit numbers in the right and left margins. Two-digit numbers are in the upper and lower margins (not shown here).

I would very much like to thank the Kartographischen Abteilung des Reichsamtes für Landesaufnahme [Cartographic Department of the National Office for Land Survey] for their very kind support of the Directory. Special thanks also go to Privy Councilor Professor Dr. [Gustaf] Dalman and cartographer [W.] Goering of the Orientabteilung des Reichsamtes für Landesaufnahme [Oriental Department of the National Office for Land Survey] for the factual verification and improvement of the local data of the map quads, as well as for identifying some of the practically difficult photographs. For the editing of the survey map of Palestine, Goering also earned the thanks of all friends of Palestine.

Note: Most of the photographs are oblique and therefore their designation as such (SA) is mostly omitted in the Directory for the sake of brevity. Since actual vertical shots are extremely rare, the term VA is relative. On that note, all photographs with focal distance of 50 may be considered vertical shots.

Endnotes

1 Cf. A. Alt, Aus der Kriegsarbeit der deutschen Wissenschaft in Palästina [From the War Effort of German Science in Palestine], Zeitschrift des Deutschen Palästina Vereins [Journal of the German Palestine Association]. XLIII, issue 3–4, pp. 93–108.

2 Cf. Dr Kurt Krause, Die Fliegeraufnahme und der erdkundliche Unterricht. Geographischer Anzeiger, 20. Jahrg [Aerial Photography and Geography Lessons. Geographical Journal, 20th Year], (1919) pp. 17—21. On the setup and function of the aircraft camera, see Dr

Eng. Erich Ewald, Die Verwendung der Flugzeugphotographie [The Application of Aerial Photography]. Internationales Archiv für Photogrammetrie [International Photogrammetry Archive], Volume VI. (1923) p. 1—12.

3 Cf. Joseph Filbig, Fliegerbild und Heimatkunde. Ein Beitrag zur Einführung ins Kartenverständnis [Aerial Photography and Local History. A Contribution to the Introduction to Map Understanding]. VIII, p. 47, Munich-Berlin, 1920).

4 Filbig, Fliegerbild, and Heimatkunde *Aerial Photography*.

5 Cf. also for further details K. Krause, op. cit., and Filbig, op. cit.).

6 See Krause, op. cit. p. 19, figure 3).

7 Cf. Erich Ewald, Das Luftbild im Unterricht. 1. Heft der Sammlung „Bild und Schule“ [Aerial Photographs in Instruction. First Booklet of the collection “Photos and School”]. Zentralinstitut für Erziehung und Unterricht [Central Institute for Education and Training]. Breslau: Hirt, 1924, p.14.

8 See Ewald op. cit. p. 20, fig. 2 and p. 22.