

August 29, 1945

**George C. McDonald, Brigadier General, to the
Commanding General, USAFE, 'German Underground
Structures'**

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Summary:

The report delivers observations and conclusions of Germany's underground structures.

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HEADQUARTERS
UNITED STATES AIR FORCES IN EUROPE
Office of Asst. Chief of Staff A-2

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AAF Station 379
APO 633, U S Army
29 August 1945.

SUBJECT: German Underground Structures.

TO : Commanding General, U. S. Air Forces in Europe, APO 633, U S Army.

1. In compliance with your instructions, the following report on German underground structures is rendered.

2. This is based on the writer's personal observations during the period 14 May to 1 August 1945. It is of necessity in the nature of a preliminary report for an insufficient number of undergrounds were visited to make a complete report on so large a subject. Again, these installations were inspected primarily for their equipment installations of urgent ATI interests, rather than for the details of their construction. However, the main structural features were examined and noted.

3. A list of the undergrounds visited is attached hereto as Appendix 1. These varied in size from approximately five (5) to twenty-six (26) kilometers, lineal measure, of underground galleries. Dimensions of the galleries varied from four (4) to twenty (20) meters in width and five (5) to fifteen (15) meters in height, the floor space from twenty five thousand (25,000) to one hundred thirty thousand (130000) square meters.

4. All of the undergrounds examined are level entries driven into solid limestone, requiring drilling and blasting for excavation, to a soft, fine-grained sandstone which could be dug by pick alone. These last are all well supported by heavy masonry or concrete linings. Some of the solid limestone galleries are also lined. In all cases the workmanship (though chiefly done by slave labor) is excellent and the construction is of permanent nature for long endurance, rather than to meet temporary war construction.

5. All entries are in steep hillsides having slopes of thirty (30) degrees or more. In nearly every case an open cut was excavated in the hillside so that even the portals are under one hundred (100) feet, or more, of overburden. From the portals the rising slope of the surface increased the solid overburden rapidly to two hundred (200) to five hundred (500) feet.

CONCLUSIONS

6. Even though well drained, lighted and ventilated, these underground structures are, of necessity, inferior to surface buildings for housing industrial plants. Their only advantage is protection from bombing and they, therefore, have no place in a peacetime industry. Their continued existence is a military asset.

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7. Well supported excavations under the protection of a deep solid rock overburden are extremely stable and are impervious to damage by attack from the air by any existing bomb. The future developments of the atomic bomb cannot now be predicted. However, to destroy the workings from the air, the entire overlying hill would have to be blown off, a matter of shattering solid rock, from above, to a depth of 200 feet and more. This is now considered impractical.

8. Neutralization of level entry undergrounds must include nearly complete destruction to be effective. Sealing the entrances only would be merely a short delaying action. However, where entry is by vertical, or inclined shaft, the destruction of the shaft may render reopening impractical under certain conditions. It would in any case cause a long delay.

9. So long as these undergrounds remain intact they are available for bombproof housings of important industries in any future war. It is recommended that careful consideration be given to their neutralization even though its accomplishment will be a difficult and costly work.

10. To approach this problem, it is recommended that all existing undergrounds be examined by personnel qualified to judge not only the strength of the supporting structures, but the character of the overlying rock, its structure, joints, bedding planes and other lines of weakness. Maps showing the underground galleries should also have the surface contours superimposed to show depth of overburden at all points. The above information is needed before any detailed plan of neutralization can be made.

11. It is believed that the most effective method will follow the general plan of blasting out the strategic supporting column of rock with explosive blasts strong enough to shatter the overlying rock along lines of natural weakness sufficiently to render its support impractical.

RECOMMENDATIONS

12. The overall problem can best be evaluated under the direction of a geologist with practical experience in underground development. He can correlate the primary factors:

- a. the overlying rock structure and strength, with
- b. its support.

With him should be associated men of extended practical experience in underground construction and an explosive expert.

13. It is recommended that this paper be forwarded to Headquarters, Army Air Forces, with the idea of selecting targets of above mentioned types for secret experiment of rocket propelled atomic bomb.

APPROVED BY:

PREPARED BY: G.C.M.D. / *lms*

POST HOSTILITIES INTELLIGENCE

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Asst. Chief of Staff A-2.

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2 Incls: List of undergrounds.
Map of Camp St. Georgan.

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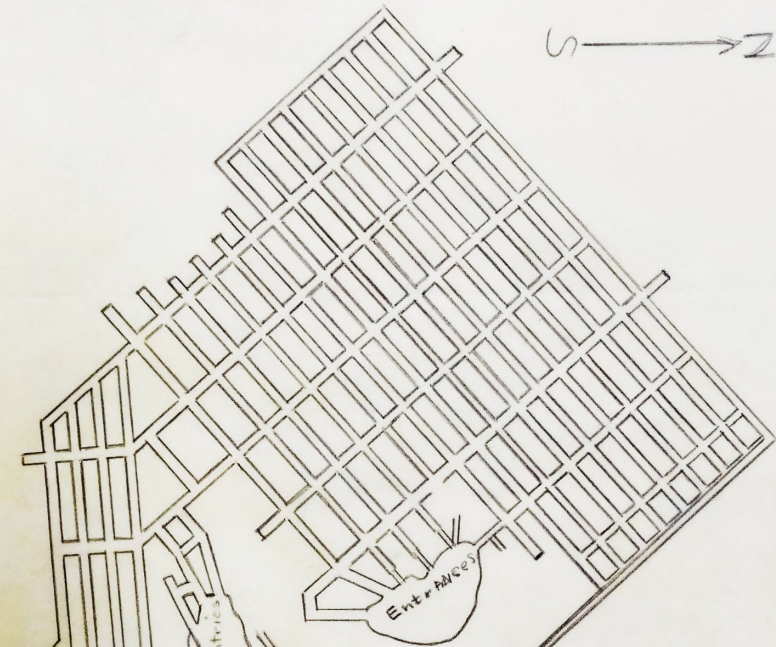
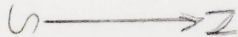
1. List of undergrounds examined.

Camp Gusen	Aircraft component factory
Camp St. Georgan	" " "
Camp Ebensee	" " "
Kahla	" " "
Between Kahla and Jena	Optical lens grinding plant.
Redl-Zipf	Oxygen making plant.

2. Attached is the map of the underground workings at Camp St. Georgan. This illustrates the general type of structure though it is more regularly laid out than the others.

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Plan of Underground
Camp St Georgan

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