The History of the German Steel Helmet

1916-1945



by

Ludwig Baer

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K. Daniel Dahl

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Ludwig Baer

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THE HISTORY OF THE GERMAN STEEL HELMET FROM 1916 TO 1945

Its history in text and pictures, newly revised and translated, and assembled from the documents of the Bavarian War Archives, the Federal German Archives, the Military Archives in Freiburg, the Federal Office for Defense Technology and Procurement, the State Archives in Stuttgart, the War Archives in Vienna, and other sources.

Written by Ludwig Baer
Translated from the German by K. Daniel Dahl

FOREWORD

Dear Reader and Collector:

To date I have written three books concerning the German steel helmet and its evolution. The first was a small book giving an overview of the subject, whereas the second covered the nearly complete history of the steel helmet, but was written in German. After updating and enlarging the German edition, I turned the manuscript over to my friend, Dan Dahl, a fellow collector, for translation into English. This book is the result of his diligence and knowledge of the German language and I thank him for his outstanding work.

The text of my second book, published in 1977, has been significantly enlarged, especially in the World War I section. For example, as a result of my research I was able to positively identify the helmet with the ear cut-out as no more than a helmet to increase the ability for better hearing. A limited number of about 300,000 of them were produced and issued after August 1918. The number of period photos has also multiplied considerably, making the book much more valuable to the collector and researcher.

A question often comes up as to what happened to the helmets of soldiers killed in combat. During World War I, they were collected and sent to repair shops for refitting. During World War II, the helmet of a dead soldier was used to identify his grave. During the rapid advances of the Wehrmacht up to late 1941, there was normally not enough time to bury soldiers, individually, in a cemetery. They were, therefore, normally buried where they fell. Later in the war, these graves were reopened and the remains moved to established cemeteries. The helmet served to identify the grave of a German soldier for the "collecting" troops. Sometimes the helmets were moved with the remains or sent in for repair . . . to date no special order relating to the above has been discovered.

The German soldier was issued his helmet along with all his personal field equipment upon entering the service, and retained it unless he was wounded and sent to a field hospital. The military forces had only one pattern helmet during World War II which saw two modifications. But the civil services used numerous designs of helmets, most of which were individually developed by various organizations like the fire brigades, the Luftschutz, etc. Because of the

multitude of designs and potential decal combinations, it will be impossible to illustrate every variation that existed.

And finally, I would like to thank our wives, to whom we did not always pay the proper attention during the development of this manuscript. Their patience with us and our interests are lovingly appreciated.

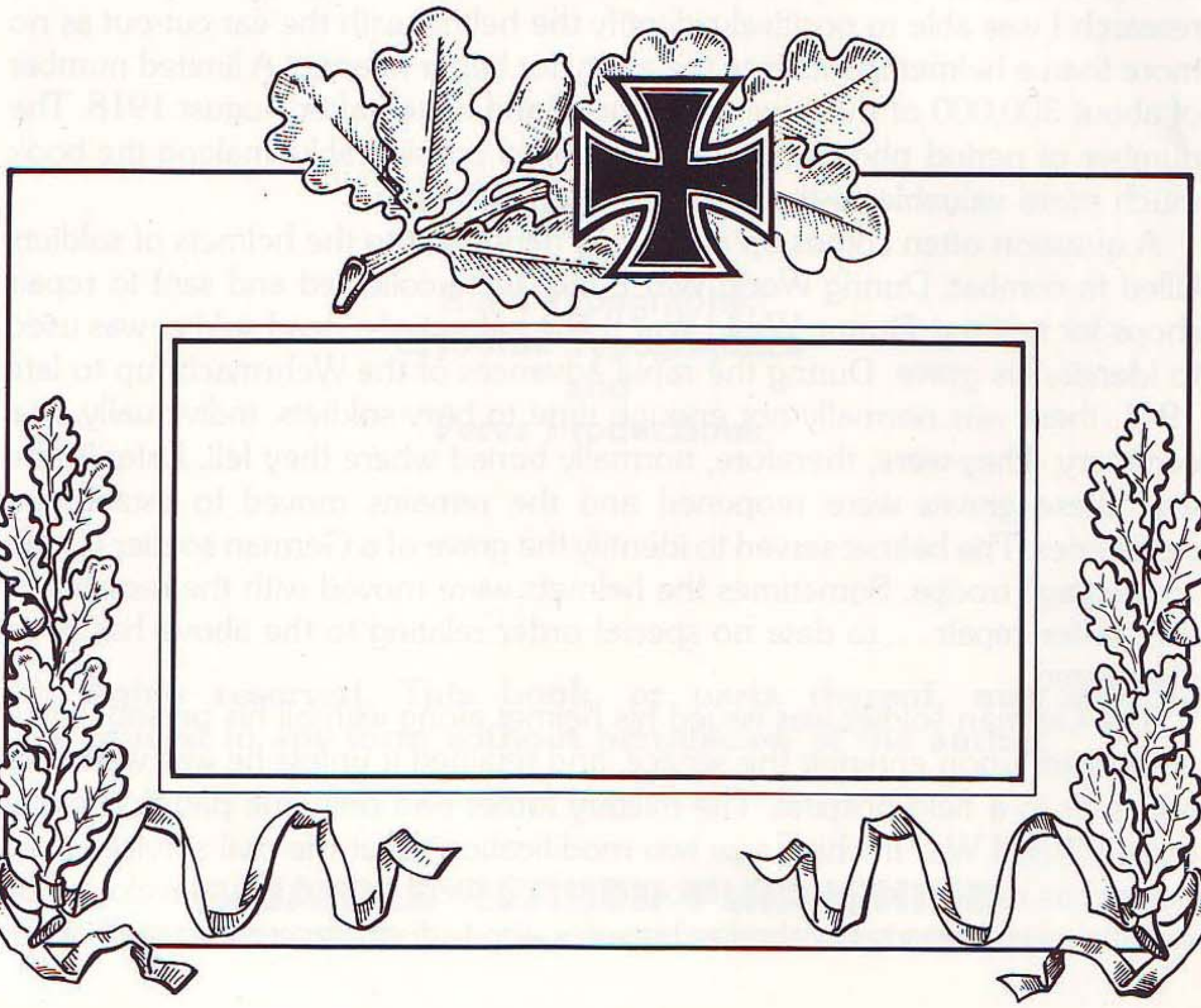
Ludwig Baer

TRANSLATOR'S NOTE

In preparing the translation of this book, I have attempted to follow the original German text as closely as possible. In some instances, departures have been made in order to clarify some of the German concepts and terminology for the English-speaking readers. German terms have been included in text at points where they were appropriate. These terms are to be found in parentheses following their English equivalents. The reason for this practice is twofold: it is my hope that this will give the reader a "feel" for some of the terminology and concepts involved; further, this may help to familiarize the reader with some important terms which may be encountered in other resources.

Having been a helmet collector for many years, I was most pleased to have a hand in this project. It is my sincere hope that this translation of Herr Baer's book will assist all those of us who are interested in the history and evolution of the German steel helmet.

Daniel Dahl
West Seneca, N.Y.



ACKNOWLEDGEMENTS

The following archives and individuals have been instrumental in the production of this publication. With their generous contribution of knowledge and photographs, this book is in its present form. I am most proud of it. They should be also.

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Archiv der TH Hannover
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Although Mr. Baer listed most of the following individuals in his own credits, I wanted to single them out for their outstanding contributions to this book. To a man, the following spent countless hours of research and proofing plus considerable amounts of their own funds for professional photography--all for the benefit of producing the best book possible for you, the reader/collector/researcher. I take my steel pot off to them with sincere appreciation.

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Dave Powers

My thanks are also extended to my co-workers, Jerry Weiblen for his expert proofreading, and to Ken Lazier, whose photographic skills are evident from the excellent quality of the helmet photos in this book.

THE GERMAN STEEL HELMET

German Helmets at the Outbreak of World War I

At the beginning of the First World War, German troops were equipped with the spiked helmet made of leather with metal fittings. This helmet was originally introduced in 1842 and underwent several modifications during the course of years. The highly vaulted crown was lowered and the metal furniture was modified several times as well. This leather helmet stood the test during the wars of 1864, 1866 and 1870-71, but due to the requisites of modern trench warfare, the helmet did not provide its wearer with sufficient protection against bullets, shrapnel and rock fragments. Even the iron-tin alloy helmets of the cuirassiers and mounted riflemen (Jäger-zu-Pferde) were of little protection. Even less so were the ersatz helmets made of pressed felt, thin sheet metal and pasteboard which were introduced because of the leather shortage of 1915.

The Helmet of the Army Group Gaede

In the year 1915, the Army Group Gaede (named after its commanding general) was in position on the Vosges Front, a very rocky region. The losses were extremely high, particularly through head wounds caused by rock fragments resulting from artillery bombardment. The headquarters of the army group had not succeeded in obtaining a better helmet from the Prussian War Ministry. After a long search, the army group developed its own steel helmet and had them manufactured in the group's artillery plant in Mühlhausen. The driving force behind this development was the Chief of Staff of Army Group Gaede, Lieutenant-Colonel Hesse. After approximately 1,500 helmets had been manufactured, the colonel nearly had to personally assume the cost of the unauthorized helmets, but this was finally prevented through negotiations. This head protector was quite similar to the French "calotte," but was provided with a noseguard. In order that the very heavy helmet might be more easily worn, a cap of leather and cloth was put into position underneath. The thickness of the steel portion was between 5 and 7 millimeters and had a weight of 2.05 kilograms (about 4.5 lbs). When in 1916 the steel helmet was introduced, the Gaede helmets were withdrawn and melted down. This helmet is therefore extremely rare today.



Bayer. Armeemuseum



Steel helmet of Army Group "Gaede."

The Development of the Steel Protective Helmet

The creation of the steel helmet of the Army Group Gaede resulted from individual initiative and remained limited to that group. The idea for the creation of a steel helmet made of specially alloyed steel was born in dispatches between a technical specialist and a doctor in the summer of 1915 following a visit to a hospital of the 2nd Army in St. Quentin. Friedrich Schwerd, a professor at the Technical Institute in Hannover, was a captain in the Landwehr attached to the Second Communications Zone Inspectorate. This unit was a part of the Second Army, France. His dispatch correspondent was Prof. Dr. August Bier, the Naval Doctor-General and consulting surgeon to the XVIII Army Corps. Prof. Schwerd had set up a strong electromagnet in an operating room which was equipped to deal with brain injuries. With this equipment, he planned to pull small metal splinters out of the brains of the in-



Professor Dr. Schwerd as an Army captain.



Dr. Bier

jured. During a conversation, Schwerd assured the doctor that it would be possible to produce a one-piece helmet of improved chromium-nickel steel or some similar alloy. He foresaw that the helmet would have both neck and eye protection and would be able to withstand the sort of fragments with which he had become familiar during surgical procedures. On the basis of this conversation, Dr. Bier wrote to the medical staff of the 2nd Army on 15 August 1915:

> "To the Second Army Doctor:
>
> Press reports indicate that the French are investigating the production of a steel helmet for head protection. Naturally, this can only mean a protection against grenade fragments and secondarily against shrapnel. Standard rifle bullets will penetrate the helmet. In the current sort of static warfare and artillery duels, bullet wounds remained in the background. Shell fragment and grenade injuries, however, occurred with frightening frequency. It happened during the 2½ month (1 June to 15 August) period that I was consulting surgeon here at the surgical section of the Palace of Justice Military Hospital: in one section of the hospital, no less than 102 head wounds were admitted. Of these, 71 were shell fragment wounds and only 19 were from bullets. Twelve were indeterminate, but at least eight of these were probably wounds from shell fragments. The greatest part of these by far resulted in serious brain

damage. These wounds, frequently of the very worst sort, were caused by remarkably small fragments. The largest fragment observed was no larger than the size of a bean, but most were no larger than the average cherry pit and frequently even smaller. In disproportion to their smallness, we found that these projectiles possessed great penetrating power. Most of the fragments which remain inside the skull frequently cause the most severe brain injuries, particularly because of the spinning motion of the jagged projectile. Brain injuries have caused a most sorrowful chapter in the history of military surgery. A proportionally large part of the surviving wounded became "healed" only insofar as the repair of their wounds. In reality however, they were sent home crippled, and not only in the physical sense but even worse, crippled psychologically, spiritually and emotionally. I know from my extensive experience with the Berlin Reserve Hospital that a large percentage of the socalled "crippled healed personnel" later died. I am of the strong opinion that only a very low percentage were sufficiently healed after several years so that life for them was actually worth living. Of those who die later, many will do so as a result of their injuries and a portion of them will commit suicide. The majority of the rest will develop physical, spiritual and psychological ailments of the very worst sort, manifested as paralysis, epilepsy, mental and physical incapacities and other illnesses.

A protection against these frequent and terrible results of war is of great importance. After a consultation with Capt. Prof. Schwerd who is an authority in the technical area, it became quite evident that a sufficiently strong and light protective helmet which can defend against shell fragments can be rather easily made. Prof. Schwerd also believes that it would be quite possible to find a material tough enough to insure that no secondary metal fragments would enter the skull in substantial numbers after the penetration of the helmet by a rifle bullet.

Because of this, the question of a protective helmet appears to me to be of the greatest importance to military experts and I consider a speedy determination of this concern to be most important so that we are not outstripped by the French in this area.

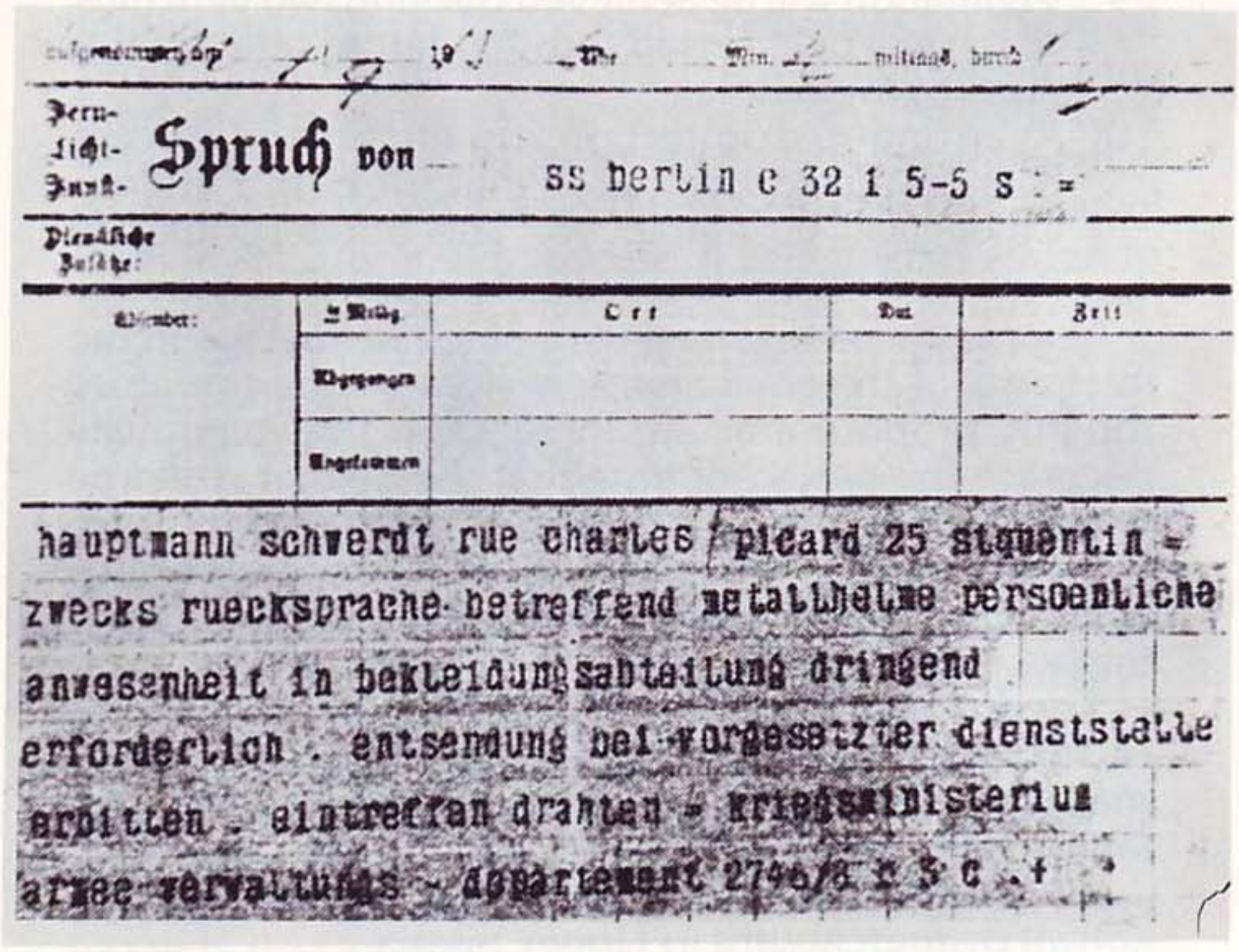
I request that you gentlemen stimulate this matter with those in higher levels.

(signed) Bier
Naval Doctor-General and Consulting
Surgeon to the XVIII Army Corps and
to the Military Hospital, Section VII."

*Source: Journal *Feldgrau,* Volume 3/67

With this letter, the development of the German steel helmet was begun. This meant weeks of intensive work on the part of concerned staff and officials toward the eventual success.

This letter was sent by the doctors to the army and it was forwarded with additional comments to General von Falkenhayn, Chief of the General Staff of the Field Army. The general advocated the proposal and forwarded the letter at a later date to the Prussian War Ministry. The proposal was discussed in Berlin on 24 August 1915 and by 30 August the Clothing Section of the War Ministry wrote to Krupp Essen that the royal court's master brass foundry, Juncker, in Berlin, would develop and manufacture a steel helmet. Krupp was to supply the special steel for this purpose. The Juncker Company received this contract because they had previously produced steel helmets for the cuirassiers and mounted riflemen. The ideal person for overseeing this job appeared to be the plant supervisor, Marx. The company had submitted a design for a hard metal helmet before, but it had been rejected.



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The telegram which called Prof. Schwerd to Berlin.

At about the same time, Prof. Schwerd was called to Berlin by the Clothing Section of the War Ministry so that he might take part in the developmental work. On 4 September 1915, Prof. Schwerd arrived in Berlin and participated in a meeting of the Clothing Section. As a result of this conference, he offered the following written proposals on 7 September:

"1. The helmet will completely replace the leather helmet. It should then be constantly on hand for use.
2. Its weight is not to exceed one kilogram.
3. The double-walled model is more resistant to penetration than a single-walled model of the same weight.

4. As a result of this, sheet steel thicknesses will be about 0.5 millimeters each.
5. Protection for the neck and forehead must be provided.
6. These requirements (in number 5 above) demand a sturdy neck protector and an impact-resistant visor. For the sake of simplicity, both of these parts would only be introduced on a single-walled, thick sheet metal helmet rather than on the double-walled type.
7. The better material to use is a 5% nickel steel, although as a substitute, 11% manganese steel can be used.
8. The ballistic tests must allow no shell fragments (of the type mentioned in the report from Doctor-General Bier) to penetrate. This helmet will not provide protection against heavy shell fragments nor infantry fire.
9. Ventilation will be achieved through two vent lugs which will be inserted through bored holes in the sides of the helmet.
10. As an anti-rust protection, a matte surface process (like that used by the F. Pintsch Co. in Fürstenwalde) will be employed. The outer coating of paint will be applied at the same time.

The resistance to penetration of the helmet lies in the thickness of the shell and its weight will be therefore roughly proportional. An increase in the weight will decrease the period of time that the helmet could be comfortably worn in combat. The advantage of a further weight increment ceases at a point where large shrapnel fragments cause major brain concussion upon impact with the brain.

The following firms have been considered capable of supplying quantities of helmets. They themselves manufacture sheet steel and have the capacity and facilities to produce thousands of helmets per day:

Silesiahütte in Upper Silesia
Bismarckhütte in Upper Silesia
Wupperman
F. Pintsch

(signed) Schwerd
Captain of Artillery
Communication Zone Inspectorate 2"

*Source: Journal *Feldgrau*, Volume 3/68.

It is immediately obvious that the Juncker Co. was not considered for the production of the helmets from the steel plate which was to be provided. The Krupp Co. indicated that a helmet with a shell thickness of 6 mm would have a weight of about 4.75 kilograms and that the Juncker Co. did not have the technical facilities for the further processing of the steel plates. For this

reason, Juncker was ruled out of further participation. Ironically, Krupp was also rejected because of their lack of sufficient manpower.

In the beginning of September, 1915, Professor Schwerd had an experimental helmet prepared to his specifications by the Pintsch Company. This helmet's only function was to demonstrate the outward appearance of the design since a first-class, operational model could not be produced in such a short period of time.

On 20 September 1915, Schwerd issued a condensed report about his communications with the War Ministry:

> "Frankfurt am Main, 20 September 1915
> To the Imperial War Ministry
> Army Administration Department
> Berlin
>
> The discussions at Krupp on Thursday and Friday with the directors, Prof. Dr. Striebeck and Dr. Hartwig, indicated that Krupp has not yet succeeded with the implementation of the proper procedures for the mass production of helmets. The first helmet which they fabricated was a manganese steel alloy. Ballistic tests showed the inexpediency of this because of noticeable, deep dents. Krupp has not had success in using nickel steel in the stamping process. It was further stated to me that they had not had the experience in the mass-production of sheet steel that other firms had, notably those companies dealing with the Pottery and Electricity Branches of the Ministry.
>
> In consideration of the overload of contracts, Director Hartwig stated that he could not make the essential personnel available for the experimental work and that Krupp would have to decline both the on-site experimentation and the acceptance of further contracts.
>
> Up to this point, the contractual arrangements had been carried out by Director Dr. Rausenberger. He was at the front and while in Mezieres he had apparently promised that he would take charge of the preparatory work in the procurement of helmets. It is yet possible that after his return to Krupp he may further involve himself in this matter. The director stated at that time why the long-awaited helmets had not yet arrived at the War Ministry.
>
> I decided to travel to the Krefelder Stahlwerke which had a standing corporate association with Siemens-Halske A.G. My wish was to achieve the most efficient cooperation between the steel works and the finishing plants. The Krefeld plant also rejected the use of manganese steel and instead proposed the production of a 1.5% nickel steel. They stated that they were prepared to produce this steel and could subsequently temper the steel through a warm-drawing process. They did also state that they had previous experience in this endeavor. It was their intent to send a representative to the Siemens-Halske plant. Krefelder was

of the opinion that only the warm-drawing process would succeed with such a special type of steel and that any difficulties which might arise could be overcome within a short period of time.

In order to supply Siemens-Halske with the necessary material for the fabrication study, I ordered a 1.5% chromium-nickel steel. This order was comprised of two sheets each of 1 mm, 1.3 mm and 1.5 mm thicknesses. The target was about 500 units and the delivery date was to be 14 days hence. In actuality, however, only 8 units made of such material (and without liner) will be available.

The delivery lag time seemed to me to be too long and besides that, the Rifle Testing commission had specifically recommended the Becker Steelworks. Therefore, I also went to this plant which had shown great interest in this matter.

The plant director, Kowollick, stated that the best material would be a minimum 1.5% chromium-nickel steel. He recommended that, in case of shortage, a nickel-free steel could be substituted. This steel was said to be on hand at the plant and I was also told that Krupp did produce this same alloy. The use of this steel, however, would entail a 15% increase in the thickness of the helmet shell and therefore also in weight. He supplied free of charge two sample sheets each of ca. 4% nickel-steel in 1 mm, 1.25 mm and 1.5 mm thicknesses. I proposed at this point a 1.5% steel. This material was not to be available in quantity for some time and thus it appeared that one had to rely on supplies now on hand. Furthermore, tests of these materials could demonstrate the highest achievable limits of production. We were also promised a shipment of nickel-free steel in the aforementioned dimensions. Finally, the firm offered to produce within 14 days a test helmet made of 1.5% nickel steel with a shell thickness of 1.25 mm. They were of the strong opinion that they could accomplish the necessary production procedures within a reasonable time frame.

All the companies agreed that the research on these helmets should occur by ballistic testing using a shrapnel pellet fired at a velocity of 270 meters per second. Further, with the possible later reduction in the thickness of the helmet shell, the only effective way to monitor the toughness of the steel was by means of this ballistic testing.

I gave the address for all shipments as the Army Administration Department of the War Ministry for the sake of simplicity. I requested their office to forward the incoming test helmets to Siemens-Halske A.G. in care of Director Jungheim at the Werner Werk.

I issued a contract for the production of 10 test helmets to the firm of Juncker, Alte Jakobstrasse 13, Berlin, in order to draw upon their experience with metal stamping. After eight days, all was in readiness so

that the Werner Werk of Siemens-Halske could begin the fabrication study in which I participated.

I have drawn up a more precise framework for the production of the steel helmet in the enclosed document. The typing was done by the secretary to the director of the municipal electrical plant in Frankfurt am Main after she had been subjected to security clearance procedures.

My address starting tomorrow evening will be: Staff, Communications Zone Inspectorate II.

1 Enclosure
(signed) Schwerd
Captain of Artillery
Staff, Comm. Zone Insp. II

Enclosure

20 September 1915

Rationale for the Production of the Steel Helmet

By Schwerd, Capt. of Artillery, Staff, Comm. Zone Insp. II

The negotiations with the Rifle Testing Commission, the Artillery Testing Commission, the firm of Friedrich Krupp and the Krefelder Stahlwerke led to the decision to abandon the double-walled helmet model as stated in the letter of 7 September 1915. It has been proposed that the superior 1.5% chromium-nickel steel should be used in the production of helmets.

The fabrication of one million steel helmets will require something in the area of 15 tons of nickel. Director Striebeck, who was involved in the quantitative materials problems of Krupp, was of the opinion that the necessary supplies of nickel could be justifiably supplied in spite of the pressing shortages of this metal due to other requirements. The question of the proper material is thus decided. A helmet of nickel-free steel would be 15% heavier. In view of the preceding facts, one comes to the following conclusions:

1. From the experience of Dr. Bier, of every 100 head wounds, over 80% were caused by artillery fragments and less than 20% were due to rifle fire. There is no primary impact direction for shrapnel. This leads us to the conclusion that the skull must be protected from the neck all the way around to the nose. A helmet which would be designed to defend the wearer in this fashion against infantry small arms fire would have a mass of at least 6 kilograms and is therefore out of the question.
2. The troops will demand that they do not have their vision impaired for shooting, either advancing or retreating. This design must also incorporate a neck protector for the rear of the head. The position of the backpack must therefore be considered in the design. The protection for the face and temples must allow for the use of a rifle and must not obscure the target. The

recent thoughts of a movable visor like that on an old knight's helmet with very large eye holes for vision have little chance for success in that cutouts of this sort in the visor would be so large that equivalent protection would be achieved with a fixed frontal plate.

3. In the view of all the steelworks, a single-walled model is able to provide sufficient protection against the effects of artillery fire, but only if the shell is 1.5 mm thick and if the steel is at least a 1.5% nickel alloy. A nickel steel sheet with a thickness of 6 mm withstood a rifle shot delivered from 30 meters. The best manganese steel (with about 15% manganese) had similar resistance, but the tests showed that the inward bulging after impact was so deep that the helmet would have to have its diameter increased by 3 cm. This enlargement would cause a resultant weight increase of at least 20%. The helmet would also appear to be misshapen because of this. The French steel helmets were made of 0.7 mm thick common poured sheet metal. The resistance of this material resulted somewhat from the helmet's four-part construction. On the whole, however, these helmets provided no protection worthy of mention.

4. The prior work on the form-stamping of the helmet was carried out with common sheet steel. Our work showed that the protective upper surface of the helmet had to be lowered if the helmet were to successfully replace the leather spiked helmet. The previous infantry helmet weighed about 450 grams; the cuirassier's helmet weighed about one kilogram. Only with difficulty will the troops accept any helmet that weighs over 750 grams, especially when one considers that the helmet will be used only during maneuvers (without the frontal plate). A steel helmet made of 1.5 mm steel would reach this weight if it were in the shape of a skullcap alone. Forehead and neck protectors would have to be reduced to a minimum. Each strengthening of the helmet must avoid the use of seams and the like as much as possible.

5. Ideally, a one-piece helmet should be produced and it should incorporate both neck and forehead protection. The helmet may be manufactured by either cold- or warm-drawing, but experience will probably teach us that the steel quality is best if warm-drawn. In this case, the steel helmet will have to be tempered after stamping. If the proper procedures are complied with, this operation is safe and easy to carry out. The steel must be subjected to no temperature greater than 750° Celsius. Autogenous or electrical welding is strictly out of the question. If, contrary to expectations, the stamping of the forehead and neck protectors cannot be accomplished, then the riveting of these components can be the only acceptable mode of attachment.

6. On this basis, the described helmet was produced (as per the enclosed diagram) with a neck protector which stands away from the neck and extends frontward to the temples and over the brow, much like the iron "Schallernhelm" of the Middle Ages. This design can only be carried out if modern stamping technology permits it. Only experience can determine whether the neck shield and brow protector must be dealt with as separate pieces.

7. The necessity for special protection during momentary tactical conditions in trench fighting and against hostile infantry fire can be provided by the addition to the helmet of a cap-shaped, stamped frontal shield about 5 mm thick and weighing about 1 kg. This frontal shield is analogous to the armor plate on an artillery piece. It must be carried in the soldier's personal gear and must be able to be quickly fastened on to the helmet at the command, "Protective shields on!" ("Schutzschilde hoch!")."

*Source: Journal *Feldgrau,* Volume 3/68.

Professor Schwerd described the helmet exactly, but there were still many problems to be solved. On 6 October 1915, Major Küntzel, the project's current military advisor, received a communique from the Prussian War Minister, General von Scheuch. The War Minister placed great value on the helmet's having a strengthened front side. Prof. Schwerd was well aware of the technical problems inherent in this design, but the minister refused to be swayed, even though this pattern could never materialize. Since these overall plans were also being presented on behalf of the Greater Headquarters, Major Küntzel wrote on 16 October 1915 to the Staff of the War Ministry at the Greater Headquarters:

"In the opinion of Professor Schwerd, who is an authority on the form and materials required for the proposed steel helmet and who is presently attached to the Clothing Section, the fabrication of a helmet which is thicker in the front than in the rear is technologically impossible. In any case, the helmet could not be produced in one piece, but would have to be made from many smaller parts which would have to be held together by rivets. Each rivet, however, would diminish the ballistic integrity of the helmet. Any helmet made in this manner would require a three-fold man-hour labor expenditure. Since an opposing viewpoint is maintained by the Greater Headquarters, the Clothing Section requests that a list of the names of those experts qualified in this area be presented so as to involve them in this work.

It should be noted that the helmet was primarily designed to protect against grenade splinters and small fragments of schrapnel coming from any direction, but

it must also be light enough so that it may be worn by foot soldiers, even while marching. If the helmet were made so strong in the front as to resist infantry fire, the department felt that it would not be worn for long periods of time because it would place an undue burden on the skull. Against small arms fire, the helmet will have, as per specifications, an armored cap which the soldier will himself put into position. While on the march, this part will be carried in the backpack or rucksack so that no undue weight will be placed on the soldier's head.

For a confirmation of this viewpoint, the department has been in communication with other specialists such as Professor Mass of the Artillery Testing Commission and Herr Jungheim, the director of the Siemens-Werner Werke. Both are in total agreement with the position held by Professor Schwerd."

*Source: Journal *Feldgrau,* Volume 2/70.

After this report, plans for the strengthened version of the helmet were abandoned. On 26 November 1915, Major Küntzel submitted a report concerning the preliminary research on the new helmet:

"The prelimiary research on the steel helmet with which his Majesty, the Kaiser, has ordered that the army shall be equipped has succeeded to the point that in about four weeks the ballistic investigations can take place.

To this end, 25 to 50 helmets made of nickel steel in two different thicknesses will be submitted for testing. For the purposes of comparison, the same number of infantry leather spiked helmets, French helmets and helmets made of manganese steel will be tested. All tests will take place at one designated location.

Since it is desirable that the tests judge the helmets' resistance to both shrapnel and grenade fragments at the same time (and also to the effects of infantry small arms fire), it would be most useful if the helmet were attached to a dummy during the ballistic tests.

The Clothing Department therefore wishes to relinquish the further tests in the matter of the aforementioned helmets and respectfully requests that the testing be accelerated as much as possible so that the new helmet pattern can go into production immediately following the close of successful ballistic research.

For these ballistic tests, the following persons or offices will be participating: the concerned offices of the War Ministry and Army General Staff, Captain Professor Schwerd of the Technical Institute in Hannover and Major Kleinhans of the Rifle Testing Commission.

In addition, the following persons were also summoned for participation: Naval Doctor-General Bier, the consulting surgeon to the General Command of

the XVIII Army Corps, and Superior Doctor-General Scheibe of the 2nd Army."

*Source: Journal *Feldgrau,* Volume 2/70.

As a result of this arrangement, a dispute over competency arose between the Rifle and Artillery Testing Commissions and this had to be finally settled by the War Ministry.

On 31 October 1915, the Artillery Testing Commission was informed by Major Küntzel that the ballistic testing would probably take place on 20 November 1915 at the Kummersdorf Proving Grounds.

So that the preparatory work could progress swiftly, everything possible was done by the Clothing Department in order to implement the production of a usable helmet. Therefore, the expert advisor, Major Küntzel, went to Thale to visit the Eisenhüttenwerke on 13 November 1915. In the interim, this plant had been involved in the production of experimental helmets. The Eisenhüttenwerke had previously been occupied in the manufacture of torpedo hulls as a subcontractor for other firms. This procedure was quite similar to that required for the manufacture of helmets. Major Küntzel wrote a report abstract about his visit to Thale. The following is the text of the major's report on helmet manufacturing procedures:

"The Steel helmet will be manufactured of quality steel which has been smelted in an electric furnace. Those plants which are considered capable of the manufacture of this steel are: Bismarckhütte in Upper Silesia, the Röchling Stahlwerke in Völklingen, the Becker Stahlwerk; Lindenberg at Remscheid and Krupp. The Eisenhüttenwerke in Thale does not possess such an electric furnace. For this reason, the steel planchets (Platinen) must be supplied by an outside source and then sent to Thale so that they may be processed by the most efficient rolling and stamping plant in all of Germany. In our visit and by follow-up correspondence, it was determined that this plant was in a position to carry out all of the rolling of the sheet steel so that a daily production of 50,000 helmets could be achieved. Experience has already shown us that steel sheets from other plants were unevenly rolled and this caused us great difficulty during the helmet stamping process. It is further proposed that Thale alone should undertake the rolling of the planchets and the quality control of the planchet thickness. This would alleviate our direct supervisory duties, but it would mean that special (and most necessary) work crews would have to be allocated to the Hüttenwerk at Thale. The use of these workers has already been approved by the War Ministry, but only for as long as the work requires them. The staff of Section B3 of the Clothing Department will supervise these workers. More than half of the existing sheet rollers and stamping machines are now standing idle because the specialists who operated them have been called up for active duty in the armed forces. If the final

permission is not forthcoming, then the rolling procedures must be taken over by other plants which must likewise requisition additional labor forces. However, exacting supervision of all of these plants will then be precluded.

Further production occurs in the following phases: from the drawn and precut sheets, the helmet will be formed in seven stamping steps. Four separate annealing steps will be necessary during this. After the basic shape has been attained, the margin will be trimmed and crimped underneath, the necessary holes will be formed as per the pattern and the air vent lugs and chinstrap hooks will be inserted.

The most important and difficult task is the tempering process which follows. The tempering is directly related to the temperatures used during the individual smeltings from the various production lots coming out of the furnaces. It is therefore proposed that all the helmets be produced in a uniform manner and then be delivered back to the factories that produced the steel used to make them since they alone know the exact quality and composition of the steel. Through this means, each steel mill can be made directly accountable for the results of the ballistic testing. The tempering is to be done by rapidly heating the steel up to 800°C (although a 25°C variance above or below this is permissible). The material is then to be dipped in a high grade oil, although with several types of steel, water or air may be used. A second heating of the steel from 250° to 500°C will be carried out (again, dependent upon the quality of the steel) and finally a long cooling period will complete the process. The helmet will then be painted a field grey color both inside and out and then the finish will be fired at a temperature of 120°C. This same process has been done with the exterior surfaces of mess kits that were made in Thale and their durability seems to have improved. Finally, the padded leather liner will be installed.

It is recommended that after the test research on 20 November, about 30,000 troops in various theatres of operation be equipped with these helmets so that we may collect data about their effectiveness in various locations. As soon as the pattern is firmly established and full-scale production is implemented, a daily output of from 25,000 to 30,000 helmets should be achieved."

*Source: Journal *Feldgrau,* Volume 3/71.

Professor Schwerd was assisted in his work and visitations by his former institute assistant, Moller, and by his former colleague at Krupp, Lieutenant-Captain Schwarzenauer.

On 20 November 1915, the ballistic tests took place at the Kummersdorf proving grounds near Berlin. Four hundred helmets were used for these

tests: one hundred with a shell thickness of 0.8 mm and three hundred with a thickness of 1 mm. They were fired upon with thirty field cannon shrapnel shells from a distance of 1,200 meters. The explosions from these resulted in a blast height ranging from five to ten meters and a blast diameter of about thirty meters. The test helmets were next fired upon with thirty-six 10.5 cm howitzer rounds from a distance of 1,200 meters. The same tests were also carried out on captured enemy helmets and the standard leather spiked helmets. The test helmets came from the following plants: Bismarckhütte, Krefelder Stahlwerke, Lindenburg A.G. in Remscheid and the Röchling Werke.

On 23 November 1915, two expert opinions were filed. One was from a medical section within the War Ministry and the other was issued by the Institute of Hygiene at the University of Berlin. The former was written by a doctor of the Higher Staff and it had the following content:

> "This reporter received an order to utilize X- radiation to establish if, and in what numbers, secondary helmet fragments enter the skull after penetration of the helmet by bullets or shrapnel. The matter of whether the helmet protects the wearer against the greater portion of projectiles is not of concern here: about that there can be no doubt. There are many finer distinctions to be determined in the behavior of the helmets supplied by various firms. These distinctions provide keys to the toughness of the material. Into this determination come two considerations: the degree of fragmentation of the helmet and the nature of the fragments of helmet torn off at impact and thence projected into the skull. It is to be expected that shell fragments from a nearby explosion will indeed penetrate through the helmet's mass.
>
> The helmet fragments which were shorn off always occurred inside bullet entry holes. A smaller number were also observed emanating from bullet exit holes. Helmets manufactured by Röchling, all of which had a thickness between 0.8 and 1 mm, showed an entry hole which was almost always circular and embossed. The rims of these helmets exhibited little if any deformation. When an especially large entry hole occurred, numerous tiny, sand grain-sized fragments almost always resulted.
>
> Judging the helmets of the Lindenberg Co. was more difficult since only one helmet was submitted by them for testing. If the edge of the entry hole was somewhat inwardly bent, the X-ray film showed large quantities of secondary fragments. This would seem to indicate that the metal is too brittle.
>
> Krefelder helmets exhibit in part strong splintering around circular entry holes. Inwardly-bent entry hole edges were also found and numbers of larger metal fragments showed up under X-ray analysis.

The helmets made by Bismarckhütte showed conspicuous inward tearing and bulging at the entry hole, but the related fragmentation of the helmet shell was minimal. The X-ray films showed, for the most part, only a few large metal splinters.

The decisions arising from these observations were as follows: the Röchling helmets were too brittle; the Bismarckhütte helmets needed only a tougher shell since a great value was placed on the helmet's lack of fragmentation during testing. The X-ray films and removed metal fragments are now in my laboratory."

Professor Heymann of the Institute of Hygiene made the following statement:

"Investigations have covered these areas:

1. The strength of the air exchange inside the helmet.
2. Heat ratios under the helmet during different, artificialy-induced atmospheric conditions.
3. Elasticity of a rubber substitute, felt and horsehair as possible liner padding materials.

For purposes of comparison, these same criteria were tested with the leather spiked helmet as well. The results were these:

1. The exchange of air is less in the leather helmet than in the steel.
2. When the air is still or only very slightly moving, there is practically no difference in temperature under the leather and steel helmets. Those temperatures tested were 2°C, 15°C and 20°C.
3. With moving air (up to a wind speed of 6 meters per second), the air temperature under the steel helmet was from 2° to 3°C less. Condensation on the inside of the steel helmet was not observed.
4. In very sunny weather, as on a hot summer day, the highest recorded temperature was 40°C for the steel helmet and 38°C for the leather helmet. The steel can become so hot that it can be readily felt with the hand. On the head however, no noteworthy effect can be sensed.
5. The addition of a woven cotton cover increases the inside temperature of the steel helmet from 4° to 6°C above normal.

The elasticity of felt, horsehair and synthetic rubber were tested and measured with a load equivalent to the helmet's mass. After 24 hours, the felt showed almost no change. The synthetic rubber showed a noticeable change, but the horsehair retained almost all of its resiliency. The cushions will need to be designed in proportion to the overall size of the helmet. Using cushions filled with rubber or horsehair, a quilted effect should be achieved. The horsehair has shown itself to be the most suitable, particularly with regard to the comfort that it provides to the wearer of the helmet. For each helmet, about twenty to twenty-two grams of

horsehair are required, as compared to about sixty grams of rubber. One advantage of horsehair is that its characteristics are well known, whereas there are many unknown factors relating to the synthetic rubber. It was also thought that the quantities of synthetic rubber needed might place a burden on the market. A kilogram of horsehair should cost about 7 Reichsmark, while a kilogram of synthetic rubber should cost between 3 and 5 Mark. At this point, it cannot be ascertained whether the supply of horsehair will be sufficient for our needs.

Summary:

There are presently no health reasons which would preclude the use of a steel helmet. Placing fabric over the helmet is not recommended since it raises the temperature under the helmet in warm weather. Should the head become too cold in winter weather or in extreme wind, a handkerchief or piece of similar cloth may be placed over the head to keep it warmer under the helmet.

Felt, as used for the cushions, is probably the worst material. Synthetic rubber is somewhat better, but the best material by far in terms of elastic properties is horsehair.

With regard to a possible weight increase of the helmet, health considerations can only be determined through comparative research with existing helmets. At this time however, there seems to be little chance of this sort of change taking place."

*Source: Journal *Feldgrau,* Volume 3/71.

At the decisive session of the Prussian War Ministry, General von Wrisberg, the director of the General War Department, presided. The following persons also took part in this meeting: Prof. Dr. Bier, Doctor-General Schultzen and Lt. Col. von Feldmann, the chief of the Clothing Department. The Artillery Testing Commission had two representatives and the Rifle Testing Commission had one.

They were agreed that, with the helmet design in question, the best possible use would be not only as a protection in trench warfare, but also as a piece of gear to be worn while marching. An official requisition for 30,000 helmets was immediately sent to the War Ministry.

The new steel helmet was made of a sheet steel that ranged from 1 to 1.1 mm in thickness. The steel was drawn seamlessly and was inwardly crimped all around the rim to a distance of 5 mm. The size was measured in such a way that the helmet stood roughly a two-finger distance away from the head on all sides. Three holes were punched into the helmet for the insertion of the liner; two were near the temples and one was at the rear center of the helmet. On each side of the helmet was also found a hole for the insertion of the ventlation lug and its retaining washer. These lugs protrude outward about 8 mm and are found in four sizes, but only two varieties--the "step" lug and the "straight" lug. The smaller sized helmets have a two-stepped lug and

the larger helmets have a smooth-sided, unstepped lug. These varieties allow for a single sized armor plate to be used on helmets of various sizes. The lower portion of the helmet runs rearward from the visor and then dips downward to form an apron that protects the neck. The lower edge is horizontal when the helmet is put down.

In a letter dated 14 December 1915, The Prussian War Ministry informed the Bavarian War Ministry about the proposed introduction of a steel helmet for the troops of the Prussian contingent:

War Ministry
No. 2678/11.15.B3C
To: the Imperial Bavarian War Ministry
Subject: Steel helmets

Berlin W.66
Leipzigerstrasse 5
14 December 1915

The War Ministry is pleased to announce that, by command of His Majesty, the Kaiser and King, the troops of the Prussian contingent will shortly be equipped with a steel helmet to protect against mortar fragments and shrapnel. The preliminary trials have succeeded to the point that 30,000 helmets will be issued for field trial by the end of January.

The helmet, which is made of drawn chromium-nickel sheet steel, is considered to be a marching helmet. The thickness of the steel has been established at approximately 1 mm in order to maintain a helmet weight of about 1 kilogram.

An effective protection against infantry small arms fire in the trenches will be achieved by the use of a frontal armor shield. This shield will conform to the shape of the helmet and will extend over the forehead and temples. The shield will hang from the two ventilation lugs on the sides of the helmet and will be held in place by a strap which attaches under the lower rim of the helmet (sic).

Care is to be taken to see to it that the helmet provides adequate ventilation and that the liner insures a proper positioning on the head.

The shipment of a sample helmet and frontal plate remains yet to be carried out.

With respect to the conclusion of the obliging letter (No. 109901) of 21 November 1915, it was noted that the Nürnberg Metal and Lacquerware Factory (formerly Bing Bros. Inc.) in Nürnberg was selected to carry out on 7 December 1915 the drawing and tempering procedures for the steel helmets in cooperation with the Eisenhüttenwerk in Thale/Harz.

If, and to what degree, the company is capable of completing the current issuance depends upon the volume of orders, their price and their efficiency.

As a representative,
(signed) Wander

THE INTRODUCTION OF THE STEEL PROTECTIVE HELMET

After the close of the preliminary work in Berlin, the 1st Assault Battalion under the command of Captain Rohr received the first shipment of steel helmets for troop field testing in December 1915. This unit had been specifically designated as a group which would be utilized for research purposes. In spite of the short period of development and the rapidity of the issuance of the helmets, these trials proved to be most satisfactory. By the end of January 1916, the Eisenhüttenwerk in Thale had issued the first 30,000 helmets. The initial order for these had been placed at the end of November 1915 for the assault units serving at Verdun. The action at Verdun showed the same positive results that were observed with the 1st Assault Battalion. On the basis of this, the Chief of Staff of the Field Army, General von Falkenhayn, authorized the introduction of the steel helmet for the field army in the first half of February 1916. In spite of intensive research on our part, it has been impossible to ascertain the exact date of the helmet's introduction due to the fact that the Prussian War Archives were burned in 1945. All this data is therefore lost forever.

1st Bavarian Landwehr Division
Section I. No. 1114

Regarding: Steel helmets 23 March 1916

To: Commander, 1st Landwehr Infantry Brigade
Commander, 2st Landwehr Infantry Brigade
Command of Pioneers

The following is an evaluation by the Imperial Prussian War Ministry of the experiences with steel helmets and armored frontal plates. It is recorded in a question-and-answer format and deals directly with the experiences of the assault detachments engaged in the Battle of Verdun.

0I.a. Does the helmet, as established in tests at closer ranges, survive the impact of mortar and shrapnel fragments approximately the size of a pea without penetration?

Answer: Yes.

b. Does the helmet protect against shrapnel pellets?

Answer: Very probably yes, but this cannot be solidly established.

c. Does the material of which the helmet is made maintain its integrity after penetration, or are fragments torn off by the penetration of projectiles, etc.?

Answer: The helmet's material remains intact.

Helmets which have been penetrated are to be sent directly to the Clothing Section, if possible with the fragments and a report of the resultant head injury.

Answer: In the case of two penetrated helmets, one of the men received a temporal concussion and the other received a non-mortal wound to the nape of the neck. Helmets were sent to the Clothing Section of the War Ministry.

d. What perceptions does the wearer of the helmet have at the moment of impact by fragments, etc.?

Answer: He reported a blow. Some people were knocked to the ground; others were rendered temporarily unconscious, but without particular result.

II.a. Is the weight of the helmet notable after a long period of wearing?

Answer: The helmet is not too heavy for protracted wear.

b. Has the liner proven itself, and if the need arises, can proposals for improvement be made?

Answer: The liner has proven itself.

c. Is the ventilation arrangement to be viewed as purposeful, or was an unpleasant feeling of coldness evident even after the plugging of the vent holes and the covering of the head with a cloth?

Answer: Without a cloth, the ventilation was too strong and caused a feeling of coldness.

d. Can the helmet also be worn on long marches and has the helmet proven itself in this regard? Was it too heavy?

Answer: Yes, it has proven itself. No, it is not too heavy.

e. Has the announcement of the steel helmet as a replacement for the leather helmet, etc. as a marching helmet and field helmet been made?

Answer: Yes.

III.a. Has the field grey paint on the helmet's surface proven itself, or must it be made more matte?

Answer: It must be made more matte since it shines in the sun.

b. Is the placement of the regimental (etc.) number necessary. Is this also important if the helmet is viewed as a marching helmet?

Answer: No.

IV.a. Has the frontal plate proven itself?
Answer: Not worn, since it was too heavy during movement.

b. Does it defend against the French copper bullet at a range of 40 meters, as was demonstrated in tests at shorter distances?
Answer: Does not apply.

c. Does the frontal plate sit firmly on the helmet or does it rattle during movement? What proposals for improvement could be made.
Answer Does not apply.

d. Is the weight distribution satisfactory?
Answer: Does not apply.

e. What were the impressions of the wearers of frontal shields when hit by a non-penetrating bullet? Penetrated shields are to be sent immediately to the Clothing Section.
Answer: Does not apply.

f. When the frontal shield is being worn, must the helmet's chinstrap be worn further forward, to the rear, or is it satisfactory as is?
Answer: Does not apply.

V.a. Is the rear apron of the helmet a hindrance in the prone position as it contacts the backpack? This in particular regard to the use of small arms.
Answer: The rear apron is no more a hindrance than that of the previous helmet.

b. How much shorter must the rear apron be made? Does the neck then receive sufficient protection?
Answer: Does not apply.

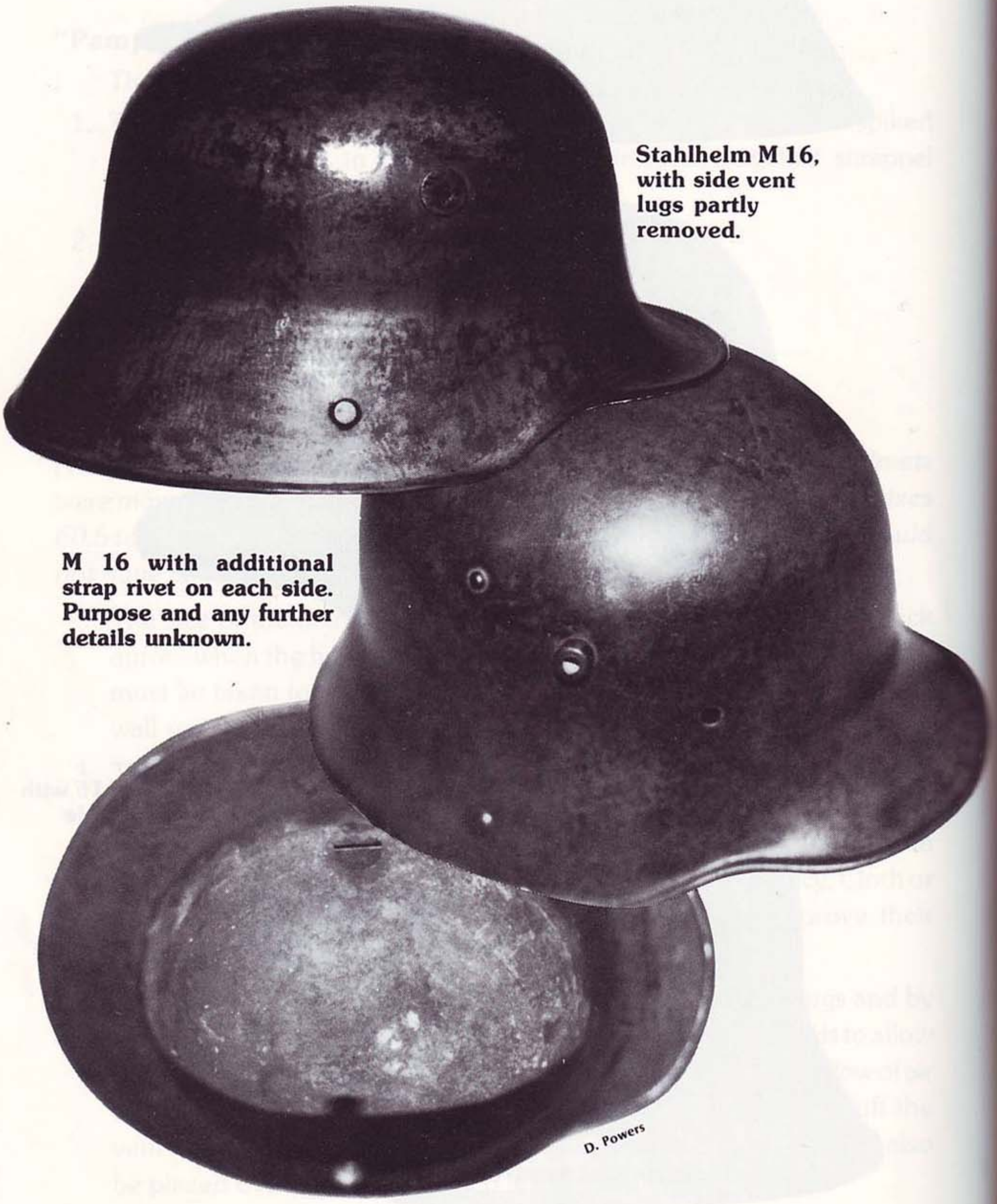
VI.a Has the helmet so proven itself that it should be distributed on a wider basis?
Answer: Yes.

b. Has the frontal shield proven itself in positional warfare?
Answer: Does not apply.

The helmet was worn by the assault troops at the Battle of Verdun. The troops had great faith in the helmet and it protected against many head wounds.

The infantry envies the assault troops because of the helmet. Many helmets were taken from the assault troops by the infantry.

5. When one first wears the helmet, the increase in weight on the head and neck may seem uncomfortable compared to the leather helmet, but this discomfort decreases with time. Furthermore, the weight is more than compensated by the improved ventilation, the superior comfort of the liner, and by the fact that the helmet liner is adjustable for each head.
6. The chinstrap of the helmet is removable. It is to be hung on the M91 hooks on the underside of the apron. When not drawn under the chin, the chinstrap can be placed above the visor.



Stahlhelm M 16, with side vent lugs partly removed.

M 16 with additional strap rivet on each side. Purpose and any further details unknown.

D. Powers

II. The Frontal Armor Plate

7. The frontal armor plate protects the wearer primarily against infantry small arms fire from a distance of 50 meters and beyond, but not against armor-piercing bullets. It protects the forehead and temples of the wearer, but extends outward beyond the sides of the helmet so that even the rear portion of the head is somewhat protected from frontal fire.
8. The frontal plate can only be worn for short periods of time because of its weight and therefore it will only be used in special circumstances (in trench fighting, by forward observers, and the like).
9. Its shape allows it to be worn on all sizes of helmets. It hangs on the ventilation lugs on the side of the helmet and is secured in position by a strap.

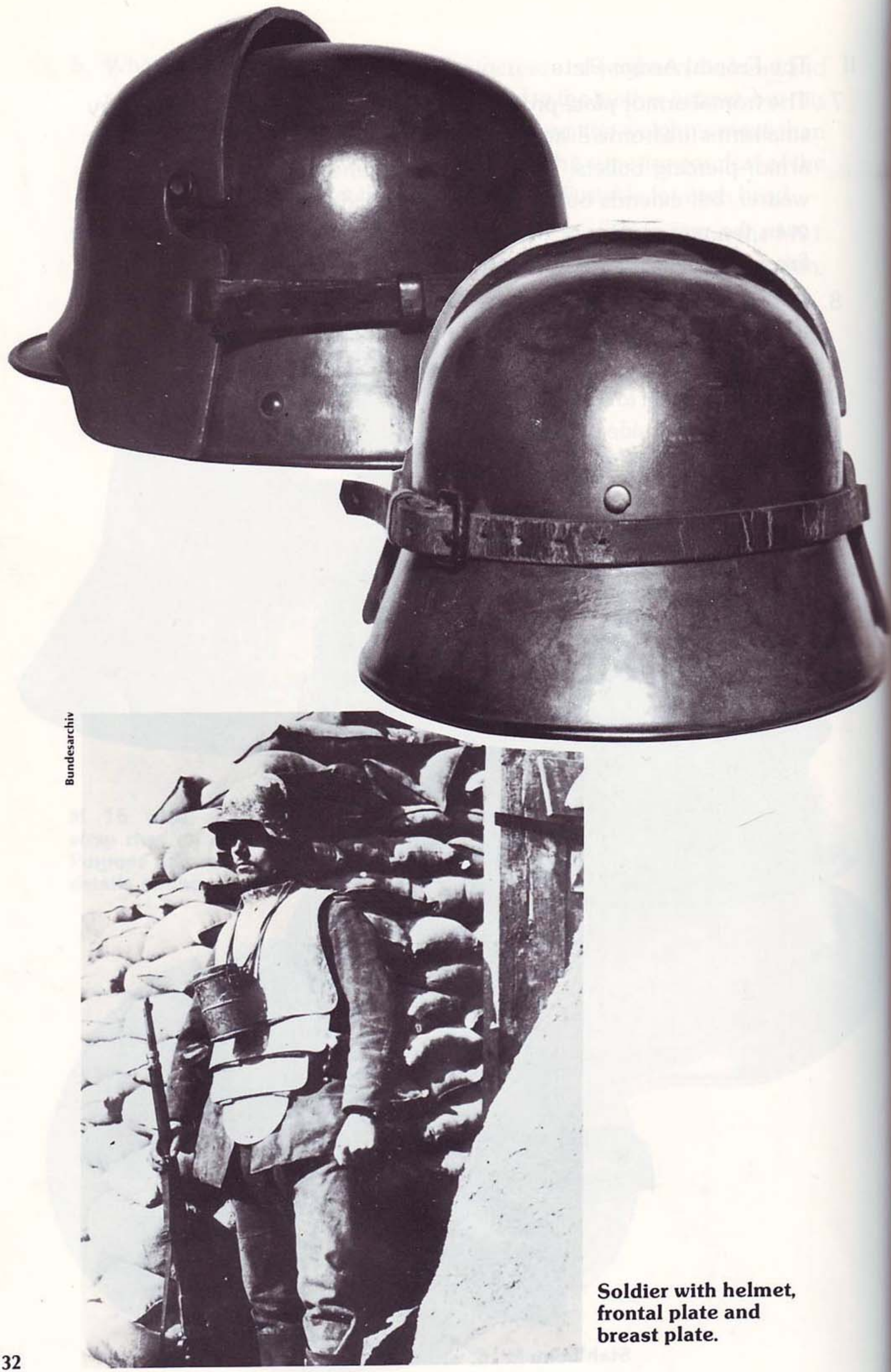


J. Bandy



J. Bandy

Stahlhelm M 16, with frontal plate.



Bundesarchiv

Soldier with helmet, frontal plate and breast plate.

III. General Comments

10. The helmet is part of the personal equipment of each solder. If the helmet is subjected to fire, it will lose its ballistic resistance.

11. In case of some damage to the surface, the helmet has to be repainted as soon as possible either completely or at least partly.

12. Helmets and frontal plates that have become unusable are to be turned in to the Zone Inspectorate for later disposal."

The introduction of the new helmet was not long hidden from the enemy. The Paris newspaper, "Le Temps," carried an article about the new helmet on 10 March 1916, mentioning both the helmet and its frontal plate.

Shortly following this, several army groups were to be equipped with the new helmet. Priority was to be given to the troops which were fighting at Verdun and on the Somme. Those troops engaged on the Eastern Front had to wait for their allotment of helmets. We know that the troops at Verdun were chosen to be supplied first because of a letter dated 16 April 1916 from the Imperial Naval Office to the Naval Corps in Flanders. The corps had requested 333 helmets and 100 frontal plates, but the Naval Office was unable to issue them because all supplies came through Army Administration. The plight of the Naval Corps was relayed to the 4th Army, which supplied them. The corps was situated on the right flank of the Western Front and was composed of three naval divisions, coastal artillery, naval flying units, torpedo boats, destroyers and submarines, but they all received their supplies from the army. On 17 June 1916, the Prussian War Minstry informed the Imperial Naval Office that the 4th Army would shortly be issuing 7,500 steel helmets and 375 frontal plates to the Naval Corps. It cannot at present be exactly established how many of these helmets and plates the corps actually did receive. Originally, it was planned that 5% of the helmets would have a frontal plate, but this was never accomplished due to the nickel shortage.

Based upon a letter dated 27 July 1916 received by the Prussian War Ministry, the following reply was sent to the Bavarian War Minstry:

"On the basis of your pleasant letter of 27 July 1916, the War Ministry is humbly honored to announce that the outfitting of the Army with steel helmets and frontal plates is being carried out as per the distribution plans of the Chief of the General Staff of the Field Army.

Up to 29 July 1916, the following distributions have been made:

2nd Army	133,500 steel helmets
3rd Army	10,500 steel helmets
4th Army	10,850 steel helmets
5th Army	55,550 steel helmets
6th Army	13,750 steel helmets
7th Army	11,350 steel helmets

Army Group Gaede ..... 8,500 steel helmets
Army Group von Strantz ..... 8,000 steel helmets
Army Group A ..... 9,500 steel helmets

Again, 5% of these numbers of helmets will also be issued with frontal shields.

The distribution of helmets and frontal shields to the troop units will be regulated by the Army High Command. This will naturally be carried out with a view to exigency on the part of the troops.

(signed)
von Oven

A further letter from the same officer documents the testing of the white helmet cover in late 1916 and early 1917:

War Ministry
Army Administration Department
No. 2207.12. 16 B 3 C b

Berlin W. 66
3 January 1917

Test of the white cover for the steel protective helmet.

1) As a protection for the steel helmet against visibility in snowy regions, white helmet covers underwent testing (see enclosure) prior to their introduction and were, in fact, designed in various sizes to fit helmet sizes 60, 62, 64, 66 and 68. The description and acceptance specifications are enclosed.

2) A sample may be bought by the manufacturers through the Clothing Office of the "Gardekorps."

3) The Corps Quartermaster's Office must deliver the Clothing Office receipt for samples destined for the Clothing Department of the War Ministry.

The War Clothing Office has received a copy.

(signed)
von Oven



White helmet cover for the Stahlhelm M 16 and 18.



White helmet cover, inner side.

Straske



Stahlhelm M 18, with a liner made of felt, showing the hooks of the helmet cover.



Soldier with a white helmet cover.



J. Bandy

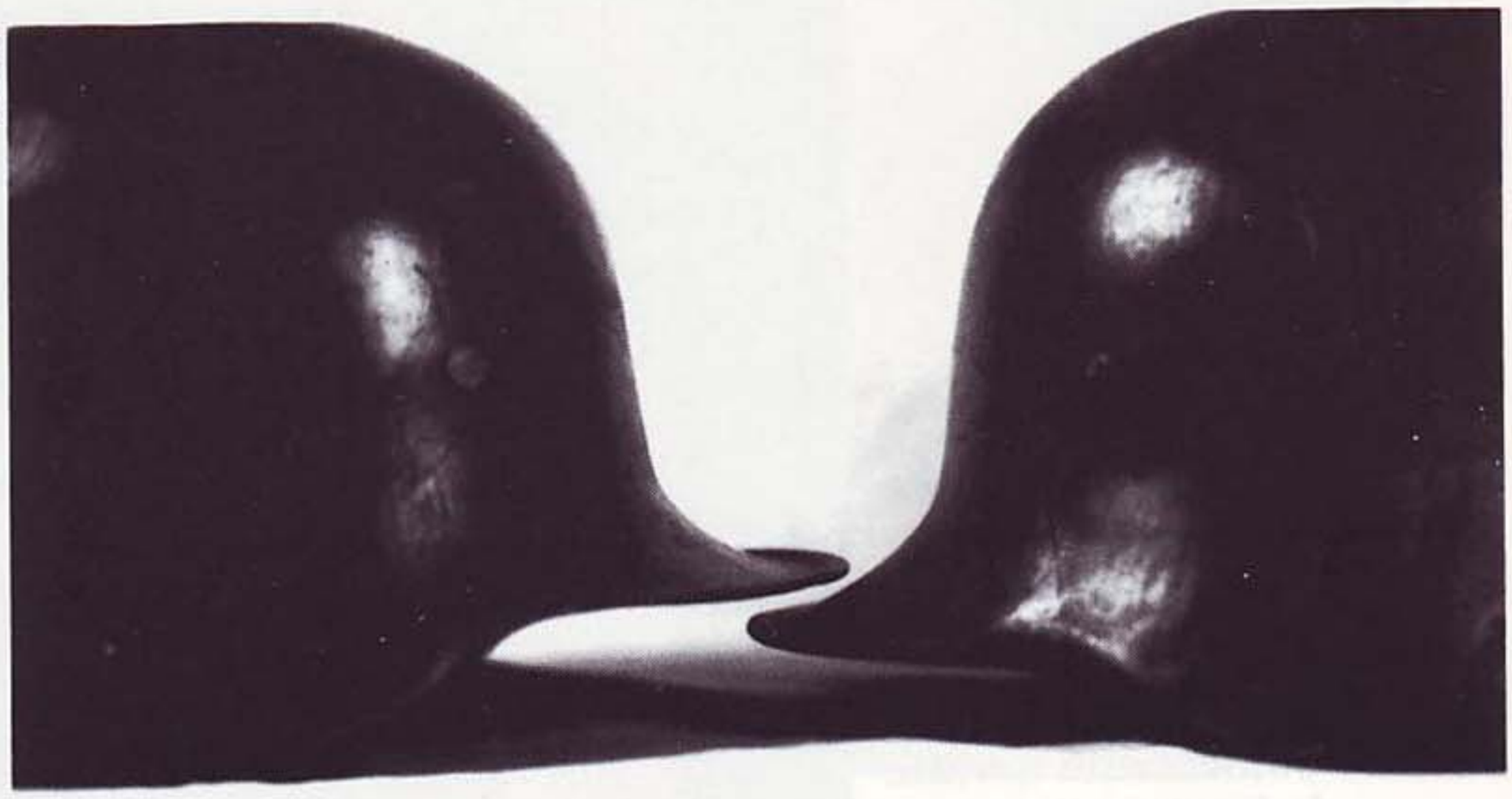
The full visor variant at left exists in both the M 16 and M 18 models. It may have been tested in the field for wear with the gas mask, as it gave greater clearance between the forehead and the visor, or worn in trench warfare conditions where the greater frontal angle provided additional projectile deflection.

Bayer. Armeemuseum



The production of helmets during WW I.

D. Dahl



M 16 with different visor heights due to apron depth.



Two "soldiers" wearing the new helmet.



German troops being inspected by the "Kronprinz."

After careful examination of all available M16s with the square dip (see photos), it is believed that this version was the very first M16 produced and distributed. It is interesting to note that almost every specimen observed had a crack in the square dip area, on both sides of the helmet. This is probably due to the stress factor on the sharp curvature between the visor and neck guard. The production of this M16 version was certainly discontinued immediately upon discovering the design problem, which accounts for the helmet's extreme rarity. All specimens examined were of 1916 manufacture and were marked ET 62 or 64.

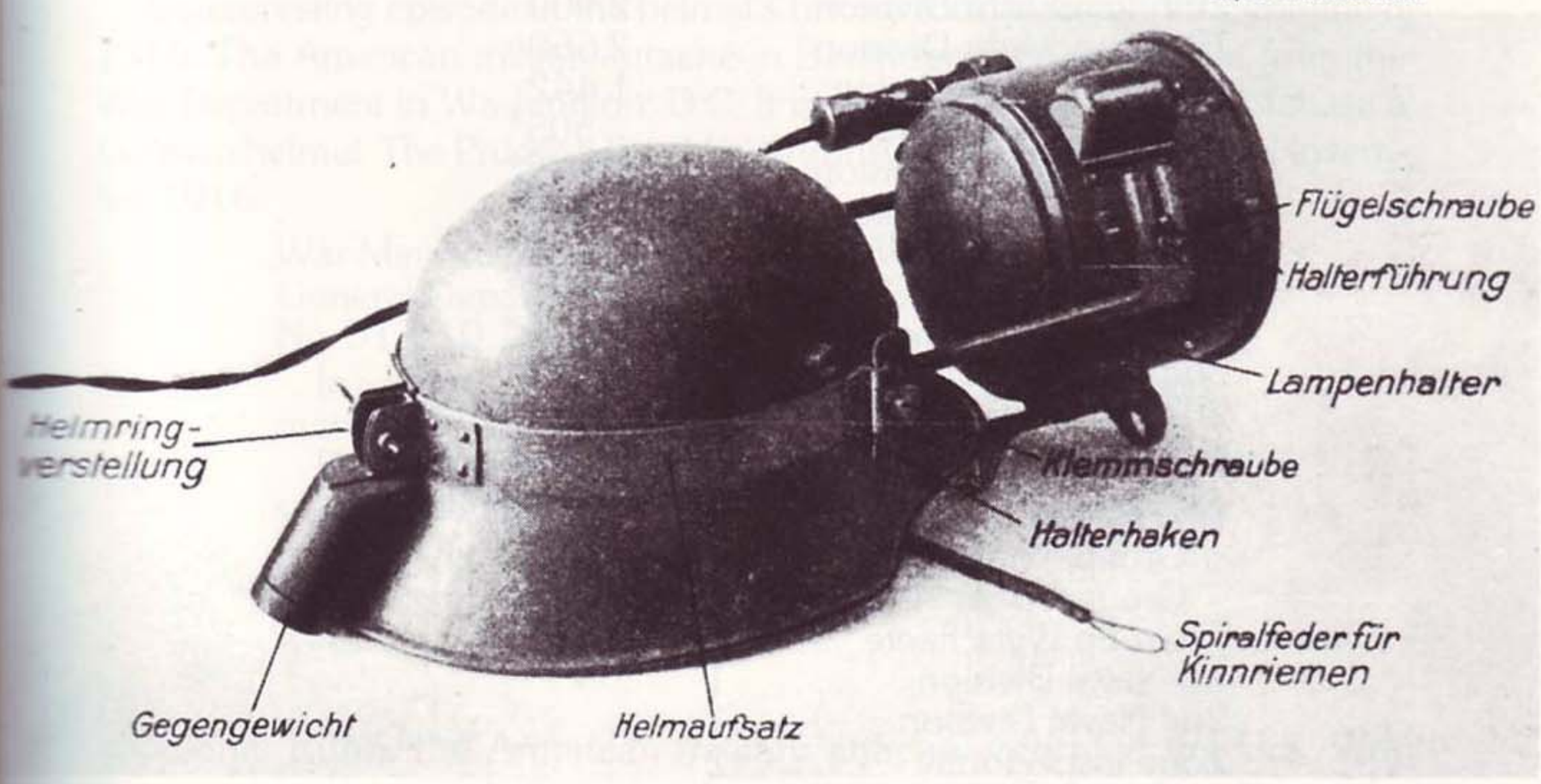


Area where all cracks observed, are located.



Soldiers of the German "Marine Korps" firing a mortar.

Bayer. Armeemuseum



Stahlhelm M 16 with special equipment, a so-called signaling apparatus which was used for transmitting messages to the pilot of an aircraft.

Another letter from von Oven dealt with the recall of leather spiked helmets from field units as the shipments of steel helmets arrived

War Ministry
Army Administration Department
No. 701/2. 17. B 3 C b

Berlin W. 66
11 February 1917

The Department has cause to point out the decree of 30 August 1916 (No. 958/8. 16. B 3 C), according to which:

I. The troops equipped with steel helmets have sent back their superfluous leather helmets to the replacement troops sections and,

II. For the duration of this withdrawal (of leather helmets), the steel helmets are to remain in the field and, with a change of the unit's position, are to be brought along on the pack wagons.

Enclosures

(signed)
von Oven

The following letter from Colonel von Hammerstein of the Army High Command 4 outlined the dispersal of helmets through the inspectorate of the 4th zone:

Army High Command 4
No. 37826

25 March 1917

20,000 steel protective helmets were made available for dispersal through the 4th Zone Inspectorate as follows:

1st Naval Division	750 steel helmets
2nd Naval Division	3,300
20th Landwehr Division	2,900
19th Landwehr Division	2,660
185th Infantry Division	1,442
21st Landwehr Division	505*
40th Landwehr Division	1,082*
208th Infantry Division	1,401*
Group Ypern	69*
Group Wytschaete	896*
2nd Cavalry Division	36*
2nd Infantry Division	1,626*
207th Infantry Division	3,333*

*Outfitting is complete with this shipment.

Distribution:

Group North	4
Group Ypern	6
Group Wytschaete	4
1st Naval Division	1
2nd Naval Division	1
Zone Inspectorate	2

(signed)
von Hammerstein
Colonel

On 30 January 1917, the Army Administration Department issued the following regulation to the representatives of the General Command:

War Ministry
Army Administration Department
No. 2701.1. 17 B 3 C a

Berlin W. 66
30 January 1917

Secret

In accordance with the regulation of the Chief of the General Staff of the Field Army (Document 27775/16 of 6 November 1916), the assembled troop sections already on home soil are being equipped with steel protective helmets.

Involved in this regard are infantry regiments, pioneer and mortar companies. For each field artillery unit 15 steel helmets for observers are to be issued.

In total, 10,000 steel protective helmets are planned for each division and during the month of February they shall be dispersed to the various divisions. In order to be punctual in this dispersal, we must be able to comply with the existing guidelines and therefore the department requests the *soonest possible* declaration of the destination and point in time — the week — for which the division desires the delivery of the helmets for the troops. Each 2,500 helmets fill one supply wagon. Partial shipments are to be avoided if possible.

(signed)
Brendel

To: the Imperial representatives of the General Commands of the Guard Corps, the I, IV, VI, VII, VIII, X, XV, XVII, and XVIII Army Corps.

An interesting episode in the helmet's history took place on 15 September 1916. The American military attaché in Berlin received a directive from the War Department in Washington, D.C. It instructed the attaché to purchase a German helmet. The Prussian War Ministry answerd his request on 18 November 1916:

War Ministry
General Department
No. 513/10 16Z1

Berlin W. 66
Leipzigerstrasse 5
18 November 1916

In answer to your letter of 7 October 1916, the department responds as follows:

Because of problems with patent rights, we are sorry to say that we are unable to supply you with the requested helmet.

(signed)
Hoffmann

Colonel Kuhn, the American military attaché, informed the U.S. War Department of this and suggested that the attaché in Paris or London might be able to obtain a helmet that had been captured in combat. In February 1917, a German helmet was received from Paris.

On 22 January 1917, the following telegram was sent to all the army groups by General Ludendorff, the chief of the General Staff:

> It is announced that the German troops will be equipped with steel helmets as follows:
>
> a) Infantry, active cavalry and rifle regiments, assault battalions, engineer and mortar units
> b) Field and foot artillery batteries will receive 20 helmets each.
>
> By order,
> Ludendorff

On 23 January 1917, the 4th Army High Command ordered the issue of helmets to units on the basis of this new order. Thus, the 1st Naval Division still lacked 6691 helmets while the Naval Corps requisitioned about 30,000 helmets for its troops. On 27 January 1917, the Prussian War Ministry informed the Imperial Naval Office that on 3 January 1917 white camouflage covers for the helmets had been introduced and that they should place their requisition directly with the 4th Army High Command.

On 13 February 1917, inquiries from the General Supply Offices were made to the individual army groups regarding the necessity for a field grey cover for the steel helmet. The cover was to be used to cut down on the reflection from the helmet caused by both the sun and the moon, as well as glare that might result during damp periods. If it were desired, should all the troops be equipped with a cover or only patrols or sentries? The Naval Corps saw it as unnecessary and instead requested a matte finish on the helmets. The High Command of the 4th Army considered the idea, but no decision was reached. From contemporary sources, we know that 800,000 helmet covers were issued, but it is now impossible to determine their color.



The field grey helmet cover.

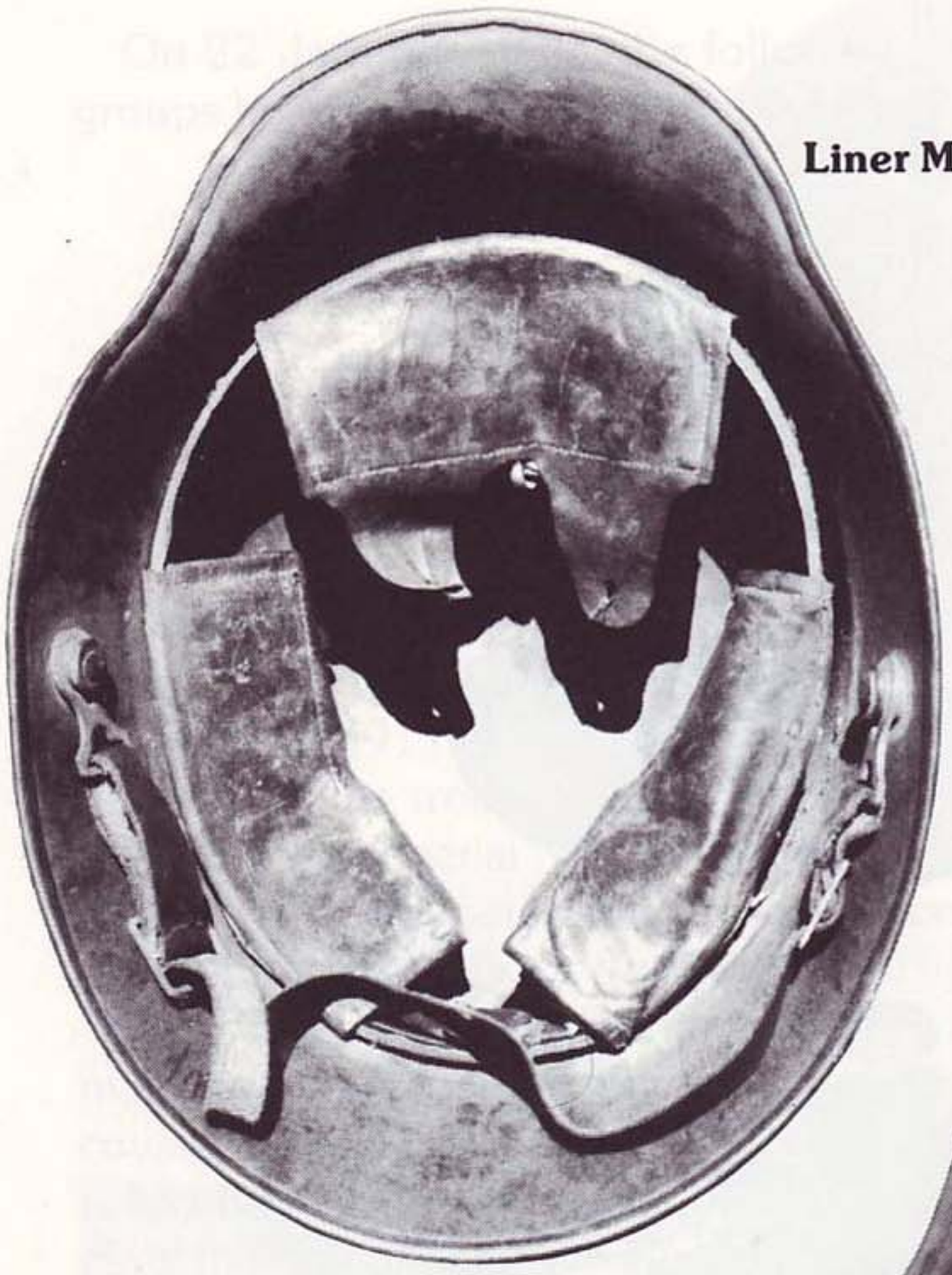


Machine gun crew wearing the field grey helmet cover.

It was announced on 7 April 1917 by the Chief of Staff of the Field Army that from 22 January 1917 on, all stretcher-bearers from medical units and all radiomen from communication units were to be equipped with helmets as long as they were in a fire zone.

In May 1917, the liner of the helmet was modified by authority of the Clothing Procurement Office of the War Ministry. Up until this point, the liner's three leather pads had been attached to a leather band, but due to the leather shortage, the band was then made of sheet metal. Unfortunately, the exact date of this change cannot be precisely determined. However, a letter from the attaché of the Bavarian military command in Berlin dated 9 May 1917 has established that the sheet steel ring of the liner was manufactured by the same plants that produced the steel helmets.

In August 1917, the War Ministry regulated the replacement parts supply for helmets and announced this to the individual armies through the Army's



Liner M 16



Liner M 17

official regulation digest (Armeeverordnungsblatt). The following is an extract from the 5th Army's digest:

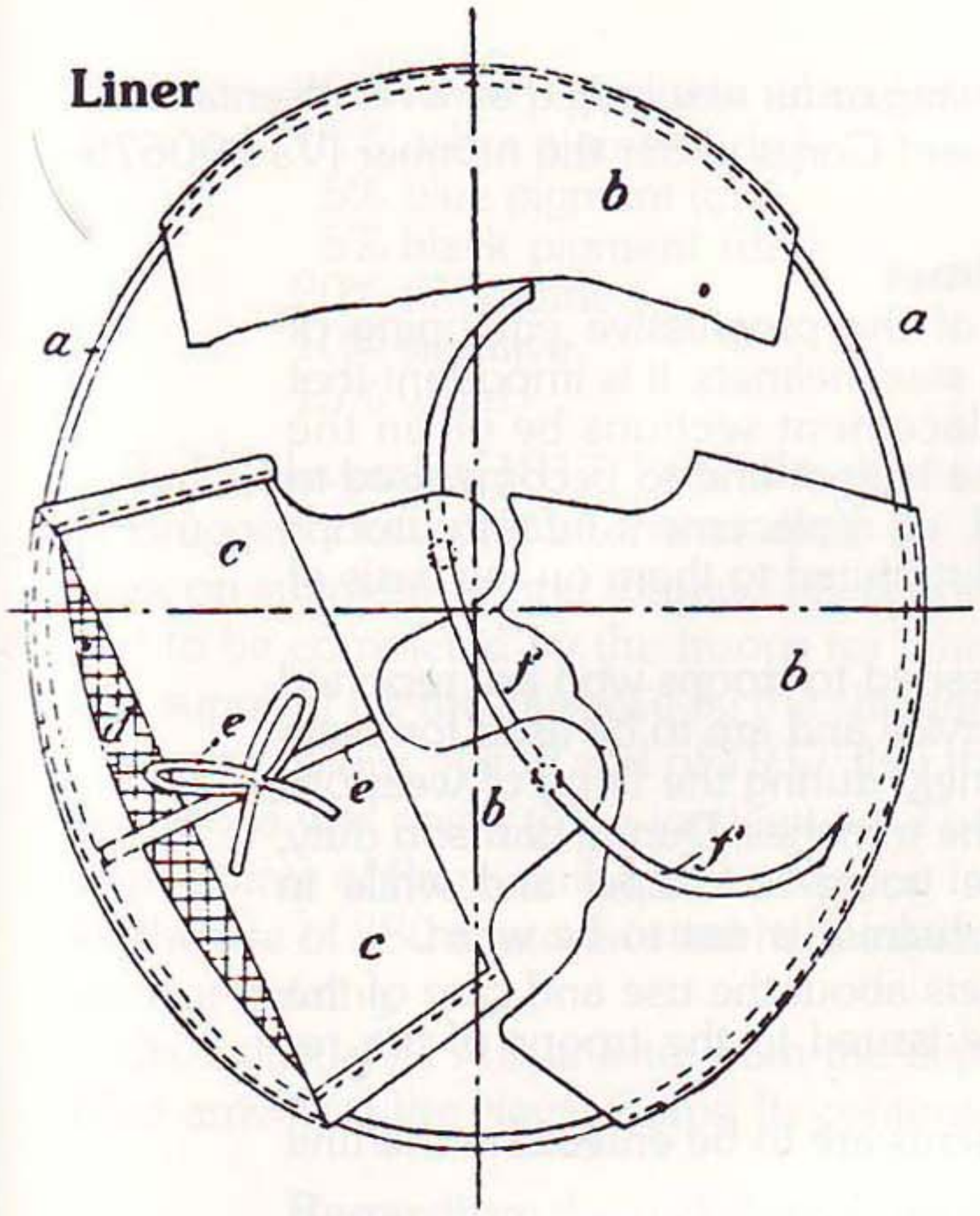
IV.a. No. 8693/17 of 19 August 1917

No. 481

Specifications of Replacement Parts for Steel Helmets

Liner and Metal Fittings for the Steel Helmet

Liner

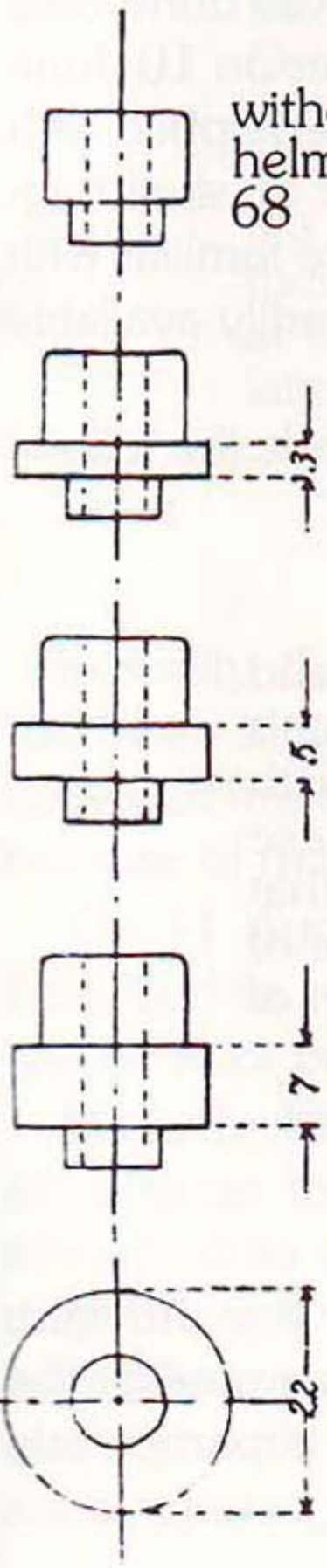


a. Band (leather or sheet metal)
b. Sweat pads
c. Cloth pouch
d. Cushion
e. Strap
f. Drawstring

The War Ministry announces Order No. 741/ 6. 17 B 3 C a IO of 8 August 1917 which forbids divisions to requesition steel helmet replacement parts directly from the Army Administration Department. In accordance with Order No. 248 in the Army's regulation digest, those replacement parts needed by the troops are to be requested from the Quartermaster's Office through an appropriate field supply office not later than the 5th of each month. The Quartermaster's Office will report total requisitions to the Army Dispersal Office for final disposition to the individual troop sections. To avoid errors in the ordering process, the attached requisition form is to be utilized.

(signed)
von Stockhausen

Vent Lugs



without rim A.1 for helmet sizes 66 and 68

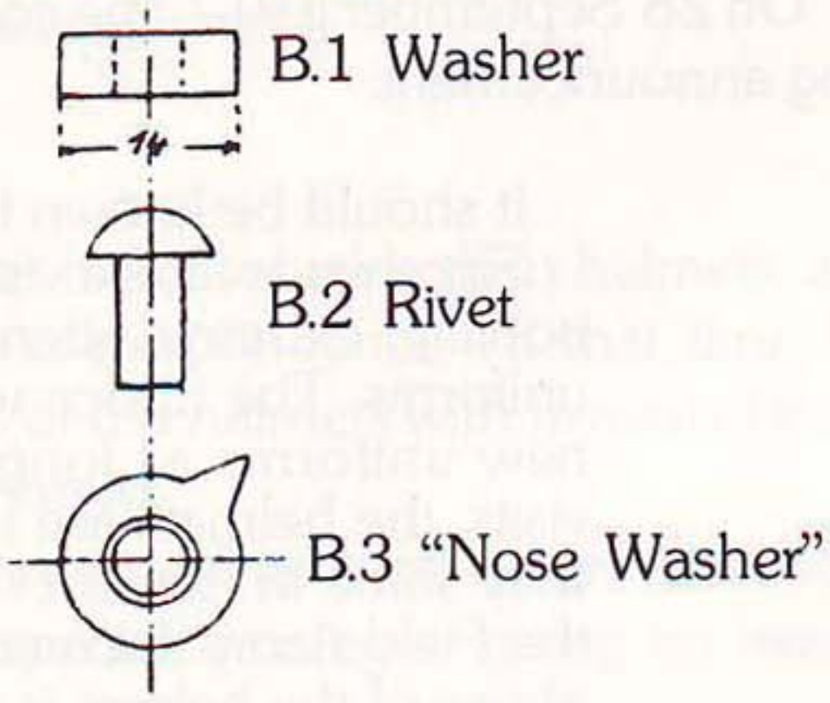
A.2 for helmet size 64

A.3 for helmet size 62

A.4 for helmet size 60

A.5 for retaining washer

Chinstrap Retainer

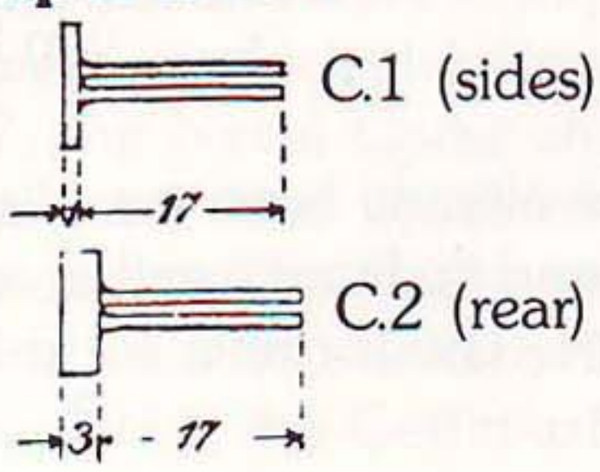


B.1 Washer

B.2 Rivet

B.3 "Nose Washer"

Split Rivets



C.1 (sides)

C.2 (rear)

On 29 October 1916, the following order was issued by a representative of the General Command of the Guard Corps under the number IVa 390675-1680:

> **Steel Protective Helmet**
>
> As a consequence of the progressive equipping of troops in the field with steel helmets, it is important that the troops of the replacement sections be given the opportunity to wear the helmet and to become used to its weight. To this end, all replacement infantry troops should have helmets distributed to them on the basis of the plan below:
>
> Helmets are to be issued to troops who are reported to be ready for field service and are to be used for every practical purpose, namely during the firing of weapons and while on duty in the trenches. During garrison duty, while on watch, while going to chapel and while in walking-out dress, the helmet is not to be worn.
>
> A supply of pamphlets about the use and care of the steel helmet should be issued to the troops of the replacement section.
>
> The helmet assignments are to be entered in the unit records.

Apparently, the issuance of helmets to replacement troops was done only on a local basis since the Army High Command issued an order on 10 June 1917 which decreed that the field recruiting stations were to be equipped with steel helmets because soldiers were frequently being wounded by shell fragments and furthermore, young soldiers needed to become more familiar with the helmets since this particular piece of equipment was not readily available on the home front.

On 28 September 1917, the commander of the field army made the following announcement:

> It should be known that:
>
> Since we are to be visited by high-level commanders and nobility, extreme attention is to be given to the men's uniforms. The troops will be progressively outfitted with new uniforms as long as they are needed. For these visits, the helmets are to be polished with grease so that they shine in the sun. The Chief of the General Staff of the Field Army decreed on 3 May 1917 that any sort of abuse of the helmet is forbidden.
>
> (signed)
> von Eisenhart

As it has already been established, the helmet was reflective in sunlight, moonlight, and in damp weather and that a matte finish was requested by the Naval Corps. The formula for mixing the color of the paint is particularly noteworthy:

30% white pigment in an oil base
15% ochre pigment (dry)
5% blue pigment (dry)
5% black pigment (dry)
20% turpentine
10% siccative
15% water

By 13 November 1917, 26,270 helmets had been painted in the shipyard in Brugges. However, after that date, the shipyard was heavily involved in work on submarines and torpedo boats and thus the painting of the helmets had to be completed by the troops for which they were destined. The paint was supplied for this purpose by the shipyard.

It was obvious by the end of 1917 that the number of helmets available to the troops was going to be inadequate. Therefore on 17 October 1917, the Inspectorate of Engineering sent a request to the Bavarian War Ministry Office for the use of 380 captured steel helmets for their pioneer troops during close combat training.

On 1 January 1918, a letter from the deputy of the Quartermaster-General/ West arrived at the Naval Corps. Its contents were these:

> **Regarding:** the nickel-steel head shield for riflemen.
>
> From communications with the War Ministry, War Office document number 187/12. 17 K.R.A., it appears that there should still be a number of riflemen's shields in the field. These shields are no longer being manufactured. Ostensibly, the shields are being used to reinforce the trenches.
>
> The War Office is investigating the possibility of recalling these shields so that they may be smelted to regain their nickel content. This nickel shortage is very pressing at the moment and we request that you report to us no later than 15 January 1918.
>
> The Deputy Quartermaster-General
> (signed)
> v. Müller

In reality, the 4th Army zone had far fewer frontal shields than helmets, as had been indicated by other contemporary correspondence. At that time, it appeared impossible to equip more than 5% of the helmets with frontal plates because of manufacturing difficulties encountered.

On 11 August 1917, the Naval Corps ordered that those helmets which belonged to soldiers leaving their units for special training or going on leave, will be kept by the field unit.

Since the helmets had stood up well to the test and were highly valued by all, a great many requests for helmets were made by various units not already thus equipped. On 8 April 1917, the Naval Corps ordered that machine gun detachments, spotlight personnel, and winch crews in the wharf areas were to be outfitted with steel helmets. The reason for this order was that antiaircraft barrages often scattered shell fragments over the dock areas, causing many casualties. On 3 June 1917, the Command of Naval

Aviation of the Naval Corps ordered steel helmets for the 2nd Naval Air Station in Ostende, Belgium. These special requests soon became continuous. The harbor construction director of the Naval Corps requested a helmet on 2 March 1918. The last request ever filed was on 22 May 1918 by the commander of torpedo boat forces in Flanders. He requested 1,624 steel helmets for the deck crews of his destroyers and torpedo boats.

Chief of the General Staff of the Field Army
II. No. 91 366 7 July 1918

Through a purposeful, variegated surface paint on cannons, mortars, machine guns, steel helmets, etc., these devices may be much more easily hidden from view than before.

The authorized trials have produced the following results:

1. *Steel helmets:*

A painted surface with one color (e.g. green or light brown) or with small splotches of a variety of colors is superior to a standard single color helmet, although it still allows the recognition of the characteristic form and silhouette.

In this regard, a three-colored surface which has had the borders blended, simulating a shadow effect is not recognizable beyond a distance of 60 meters.

Particulars regarding a useful surface:

Dull colors - the helmet must not shine. Sprinkling the still-damp oil paint with fine sand stops the surface from glistening in the sun.

The choice of colors is to be purposely changed according to the time of year. One of the three colors must match the basic color found in the region of fighting.

Suitable at this time: green, yellow ochre, rust brown

Separation of the surface of the helmet into equal-sized portions, consisting of large, sharp-cornered patches.

Support - On the front side of the helmet, no more than four colored fields must be visible. *Light and dark* colors are to be placed *next to each other.* The colored segments are to be sharply *separated* from each other by a finger-wide *black stripe.*

Necessary coloring materials for 1000 helmets: 5 kilograms each of ochre, green and brown; 2 kilograms of black.

Stahlhelm M 16/18 in different camouflage colors and patterns.











J. Bandy



J. Bandy



J. Bandy

A. Barrows

2) *Cannons and Mortars:*

Ochre, green and brown are to be used. The colors are to be applied in connected, irregular patches across various parts (e.g. barrel, protective shield, carriage, wheels). The individual colored patches are to be bordered by a black stripe with a finger-wide thickness. In this way, colors will not blend at the interfaces and this pattern will help to break up the form of the equipment.

The vertical (and therefore shadowed) parts and surfaces of the guns are to have lighter paint applied, while horizontal surfaces should have darker paint applied.

To improve the camouflage, several irregular patches should be painted in the area around each free-standing battery. These patches should be in the same color as the cannons.

3) *Machine Guns:*

Similar paint to that used on steel helmets and cannons has proven to be successful.

After ongoing scientific testing, I have requested the War Ministry to regulate the appropriate seasonal color scheme. Until that point, I request that painting be carried out in the above-mentioned manner.

(signed)
Ludendorff

To:
all Army Groups (5 each)
all Army High Commands (20 each)
Inspector General of Artillery Schools
General of Pioneers attached to General Headquarters
Commanding General of the Air Forces
Army Mortar School
Commander of the Gas Troops
M.SS Command Rozoy
General Staff Course Sedan
Field Artillery and Foot Artillery Practice Grounds
Chief of Field Transportation
Offices Ia, Ic, B, Munitions, Z, P, F, IIIb (3 each)

The following memorandum issued in July of 1918 outlined the concerns with the repair and replacement of portions of the steel helmet:

IIb No. 51507 of 21 July 1918
No. 962 Steel Helmets

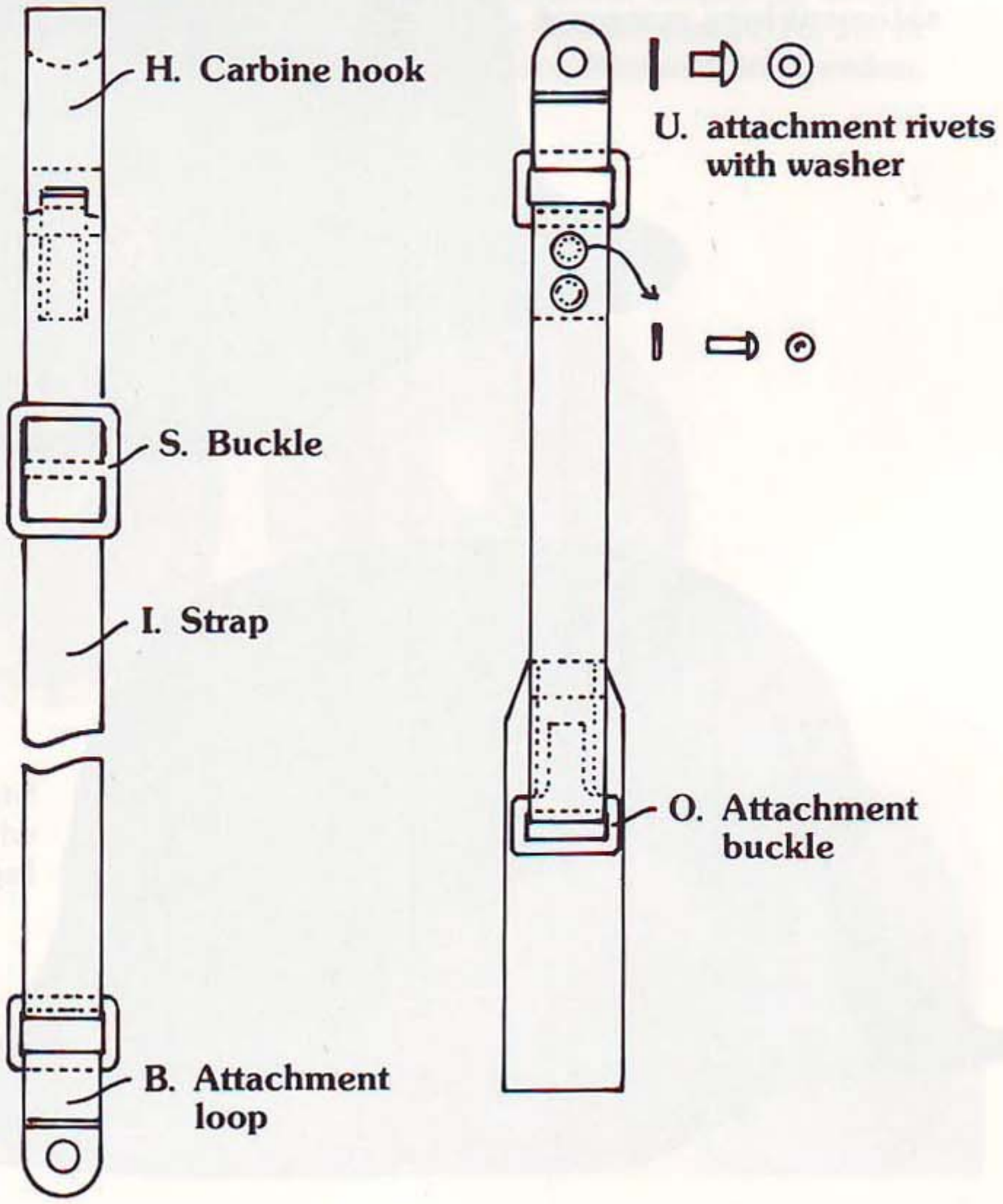
War Ministry
Army Administration Department
Ref: No. 3139/6. 18. B 3 C a
of 15 July 1918

After protracted communications, it has become apparent that the troops very often lack the paint to properly repair the surfaces of damaged helmets; from this point onward, a matte lacquer will be included with the monthly replacement parts shipments (available as per order no. 741.6.17. B 3 C a).

Steel helmets will now be equipped with a new, two-piece chinstrap which attaches directly to the liner assembly. Replacement of the new chinstrap or parts thereof is to be carried out by the Clothing Section. The attached diagram gives the designation for the replacement parts.

(signed)
v. Flotow

The following was the "attached diagram" mentioned in the document above.

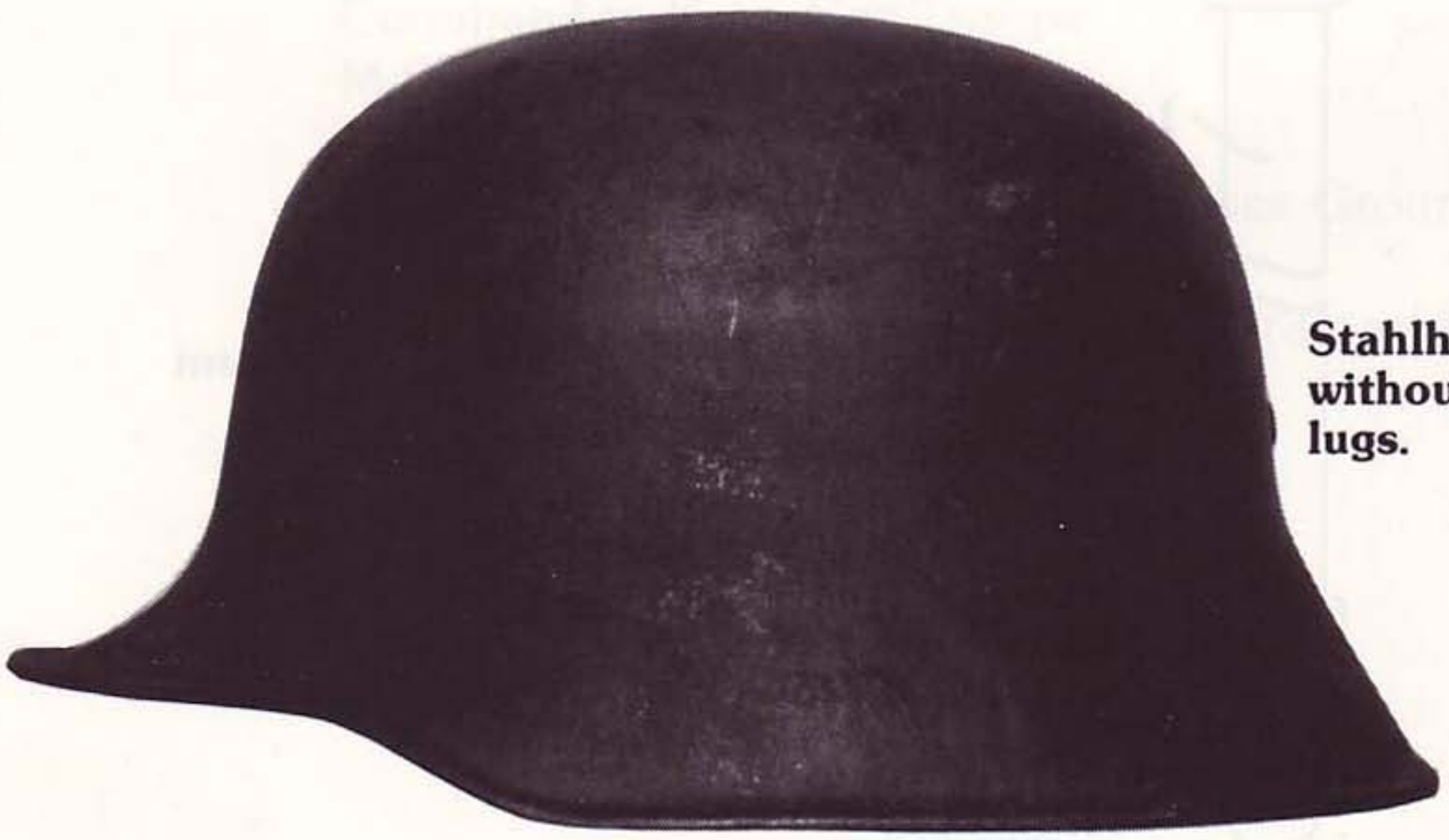




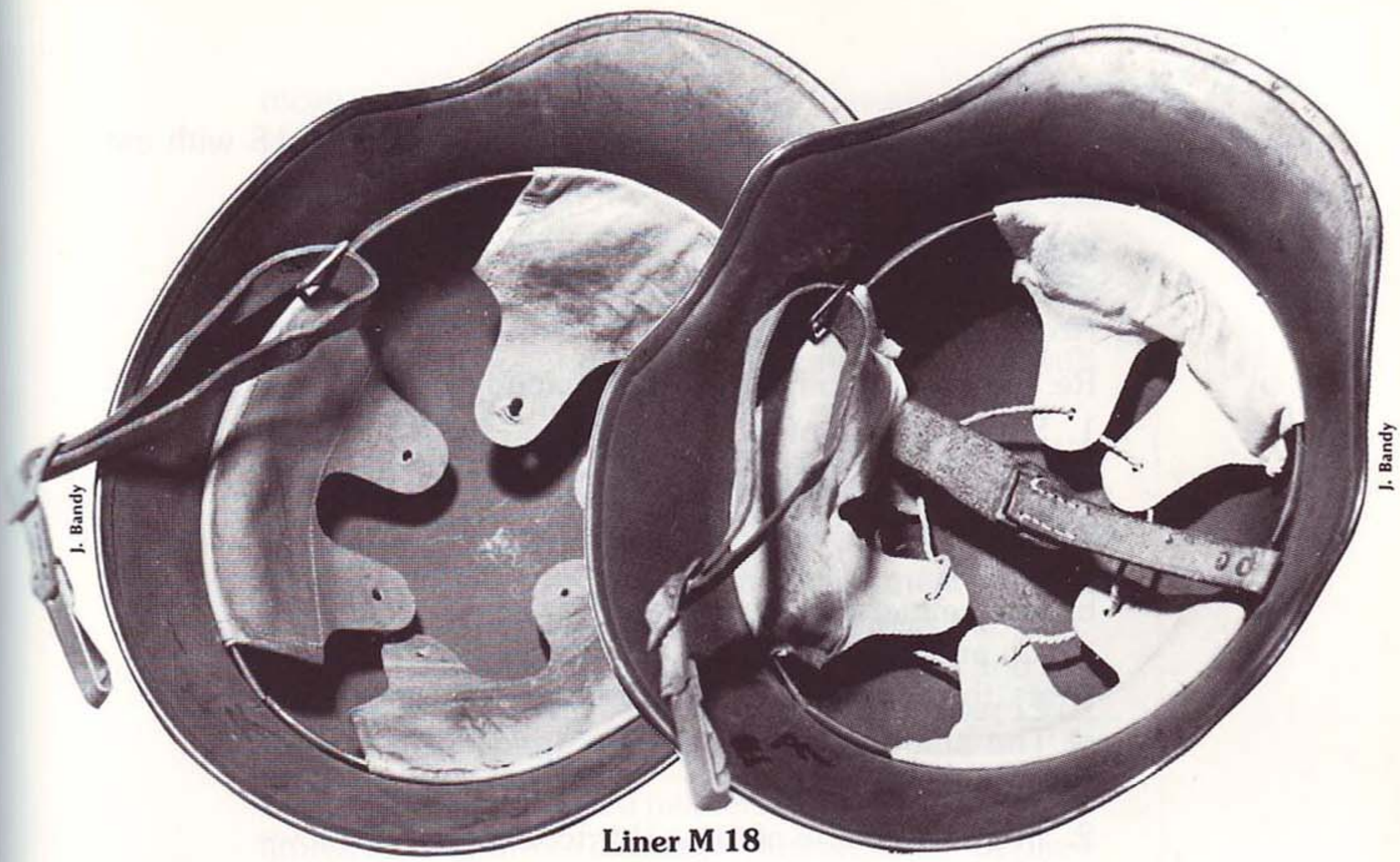
Stahlhelm M 18, size 66



Stahlhelm M 18, with side vent lugs removed.



Stahlhelm M 18, without side vent lugs.



J. Bandy

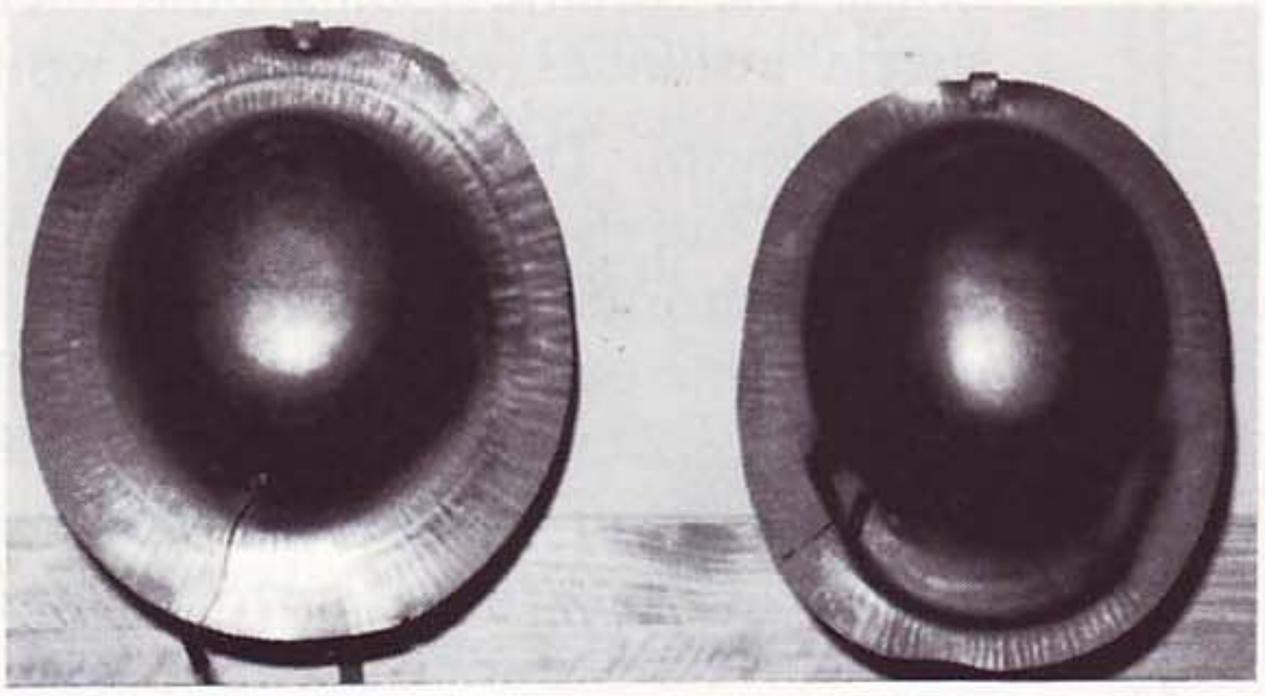
J. Bandy

Liner M 18



Six different stamping stages of the "Stahlhelm M 16/18, at the Army Museum in Dresden.





The following is in reference to the newly modified M 18 with ear cut-outs.

War Ministry
Army Administration Department — Berlin W.66
No. 2054. 7. 18 B3 Ca. — 1 August 1918

Re: Research into Helmets of Modified Design

1. Shortcomings of the Steel Helmet

a) The use of the leather helmet's chinstraps is inconvenient. They do not hold the helmet securely and are easily lost.

b) The helmet shines, particularly in damp conditions, in sun and in moon shine, and by the glare of rocket flares, thus giving away the position of the wearer.

c) The ability of the wearer to adequately hear is hindered.

2. In consideration of these shortcomings, the following improvements are proposed:

a) The helmets receive a special chinstrap attached directly to the liner. The chinstrap will be in two pieces with a carbine hook and *one* buckle.

b) 100,000 steel helmets of size 64 are to receive a matte, felt-like finish using wool dust.

c) These same helmets are to receive a half-moon shaped cut out approximately 20 x 60 millimeters on each side of the rim opposite the ear.

Regarding a): The new chinstraps are more firmly attached, do not unhook and are therefore not lost. The helmet sits more firmly. The use of a gas mask does not necessitate the unhooking of the chinstrap. The strap can be lengthened by sliding the buckle so that the helmet may be hung behind the head, the mask put on, and the helmet again placed on the head. Through this means, the most rapid preparedness against gas is achieved and the chance of the helmet's loss is diminished. The carbine hook should not be used except in special instances (e.g. in case of wounding).

Regarding b): The cloth-like surface does not glisten. It replaces the use of a cloth helmet cover and avoids several shortcomings: the increased use of woven material, increased weight, absorption of moisture and thus the encouragement of the formation of rust. With the smearing of soil on the helmet, its appearance can be better made to fit the surroundings than a lacquered helmet. This is due to the fact that the earth adheres

more readily to a rough surface, although it may be easily removed by a light washing and brushing.

Regarding c): The cut out at the ears improves the hearing of the wearer without any important diminuition of protection. Since wind may cause a notable rustling sound as it passes through the openings of the ventilation lugs, these openings may be stuffed with paper plugs on one or both sides.

3. A number of these test helmets are ready, so that 2100 helmets (size 64) will be included in the August helmet shipment to every destination mentioned in the telegram IIb 7322 of 23 July. The department requests that these helmets be allocated to the various troop sections for comparison with the previous helmets and that experiences with them be reported by 1 December 1918. See the attached questionnaire.

4. The fabrication of test helmets in size 64 will be continued so that further of these helmets can be supplied in September and October.

5. Those test helmets in various colors suggested in High Command document No. 90 352 are not affected by this decree. They will also be further investigated.

(signed)
Küntzel

Attachment to 2054.7.18. B3 Ca.

QUESTIONNAIRE

I. Chinstraps

1. Is the helmet seated better with the new chinstrap?
2. In case of a negative answer, state reasons for this.
3. Is the positioning of the chinstraps near the ear appropriate, or must they be moved further forward or to the rear?
4. Does the carbine hook retain its spring tension after long wear?
5. Is the *two-piece* chinstrap useful, or could its hook be dispensed with, making a *one-piece* chinstrap?
6. Would the application of two-piece chinstraps to already issued helmets be recommended?

II. Painted Surface

1. Does the cloth-like surface eliminate glare: a) in dry conditions, b) in damp conditions?
2. How does the cloth-textured surface compare to the lacquered surface in terms of resistance to wear?

3. Does the textured surface have drawbacks compared to the lacquered surface (e.g. the promotion of rust buildup)?
4. Is the general introduction of the cloth-textured surface to be recommended?

III. Cut Out at the Rim

1. Is the hearing of the wearer essentially improved by the cut out?
2. Does the cut out have disadvantages and what are they?
3. Is the general introduction of the cut out recommended?



Stahlhelm M 18, also called the telephone-operator helmet, cavalry helmet or helmet with ear cutout.





Stahlhelm M 18, with a special felt camouflage finish.



Stahlhelm M 18 with camouflage finish.

J. Bandy

Soldiers wearing helmets M 16 and M 18, with ear cut-out, 1918.

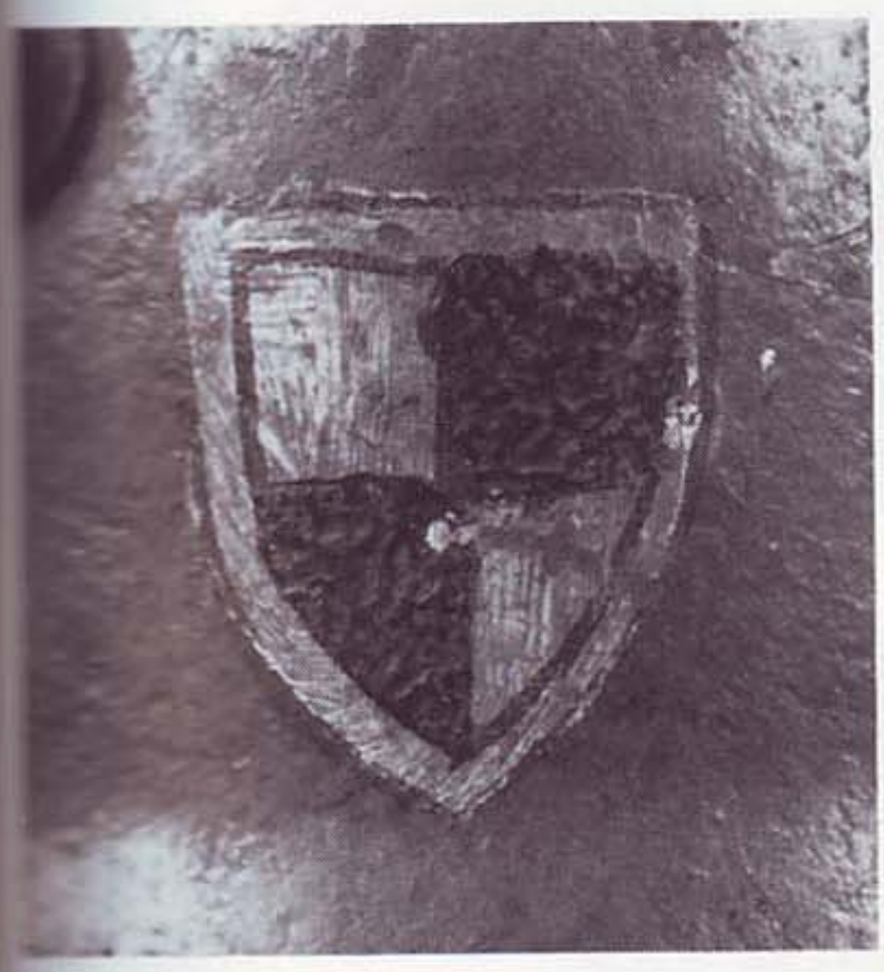
The transition from the "spike" helmet to the M1916 steel helmet began in late 1915. The evolution took several months as design and production problems, as well as an abnormal amount of "red tape," were common. The first 30,000 M16 helmets were finally distributed for combat use in January 1916 to the assault units at Verdun. The official approval for their use was given by General von Falkenhayn, Chief of Staff of the Field Army, in early February 1916.[1] Documents indicate that distribution of the M16 continued slowly through 7 April 1917. The next month, May 1917, saw the modification of the helmet liner. The leather liner band (Liner M16), to which the three liner pads were attached, was now replaced by a band of sheet metal (referred to as the Liner M17). The exact date of distribution, however, cannot be precisely determined but it appears that at that date the liner bands were already in production. The War Ministry issued a replacement parts list on 19 August 1917 for the M16 helmet as seen on page 44 of this book, indicating continued heavy usage of this model with the M91 chinstrap retainer at this late date. To this point there is no reference to a model change in the designation of the steel helmet. There is, however, documentation dated 15 July 1918 that a new, two-piece chinstrap was to attach directly to the liner assembly and the helmet was to be equipped as such. At this time, when the introduction of a new liner design (Liner M18) and chinstrap took place, it is believed that the new M18 helmet was also made available, without the M91 chinstrap retainer as on the M16 helmet. Since considerable supplies of the M17 metal liner band, which were manufactured in 1917 and so stamped, were still available, they were punched and the new chinstrap swivel ring added by means of a rivet. Also, large supplies of liner pads, made by subcontractors in 1917 and so marked, were also incorporated into the new helmet. Thus, one finds a number of 1917 dated parts in the M18 helmet. Once these supplies were exhausted, new liners incorporating the swivel ring attached to the metal liner band were produced and are referred to as the Liner M18. Another documented fact proving the longevity of the M16 helmet concerns the painting of helmets in various shades separated by a finger-wide black stripe. As of 7 July 1918, trials had been concluded with the desired results. Since the vast majority of the described camouflage pattern is found on the M16 helmet shell, this would indicate that the M16 helmet was in large use for a greater length of time than had been previously thought.

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[1]*It is interesting to note that as late as 11 February 1917, leather helmets were still being withdrawn from the front as steel helmet replacements became available.*

The above chronology of development is given the reader to "put to rest" the theory that the steel helmet, without M91 chinstrap retainers, and with parts dated 1917, is considered an M17 helmet. It is, in fact, the M18!

In general, no insignia were worn on the helmets during WW I. However, photos do exist of troops from the 1st Foot Guards Regiment and the 1st Guards Signal Batallion wearing a helmet on the left side of which the Hohenzollern crest may be seen. This insigne consists of a shield divided into four quadrants: white/black over black/white. Further details are not available.

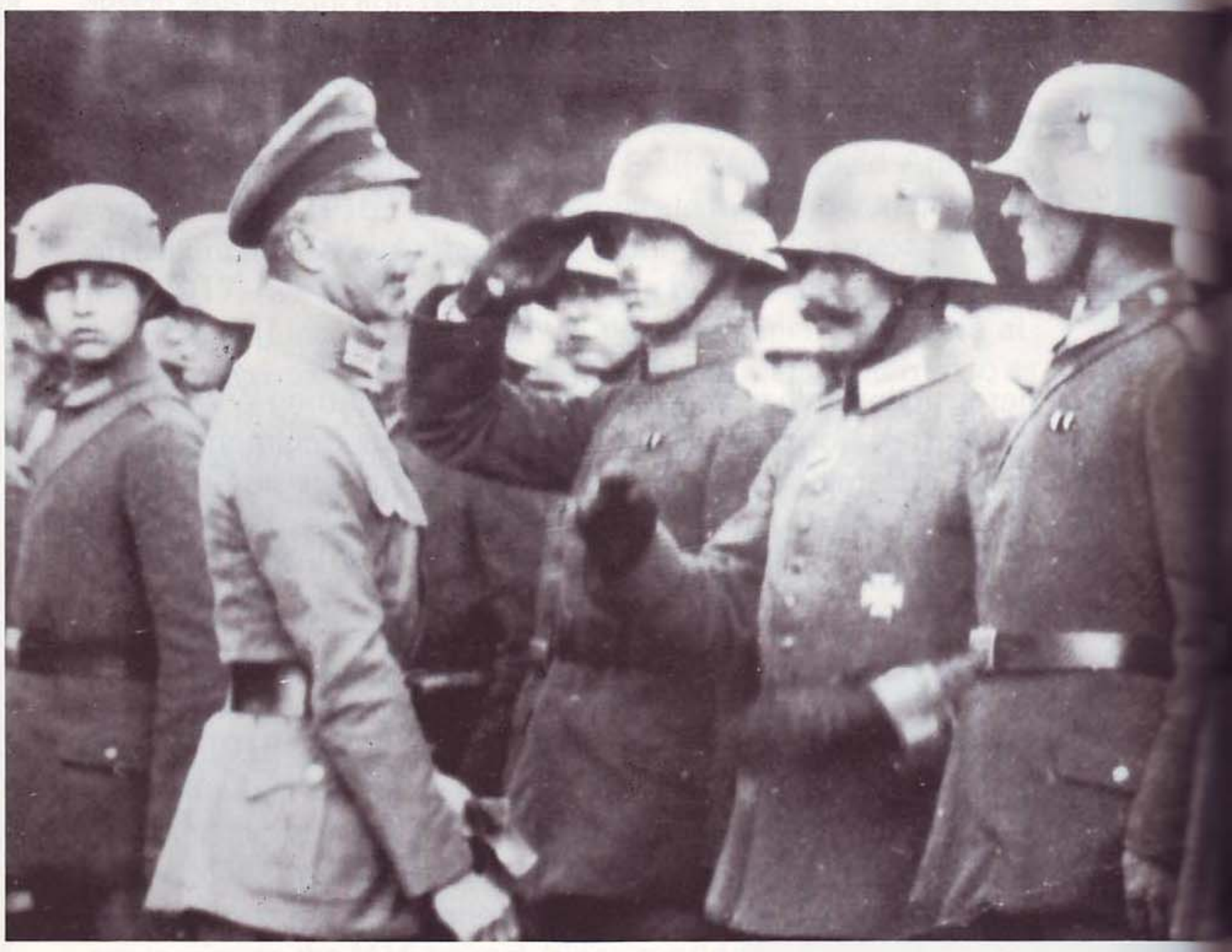




Stahlhelm M 16, with the insignia of the Prussian "Gardekorps"

D. Powers

Troops of the "German Garde Korps" are inspected by the German "Kronprinz" in France, 1917/18.

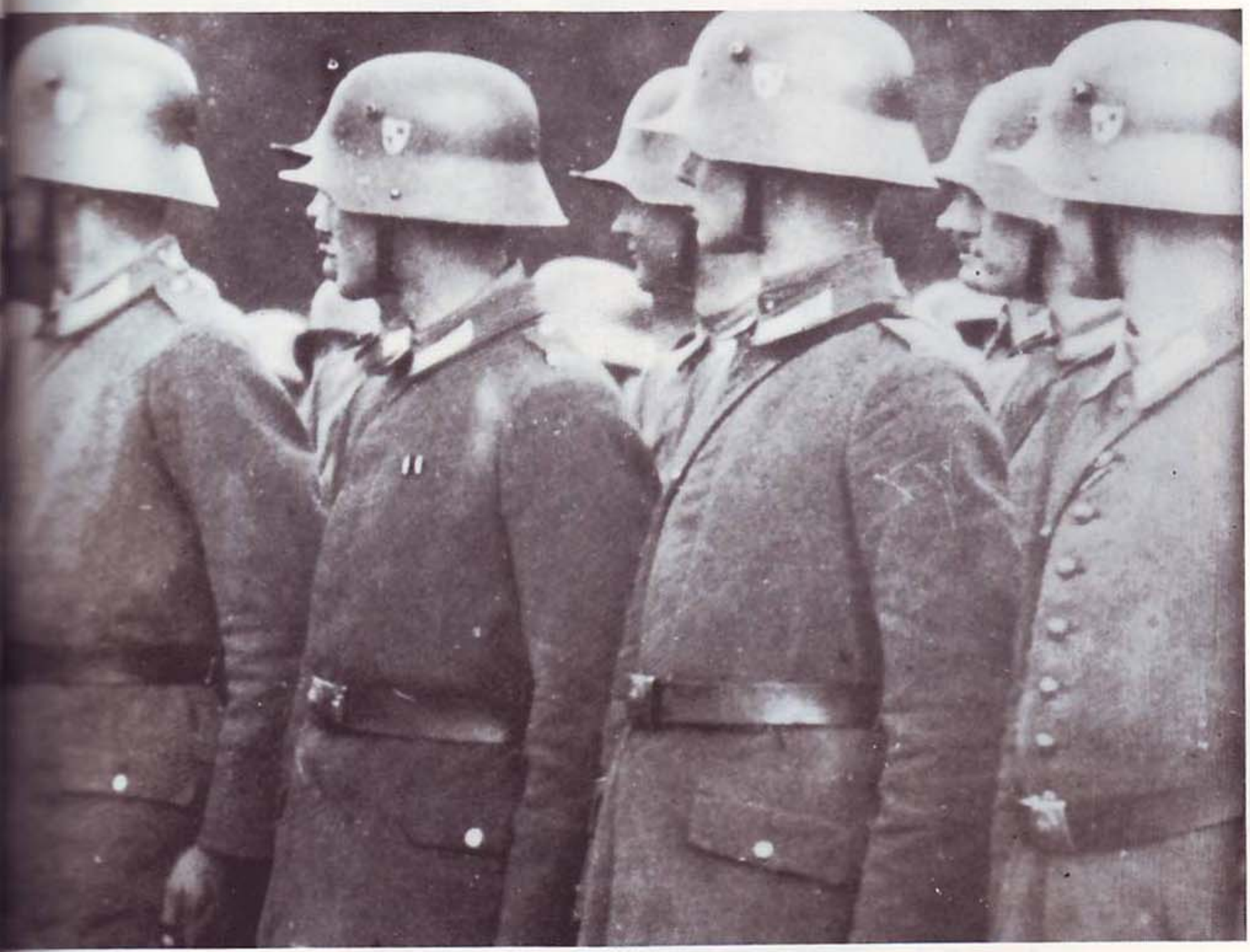




D. Deeter

M16 of 8th Company, 1st Foot Guards Regiment.

(Right) M16 of Leibkompanie (note script "L") of 1st Foot Guards Regiment.





D. Deeter

The last commander of the "1.Garderegiment zu Fuss," 1918.



D. Powers



Helmet M 16 with the insignia of the Prussian "Gardekorps" during WW I. The helmet cover is marked

B.A.X.
1918

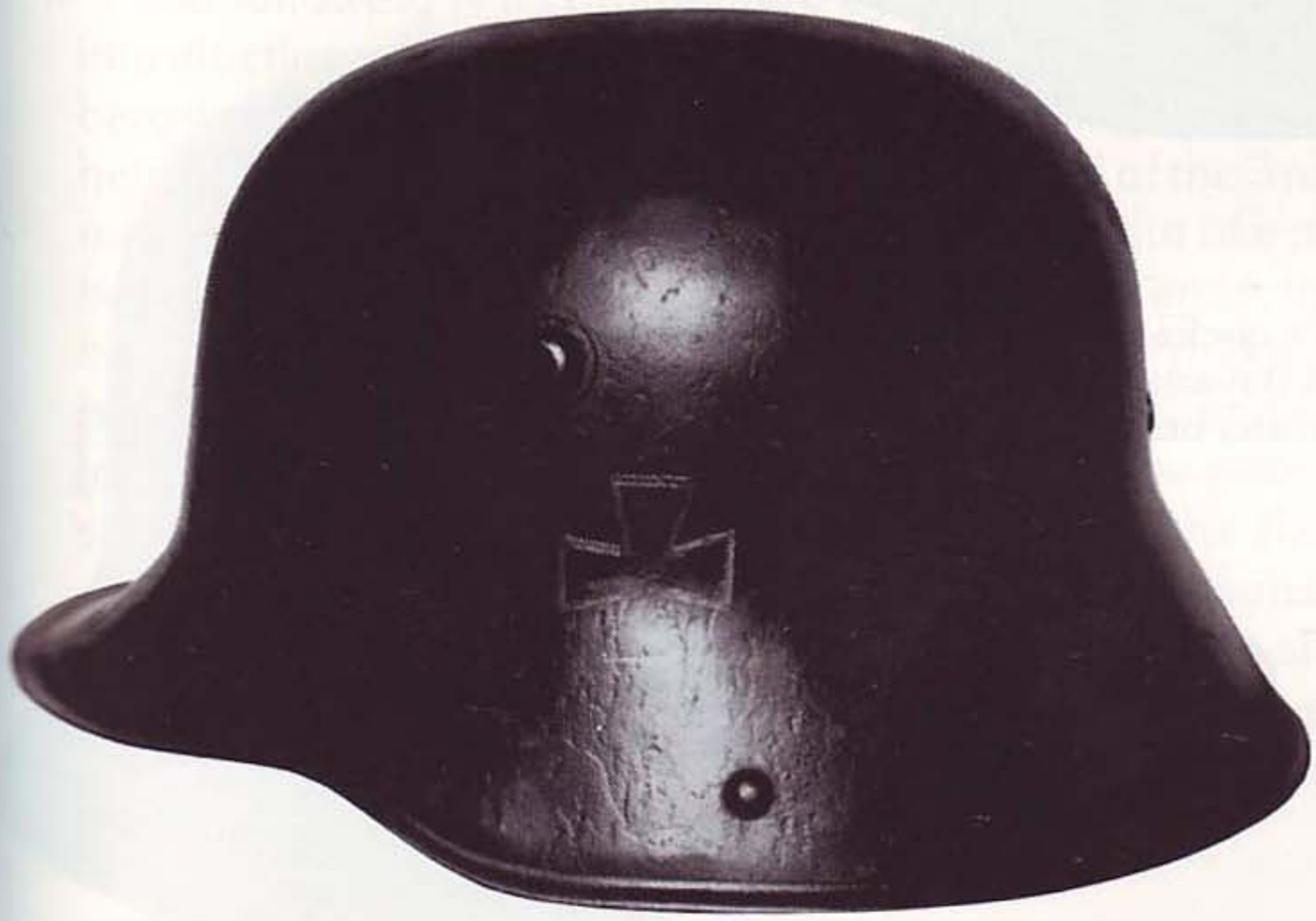
which means army clothing depot X. The meaning of the "red" figure 5 on the back is the company number.



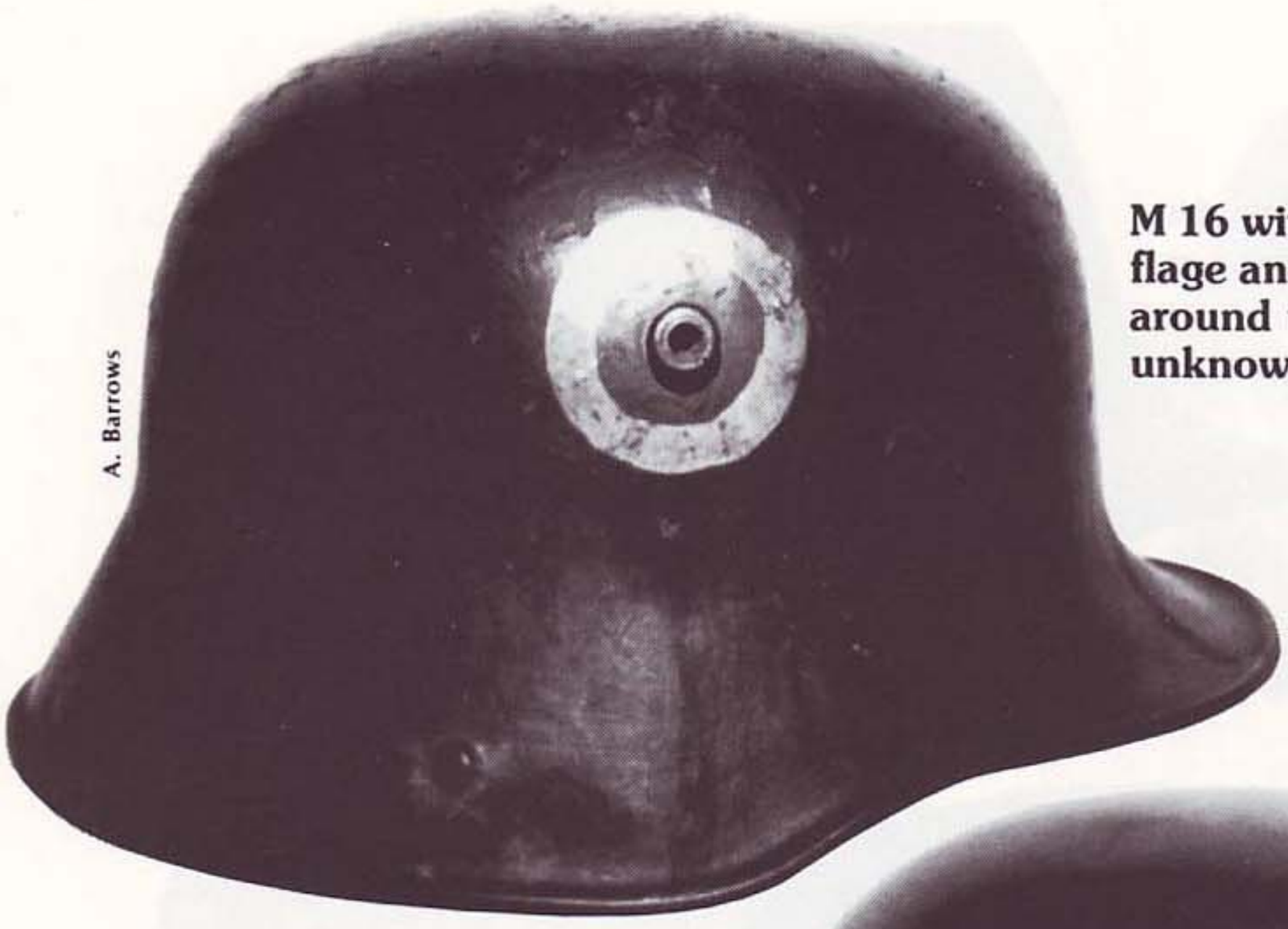
M 16 with specialty insignia of a machine-gunner.



D. Powers

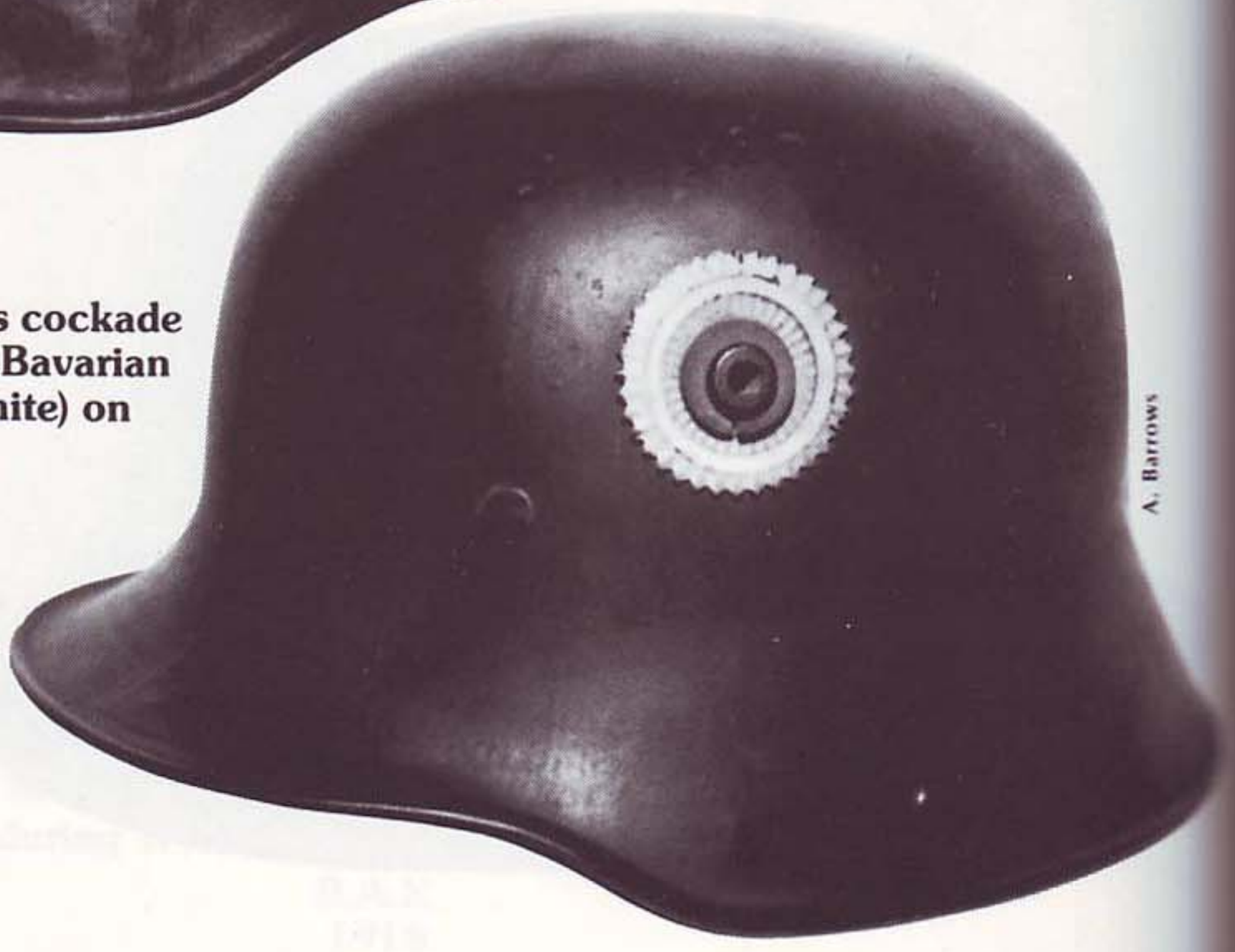






A. Barrows

M 16 with three tone camouflage and white painted "rings" around the air vents for unknown reasons.



A. Barrows

M 16 with Reich's cockade on right side and Bavarian cockade (blue/white) on left side.

By the end of the First World War, approximately 7.5 million steel helmets and 50,000 frontal shields had been produced. Helmets were also issued to Austria and Bulgaria. Aside from the normal field grey color, helmets were also issued with camouflage colors direct from the factory. This so-called "mimicry paint" was officially introduced by a decree from the Chief of the General Staff of the Field Army on 15 July 1918. The "mimicry paint" was also partially applied by the troops themselves.

At the end of the war, sufficient helmets were to be found in the factories, but the troops still on duty had not received them. Therefore, the fortress commander's office at Ingolstadt requisitioned 530 helmets for the 2nd Pioneer Battalion. Only 350 German helmets were stored in the Ingolstadt Artillery Depot, but 60,000 English and French helmets were to be found there.

In conjunction with the order for the release of helmets from the steelworks, Munich's military command office ordered the preparation of 12,000 helmets for the Munich Citizens' Defense Corps (Einwohnerwehr München) on 17 June 1919.

With the demobilization of the troops, large amounts of field gear were made surplus. Therefore, the Prussian War Ministry made the necessary decision to dispose of surplus military goods: a steel helmet without liner or chinstrap cost 14.50 Deutsche Marks, while the price for a complete helmet was 19.75 Marks.

On 28 February 1920, it was announced by the War Ministry that large quantities of complete helmets and their replacement parts were housed in the storage facilities of the Clothing and Clothing Repair Offices. These stockpiles had to be claimed by 1 April 1920, otherwise they would be transferred to the Reich's Disposal Office for sale and thus would be lost to the Reichswehr. On 16 September 1919, the frontal shields had already been transferred to the Disposal Office.

The following is a commentary by a World War I participant about the introduction of the German steel helmet. Major Siegfried Graf zu Eulenberg wrote a letter on 11 August 1916 containing his impressions of the new helmet. On this day, he had assumed command of the 3rd Foot Guard Regiment. One company of this regiment was taken out of action so that it could be reviewed by the Kaiser at Coulaincourt. Apparently, the unit had already been equipped with helmets by this time. The major probably saw the helmet for the first time during the imperial visit. After the company's return to the regiment, the major wrote home, "...a unique picture of our people in steel helmets appeared. The escort company of the Kaiser was also thus equipped. I shall send you in my next letter a photograph of me wearing one. The things are excellent and not at all inconvenient. In any case, they make one appear bellicose and that is far better than looking playful. They have already saved a great many lives. They are designed in the pattern of the old pot-shaped helmet, the 'assault helmet'...."

How We Laughed!

This humorous vignette about the early exhibition of the German steel helmet originated from Herr Hans Freund of Mainz, a former member of the Prince Carl Infantry Regiment, Number 118 during WW I.

> "A voluminous regimental order brought to the uniformed infantrymen of Infantry Regiment 118 the report that two days later a new form of headgear, the steel helmet, was to be introduced. This took place sometime in January 1916. This new helmet was to supplant the spiked helmet which had been used for so long. This newcomer did not even have a spike on top! It was supposed to protect the head from all sorts of injuries and in an emergency, it could even be used for a drinking vessel, etc., etc.
>
> Now, one beautiful day with no duty (so what else is new?), we took an omnibus ride to the division garrison. There were greetings, untold numbers of changes of formation of the onlookers, untold numbers of repititions of forward or back...more left...more right... Then the divisional commander appeared with a man

in civilian dress and many others in full military uniform. The civilian turned out to be a 'traveling salesman' of helmets and we all listened tensely. At this point, a group of pieces of the new headgear were set up. Many felt that the new steel helmet would be really heavy when worn on the head and that it would produce a whistling sound in the ears when worn during windy weather. Our advertising hero assured all present that the wearer would quickly become accustomed to the helmet. He also said that one was free to believe or disbelieve the reports of the helmet's noisiness! Then a beautifully clean, massive chopping block was carried out by three strong men — pioneers, naturally!! Two axes were lying atop the block and in the arms of an army official was a new helmet. He took great pains to hold it very carefully. Naturally, when he laid it down on its rounded side, it went rolling off the chopping block due to well-known natural laws. Medical personnel were also in attendance to serve refreshing drinks and bonbons to those onlookers who had been exhausted by running away from the rolling helmet or who had actually been injured by it.

After the first act of this tragedy, the helmet once again lay on the chopping block, the salesman standing beside it. Behind the salesman, about ten of the spectators were lined up in military fashion in order to be witnesses of such an auspicious display of new equipment. The heavy axe which was held by the salesman hurtled downward. Then, a crash! —and a fair amount of disturbance among the spectators, mixed with some rather robust swearing. Those cursing were the ones who had been hit in the head by fragments of the shattered steel helmet.

Now, as was normal for the military mentality, further replacement helmets were placed out for continued axe blows. Naturally, it was a point of honor not to endanger the ehibition and thus only softer blows were applied to the helmet!"

Another story comes from the book, *Hessians in the World War 1914-1918*, by Major Deise of the second battalion, Reserve Infantry Regiment No. 118 (retired). The major served in the battles for Douamont in October, 1916.

"...The march forward from the Fosse woods near Verdun was this time extremely strenuous and filled with casualties. Heavy rain had just fallen and the entire battle zone was about 30 cm deep in mud, mud that was tenacious and made advancing very difficult. Each step was tiring and the field pack was also very burdensome. Four days rations, 250 rounds of ammunition and a pair of hand grenades added to the weight of the woolen blanket all raised the burden on the soldier considerably. The 'armored pot' was still carried by hand since it was little-loved due to the fact that it did

not allow the soldier to hear the whine of incoming artillery shells. Therefore, it was only worn when superior officers were in the area or when we stood guard duty. Thus encumbered, we went to the front."

Another vignette comes from retired Major-General Ernst Wisselinck, a former member of Grenadier Regiment 12 in the First World War:

"My regiment — Grenadier Regiment Prince Carl, Number 12 — was attached to the III Army Corps at the storming of Verdun in February, 1916 and was also engaged in the fighting at Fort Douamont. Up until this time, we had not received any steel helmets. The special purpose units (like flame thrower units) were issued the first, clumsy helmets.

In February, the XVIII Grand Ducal Hessian Corps, ready for an attack, was emplaced on our right flank, extending as far as the eastern bank of the Maas River. It is therefore probable that the XVIII Corps received helmets earlier than we did. This is sad, since it could have saved us a great many casualties. Our division, the 5th Brandenburg, was engaged in the Summer offensive of 19 July 1916 and we received our very first helmets during the middle of the battle."

The following is a newspaper article which first appeared on 14 February 1932. It was an interview with Professor Schwerd. The newspaper in which it appeared cannot today be identified. The article deals with the development of the steel helmet and is quite interesting. It also reveals details about the early development period of the German helmet which were thought to be lost forever.

The German Helmet Made of Steel

An Interview with Professor Schwerd of Hannover,
The Designer of the German Steel Helmet

Daily, thousands of head injury victims lay in hospitals, but the concern for the supply of munitions and weapons was more important until the summer of 1915. At that time, Professor Schwerd assisted the secret medical advisor, Prof. Dr. Bier (who had prior to this been the XVIIIth Army's consulting surgeon at St. Quentin), in the installation of a large electromagnet in an operating room. The purpose of this apparatus was the removal of small shell fragments from the brains of wounded soldiers.

The events of those days have made an idea into a reality. Upon his return home, Prof. Schwerd proposed the production of a one-piece helmet with eye and neck protection made of a chromium-nickel steel or some similar alloy. Professor Schwerd stated, "...and I presented the idea that the sort of shell fragment injuries which I had observed during surgical operations could surely be prevented."

As Dr. Bier had established, only 17% of these head injuries stemmed from infantry fire, while the other 83% resulted from artillery shrapnel. Most of these fragments were no larger than a pea and many were as small as the

head of a match. In spite of their very small size, these fragments were responsible for some extremely severe brain injuries.

"I will vouchsafe my position," wrote Dr. Bier to his headquarters and a few days later Prof. Schwerd was appointed to the War Ministry in Berlin. In Berlin, Captain Schwerd presented his ideas on the introduction of a steel helmet to the chief of the Clothing Office, Lt. Col. von Feldmann. Two strong-willed and outspoken men had finally found each other.

Affairs went smoothly between these two men, but as we are all aware Prussians are not prone to jump headlong into a project without due consideration and thus Captain Schwerd was forced to thrust out his demands. "I must develop a prototype and I must have my own people with me!", he exclaimed. Despite some difficulties, he succeeded in obtaining the services of his ex-assistant at the Technical Institute in Hannover, Naval Engineer Moller, and his colleague at Krupp, Lt. Capt. Schwarzenauer.

In spite of many difficulties like the shortage of nickel, the effectiveness of this man is unquestionable. For these fourteen years since the end of the (First World) War, Prof. Schwerd has resided quietly at Podbielskistrasse 14. When he thinks back upon all the difficulties that emerged at that time, he offers a gentle and almost imperceptible smile.

"I knew that I was on the right track." These words, so often repeated, seem to be the very basis for his success in spite of the many hardships. What are we to think when we hear that a telegram sent off by Dr. Schwerd in the morning was still lying in the office because it still needed eight authorizing signatures! What are we to think when it was decreed that the mannequin heads used to support the helmets during the ballistic testing at the Kummersdorf Proving Grounds were not to be simple, rounded wood, but rather were to be meticulously carved wooden heads with full facial features? This may sound to us today like dusty documents and bureaucracy, but Prof. Schwerd tries to maintain as much distance as possible between himself and those things which today seem so subjective and tragic.

"The helmet was correctly designed in every respect." This is not meant to be so singularly ironic as it may sound to us today. There were various design questions, among them being if the helmet should be made of a single thickness of steel or of two half-thickness sheets folded over on each other, or making a stronger helmet by welding these two sheets together. A major consideration was the helmet's ability to prevent concussions.

"But difficulties and problems are always a part of life." A short comment was then inserted by the professor, who, like us criticized the inconsistent and imprecise around us. Why do we make mention of this? Because here is not only his method of work made clear, but also the conception of life of this learned scholar, who, however timeless in his appearance as a genuine German spiritual laborer, wanted no special wages for his work. Instead, he merely wanted to help in the achievement of this higher goal.

What honors came to him during the World War? The recognition of those in the highest places! (He made no mention of the Iron Cross 1st Class that he was awarded as an officer at the front.) What about the revenues from the manufacture of steel helmets which saved the lives of one hundred

thousand German soldiers? None whatsoever! And he still is — unintentionally, of course — trying to minimize his role in the invention of the steel helmet.

Therefore, it should be established here in all urgency and simplicity that the helmet that Professor Schwerd single-handedly envisioned in 1914 has become a reality!

And when we consider the current helmet models spread out on a table before us, as laymen we would witness the spiritual "children" of this original device.

The other nations have naturally had their own helmet designs, some functional, some not, but all developed through their own experimentation. There still resulted many instances of helmet models which were totally unsuited to combat conditions. In spite of this, Prof. Schwerd was without any feeling of malicious joy or vanity. "That's just the way it was," he stated and this is a well-established fact. With this sort of wage, an upright man can be well-pleased.

Then a question: "What is the current situation with the present German helmet?" Only hesitantly was the reply given: "It is today possible to construct a helmet which is half again as resistant."

One would do well to avoid adding anything pathetic to these few words. Prof. Schwerd had once spoken these words during the war and still maintained this point. We would like those in responsible positions to again hear him.

The problem was to produce a protective helmet that would also serve as a marching helmet. Protection was to be achieved through the most resistant materials and through thick walls. The helmet's weight, however, must not prohibit its protracted wear by the soldier. The confidential councillor, Dr. Bier, desired protection that covered the face all the way down to the point of the nose and possibly covering the neck arteries.

The invention of the helmet rested in the recognition of the fact that a truly effective protection could be achieved with the development of an improved steel called Edelstahl and through careful, step-by-step designing.

A further problem presented itself: how to develop a helmet which was secure on the head, but would avoid cranial concussions. This was achieved by a second invention.

Every possible design emerged from this intense work: the articulated visor, a double-walled helmet shell, helmets with ornamentation, and so forth. The primary design remained as a one-piece helmet made of hardened steel (see diagram 1).

The Juncker Company in Berlin had already designed a prototype helmet made of sheet iron (see diagram 2). This design originated prior to Prof. Schwerd's employment there. This helmet was similar in design to the French multipiece model. "I was not entirely receptive to this idea and wrote this to his excellency, Herr von Nieber."

From this point on, Major Künzel, the consultant from the War Ministry, was present in the Juncker's project. The following contractual stipulations were given for the Tombak helmet model: "A simple 'cupola' similar in

shape to the stiff, black leather hat (sic); spacing of 2 finger-widths between the skull and the top of the helmet and one finger-width around the skull, so that no cranial damage could result from even the deepest inward dent, short of total penetration of the steel. There must be a direct transition from the dome to the visor and a neck protector must exist in the rear and on the sides. These structures must neither hinder vision nor the wearing of a back-pack. The rain must drip off of it and the wearer must be able to rest comfortably while wearing the helmet. Sudden transition to the visor and neck apron, as that designed by the firm's foundry master, Marx (see figure 3) was a design flaw since it caused peripheral fractures which in turn caused a large amount of waste during the manufacturing process. In contrast, the helmet made of improved steel with a less severe transition was introduced. In figure 4, the dotted line indicates this helmet."

I recognize that the Juncker Co. and its foundry master, Marx, produced its helmets speedily, in accordance with specifications, up until the discovery of the design flaw. The flaw lay in the fact that Marx too-closely modelled the helmet after the pre-war cuirassier helmet and the medieval gothic helmet (similar to fig. 3) and thus the point where the visor and neck protector met the dome was narrower than the dome itself. This configuration was practically impossible in mass production! Marx had not grasped the problem, namely the use of high quality steel for the mass production of steel helmets. This deviation from the current form of the helmet was rejected at once, as was the sharply angular transition of the visor and neckguard, so similar to the Tombak model. This angularity could only be achieved through a special stamping stage.

I assume that the "pirated" helmet form was well-known in some manner and therefore acted as the motive force in the design of this far from contemporary helmet, the manner of construction of which reaches back to the high point of the helmet's development in the Middle Ages. This was, of course, the gothic helmet. Since I had never had an opportunity to see a gothic helmet, I wondered as I read articles in the newspapers of 1916 (without fully understanding) where the design actually originated.

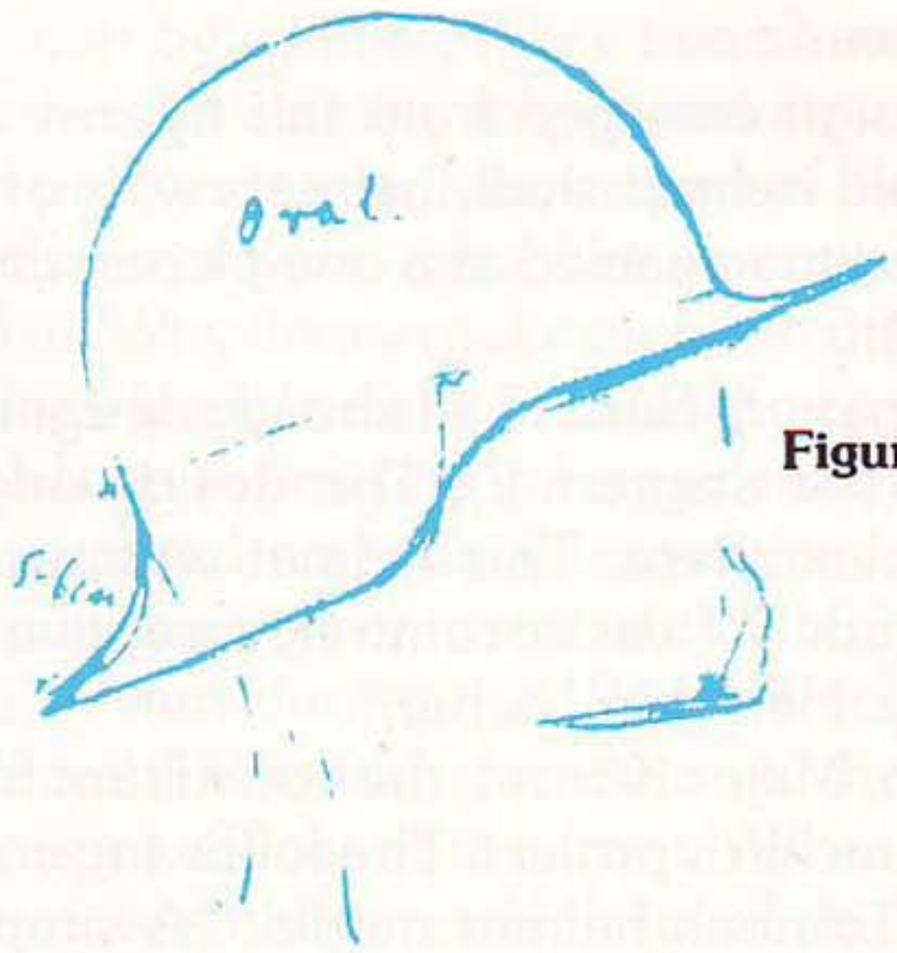


Figure 1

The current helmet is constructed to withstand the concussion of angular shots and provides the greatest possible resistance against direct hits. Its design embodies only pure, simple purposefulness of form.

The author of this article was Werner Rusack.

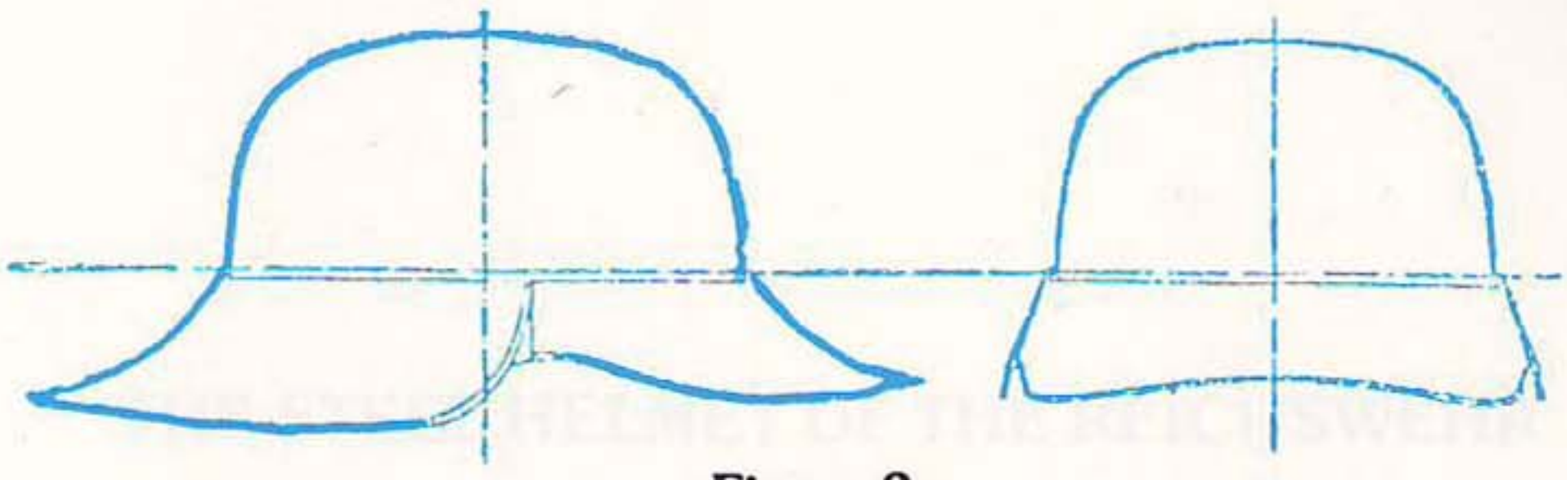


Figure 2

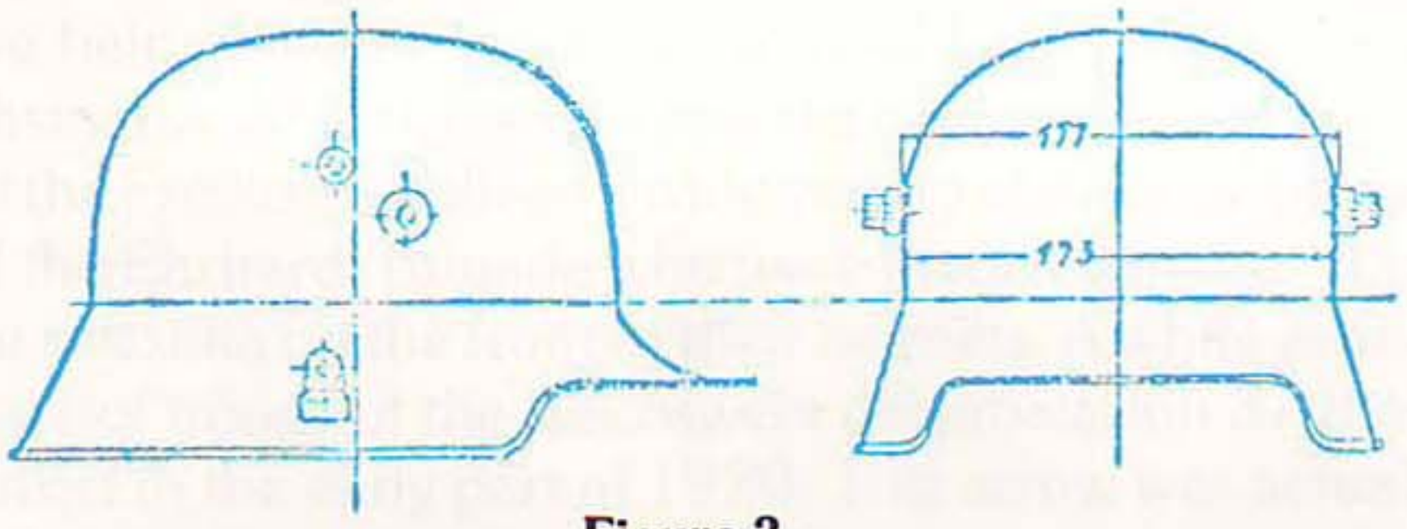


Figure 3

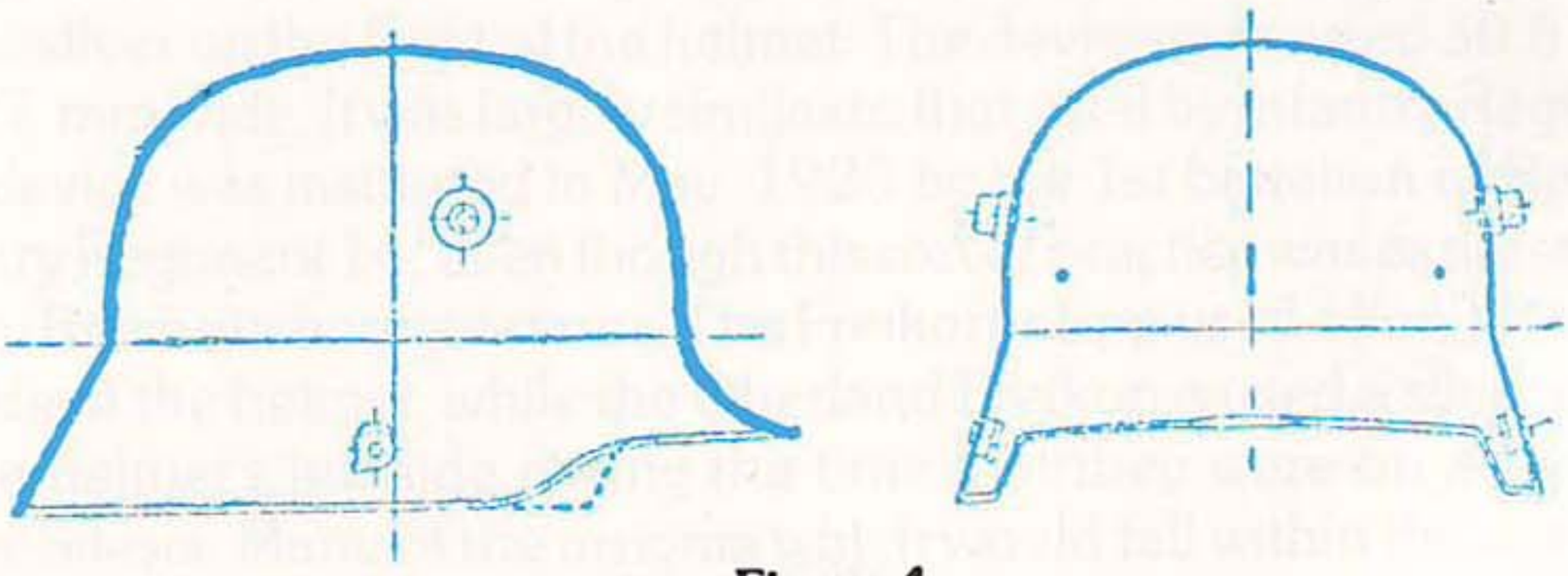


Figure 4

NOTE:
Figure 3 above is almost identical with the M16 with square dip and Figure 4 shows the alteration to the angle as was followed in later manufacturing of the steel helmet.

THE STEEL HELMET OF THE REICHSWEHR

After the collapse of the monarchy, the old steel helmet was once again worn by the remnants of the old army, the precursor of the Reichswehr, and by the ubiquitous Free Corps (Freikorps) units. Reichswehr officers and their subordinates had to supply their own helmets, as per an order dated 22 July, 1919. These helmets were supplied out of old military stores at a cost of 19.75 Reichsmarks. At first, the Reichswehr had no insignia applied to their helmets, but the Freikorps utilized a wide variety of devices. In March, 1920, members of the Ehrhardt Brigade who were involved in the "Kapp Putsch" wore a white swastika on the front of their helmets. A white arrow was used on the helmets of troops of the Reichswehr Jägerbataillon 37 during duty in the Ruhr district in the early part of 1920. This arrow was actually a covert designation for the Freikorps Rossbach. The arrow went angularly upward from the left to the right on the front of the helmet. One Freikorps from Mecklenburg had a shield with the state colors of blue/yellow/red; these were on the left side of the helmet. The Freikorps Hacketau wore a death's head colored in new silver on the front of the helmet. The device measured 30.5 mm high and 27 mm wide. It was largely similar to that used by Infantry Regiment 92. This device was instituted in May, 1920 by the 1st battalion of Reichswehr Infantry Regiment 14, even though this sort of practice was expressly forbidden by Reichswehr regulations. The Freikorps Epp used a lion's head on the left side of the helmet, while the Oberland Freikorps used a silver edelweiss on the helmet's left side during the time that they were on active duty in Upper Silesia. Many of the insignia which would fall within the scope of this book cannot now be established, although further investigation might yet prove fruitful. It is also known that during the march on the Feldherrnhalle on 9 November, 1923, SA members who took part wore, in several cases, black, handpainted swastikas on the fronts of their helmets. Some of these men were originally Freikorps members and this might account for their use of that particular insigne on their headgear.

On 1 January, 1921, the Reichswehr issued new uniform regulations. In accordance with these new regulations, the Reichswehr Ministry inquired of the provincial commanders on 29 October, 1920 regarding their feelings about the institution of provincial insignia. Although the steel helmet was

Helmet insignia of the German "Freikorps," 1919/20.



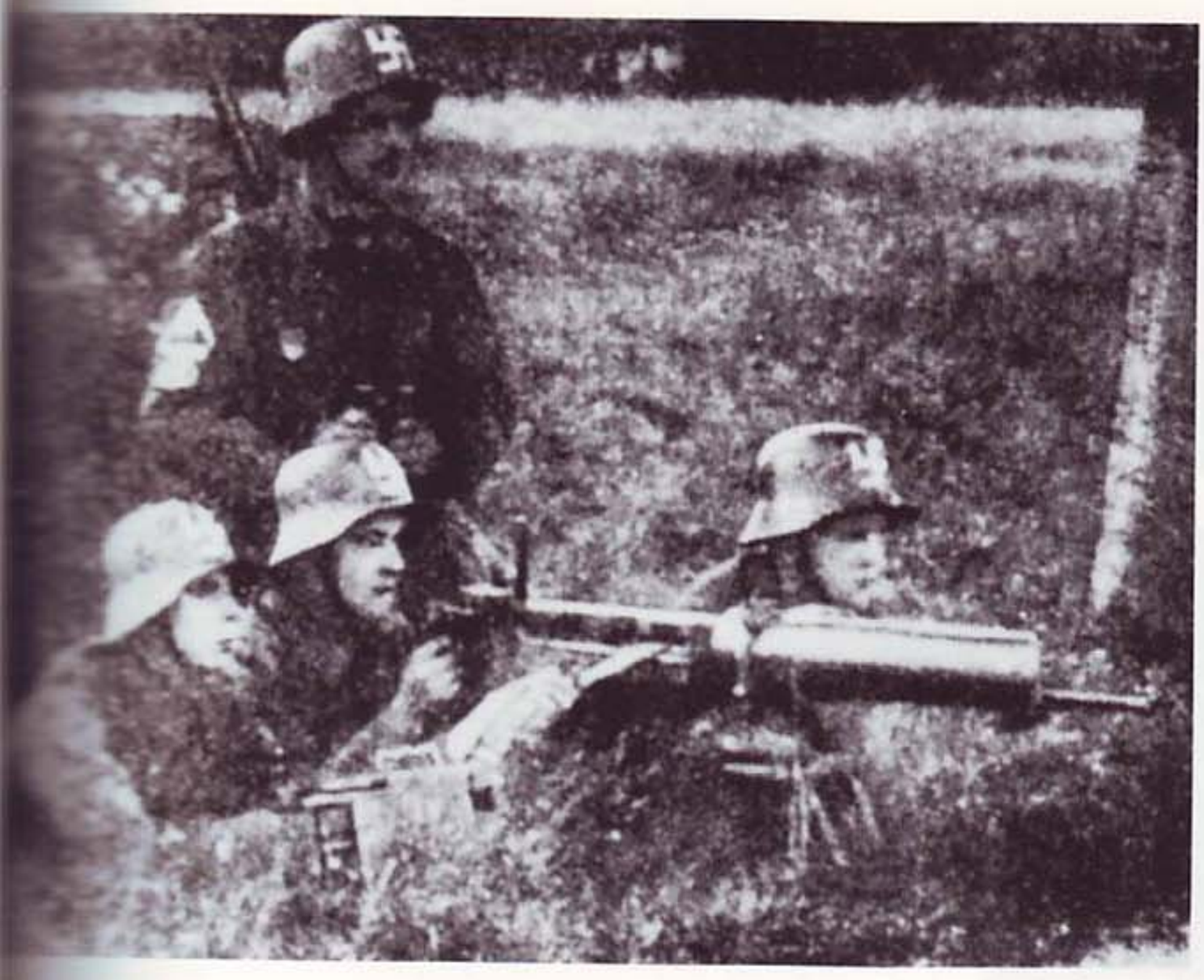
T. Goodapple

Brigade Ehrhardt

Bundesarchiv



Soldiers of the "Brigade Ehrhardt," Berlin, 1920.



Light machine gun of the "Sturmabteilung Heinz," 1919.





K. Dahl

Freikorps Hacketau



K. Dahl

Jägerbataillon 37 (Reichswehr) and covertly, Freikorps Rossbach.



White Maltese cross.





A. Barrows

Austrian M 16 repainted black with a "Sturmtruppe" badge soldered on the front. Worn by a Heimwehr/ Freikorps unit.

German M-16 painted flat red with a skull and cross bones in whitewash.

A. Barrows

BA Stiftung Preuss. Kulterbesitz



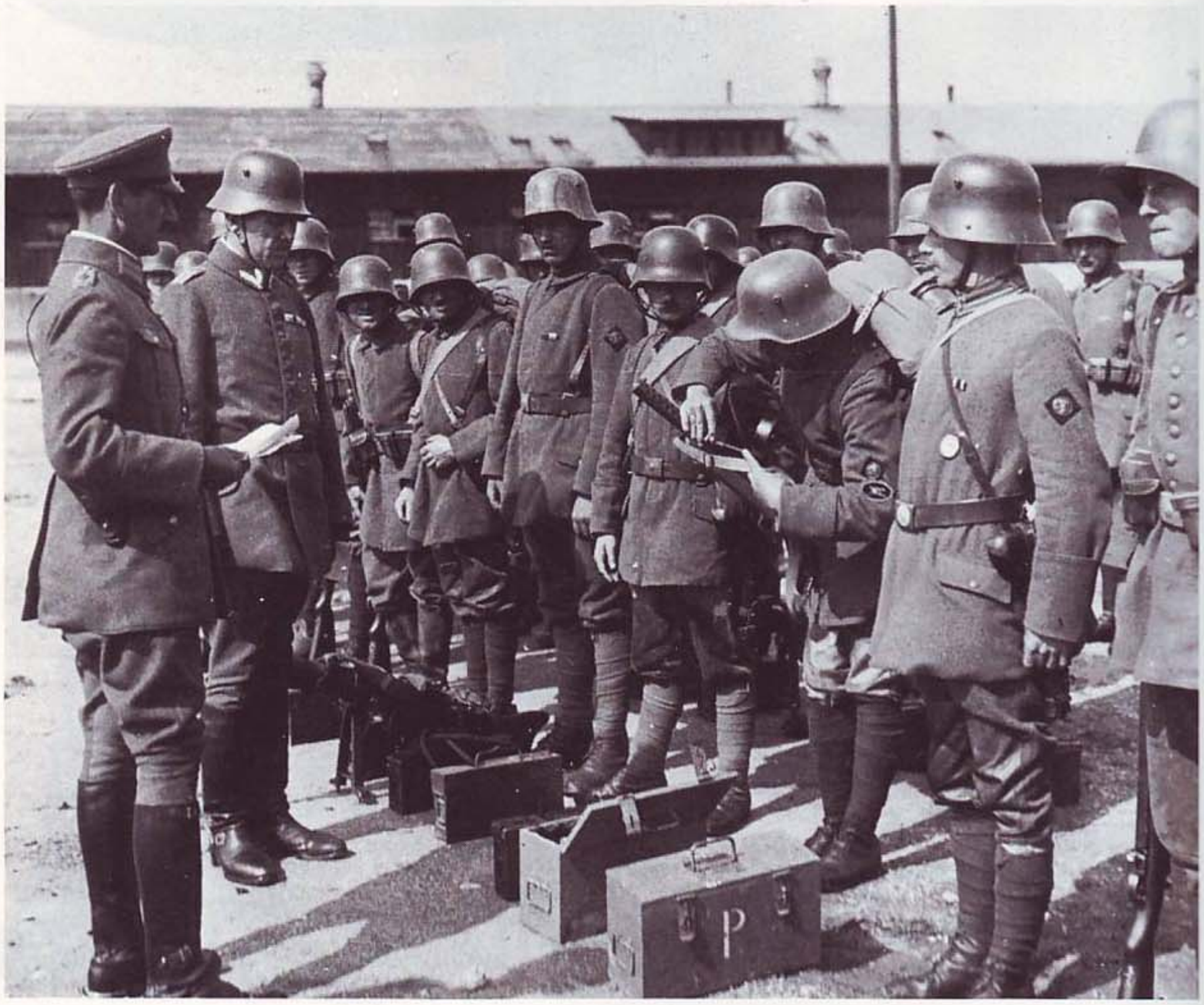
'Freikorps" in Berlin. Some soldiers are wearing Turkish helmets, March 1919.

Bundesarchiv



Soldiers of the "Freikorps Epp" in Munich, 1919. Note white "E" on front of helmets.

BA Stiftung Preuss. Kulterbesitz



Ritter von Epp, while inspecting his troops, Munich, 1919.



Insignia of the "Freikorps Randow," 1919/20.

Helmet insignia of the Bavarian "Freikorps" and "Einwohnerwehren," 1919/20.



Shield is white/blue surmounted by a gold, white and grey crown.

Bayer. Armeemuseum



Shield: white/blue.



Stadtarchiv Munster

Bundesarchiv



Soldiers of the "Freikorps Bayreuth" equipped with French WW I helmets, Munich, 1919.

Stadtarchiv Munster



Soldiers of a German "Freikorps" wearing helmets M 18 with ear cut out.

Soldiers of a German "Freikorps" wearing helmets M 18 with ear cut out, 1919.



Shield: white/blue



Shield: white/blue



Shield: white/blue

Helmet insignia of "Einwohnerwehr" in Munich, 1919/20.



Shield: black/yellow



Band: black/gold

A. Barrows



Shield: black/yellow

not specifically mentioned, a letter from Wehrkreiskommando VII (the 7th Defense District command) in Bavaria to the various Bavarian Reichswehr units stated that a small white and blue shield was to be applied to the left side of the steel helmet. A handwritten notation on the letter indicates that this order had received the approval of the Reichswehr Ministry, but no specific date was indicated.

Apart from the special Bavarian regulation, the question of the application of provincial insignia was first clarified by the Reichswehr ordinance of 21 March, 1921. The responsibility for the insignia fell to the provincial commander who was appointed by the Reichspresident on the recommendation of the provincial government. This was the case in Bavaria, Baden, Hesse, Saxony and Württemberg, but in Prussia this responsibility fell into the domain of the Ministry of State. On the basis of the Reichswehr ordinance and communications among the Reichswehr Ministry, the provincial commanders and the provincial governments, it is known that the Reichspresident issued a statement on 19 April, 1922 which instituted provincially-based membership in the individual units. The name of the home province was to be placed before the unit's designation, for example (Pruss.) Infantry Regiment 1. The commanding echelon and troop sections which were assigned this parenthetical provincial designation utilized the provincial colors inside of which the unit designation number was placed. The staffs of regiments, battalions and sections which had no provincial designation number were to use the colors of the province only. These colors were to be displayed in such a way that the majority of the unit wore a standardized shield of the proper size and proportion. The colors of the insignia had to be those of the province in which the unit was garrisoned. On the basis of this ruling, the staffs of the posted units received the following assigned provincial emblems: Prussian colors were worn by the staffs of Infantry Regiments 6, 12, 16, 17, and 18, the 2nd battalion of Infantry Regiment 18, Cavalry Regiment 14 and Artillery Regiment 5; the colors of Saxony were worn by the staffs of Artillery Regiment 4, Heavy Transport Section 4 and Motor Section 4; the colors of Württemberg were worn by the staffs of Cavalry Regiment 18, Pioneer Battalion 5, Communications Section 5, Heavy Transport Section 5 and Motor Section 5; the staff of Infantry Regiment 15 wore the colors of Hesse. Further, the members of the Reichswehr Ministry, the Weapons and Equipment Inspectorate, command echelons who wore no other provincial insignia, weapons school staffs and other instructional personnel were to wear either the colors of their most recent troop section or, if they did not belong to a troop section, the colors of the province in which they were currently garrisoned.

The steel helmet was described in the previously-mentioned uniform regulation, section B, number 27 and reference was made to the shield-shaped insigne (Wappenschild) with the colors of the province from which the unit was assembled. In number 49, figure 4, the individual provincial colors (Landesfarben) were given and the size of the shield was specified: 3.4 cm high and 3.0 cm wide. The Navy introduced its own helmet insignia on 26 January 1924.



Bundesarchiv

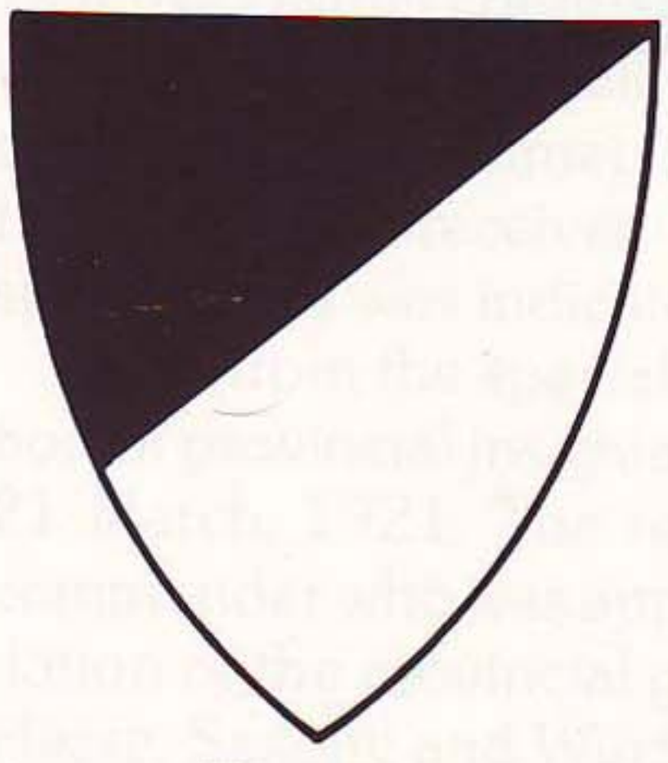
Soldiers of the "Reichswehr."

Bundesarchiv

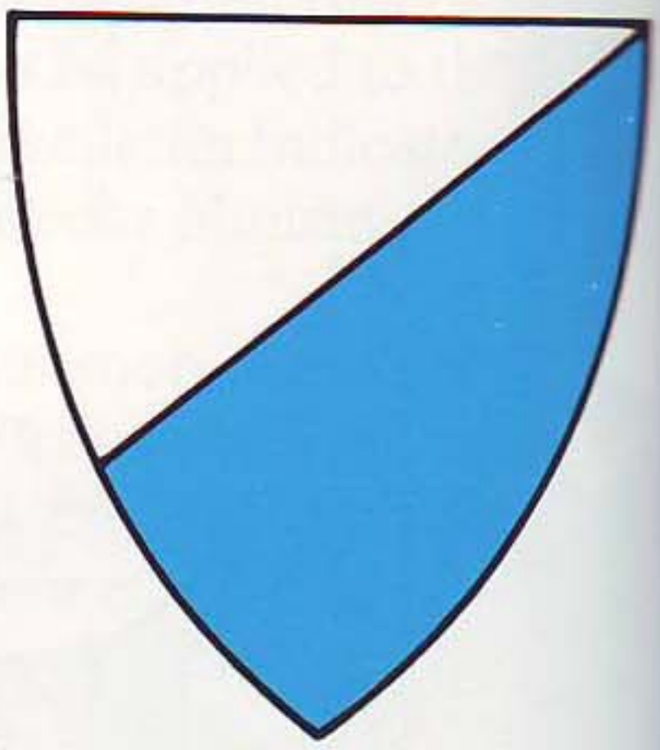


Trumpeter of the "Reichswehrkavallerie" during maneuvers.

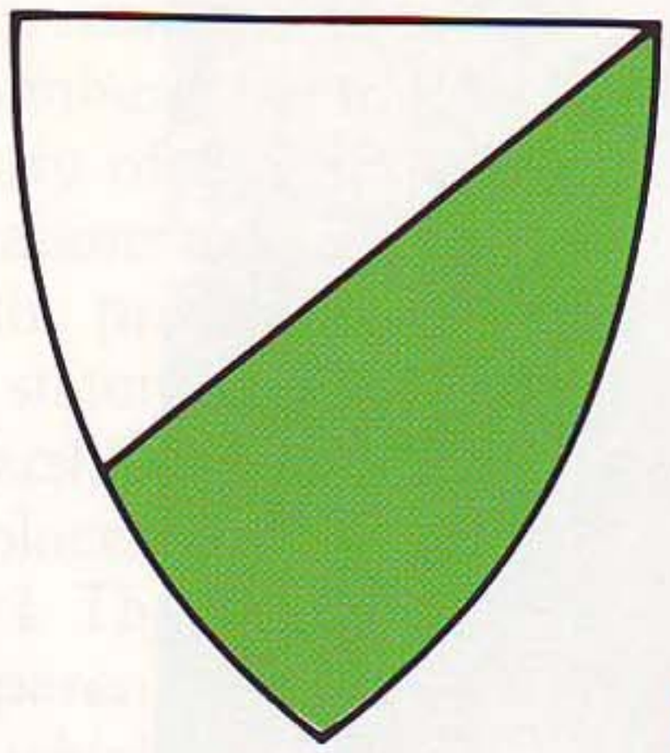
Helmet insignia of the Reichswehr, 1923-1933



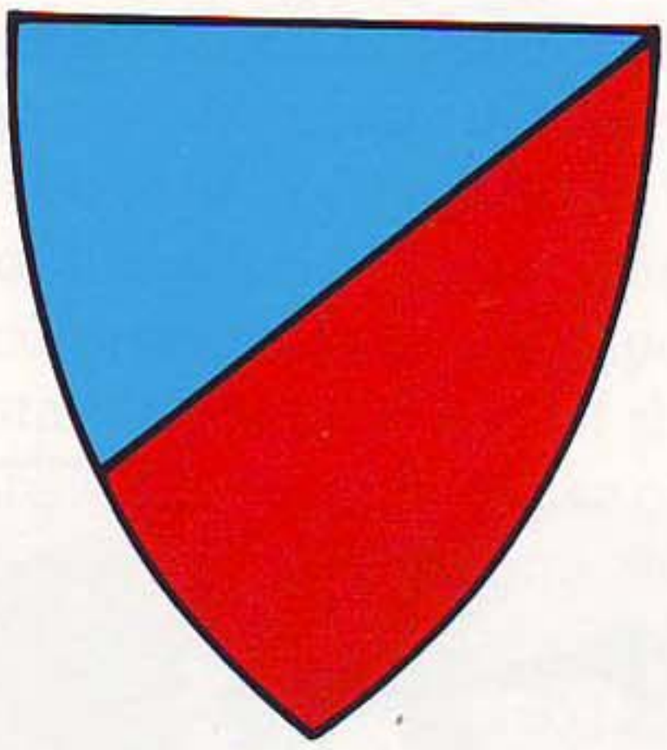
Preussen



Bayern



Sachsen



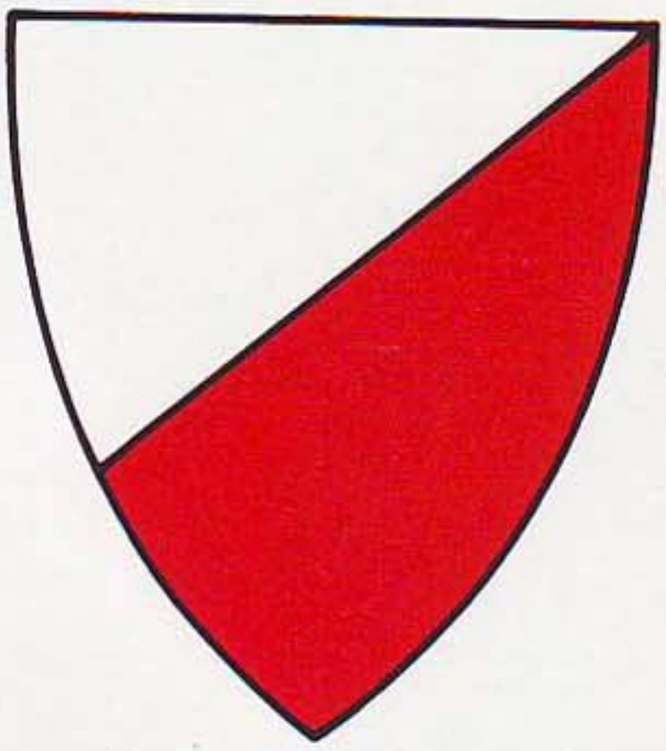
Oldenburg



Hessen/Thüringen



Braunschweig



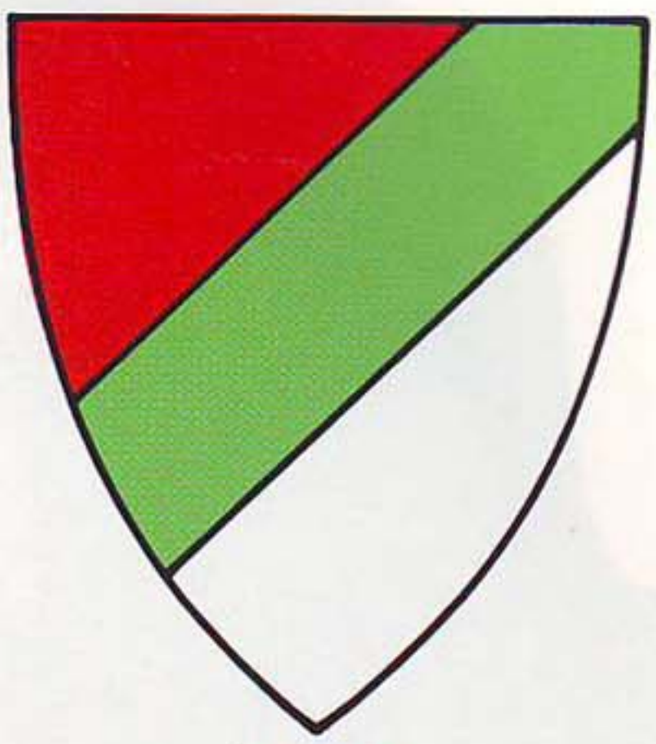
Bremen/Lübeck



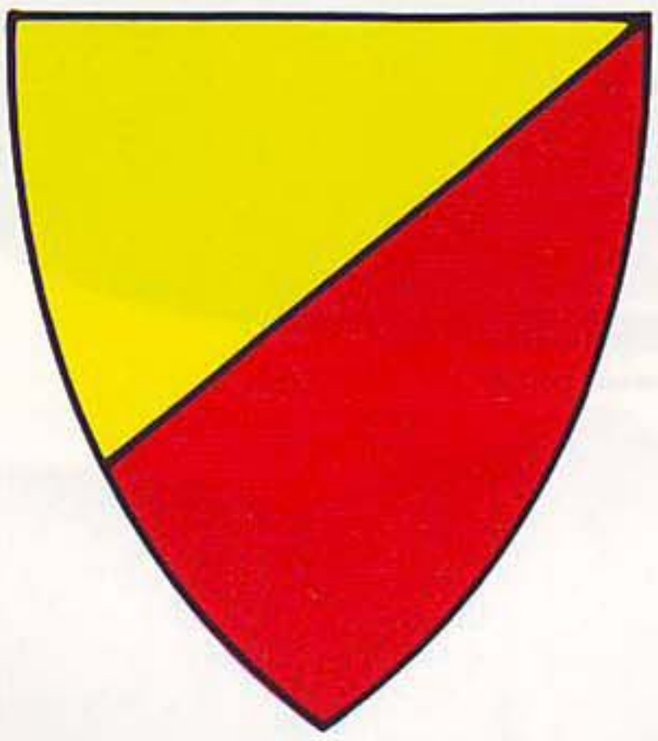
Baden



Württemberg



Anhalt



Lippe



Schaumburg-Lippe



Mecklenburg



All units from
14.3.1933 to 17.2.1934

The following is the text from an instruction booklet which was issued on 8 July 1921:

Pamphlet About Steel Helmets

1. After combat experience, the steel helmet has proven itself to be indispensible to all branches of service. It provides protection against shrapnel pellets and small shell fragments. The weight and method of its placement



Stahlhelm M 18, with Bavarian colors used by Bavarian units of the "Reichswehr," 1921-1923.

Bayer. Armeemuseum



Stahlhelm M 18, with Prussian colors used by Prussian units of the "Reichswehr," 1923-1933.



Stahlhelm M 18, with Bavarian colors used by Bavarian units of the "Reichswehr," 1923-1933.



Stahlhelm M 18, with the colors of Baden, 1923-1933.



Pressed canvas covered felt veterans' helmet, painted field grey, with black/yellow shields painted on both sides (Munich?).

A. Barrows

on the head result from the requirement for its high degree of resistance against the impact of bullets. In contrast to the earlier leather helmet, the higher weight of the steel helmet will also be offset by its superior ventilation and padding.

2. The size of the helmet is stamped into the inner left side of the neck apron. The sizes show the following correspondence:

Helmet size	60	for head size 50 to 52 cm
	62	52.5 to 54
	64	54.5 to 56
	66	56.5 to 58
	68	58.5 to 60

The visor should rest at the level of the eyebrows. In order to select the proper size of helmet, refer to the chart above. Care should be taken to insure that a space exists between the inside of the shell of the helmet and the head. This

will insure that injury does not result if the helmet is dented inward by an impact. Appropriate adjustments must also be made to the liner cushions so that the helmet conforms well to the shape of the head of the wearer, as was the case in the earlier leather helmet. It then sits firmly on the head and is not as inconvenient as the leather helmet.

3. The liner cushions lose their elasticity in time. They must have this restored from time to time by kneading and squeezing the cushions. Strips of cloth or paper may also be inserted inside of the pocket behind the cushion to provide the necessary thickness.

4. The lugs on the sides of the helmet serve as ventilation openings, as do the spaces between the three pads of the liner. In stormy weather, the flow of air may be reduced by stuffing the ventilation lug openings with paper or rope fibres. In cold weather, the head may be protected by the wearing of a field cap under the helmet or by placing a handkerchief inside of the helmet.

5. Application of insignia to the helmet is forbidden. Camouflage for the purpose of adapting the helmet to the terrain of the locality is to take place only in the field. This is to be accomplished only through the application of moist earth or clay, or by the attachment of twigs, leaves, etc.

6. Chinstraps which are not drawn down under the chin are to be worn over the visor.

7. The misuse of the helmet, for example by its use in cooking, is strongly forbidden since the metal loses its strength and ballistic integrity when exposed to the heat of a fire.

8. The colored surface of the helmet is to be repaired as quickly as possible after damage. The use of a matte, field grey paint will serve to inhibit rust on the surface. Shining, lacquering or smearing the helmet with grease are all forbidden since these cause the helmet to lose its dull appearance.

9. Simple repairs to the helmet (removal and replacement of vent lugs, attachment of chinstrap hangers, tightening of split rivets, etc.) are to be carried out by the unit's ordnance master. Repairs to the leather portions of the helmet are to be done by the unit's saddler.

10. In view of the financial state of the Reich at this point in time, the replacement of steel helmets in the foreseeable future is not a consideration. The helmets on hand, both with and without ear cutouts and with various liner systems are all to be worn together. Helmets with ear cutouts are to be used primarily by cavalry units.

11. Helmets which are stored away must be protected from scratching. Therefore, a layer of paper should be placed between each helmet in the stack. Each stack should not exceed five helmets high.

The Coastal Defense Force (from 1 October 1926 onward, referred to as the Naval Artillery Land Units) and the ship cadre sections were given new orders for the issue and use of a field grey naval uniform. This order was dated 15 April 1924. The use of the Model 1916/18 helmet for sentry and field duty was also initiated. On 26 January 1924, a special naval insigne

was authorized for wear on the left side of the helmet. It consisted of two plain, crossed, yellow anchors on a white field. The shield had a 2 mm wide, yellow border. The height of the shield was 3.4 cm and the width at the upper corners was 3 cm.

Bundesarchiv



Reichsmarine

Honor guard of the "Reichsmarine" in Wilhelmshaven.

The Treaty of Versailles stated specifically which and how many weapons and pieces of equipment the Reichswehr was allowed to maintain. Therefore, the Reichswehr Ministry issued an order on 15 September 1921 which was based on the policy of the Allied Military Control Commission. It stated that, "...clothing and large pieces of equipment (would be allowed) for the 100,000 man army...(and that) each soldier shall have a helmet and a further 15,000 helmets are to be stored in troop sections and at army corps depots...". In this order, it was further stated that mounted troops were to be equipped with those helmets which had the special ear cutouts. In hindsight, it appears that this portion of the order was not strictly observed.

On 21 March 1924, the Army Administration Office advised that care had to be taken when replacing the split-tailed liner retaining rivets because the external portion of the rear rivet had to protrude a greater distance than those on the sides and that this rivet also had to be stronger than the others. Further, this same office put forth a new regulation about the issuance of steel helmets to officers on 12 November 1927. Accordingly, each officer and army official could be loaned a helmet out of troop stores. Upon the return of the helmet, a wear-and-tear compensation had to be paid and this money was channelled into the equipment fund.

On 16 January 1920, the second and third paragraphs of the helmet instruction sheet were altered as follows:

"In peacetime, the helmet may only be camouflaged with branches, grass, etc. on the orders of superior officers; smearing the helmet with soil, clay, etc. is expressly forbidden. In the field during combat situations, every camouflage possibility is to be utilized."

This revision also indicated that the old helmet was no longer being manufactured and it gave the reader the impression that a new model of helmet was destined to replace the old. The bases for this sentiment were: 1. the helmet's weight was too great, 2. the helmet hindered both hearing and sight, and 3. it was often the cause of heat-stroke and premature exhaustion because of its weight and extreme heat retention during the warmer months.

It was for these reasons to be replaced by a more functional and lighter piece of headgear. These new helmets had to be weatherproof and had to stand up to long service. The basic shape was to be retained, although it would not be designed to defend against bullets or large shrapnel fragments. The preliminary research on the new helmet was carried out by the 3rd battalion of the 9th Infantry Regiment. This study showed that the new helmet did not hinder the wearer in aiming, shooting, or lying prone. The helmet was made of drawn, vulcanized fibre and weighed only one-half of a similar aluminum helmet. The helmet was both tough and resistant, as well as being elastic. The helmet and liner together weighed only 450 grams. A large-scale research project to test the usefulness of the helmet was needed. To this end the chief of the army command selected the following units on 18 March 1932 to participate in this testing: a rifle company from the 1st battalion of Infantry Regiment 3 of the 1st Division, a battery from the 3rd battalion of Artillery Regiment 3 and a company from Communications Section 4. A total of 510 helmets were apportioned as follows: the rifle company received 140 helmets, the artillery battery received 110 helmets and the communications company was issued 120 helmets. The concluding

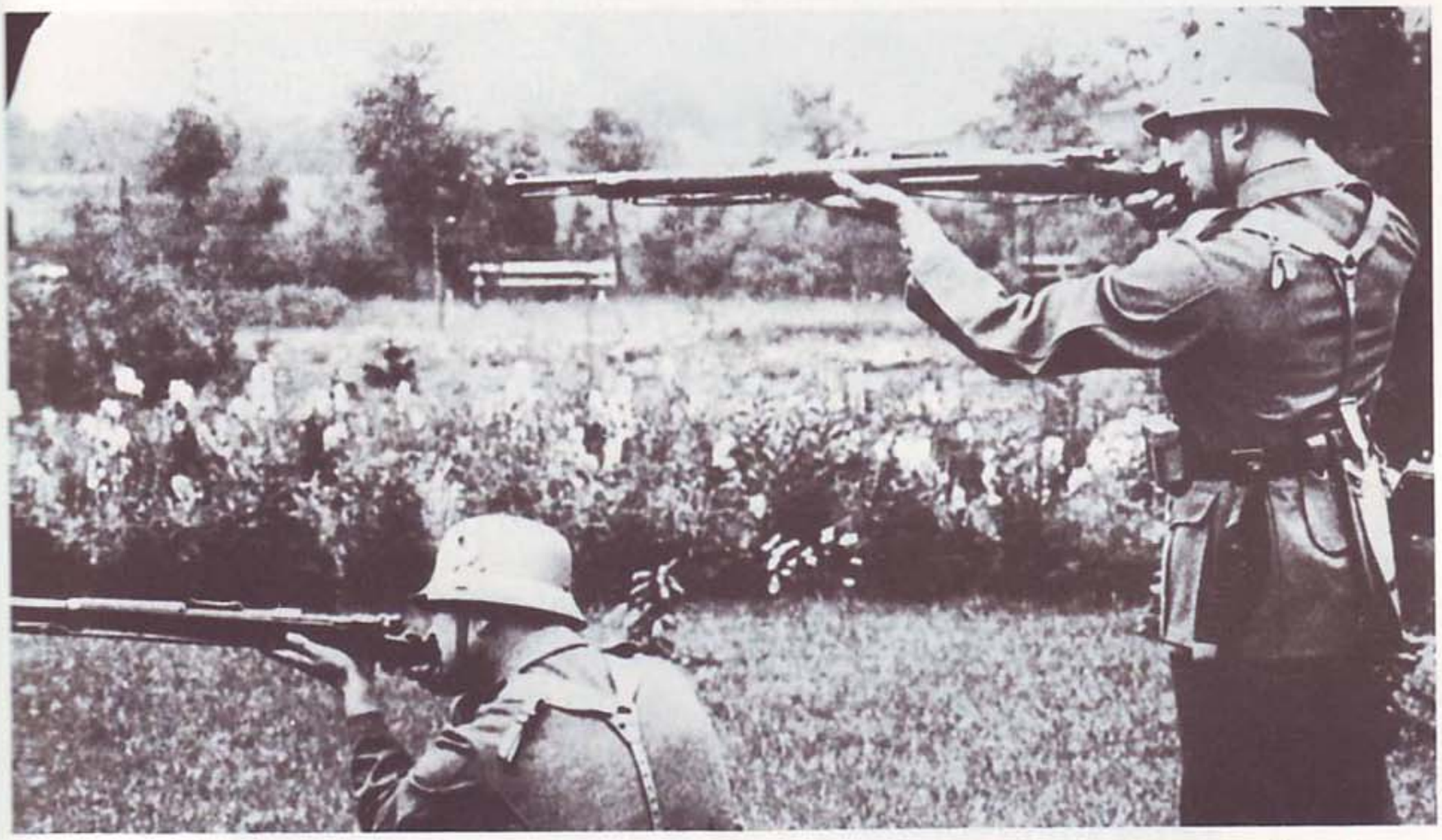


"Vulkanfiber" prototype helmet with army decals, smooth green finish and civil-style liner. Note two holes on left side where metal, national colors shield once was.

T. Goodapple

report on the field trials arrived in Berlin on 15 March 1933 and questions about the prototype helmet were posed:

a) In comparison to the steel helmet, which front and rear parts of the prototype hinder hearing and sight during aiming, shooting, and operating optical devices?
b) Is the material sufficiently sturdy for heavy use and is it weatherproof?
c) Can the helmet be carried by its chinstrap?
d) Are the same sizes that are found in the steel helmet still necessary?
e) What modifications and improvements should be made?



Soldiers of the "Reichswehr" with a new uniform and a helmet made of "Vulkanfiber."

On 4 May 1933, the Reichswehr Ministry informed the troops that the field tests were to be carried out on an even wider basis. As it later developed, this vulcanized fibre helmet was rejected in favor of the Model 35 steel helmet. It is worthy of note that the fibre helmet had removable insignia on both sides (initially only the national colors on the left side, but later on both sides as the new army decals were introduced while the field tests were still in progress).

Throughout the course of years, there were always complaints about the painted surface of the helmet. In 1922, the Inspector of Cavalry reviewed Cavalry Regiment 17 and criticized the helmets of supposedly well-concealed riflemen because they reflected sunlight as they advanced through the heather. The Reichswehr Minister authorized the investigation of various colors for use on the helmet. The results were issued on 15 October 1930:

"Steel helmet paint

In comparison to the previously-used helmet paint (primer made by Mosebach in Riesa and finish coat by Blume in Magdeburg), the following paints have been

extensively tested as a possible improvement in this area:

a) Cellon Primer B and Cellon Lacquer KR from the Cellon Factory in Berlin-Charlottenburg.
b) Primer and surface coat from the firm of Leonor Tasse in Zeitz.
c) New primer and old surface paint by the firm of Blume in Magdenburg.

Results:

The previously-used paint and the paint mentioned in letter c) above meet the standing requirements for steel helmet paint the best. The paint and pigments by Tasse were somewhat inferior both economically and in terms of covering ability. The Cellon paint did not fulfill the minimum criteria."

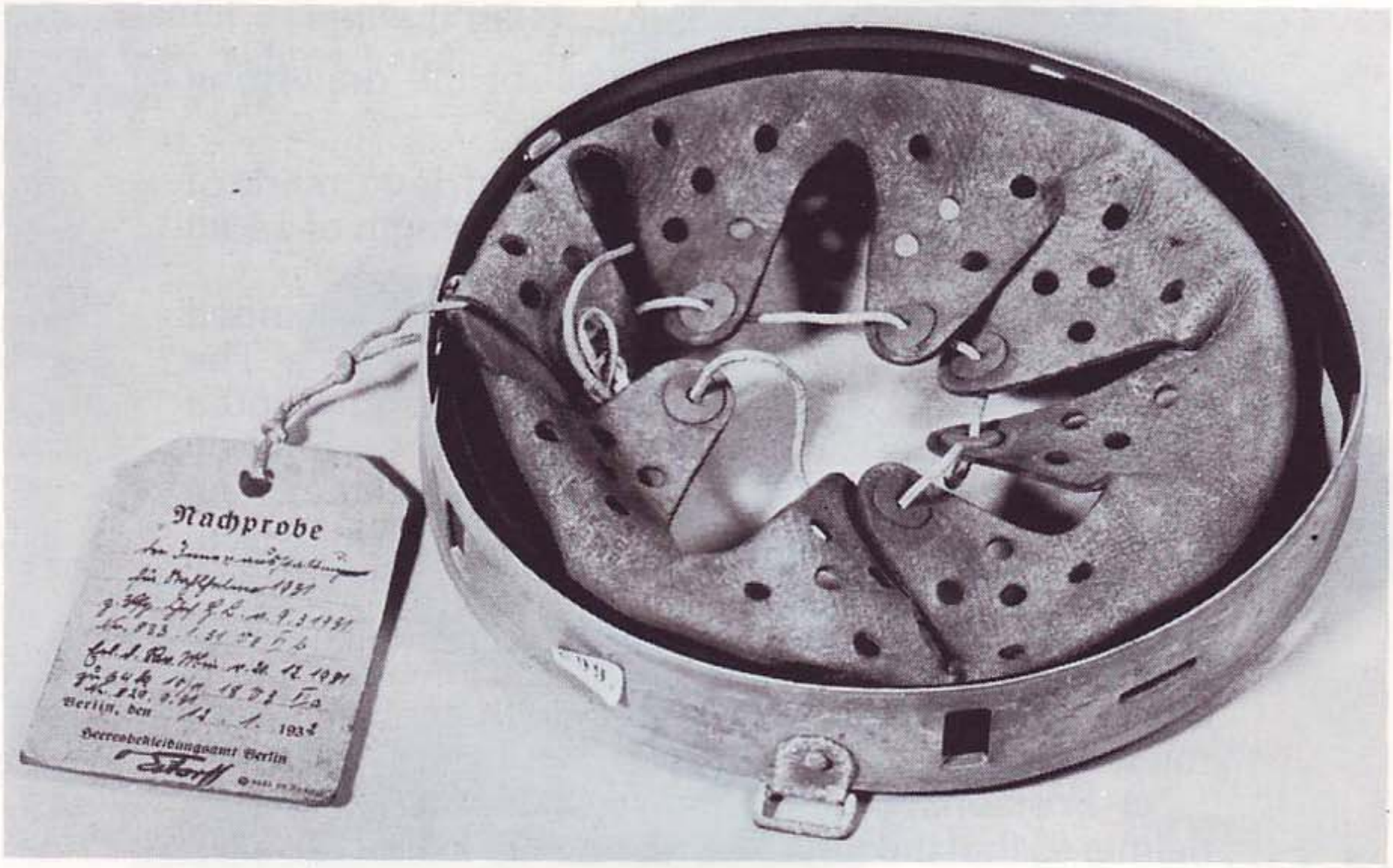
In 1931, the Model 31 liner system was introduced for use in the steel helmet. This system was described in Army Directive 122, dated 14 November 1934:

"The Liner System 31 with Chinstrap for Use in Steel Helmets

a) The liner system consists of:
   1. an outer aluminum band with two pivoting rings,
   2. a steel band with five steel leaf springs,
   3. a 7- to 9-eared leather lining with a felt strip, and
   4. a drawstring.

1. The aluminum band (outer ring). It is stamped out of a single piece, about 3.5 cm wide and 0.1 cm thick; it fits into helmet sizes 60-68 and is fastened together with two aluminum rivets. Between these two rivets is a round hole about 0.8 cm in diameter to accommodate the rear liner-retaining rivet. On the sides, roughly opposite each temple, are two slots about 2 cm long and 0.4 cm wide. These two slots accept the other two liner-retaining rivets. On the band are five vertical, inwardly-pressed sleeves for the insertion of leaf springs from the inner steel band. The lower rim of the aluminum band is rolled outward slightly while the upper rim is inwardly crimped. In the center of each side of this outer band is a pivoting loop with an inserted D-ring made of aluminum for the attachment of the chinstrap.

2. The steel band with springs (inner ring). The inner, steel band is about 3.5 cm wide and 0.25 mm thick. It is held together with two copper rivets. On the lower edge are 10 to 14 round holes (depending upon the helmet size) for the attachment rivets which secure the leather sweat lining and the felt strip to the band. Five copper rivets are used to attach the leaf springs to the steel band. The dimensions of the springs are as follows:



Bayer. Armeemuseum

Experimental example of liner 31.

Length, in sizes 60-64: ca. 21.2 cm
Length, in sizes 66-68: ca. 23.2 cm
Width: ca. 1.5 cm
Thickness: ca. 0.25 mm

The ends of the steel springs are inserted through the openings of the sleeve-shaped pressings in the outer band in such a way that the steel band lies about 0.5 cm below the upper edge of the aluminum band. The steel and aluminum bands are rustproofed by means of parkerizing, cadmium-plating or lacquering.

3. Leather sweat lining with felt strip. The lining is made of sturdy, grained sheep leather about 1 mm thick. It is cut in a single piece so that each helmet has between 7 and 9 flaps (depending upon the head size) and each flap has five air holes, each of which is about 0.6 cm in diameter. At the peak of each liner flap is a reinforced hole to accommodate the drawstring. The reinforcement around this hole is accomplished by a leather washer. A felt strip is sewn to the bottom edge of the leather lining. This strip is about 4 cm wide and 1 mm thick. The leather lining is attached to the lower edge of the steel band by 10 to 14 split-tailed aluminum rivets. It is attached in such a way that the line of rivets surrounds the base of the steel band and about 3 cm of the felt extends around the bottom of the steel band to sit between the band and the leather lining. The dimensions are these:

Height of the flaps: ca. 5.0 cm
Height of the leather sweat lining: ca. 8.8 cm

Width of the flaps: ca. 5.0 cm
Width of the flaps at the level of the drawstring hole: ca. 2.5 cm.

4. a) Drawstring. Approximately 60 cm long, made of white cotton with a minimum tensile strength of 14 kg at a 30 cm length.

b) Chinstrap. A two-piece strap made of tanned leather dyed black on its grained, outer surface. The buckle portion has a carbine hook at one end and a black lacquered roller buckle at the other. Slightly ahead of the buckle is a sleeve made of leather. The buckle and carbine hook are made of zinc-plated iron. The buckle strap, about 42 cm long and 1.6 cm wide, has 15 holes for adjustment. On the blunt end is a leather loop which is attached on the inner side. This attachment is achieved by two longitudinally-stitched rows, each of which is composed of five stitches.

c) Positioning. 1. The liner system is inserted in the helmet so that the round rivet opening in the band lines up with the opening in the rear of the helmet. The rivets are then inserted to secure the liner to the helmet shell. The spring suspension insures that the helmet will remain in its proper position. The positioning of the helmet can be further improved by adjustment of the drawstring.

2. The short section of the chinstrap with the buckle and carbine hook is to be hung from the left D-ring of the liner. The long segment of the strap passes through the right D-ring with its pointed end going from inside to outside. The end then passes through the buckle where it is secured. Left-handed shooters are to reverse the placement of the strap sections.

d) Weight. The liner weighs approximately 195 g and the chinstraps about 40 g."

Although the Imperial Army had already introduced a red helmet band on 23 June 1909 for use by the "red maneuver teams," the Reichswehr decided instead to use a blue maneuver band. In April of 1924, this band was determined to be inadequate, but it was not until 1932 that a new red and yellow reversible band was tested. On 7 June 1932, the Chief of Army Headquarters wrote the following statement:

"Helmet Band.

1. A two-colored helmet band (outside red and inside yellow) was tested by the 3rd battalion of Infantry Regiment 9. The purpose of the band is for the representation of enemy soldiers and for those who are taken out of combat. The battalion felt as a whole that the attachment of red and yellow sides was useful. The yellow side should be clearly recognizable from the red and therefore the red side should have its color improved for better differentiation.

Experimental example (Probe) of the blue helmet band used until 1932.



Bayer. Armeemuseum

NOTE:
A white helmet band also existed for umpires (Kampfrichter).

Helmet band 32.

2. Before the final introduction of the helmet band, usefulness will be further tested during the maneuvers of the 2nd Division on 22 August to 2 September 1932. The following units are to be involved in this field trial: Infantry Regiments 4, 5, 6, and 16, Artillery Regiments 2, 7, and 8, the 11th Battery (horsedrawn) of Artillery Regiment 6, Communications Section 2, Transport Section 2, and Cavalry Regiment 14."

After the close of the field trial and following the final evaluation of the maneuver reports, the helmet band was officially adopted under the designation "Helmband 32." In Army Directive No. 122, dated 14 November 1934, the Helmband 32 was described as follows:

a) Helmet Band. Woven, double-sided, red/yellow (Atlas Binding), 4 cm wide with a triangular tip about 2 cm long with a friction buckle at the other end. Total length with the buckle is about 75 cm. The friction buckle is made of round, stainless iron wire. In the center of the buckle is a flat slider the ends of which are electrically welded to form loops which surround the top and bottom of the buckle. The buckle is sewn into about 4.5 cm of the band's fabric. The movable center slider is 5 cm

long and moves along the short side of the buckle. The length of the buckle is 4.8 cm and its width is 1.1 cm.

Inside the helmet band (directly against the sewn-in, long side of the friction buckle) is a half-linen, field grey strap 1.5 cm wide and 8 cm long. it extends about 5.3 cm below the bottom edge of the band, neglecting the additional length of the hook. This matte grey, spring steel hook is sewn on the end of the strap using No. 60/3 linen thread. The helmet band is gusseted at two points so that its upper edge is some 2 cm shorter than its lower edge. The first gusset is about 19 cm from the seam of the friction buckle and the second gusset is about 46 cm away.

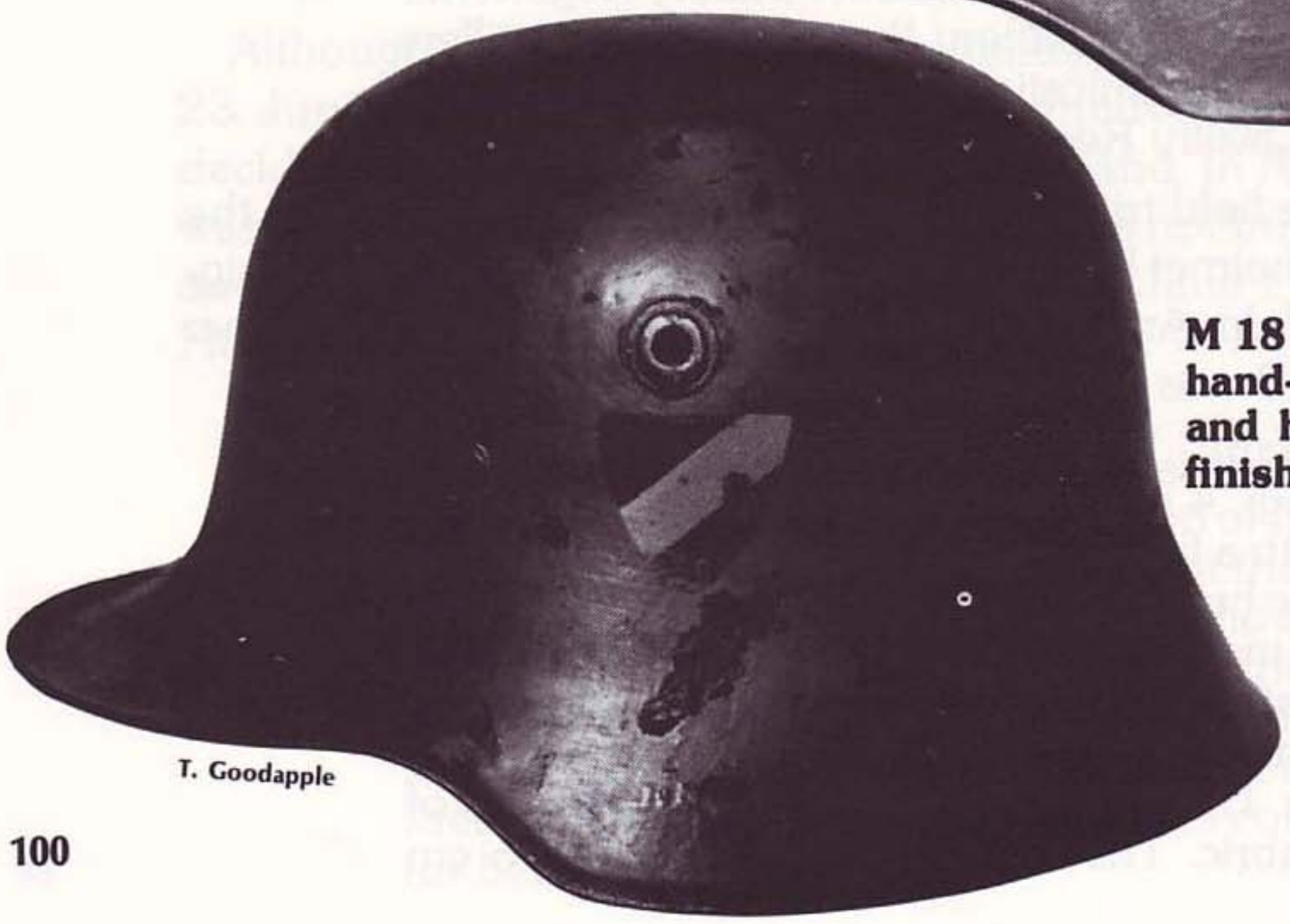
b) Positioning. The band lies beneath the air vents and the hook at the end of the retaining strap attaches to the rim of the helmet. The band must be drawn together a short distance through the friction buckle before it is placed on the helmet. The pointed end of the band must be drawn through the buckle and around the slider bar. At that point, the band is placed on the helmet and is then tightly drawn into place.

c) Weight. approximately 20 g."



J. Coy

M16 Reichswehr helmet with national colors decal.



T. Goodapple

M 18 Reichswehr helmet with hand-painted national colors and hand-painted field green finish.



Soldiers with the "Helmband 32."



A. Barrows

German M 16 with national tri-colors hand painted on the front.

With the accession to power of the National Socialists on 30 January 1933, the former provincial insignia were discontinued. On 14 March 1933, the Reichspresident decreed that the provincial insignia of the army and the anchor crest of the navy were to be replaced by a shield of the same size on which were the colors of the new Reich battle flag (black/white/red) This insigne was to be positioned on the left side of the helmet. As of 17 February 1934, the black/white/red shield was transferred to the right side of the helmet and in its place, a silver eagle on a black field was instituted. The navy utilized a gold-colored eagle on the black field.

On 30 July 1934, the Reichswehr Ministry forbade the issue of helmets to anyone other than members of the armed forces. A special issue of helmets to police stations and the like had to be authorized by the minister. Under this decree also fell the disposition of unusable helmets. These helmets were to be rendered unfit for wear and then could only be sold as scrap metal.

In April of 1934, the Reichswehrminister issued an order to all command centers which dealt with the dispersal and application of the newly-issued helmet decals:

The Reichswehr Minister
64 c 32 V 3 VI a
513.4.34

Berlin,
5 April 1934

To:
Group Commands 1 and 2
Cavalry Inspectorate
Defense Districts I-VII
1-3 Cavalry Divisions

Regarding: Service insignia, etc. on the Steel Helmet.
Issued through the Chief of Army Administration on 17 February 1934
Order No. 440/34 Defense A General IV B2 Az. 64
and Orders dated 1 March 1934
Az. 64 C 32 V3 VI a
No. 209 2. 34

1. The service insignia and the color shield on the helmet (each 3.3 cm wide and 4 cm high) will be manufactured in the form of decals. They will be sent immediately along with the directions for application by the manufacturer to the supply troops with an extra 30% via the garrison headquarter and senior post officers.

The units of the Guard troops (Wachtruppe) in Berlin will receive their insignia from the Berlin Command Headquarters, but through the account of their own supply section.

The costs of the insignia will be drawn from the supply sections and paid to the appropriate Army Clothing Offices. The cost at this point appears to be 1.3 Reichspfennig for one service insigne and one color shield.

2. Immediately after their arrival, the insignia are to be applied to the helmets. This must be done within the confines of the garrison.

Placement of Insignia

3 mm under the ventilation lugs; the midline of the insigne must pass through the center of the vent opening and it must be vertical in relation to the lower rim of the helmet.

3. In the interim, the old unit shields on the left side of the helmet may be removed by the use of emery paper. The surface may then be touched up with *matte*, field-grey helmet paint. Matte surfaces are important so that the decal will adhere strongly.

The troops from the garrisons of Berlin and Potsdam which are to take part in Heroes' Memorial Day (Heldengedenktag), etc. are to remove the already-applied insignia and are to replace them with the new insignia.

4. The command of military subordinate personnel of the Army High Command has ordered the application of insignia to all steel helmets of officers as well as to those of the Rechswehr Minister and officer candidates.

5. This order is to be announced to all troops through the district defense bulletin.

(signed)
Karmann

Another document gave specific details related to the newly introduced service insigne for the armed forces:

No. 64. c. 32. V. 5. IIIa
No. 433.35
Service Insigne (Decal) for the Steel Helmet

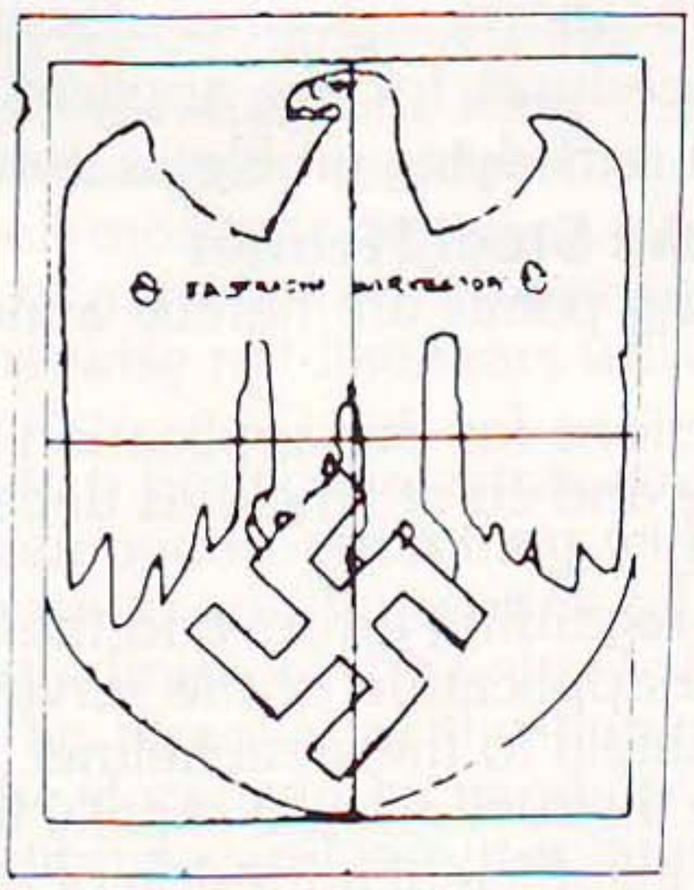
A. **Description**

A silver-white eagle with silver-grey fletching standing atop a swastika on a black shield; the head of the eagle is turned toward the right.

B. **Specifications**

1. The finest sheet aluminum is to be used for the eagle. The colors must be fade-resistant and weather-proof.

2. Dimensions:
Height of the shield: approximately 40 mm
Width of the shield: approximately 33 mm
Height of the eagle and swastika: 38 mm
Width of the eagle and swastika: 31 mm



The diagram shows the front side of the decal before its application to the helmet. The Navy (Reichsmarine) received a gold-colored eagle for their helmets, rather than the silver.

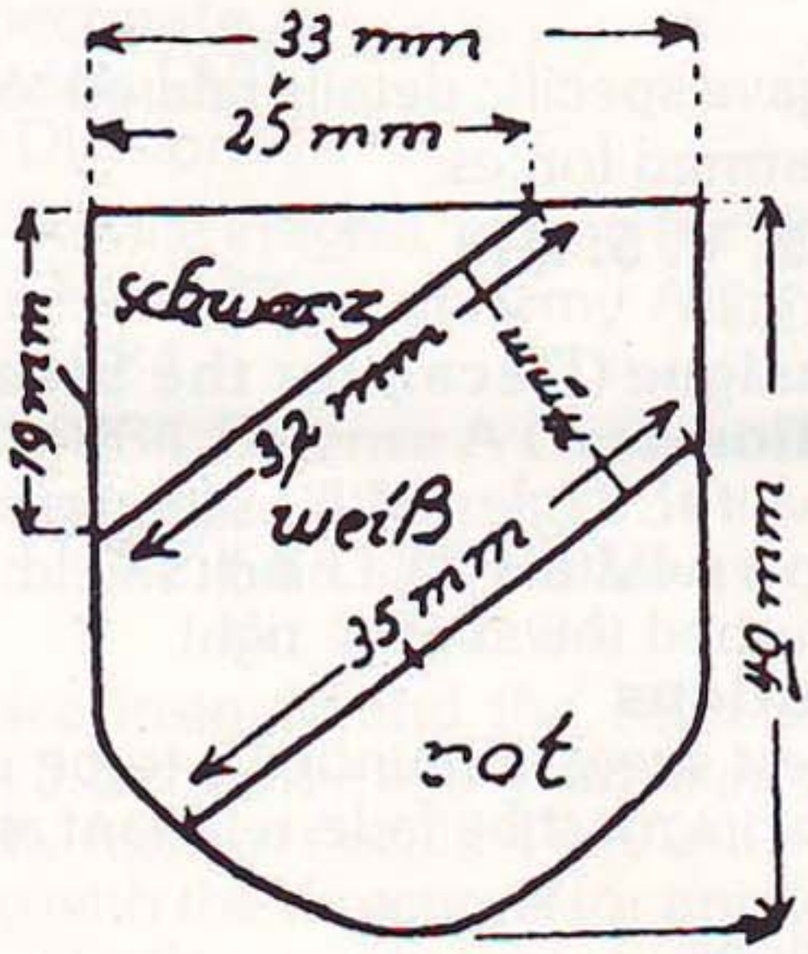
No. 64. C. 32. V 5 IIIa
No. 433.35
Black/White/Red Insigne for the Steel Helmet

A. **Description**

Vertically-aligned shield with the Reich's colors — black/white/red; produced as a decal with the help of lithographic colors and imprinted in flax oil varnish; the black color begins at the upper left corner.

B. **Specifications**

1. The colors must be fade resistant and weatherproof.
2. Dimensions: as per diagram



Following these specifications, a further document was issued which outlined the proper procedures for the application of the decals to the helmets and methods for remedying problems during the application:

Insignia on the Steel Helmet

1. The following points are hereby announced in this document:
   a. Instructions for the application of the service insigne and color shield as decals to the steel helmet.
   b. Notes regarding errors and their remedy during the application of the service insigne and color shield to the steel helmet.

   If these instructions are exactly followed, complaints of insufficient adhesion of the decal to the helmet can be avoided. It would be useful if specified soldiers of the company who have already received instruction in this area actually perform the application of the decals to the helmets.

   Ducolux lacquer made by Duco AG in Berlin-Spindlersfeld has shown very good results in acting as an overcoat above the decal. This is also true of Kopal and Damar lacquers which may be obtained in druggists shops. These latter two may be thinned with pure turpentine if necessary.
2. Preparation of copies of the pamphlets for the Clothing Sections is highly recommended.

The Reichswehrminister
(dated) 27 December 1934
64 c 32 V4 IIIa 625.12.34

Instructions for the Application of Service Insignia and color Shield Decals to the Steel Helmet

A. **Binding Agents:**
Ducolux lacquer, Kopal lacquer, or Damar Lacquer
Thinning Agents:
Ducolux thinner or pure turpentine
Next, care should be taken to see that the location on the helmet where the decal is to be placed is free of grease.

B. **Decalling procedures:**

1. The decal should be not too thinly-spread with one of the above-mentioned lacquers. The lacquer must not come into contact with the backside of the paper of the decal.
2. Wait until the lacquer becomes quite tacky (it should adhere to a finger which gently touches it). At no point should the lacquer become totally dry.
3. Trim the paper border from the decal. Place the decal in position and strongly press down on it with a slightly moistened wad of cloth or a small sponge. The paper should not be soaked through during this pressing procedure, but rather merely made nicely flexible. Blowing on the paper ought to make it flatten out.
4. After approximately one hour, the paper should be drawn downward and removed.
5. With a well-moistened sponge, clean the decal of any remnants of adhesive which previously held it on the paper, otherwise net-like tears will appear on the decal after drying.
6. Within 5 to 6 hours, the extraneous lacquer border must be removed by dabbing with a cloth wad saturated with water and turpentine oil.
7. If the matte finish of the helmet should become spotted after the removal of the paper backing, the area around the decal can be carefully washed with a mild soap solution several minutes later.
8. After approximately 24 hours, the decal should be covered with a colorless coating of one of the above-mentioned lacquers.

Instructional Pamphlet

Errors and their remedy in the application of the service insigne and color shield to the steel helmet.

1. The decal lies wrinkled on the surface of the helmet.

In this case, the lacquer (binding agent) has been applied in too thick a layer. As a result of this, the outer surface of the lacquer becomes tacky, but the underlying layer is still moist. After the decal is applied, this moist layer finally dries, drawing the design of the decal together, thus causing wrinkles. The lacquer should therefore be applied in a thinner layer.

2. The decal shifts after the removal of the paper backing or it becomes effaced:

Here, either the same reasons as stated in number 1 (above) are at fault — remedied by the same procedures — or else the decal had been covered with an excessively diluted binding agent and was applied before it became sufficiently adhesive. In this case, the lacquer is not able to properly dry since it is sealed in between the decal and the surface of the helmet. The decal will therefore retain its instability and may also be easily damaged. Remedy: Wait until the lacquer is thoroughly dry, thus insuring complete adhesion.

3. The decal tears upon application:

The fault here is in part with the lacquer which was not yet sticky enough so that when the decal was pressed downward, it was able to slide up and down because the adhesive agent was still too viscous and would not yet attach itself evenly at all places. On the other hand, if too moist a sponge or cloth ball is used to remove the paper backing from the decal before total adhesion is accomplished, this will ruin the layer which ought to secure the decal. Both of these problems which cause the same effect are easy to remedy. The insigne may also rip if lacquer makes its way to the upper surface of the decal.

4. The decal is bubbled:

In this case, air is not properly evacuated from beneath the decal when it is being applied. The decal should be pressed by starting at the center and working outward toward the border. In some cases it may be necessary to wash the surface of the helmet before the lacquer-coated decal is applied. All moisture must be removed by blowing on it before the decal can be applied.

If any points are not securely anchored to the helmet, these portions will break off as a result.

5. The decal comes loose at large or small points:

The coming loose of the decal is only possible at points where complete adhesion has not occurred. These were previously called "dry spots" in the lacquer, meaning that individual spots in the lacquer coating had already become dry. This meant that these spots could not adhere to the helmet and were only held in place by those surrounding portions of the decal where the lacquer did adhere properly. The dry spots will subsequently pull away from the helmet's surface. Aside from this, it is also possible that individual areas were not completely covered with the adhesive agent. These points will also not adhere properly and will later pull away from the helmet.



Soldier of the "Reichswehr" with helmet M 18 and the national colors on the left side.

Soldiers wearing helmets M 18 with painted eagles.



Bundesarchiv

M 16 double decal Army helmet.



J. Bandy



M 18 double decal Army helmet with early national colors decal (1934?).

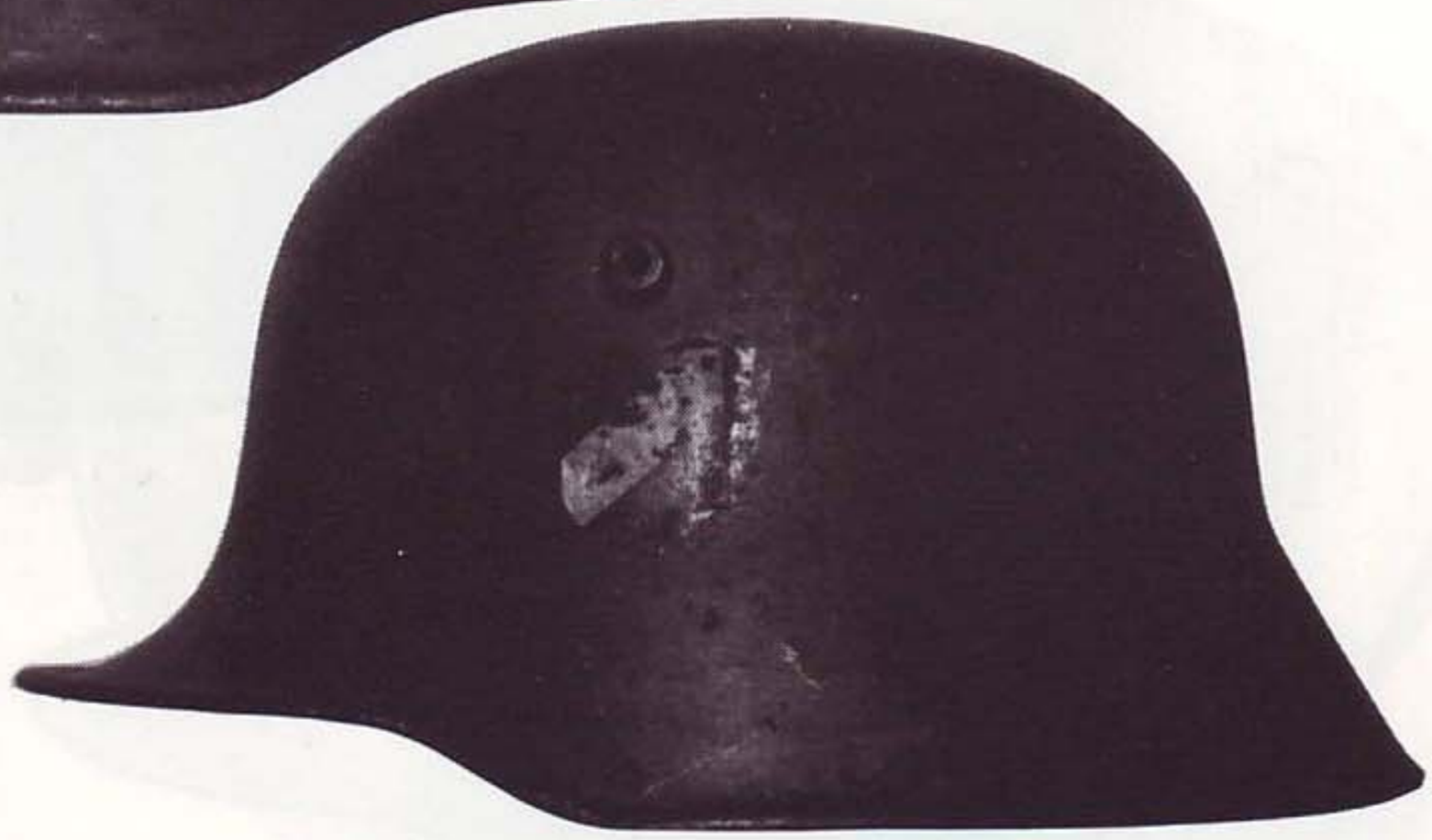


J. Bandy

M 16 double decal Army helmet (Austrian shell).



M 18 with reversed decals. The eagle decal was obviously just added to the Reichswehr helmet with national colors already on the left side.





M 16 helmet with Luftwaffe decal, first style.

M 18 double decal Luftwaffe helmet with second style eagle.

J. Bandy

J. Bandy

M 18 with ear cut-outs and Army decal.

M 16, with carrying harness.

M16 double decal Kriegsmarine helmet with parade light green finish and variant M17 style, white, three pad leather liner.



Wm. Maertz

M16/18 double decal Kriegsmarine helmet with smooth medium green finish. Originally a M16, the chin strap rivet head posts were ground off prior to repainting.



M18 ventless Army model which was reissued in 1940.



M18 style variation, single decal Army helmet with M31 liner.



Soldiers wearing helmets M 18 with standard insignia.



Two generals of the Army wearing standard helmets.

THE MODEL 1935 STEEL HELMET

Although the old helmet had proven itself in the First World War, its form, weight and overall appearance were no longer popular. The vulcanized rubber helmet did not perform well during its tests and so the development of a new helmet was undertaken. Testing of the new helmet was concluded in the beginning of June 1935. The new helmet was designated as the "Steel Helmet 35" (Stahlhelm 35) by the Supreme Commander of the Army. "General Army Correspondence" number 289 made the following statement:

1. In consideration of the drawbacks of the current steel helmet (hindrances to sight and hearing while sighting, shooting and operating optical devices) a new helmet model was developed and it has proved to be practical in tests by training and research personnel. Field trials are completed. The improved model has been designated as the Stahlhelm 35 and it will replace the helmet which up until this time was used by both mounted and unmounted troops. The new helmet has no ear cutouts nor ventilation lugs. It has a somewhat higher visor; the visor, sides and neck apron are somewhat shortened. Test results, descriptions and instructions for adjusting and wearing the helmet will be issued at a later date. The allowable duration of wear remains the same.
2. The previous helmet sizes (60, 62, 64, 66, and 68) will be retained. Intermediate sizes (61, 63, 65, and 67) will be achieved by variation of the liner.
3. As of 1 July 1935, new requisitions will be filled with Model 35 helmets. These requisitions are to be forwarded without delay from the Army Clothing Offices to the Procurement Office.

b) In consideration of future requests for Model 35 helmets, a supply will be held in reserve. All future requisitions are to state helmet sizes, intermediate sizes and head sizes as follows:

60	Z61	62	Z63	64	Z65	66	Z67	68	Z69	70
53	54	55	56	57	58	59	60	61	62	63

4. The Model 31 liner system remains unaltered.
5. Those existing helmets which are now in use are to be replaced by the Model 35 helmet and will be disposed of at a later date.
6. Dispositions about the functionality evaluation in the field trials of the vulcanized rubber helmet are the concern of the regional defense districts.

25 June 1935 (signed)
V.5 III.b. Supreme Commander of the Army

The Model 35 helmet was described in Luftwaffe Directive 422:

A. **Description**

The helmet is formed from sheet steel between 1.1 and 1.2 mm thick. At no point is the thickness less than 0.95 mm. It is seamlessly stamped and the entire rim is crimped inwardly to a width of about 5 mm. The size of the helmet is so measured that the entire inside surface stands away 20 mm from the wearer's head. Holes to accommodate the liner-retaining rivets are located at the rear center of the helmet and on each forward side, slightly ahead of each temple. On each side are also openings for the insertion of the ventilation bushings. The lower portion of the helmet extends outward at the sides and rear to form a throat (sic) and neck apron. The edge of the apron is horizontal so that the helmet sits in a level manner when it is placed on an even surface.

The helmet is coated inside and out with a rust-proofing grey-blue paint. The army uses a matte grey paint. Applied three millimeters under the ventilation holes are: a) on the right side, a shield-shaped device in the Reich's colors (black/white/red), and b) on the left side, the service insigne of the Luftwaffe in a silver-grey color (for generals, technicians and officials of general rank a gold colored insigne).

The central axis of the insigne must fall exactly in the center of the ventilation hole and must be perpendicular to the rim of the helmet. The shield 3.3. cm wide and 4 cm high. The colors must be weather-proof.

The helmet is manufactured in five sizes: 60, 62, 64, 66 and 68. This means that the inner circumference of the helmet at the point where the dome meets the apron is the measured size. The intermediate sizes are achieved by variations in the size of the liner.

B. **Adjustment and Positioning of the Steel Helmet 35.**

1. The helmet provides protection against shrapnel and small grenade fragments. This was demonstrated by experience during the last war. The helmet's weight and method of positioning are extremely important and are directly related to its ballistic integrity.
2. The helmet sizes are stamped into the underside of the neck apron. The sizes run as follows:

Size 60 for head size 53, weight 810- 930 grams
Size 62 for head size 55, weight 880-1000 grams
Size 64 for head size 57, weight 920-1070 grams
Size 66 for head size 59, weight 1000-1125 grams
Size 68 for head size 61, weight 1025-1170 grams
Size 70 for head size 63, weight 1060-1230 grams
All of these weights are measured without the liner and chinstrap.

Intermediate size 61 for head size 54

63	56
65	58
67	60
69	62

These intermediate sizes are achieved through variance of the liner.

The visor should be aligned with the eyebrows. For a correctly fitting helmet, the proper helmet size must be selected to insure that the correct size for the head is obtained. A gap must exist between the head and the leather liner so that, if the helmet is dented by impact, head injury is circumvented.

3. The helmet's ventilation is achieved by ventilation openings on each side of the helmet.
4. The application of insignia other than the authorized service insigne and national color shield is forbidden.

In peacetime, the use of grass, twigs, etc. for camouflage may only be authorized by the commanding officer. Smearing the helmet with clay, soil, and so forth is forbidden. In the field (under combat conditions), all possibilities for camouflage are encouraged.

5. If the chinstrap is not worn under the chin, it is to be placed around the top of the visor.
6. Misuse of the helmet (e.g. cooking in it) is forbidden. The metal loses its tempering and ballistic integrity when it is subjected to heat.
7. If the surface paint is damaged, it must be touched up or totally repainted as soon as possible in order to prevent the formation of rust. Polishing, lacquering, or smearing the helmet with grease is forbidden. By doing this, the helmet loses its matte, glare-free finish.
8. Simple repairs to the helmet are to be carried out by the unit armorer. For repairs to the liner, troops are advised to take the helmet to the unit leatherworker.
9. During warehouse storage, extra helmets are to be stacked with a sheet of paper between each so that the surfaces will not be damaged. These stacked helmets are not to exceed five high.

C. **Steel Helmet Rivet with Washer.**

a) The three-part rivet and washer are manufactured from brass sheeting and are then zinc-coated by galvanization. The head of the rivet is rounded and lacquered in a blue-grey color. The color of the rivet head must correspond as closely as possible to the color of the helmet.

b) Specifications:

1. Liner-retaining rivet:

Head diameter. . . . . 13 mm with 0.2mm variance
Head height. . . . . 1.5 mm with 0.95 mm variance
Shank length . . . . . 17.5 mm with 0.5 mm variance
Shank width. . . . . 6 mm with 0.3 mm variance
Shank thickness
. . . . . 0.55 mm with 0.02 mm variance
Rounded shank end radius
. . . . . 3 mm with 0.02 mm variance

2. Washer

Washer diameter . . . . . 12 mm with 0.2 mm variance
Washer thickness. . . . . 1 mm with 0.05 mm variance
Slot length . . . . . 6.5 mm with 0.02 mm variance
Slot width . . . . . 1 mm with 0.02 mm variance
Crosspiece width. . . . . 3.5 mm with 0.1 mm variance

c) Weight of the rivet and washer: ca. 3.5 grams

d) The rivet is stamped on the flat side of the shank with the company stamp and the year of manufacture.

e) The rivets are packed in such a way that the painted heads are not damaged. The name of the manufacturer is to appear on the cardboard packing box.

D. **Liner System for the Steel Helmet 35 Without Chinstraps.**

The term "liner system" refers to the Model 31 liner. Only the materials of which it is made are described herein:

Material:

a) Outer ring: light metal (aluminum-magnesium alloy) in accordance with production number 12 240.

b) Inner ring: light metal (aluminum-silicon-magnesium alloy) in accordance with production number 12 240.

c) Springs: made of the best spring steel. The scratch-resistant lacquer must be baked on the surface.

d) Hanging loops with rings: light metal (aluminum-silicon-magnesium alloy) in accordance with production number 12 240, sand polished.

e) Rivets and attachment pins: aluminum-silicon-magnesium alloy in accordance with production number 12 240.

f) Leather lining: split or unsplit sheep or goat leather must be tanned with plant agents, although the use of synthetic tanning agents in conjunction is also permitted. Sumach tanning chemicals for post-treatment are permitted. Mineral tanning agents are prohibited.

The ash content of the leather may not exceed 6% and the total rinsing loss, 7%. The fat content of the leather must fall between 3% and 8%. The leather's free fatty acid content (calculated as oleic acid) must not exceed 2%.

The leather must be free from strongly acting free acids and any chemicals that may be hazardous to health (for example, soluble synthetic tanning agents, cellulose extracts, etc.).

Only leather may be used in the production of the sweat

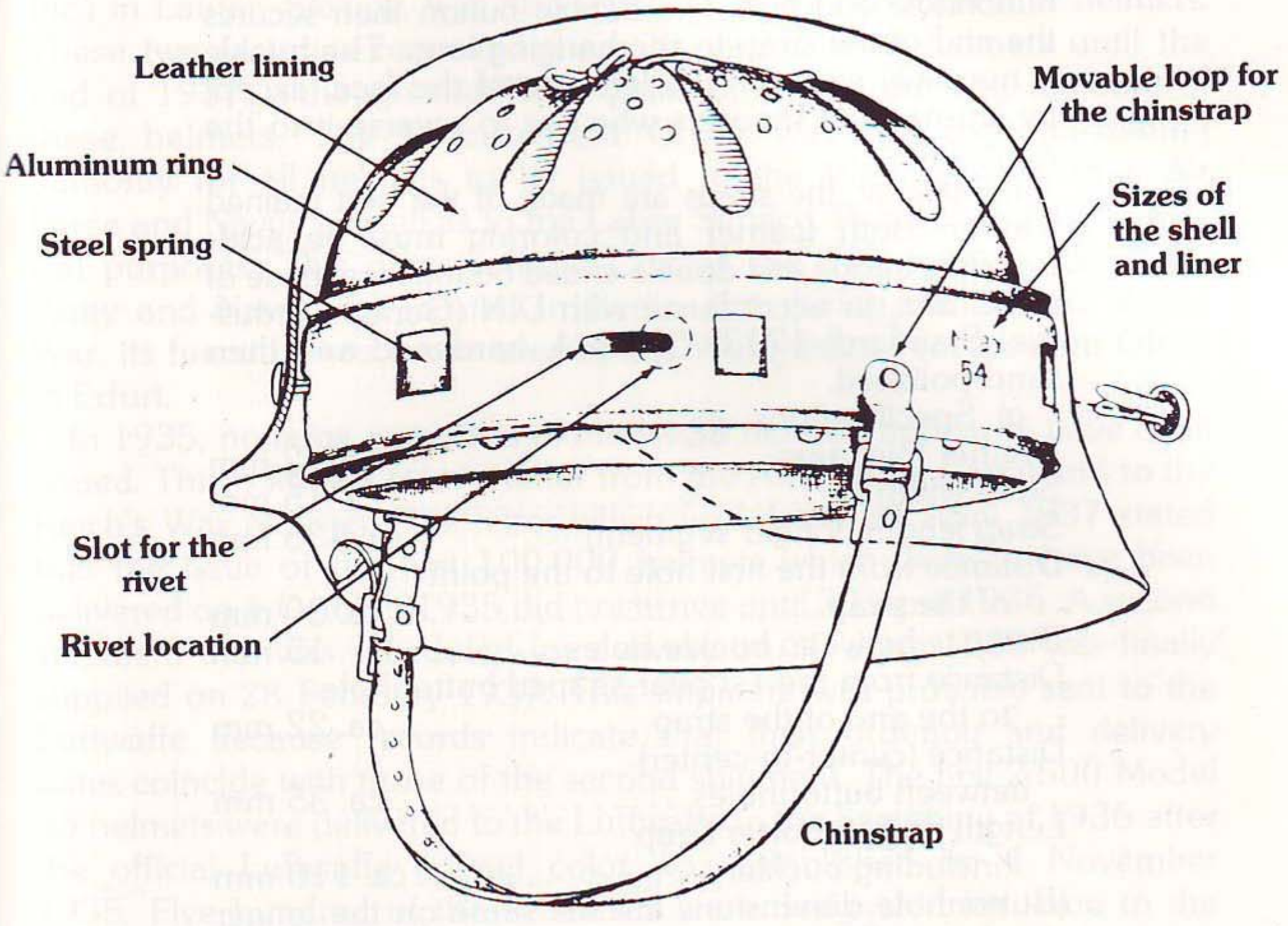
lining. This leather is to be released for processing only after close examination.

g) Felt strip: made of uncolored sheep wool (30% mixture), but without the addition of any plant fibres. The felt must be shrink-resistant and mothproof.

h) Drawstring: made of cotton with a 20% cotton admixture. The tensile strength is 11 kg at a 30 cm segment length.

i) Sewing thread: The thread used for stitching the leather lining and felt strip is machine linen thread No. 30/3 metric (50/3 English); for the closing seam of the leather liner, machine linen thread No. 10/3 metric (18/3 English) is used.

M 1935 steel helmet with M 1931 liner system.



E. **Stamping:**

On the outer ring, the following inscriptions are applied:

a) behind the right hanging loop — the manufacturer's name and the year of production.

b) behind the left hanging loop — the helmet size and the corresponding head size.

F. **Chinstrap for the helmet liner system:**

a) A two-piece strap made of natural leather, the outside of which has been grained and dyed a chocolate color.

b) The short strap has at one end a single pronged, double bar buckle that is attached to the leather

strap with two rows of stitches (eight stitches per row). On the other end are two pear-shaped buttonholes for the insertion of the double-ended button.

c) The long strap has at one end 13 holes in a row for adjustment and at the other end, the two pear-shaped buttonholes.

d) The chinstrap buckle is a single pronged type; the prong has a slight curvature. The tip of the prong is flattened and rests against the lower bar of the buckle, but cannot pass beyond it.

The double button is the same on both sides and each end is circular with a very small radius. The outer surface of each end is slightly domed.

e) Positioning: Both straps are inserted through the hanging loops from the inside to the outside, buttonhole end first. The double button then secures the end of the strap to the hanging loop. The buckle is normally worn on the left side of the face, except by left-handed shooters who are to reverse it to the right side.

f) Material: the straps are made of the best grained leather. Both leather and coloring must be acid-free. The buckle and double-ended buttons are made of aluminum, in accordance with DIN (German industrial Standard) 1713, Group 4, hardened and then sand-polished.

g) Specifications:

Leather thickness . . . . . ca. 2 mm
Strap width . . . . . ca. 15 mm
Strap length (longer segment) ca. 435 mm
Distance from the first hole to the point of the strap . . . . . ca. 30 mm
Distance between buckle holes . . . . . 15 mm
Distance from the 1st pear-shaped buttonhole to the end of the strap . . . . . ca. 22 mm
Distance (center-to-center) between buttonholes . . . . . ca. 35 mm
Length of the shorter strap (including buckle) . . . . . ca. 110 mm
(Buttonhole dimensions are the same on the longer strap, as well.)
Length from the loop to the buckle . . . . . ca. 25 mm
Size of the buckle . . . . . ca. 16 mm

As was the case with the Model 16/18 helmets, lightweight Model 35 helmets were made available to officers. These helmets were made of aluminum or vulcanized fibre. At that time, the lightweight helmets cost 14.50 Reichsmarks and were only to be worn by those officers who were not belonging to the parade troops. The Luftwaffe modified this regulation so that officers who were not on duty at the review could wear either the standard Model 35 helmet, the lightweight helmet or an old model helmet without restriction.

The stamping on the outer ring should be expanded upon as follows: behind the helmet size stands either the designation a/A or n/A; a/A stands for "alte Art" (old model) and means that this liner belonged in Model 16/18 helmets. The n/A mark means "neue Art" (new model) and this means that the liner belonged in Model 35 helmets. At the end of 1935, the carbine hook was removed from the chinstrap. In the Luftwaffe description, the designation "Liner System 31" was no longer mentioned.

The production of large quantities of Model 35 steel helmets was first undertaken by the Eisenhüttenwerk in Thale. This helped them to gain experience in mass production and in the evaluation of production procedures. In September of 1935, a second plant, the Sächsische Emallier-und Stanzwerke AG (Saxon Enamelling and Stamping Works, Inc.) in Lauter, Saxony, was also involved in the production of helmets. These two factories remained the sole producers of helmets until the end of 1937, although the Thale plant produced the vast majority of these helmets. The Procurement Office was the contract-issuing authority for all helmets to be issued to the Wehrmacht (Army, Air Force and Navy) as well as to the Labor Service, Police, SS, and for special purposes. This office, officially called the Procurement Office for Army and Navy, was located in Berlin, but during the Second World War, its function was taken over by the Wehrmacht Procurement Office in Erfurt.

In 1935, no large quantities of Model 35 helmets appear to have been issued. This is known from a letter from the Army High Command to the Reich's War Minister. The letter which was dated 24 April 1937 stated that the issue of the first 100,000 helmets which were to have been delivered on 1 October 1935 did not arrive until 30 April 1936. A second shipment that was scheduled for delivery on 30 June 1936 was finally supplied on 28 February 1937. This shipment was probably sent to the Luftwaffe because records indicate that their ordering and delivery dates coincide with those of the second shipment. The first 2,500 Model 35 helmets were delivered to the Luftwaffe in the beginning of 1936 after the official Luftwaffe helmet color was established on 4 November 1935. Five hundred of these helmets were designated for issue to the Guard Battalion of the Luftwaffe. The reason for all these delivery difficulties during 1935 and 1936 sprang from, among other things, poor-quality liner retaining rivets and a very large order (220,000 helmets) from China. The Reich's War Minister had ordered that this Chinese shipment receive priority. This obviously strained the manufacturers' capacity for several months.

Because of the poor-quality rivets, the Luftwaffe Ministry and the Supreme Commander of the Luftwaffe were forced to make the following announcement via the Luftwaffe Regulation Bulletin No. 617 on 14 May 1936:

> "It appears that those helmets that have been issued to the Luftwaffe to date have liner retaining

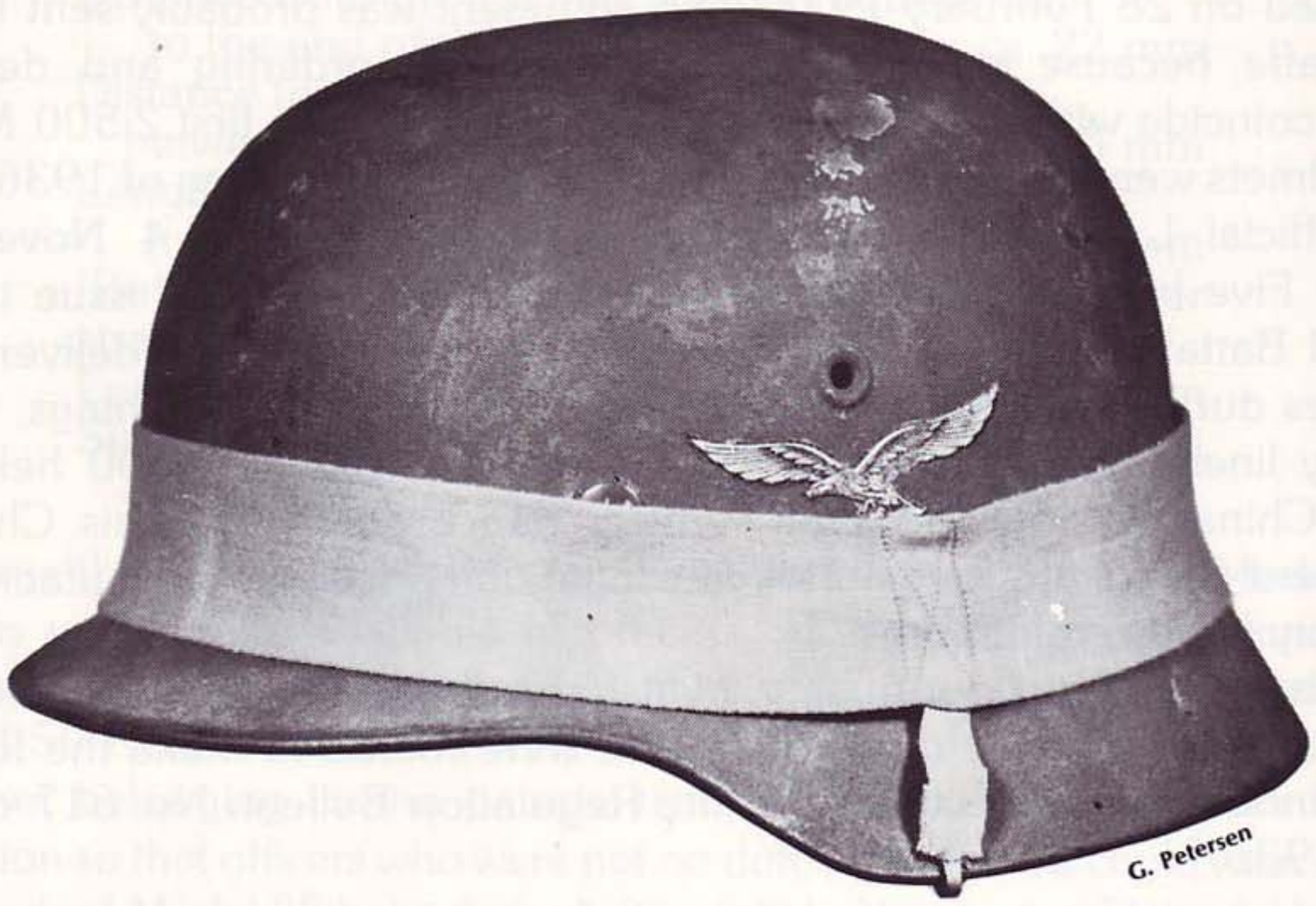
rivets that are not sufficiently strong and this causes them to shear upon impact. Replacement rivets may be obtained from the economic troop section through the Luftwaffe Clothing Office.

You are also warned against allowing the helmet to hang for long periods of time from its chinstrap since this warps the metal liner band and loosens the rivets."

In spite of the delivery difficulties that took place in 1936, the Luftwaffe Ministry, on 2 July 1936, ordered that all old model steel helmets which had been issued to sentry troops were to be recalled by the airfield commanders so that all troops could be outfitted with the new model helmets.

Since the Model 32 helmet band did not fit the new helmets, the Model 36 helmet band was introduced on 12 September 1936. The new helmet band was described in Army Service Directive 122:

a) Helmet Band: double sided, woven band — red/yellow — Atlas binding, 4 cm wide with a triangular point about 2 cm long at one end and a slider type, friction buckle at the other. The length with the buckle is about 75 cm. The buckle is made of sand-blasted, light metal wire (aluminum-silicon-magnesium alloy) with the production number 122/4a. In the center of one of the long sides of the buckle, the two free ends of the wire are welded together, forming a rectangle. A 4.5 cm long section of the band's fabric is then stitched around to retain the buckle to the band. The free end of the strap is pressed flat. The ends of the movable, flat, center bar of the buckle are bent around the short sides of the buckle. The buckle is 4.6 cm long and 1.1 cm wide.



Stahlhelm M 35/40 single decal Luftwaffe helmet with Helmet Band 36.

In the inner surface of the helmet band immediately next to the stitched-in buckle is a half-linen, field grey strap 1.5 cm wide and 8 cm long. It is attached in such a way that 4 cm of it hangs below the bottom edge of the helmet band. Further along the band are two more of the attaching straps, one about 15 cm from the buckle and the other about 19 cm from the pointed end. Three pockets are woven into the band for the insertion on these straps. The pockets and inserted straps are sewn around the border and crosswise. At the end of each of the straps is a spring steel hook which is stitched into place with No. 60/3 linen thread.

The helmet band is conically woven.

b) Positioning: The band lies under the air vents and the attaching hooks grip the helmet's rim.

Before the band is placed on the helmet, the pointed end is to be passed a short distance through the buckle. The band is then placed on the helmet with the attaching straps downward. The hooks are then attached to the rim and the band is drawn tight.

c) Weight: about 20 grams.

In late 1936, difficulties arose between the Luftwaffe leadership and the Procurement Office. The Luftwaffe felt that it was receiving unfair treatment in the issuance of helmets as compared to the army. The Luftwaffe even went so far as to place direct orders for the Thale and Lauter helmets, even though they were forced to pay somewhat higher prices than those paid by the Procurement Office. The Luftwaffe paid 6.20 Reichsmark for each helmet, while the Procurement Office paid only 6.00 Reichsmark each but with the proviso that the helmets' acceptance would be subject to subsequent general testing. In the exchange of letters that took place over a long period of time between the Reich's War Ministry, the Reich's Air Ministry and the Procurement Office, there was an indication that the Army High Command felt that the Model 35 steel helmet should be developed for first-line army use because the old model helmet was no longer suited to the demands placed on it. The old helmet hindered hearing, vision during aiming and shooting, and the operation of optical devices, It also caused hardships while the wearer tried to operate telephones and use earphones. In view of these drawbacks, the visor of the M35 helmet had been raised and both the visor and apron were somewhat shortened. The side and rear portions of the apron were drawn outwardly approximately 6 mm, thus enhancing the angularity. The ballistic resistance of the steel was increased about 15% and the ventilation lugs were no longer as obtrusive. For all these reasons, it was felt that the M35 helmet should be issued as standard equipment and that orders for them should be given priority.

In a letter from the Army High Command dated 24 April 1937, the total number of issued helmets was disclosed. According to the document the army had received 552,800 helmets out of an order of 2,030,000 (27.23%) up to 31 March 1937. The Luftwaffe received 157,500 helmets from an order of 254,000 (62%). Further — from February 1936 to March 1937 a total of 277,000 helmets were issued to the SS, provincial and protection police and to China (220,000).

In April 1937, the situation regarding steel helmets was outlined in a letter from Army High Command V5:

Accounting of Steel Helmet Requirements: 1937

I. Peacetime Requirements	
Peacetime Strength	
a) as of 6 October 1936	573,000
b) new formations up to 1 October 1937	80,000
Resultant strength as of 1 October 1937	653,000
Material on hand:	
Old model steel helmets	549,161
Non-serviceable helmets	-310,000
Serviceable helmets	239,161
New model helmets issued up to 1 March 1937	447,161
Total helmets on hand	686,322
With a 10% equalization supply, the peacetime army must have on hand the following number of old and new model steel helmets as of 1 October 1937	718,300
Number of helmets deficient for the supply of the peacetime army as of 1 October 1937	31,978
II. Mobilized Requirements	
Strength of the wartime army as of 1 October 1937 (not counting officers and officials)	2,940,000
Amounts available (see above in Section I): total quantity of helmets including those old models judged unserviceable	996,322
Quantity of helmets lacking for the outfitting of a wartime army	1,943,678
Accounting for the unserviceable old model helmets (see I)	310,000
Total number of helmets lacking	2,253,678

The above numbers apply only to the army. The Luftwaffe, during the 1937-38 fiscal year, indicated a requirement for 334,000 steel helmets, while the Navy needed only 10,000 helmets for the year 1937.

A supply office letter dated 20 August 1937 made reference to a letter from the Army General Staff, Section 6, dated 7 July 1937. This letter indicated the following requirements, based on modified mobilization determinations:

Requirement of the General Staff	4,055,000
Supply as of 1 July 1937	1,370,488
Shortfall of helmets	2,684,512

This shortfall was to be cut in half as the awaited issue of new helmets took place through 31 March 1938. In the beginning of 1937, the manufacturers supplied helmets as follows: January — 40,000 helmets and February — 67,000 helmets. Because of the year-to-year increases of mobilization requirements, it was to take several years to finally fulfill the General Staff's requirements. In its requisition reports, the General Staff established an average two year wear period for a helmet used during mobilization. Since the First World War, it had been forbidden to polish the helmet in any manner. Therefore, the Luftwaffe High Command issued the following regulation in the Luftwaffe Regulation Report of 21 January 1938:

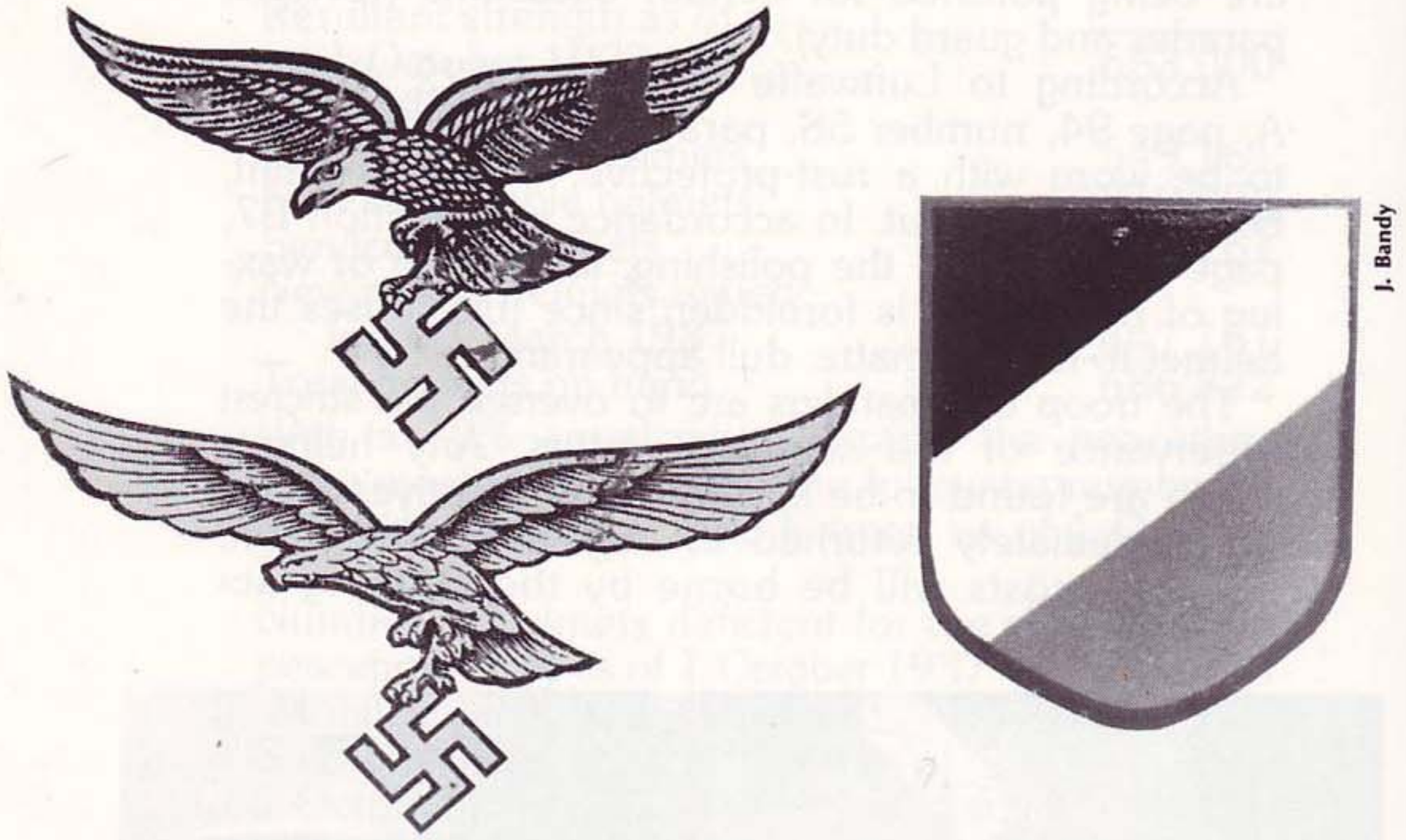
> "It has been repeatedly established that helmets are being polished for certain occasions (reviews, parades and guard duty).
>
> According to Luftwaffe regulation 422, Section A, page 94, number 58, paragraph 2, the helmet is to be worn with a rust-protective, blue-grey paint, both inside and out. In accordance with section B7, page 95 (loc. cit.), the polishing, lacquering or waxing of the helmet is forbidden since this causes the helmet to lose its matte, dull appearance.
>
> The troop commanders are to oversee the strictest observance of the standing orders. Any helmets which are found to be in offense of directives are to be immediately returned to regulation condition. Eventual costs will be borne by the clothing accounts."



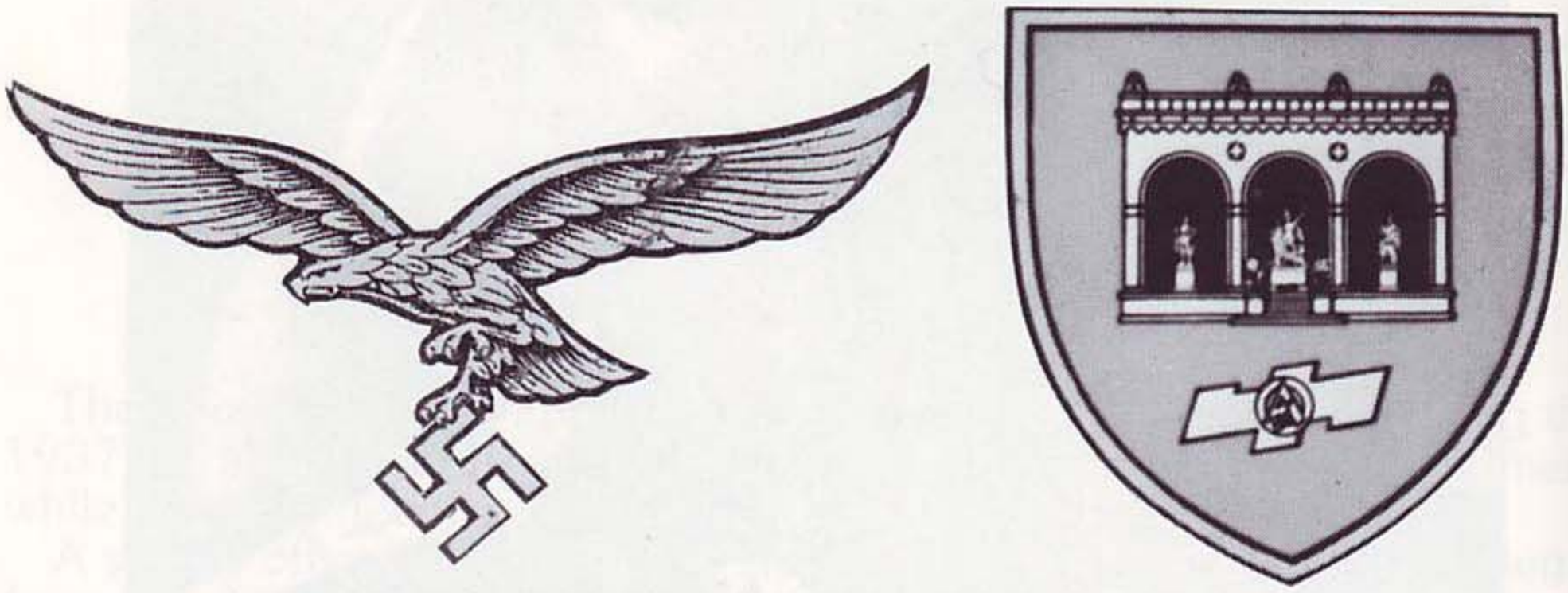
HELMET INSIGNIA OF THE "WEHRMACHT" FROM 17.2.1935 TO 8.5.1945.



Insignia of the Army (eagle silver, Navy: eagle gold)



Insignia of the Airforce (eagle for generals, technicians and officials of general rank — gold colored).



Insignia of the "SA-Standarte Feldherrnhalle," which was an airborne regiment of the "Luftwaffe" during the "Sudetenkrise" in 1938/39.

M 35 double decal Army helmet.

J. Bandy



Knight's Cross holder Georg Eschenbacher wears the M 35 Army helmet.

M 35 double decal Kriegsmarine helmet (gold eagle decal) with smooth grey-green finish.



T. Gondapple

Stamp of the "Beschaffungsamt für Heer und Marine" in top of a helmet 35.





This member of the coastal artillery wears the Navy M 35 helmet.

J. Bandy



M 35 double decal Luftwaffe helmet with first style eagle, dated 1936.

First and second style Luftwaffe eagles being worn.

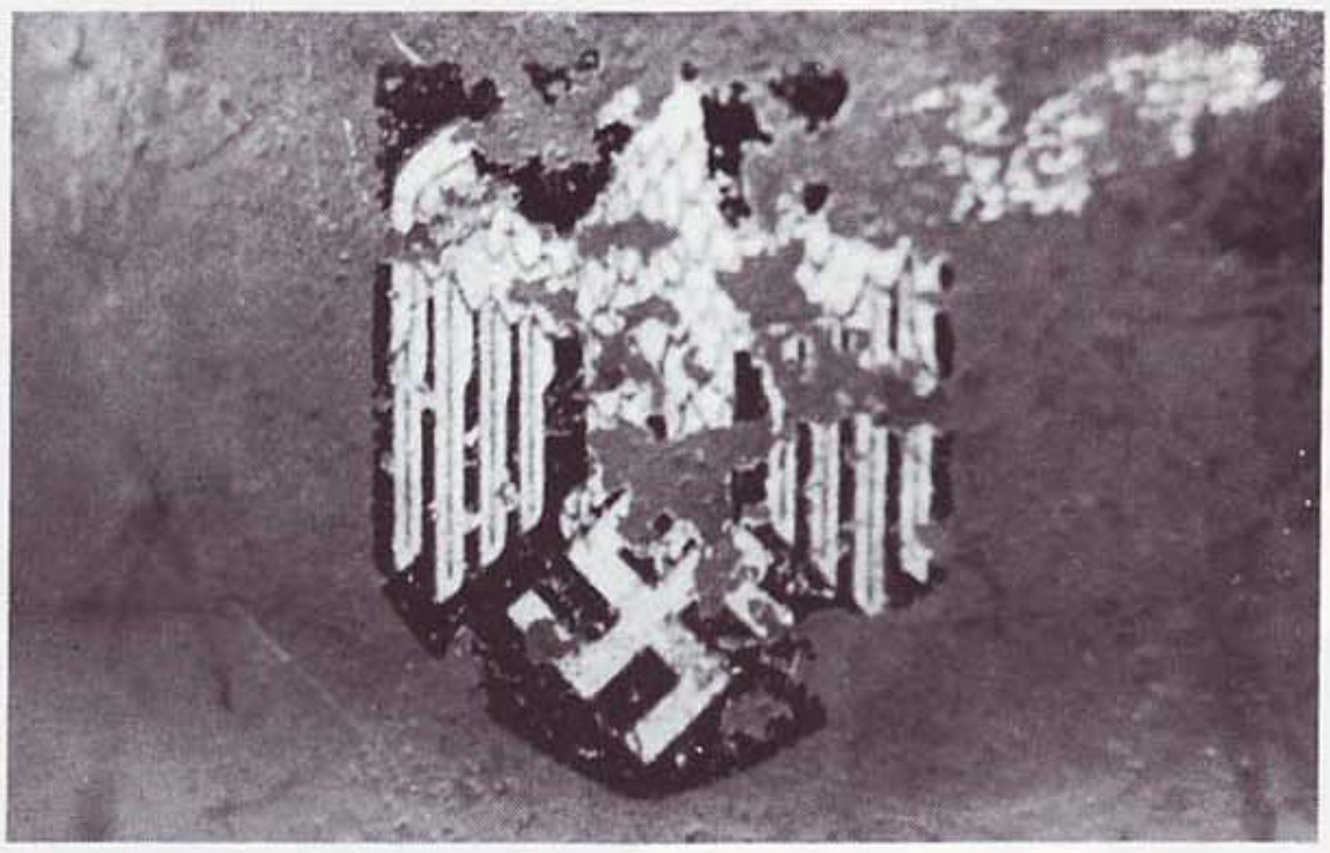


Wm. Maertz



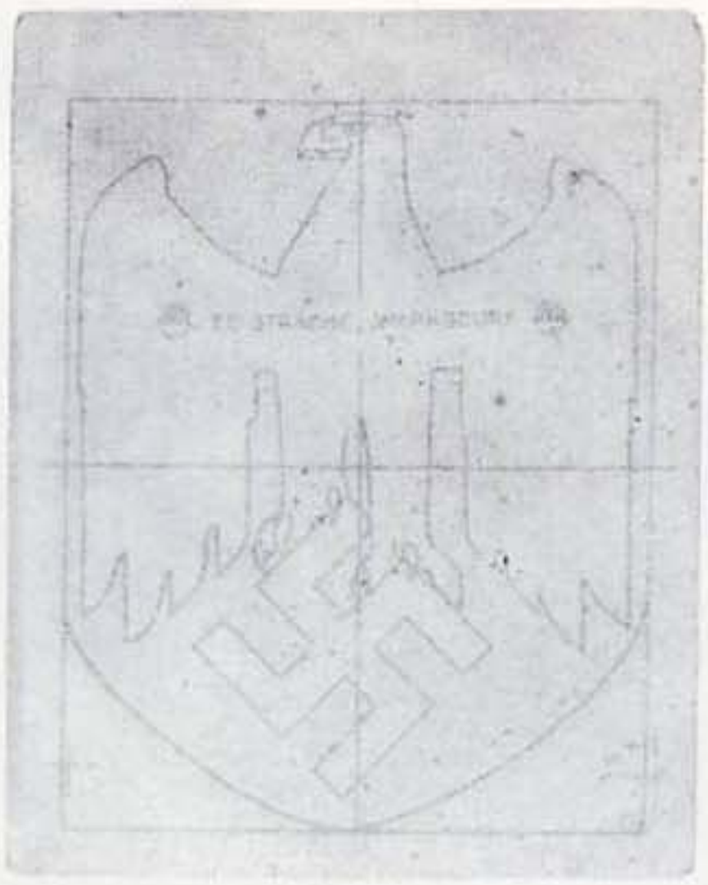
Wm. Maertz

Army eagle decal variations (Left: black outlined eagle, right: grey outlined eagle).



J. Coy

The above helmet was originally Luftwaffe issue which was repainted, redecalled and issued to the Army. Note remnants of Luftwaffe eagle under the Army decal.



Obverse of an Army decal with manufacturer's name and location (Ed. Strache, Warnsdorf).

Wm. Maertz





Wm. Maertz

Navy eagle decal variations (left: "wide wing" eagle, right: "thin wing" eagle).

A. Barrows





Obverse and reverse of a Luftwaffe eagle decal (two different manufacturers).

A. Barrows



Luftwaffe eagle decal of subdued green color.



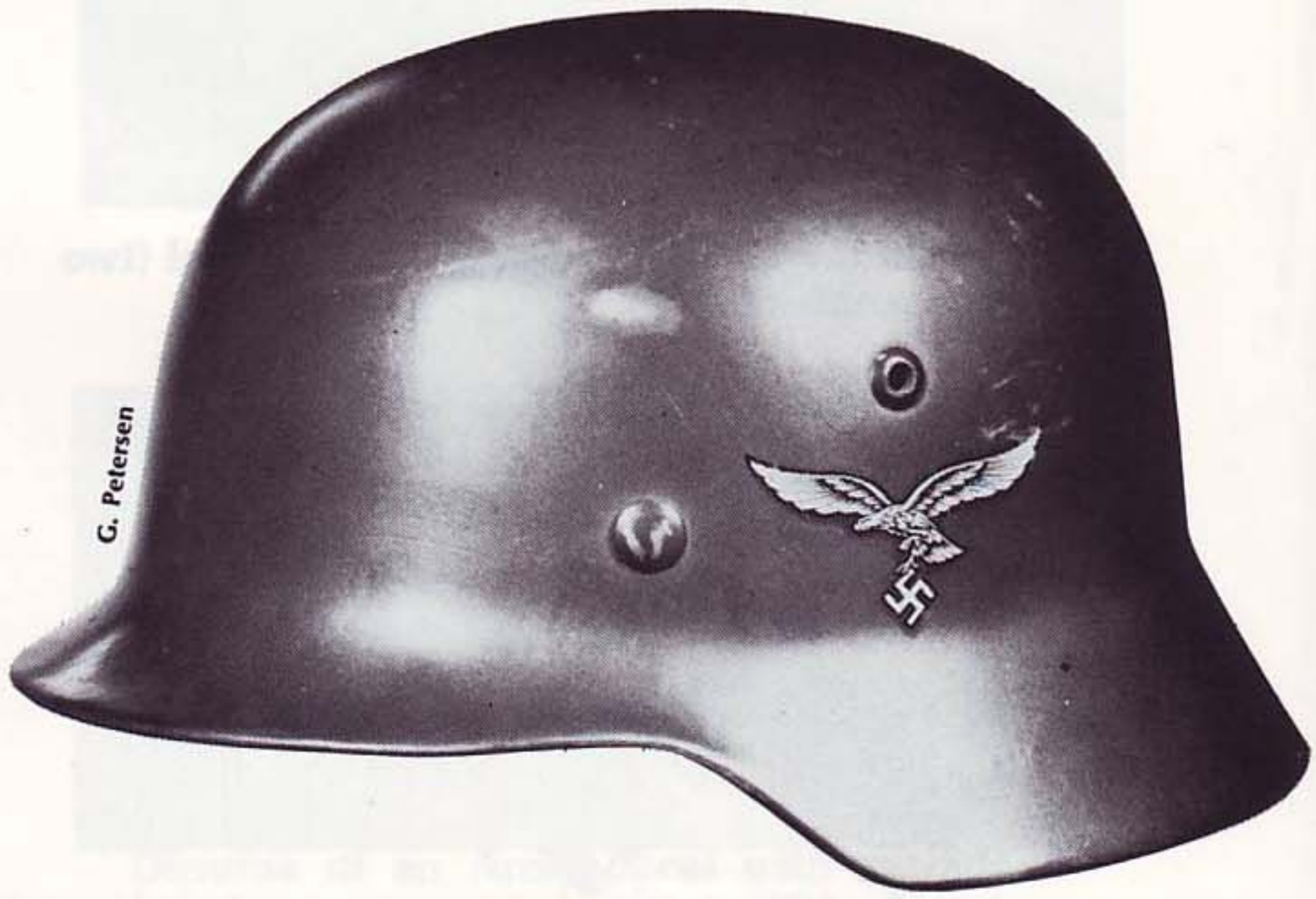
J. Bandy



J. Bandy

Note two different patterns of the first Luftwaffe eagle. The swastika at left is thick and on a 1936 dated helmet, while the swastika at right is thin and on a 1939 dated helmet.

After the annexation of Austria to the German Reich in March 1938, the soldiers of the Austrian Federal Army wore the German insignia on their parade uniforms for the first time on 15 March 1938. These in-

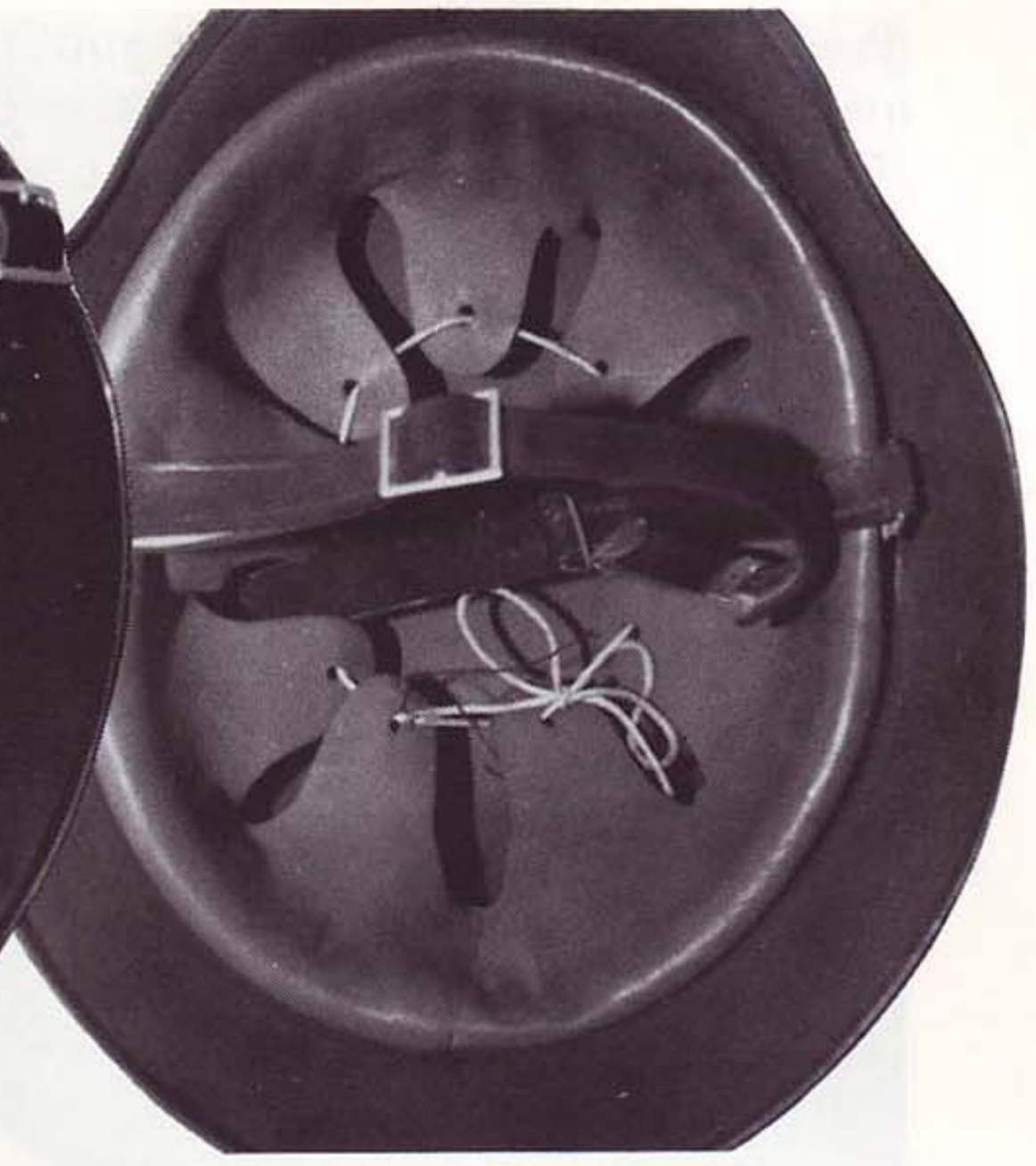


G. Petersen

M 35 double decal Luftwaffe helmet with second style eagle.



M 35, with liner 31.



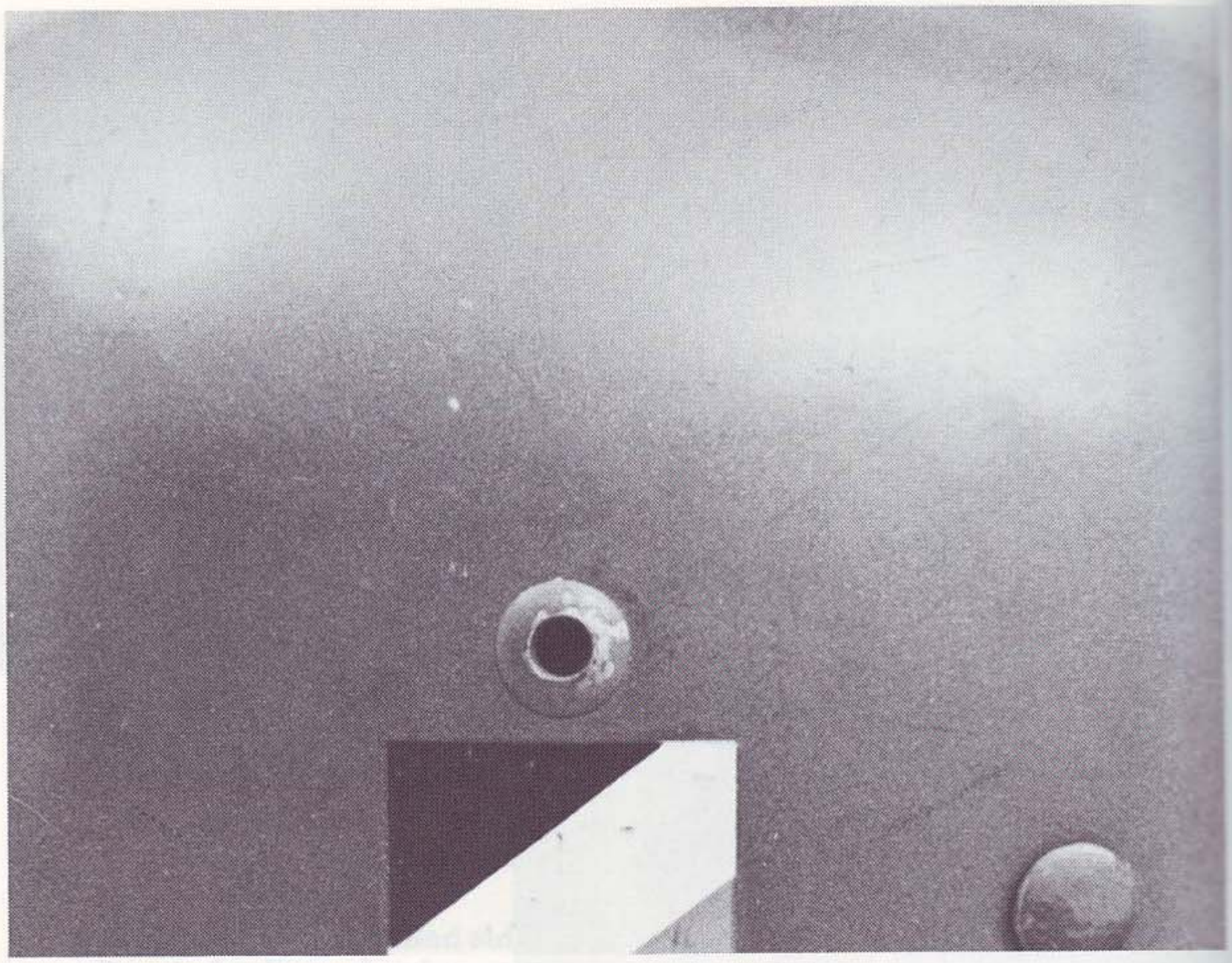
M 35 of the Luftwaffe with a modified liner.

NOTE:
This helmet was produced under order from the Luftwaffe in 1936/37. The air vent bushing is made of brass.

signia consisted of the German army eagle on their tunics and the silver eagle and national color shield on their helmets. The traditional oak leaf cluster was also worn from the vent lug on their helmets. The Austrian Guards Battalion also wore the brass "Guard Eagle" on the front of their helmets. This eagle had been introduced on 14 March 1935. Shortly thereafter, the Austrian troops were outfitted with German helmets and uniforms.

Until the outbreak of the war, no further modifications were made to the German helmet. The great demands of the war necessitated some simplification and other modifications of the helmet. In 1940, the color of the helmet was changed. This was announced in the German Army Bulletin, number 428 on 21 March 1940:

> "For camouflage purposes, the helmets of the army will receive a coating of slate grey paint, the exterior of which will be slightly roughened. The required quantities of helmet paint are to be requisitioned through supply channels. Instruction for the use of this paint will be issued as needed. The black/white/red color shield on the helmet of troops are to be withdrawn during the war. Until the issuance of texture paint, the troops are to use substitute materials for camouflage purposes (smearing the helmet with earth, clay, etc.). This does not apply to camouflage covers, netting or strapping."



Smooth pre-war paint finish.



Stahlhelm 35 with rough finish in use from March 21, 1940 for Army and Airforce.

On 2 February 1940, the outfitting of armored units had been ordered. At this point, all Panzer troops who wore the field grey uniform were issued helmets. The drivers and gun-layers of the Sd.Kfz. 221, 222, and 223 armored cars, as well as the radio operators on tanks, armored command cars and armored radio vehicles received steel helmets in addition to their field caps.

A letter from the Army High Command dated 26 March 1940 announced to the helmet manufacturing plants that the air vent was to be outwardly embossed as soon as the supply of old, insertable vent bushings was exhausted.



M 35 insertable air vent bushing.



M 35/40 outwardly embossed air vent.



J. Bandy

M 35/40 single decal Army helmet.

M 35/40 single decal Luftwaffe helmet.

J. Bandy

The Luftwaffe and paratroops discontinued the black/white/red color shield and instituted the modified helmet paint on 12 June 1940.

On 2 May 1941, the Wehrmacht High Command announced a new regulation (-3319/41-AWA/W Allg. (IIb)), which stated the following:

> "The Führer has given binding directions for the design of uniform configurations of all those not serving in either the Wehrmacht or the Waffen-SS. In particular, he has ordered that the field grey uniform, the epaulets and the steel helmet are reserved exclusively for the Wehrmacht (with the single exception of the Waffen-SS).
>
> The General Wehrmacht Office of the Wehrmacht High Command is responsible for the approval of regulation uniforms for all groups of uniformed personnel, organizations, etc. outside the sphere of the Wehrmacht. Only this office is qualified to make decisions about the various regulation uniforms of these organizations which exist apart from the Wehrmacht and Waffen-SS. This also applies when portions of these organizations serve within the framework of the Wehrmacht.
>
> It is requested that all your officers of the command zones be informed in uniform matters with respect to the uniforms being used by the various organizations."

The above order was issued under the number -64d AHA/Bekl. (IIIa)- on 14 June 1941, but with an additional note:

> "Proposals concerning uniform regulations from standing units outside the Wehrmacht are to be directed on principle to the Army High Command."

Exactly which units fell under the domain of this regulation cannot be today determined because much of the archival material is lacking. In any case, special regulations did exist for the police and the SA-Standarte"Feldhernhalle," since they were allowed to wear steel helmets after this date.

Up until this point, not all field units were yet equipped with steel helmets, since on 29 May 1942, the Chief of Equipment of the Army High Command issued the following order:

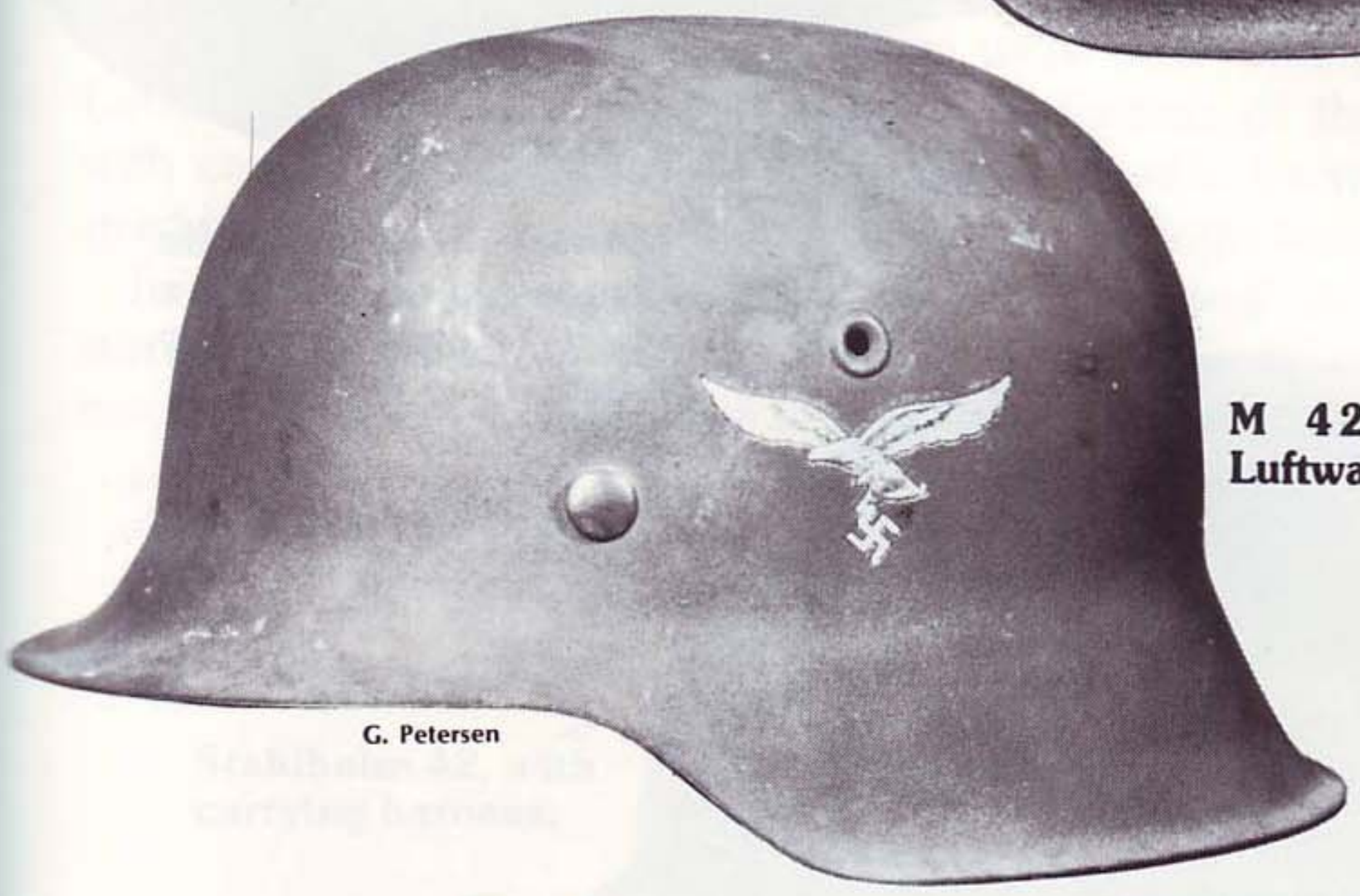
> "All units of the field army are equipped with steel helmets. Predicted shortfalls of helmets have been alleviated. The helmets needed to cover all requirements of the supply service are directly related to available stockpiles and to the urgency for issuing them. In any case, the total equipping of the units at the front will take precedence.
>
> Units in tropical climates will have special regulations applied to them."

On 6 July 1942, the Chief of the Army Equipment Office of the Army High Command announced that as of 1 August 1942, the inward crimping of the helmet rim was to be abandoned. On 10 August 1942, an

M 42 single decal Army helmet.



J. Bandy



M 42 single decal Luftwaffe helmet.

G. Petersen

M 42 single decal Kriegsmarine helmet.



The above 6 July 1942 announcement resulted in the introduction of the M42 helmet, with outwardly crimped edges, which was easier and cheaper to produce.



(Above) M 42 Luftwaffe helmet (no decal) with a rough, dark blue-grey finish.



M 35/40 Luftwaffe helmet with double handpainted insignia of 9./JG26 "Schlageter" (red on white shield). Since Luftwaffe regulations were very strict concerning personalized insignia on helmets, examples such as this are unique.

instruction sheet for the helmet netting was issued. The Luftwaffe described the use of the camouflage netting on 3 September 1942:

> "...thereupon, the ground assault units (of the Luftwaffe) will receive a helmet net consisting of:
> a) a netting of hemp twine with a drawstring and ring

b) attachment hooks made of rustproof steel.
Issuing via normal supply channels has already been ordered. Application directions and diagrams are to be found in a special publication."

On 28 August 1943, the army service insignia were removed from the helmets for the duration of the war. After 1940, the outfitting of Panzer troops with steel helmets had been ordered, but after 8 November 1943, this was no longer applicable to the crews of tanks and radio vehicles. In 1943, the army received camouflaged clothing for the first time. In addition, small quantities of camouflage covers for the helmets were also issued, athough most of the soldiers were forced to use other materials for camouflaging their helmets. Thus in Winter, the helmets were whitewashed with only the service insigne remaining visible. During the African and Italian campaigns, helmets were mustard-sand colored, although white* cloth covers were also widely used in Africa. Luftwaffe field divisions also sprayed a portion of their total helmets with camouflage paint. Both army and Luftwaffe personnel in addition used branches, leaves, grass and soil to camouflage their helmets.

In July 1942, the Luftwaffe's "Hermann Goring" Brigade (later Division) was outfitted with camouflage clothing for ground combat. Since no army pattern camouflage clothing was on hand, these troops were

*Actually, bleached khaki.



Stahlhelm 42, with carrying harness.

Stahlhelm 42, with carrying harness, inner view.



Members of the II. Grenadier-Bataillon HG (mot.) wearing SS camouflage helmet covers and smocks.

issued the very good camouflage equipment of the Waffen-SS, including helmet covers. Many of these were worn through the end of the war although some were replaced by the army pattern covers in 1943.

In a similar manner, the army's 7th Mountain Division, while on the Lappland front were issued with a supply of SS camouflage clothing from the supplies of the 6th SS-Mountain Division. Included in this shipment were the appropriate helmet covers.

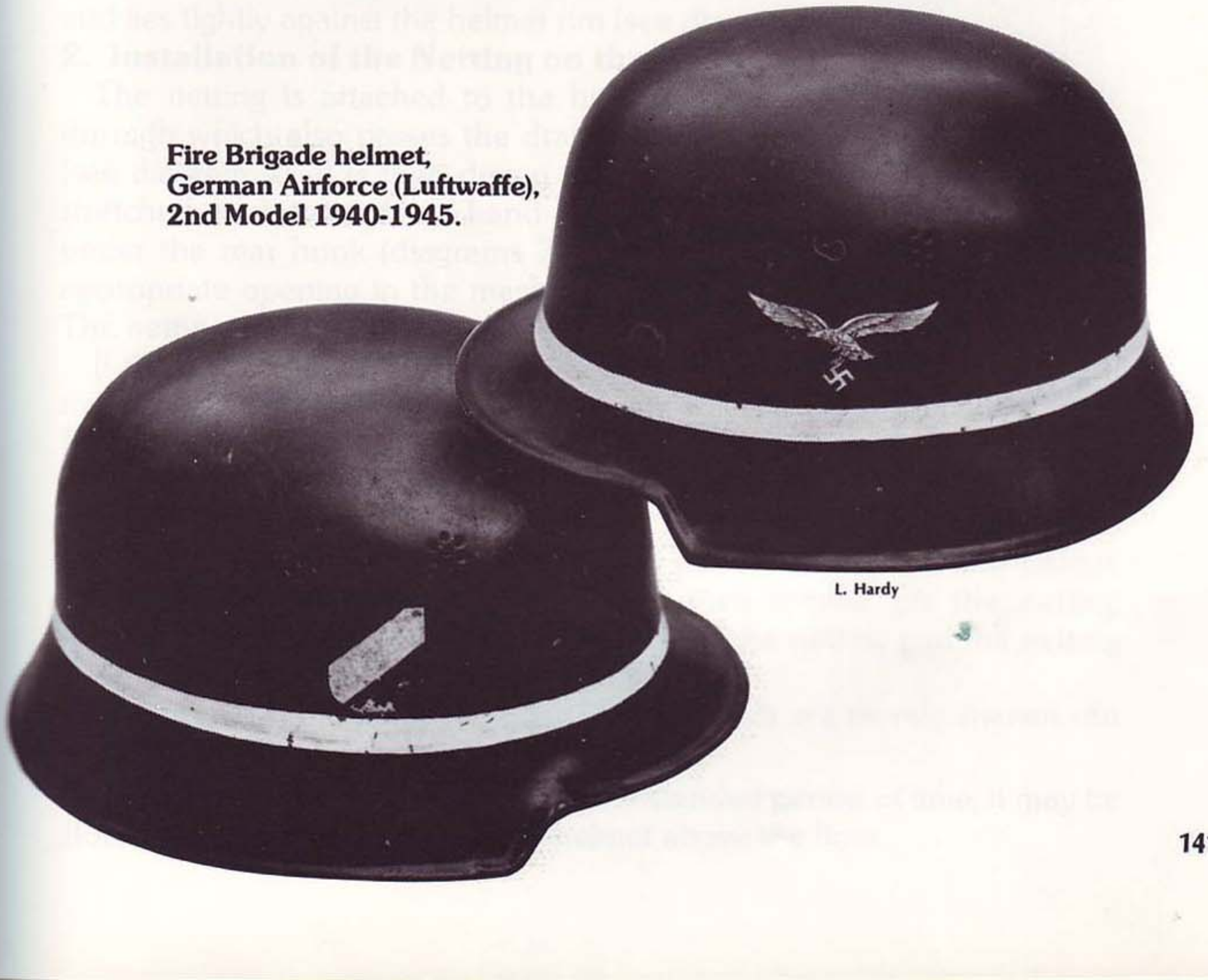
During the war, volunteer units from other European countries were assigned to bolster the German troops on the Eastern front. These units wore their own national colors on the helmet in place of the black/white/red color shield. They were at first under control of the Army High Command, but were later subordinate to the Waffen-SS. Aside from this, no other modifications were made in the German helmet through the end of the war.

Aside from those helmets already described, one other helmet pattern was introduced. It saw service with the military air base fire crews of the Luftwaffe. These crews wore the black fire brigade helmet made of aluminum with a silver-colored comb, but only during the years prior to the war. This comb was removed during the war and was replaced with a one centimeter wide white stripe running horizontally around the base of the helmet's crown. This helmet had the same insignia as the standard Luftwaffe helmet. Steel fire helmets were also used by these units.



**Fire Brigade helmet
German Airforce (Luftwaffe),
1st Model 1935-1940.**

**NOTE:
Specimens of early helmets have been observed with gold leaf, early style eagle decal.**



**Fire Brigade helmet,
German Airforce (Luftwaffe),
2nd Model 1940-1945.**

L. Hardy

Initially helmets were produced by the Eisen-und Hüttenwerke, Thale, and the Sächsische Emaillier- und Stanzwerke, A.G., Lauter. Later, three more companies were included in the production of German helmets: F.W. Quist, Esslingen; Emaillirwerk A.G., Fulda; and Vereinigte Deutsche Nickelwerke A.G., Schwerte/Ruhr. Liners were produced by Schuberth-Werk, Braunschweig; Biedermann u. Czarnikow, Berlin; F.W. Müller Jr., Berlin; Werner Zahn, Berlin; Biedermann und Czarnikow, Litzmannstadt and Karl Heisler, Berlin.

By examining surviving specimens, it is not difficult to identify the helmet producers based on their abbreviations found inside the helmet shell.

ET (later ckl)	-	Eisenhüttenwerke, Thale
NS	-	Vereinigte Deutsche Nickelwerke, Schwerte
Q	-	Quist, Esslingen
SE	-	Sächsische Emaillier- und Stanzwerke, Lauter
FS of EF	-	Emaillirwerk A.G., Fulda

According to remaining records, approximately 25 million German helmets were produced from 1935 to the end of the war.

NETTING AND CAMOUFLAGE

Instructions for Use of the Helmet Net

1. Installation of the Attachment Hooks to the Helmet:

a) Front Hook: The hook (see diagram 1) is inserted between the outer ring of the liner and the shell of the helmet. The hook's ends are then suitably bent so that they lie flat alongside each other. In this way, the hook hangs from the liner's outer ring. After this, the hook is tightly pressed against the helmet's rim (see diagrams 2 and 3).

b) Rear Hook: The hook is inserted between the inner and outer ring of the liner and hangs from the outer ring. It is then pressed into place and lies tightly against the helmet rim (see diagrams 2 and 3).

2. Installation of the Netting on the Helmet:

The netting is attached to the helmet by means of the front hook, through which also passes the drawstring (b) between the two knots (a) (see diagram 4). It is then drawn over the helmet, the drawstring being stretched and twisted by hand. The twisted drawstring then passes under the rear hook (diagrams 7-9) and the ring (c) is slipped into an appropriate opening in the mesh so that the ring lies under the netting. The netting is thus tightly drawn.

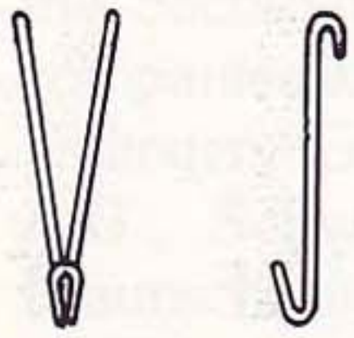
If the portion of the netting which covers the eyes is not to be used, it may be pulled back and hung on the netting by means of small hooks.

3. Use of the Netting

For the addition of camouflage materials, the closure of the drawstring is loosened at the point where it passes through the rear hook. The netting is then drawn forward and pulled away from the helmet (diagram 5). Camouflage materials are then spread on the netting (diagram 6), the helmet is tipped forward into the netting and the netting is drawn closed as previously described.

To remove camouflage materials, the contents are merely shaken out of the forward-drawn netting.

4. If the netting is not to be used for an extended period of time, it may be stored in the upper portion of the helmet above the liner.



Front view Side view

Diagram 1: Hooks

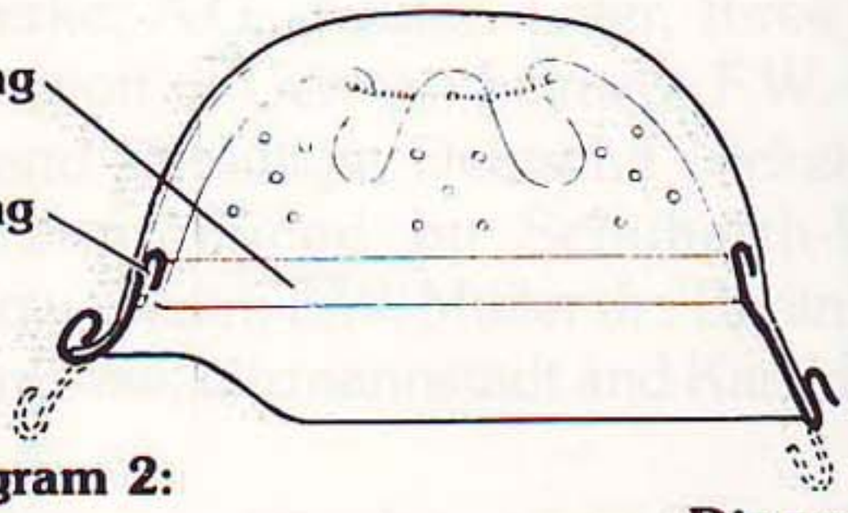


Diagram 2:

Diagram 3:

Installation and Bending of the Hooks

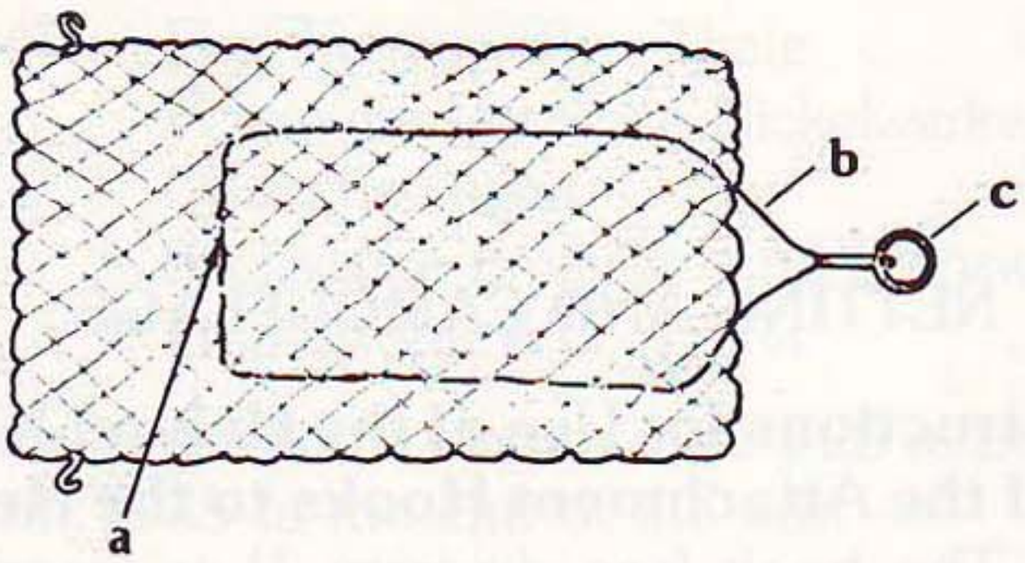


Diagram 4: Camouflage Netting

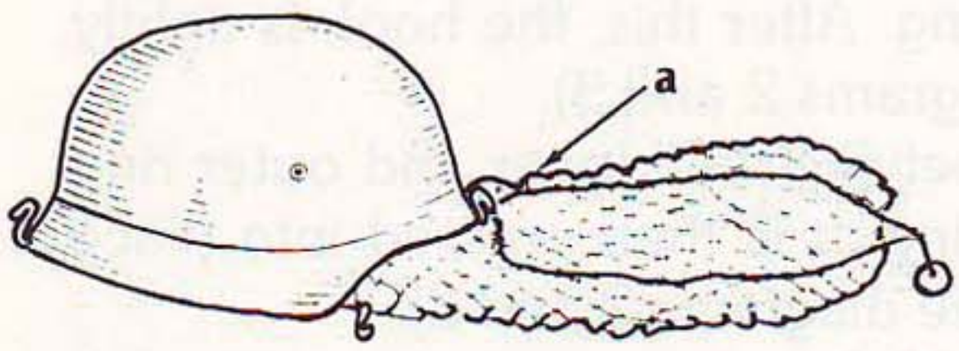


Diagram 5: Net pulled forward

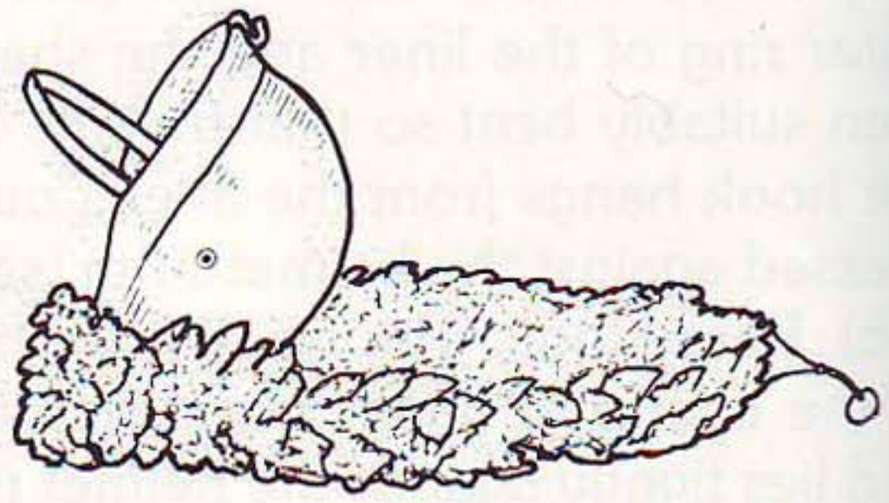


Diagram 6: Net with camouflage material. The helmet is tipped forward and the drawstring is drawn closed.

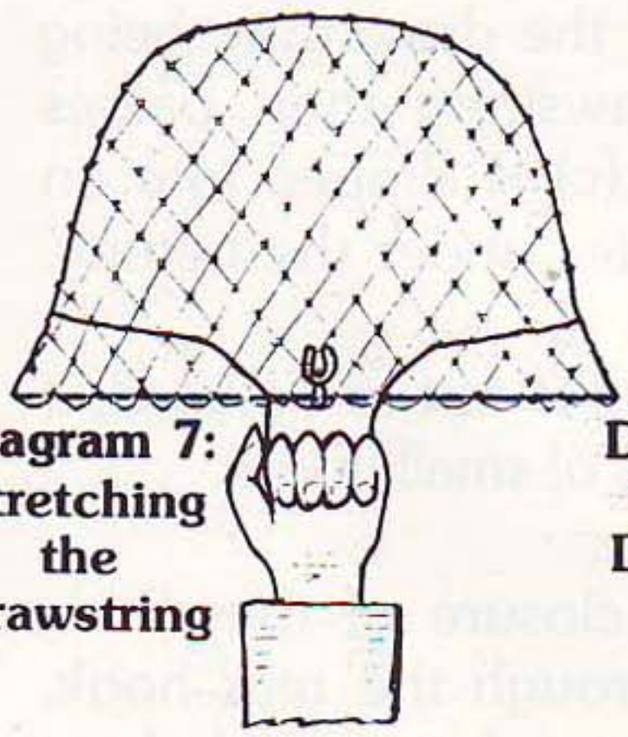


Diagram 7: Stretching the Drawstring

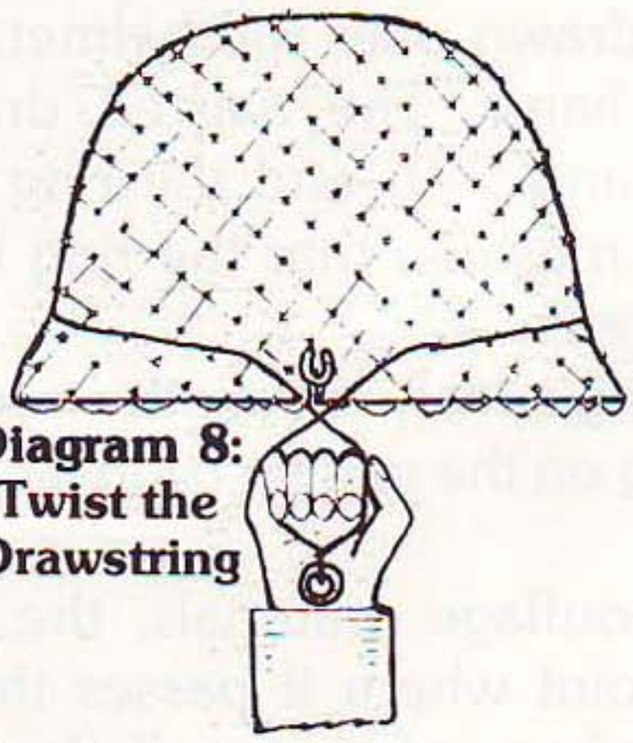


Diagram 8: Twist the Drawstring

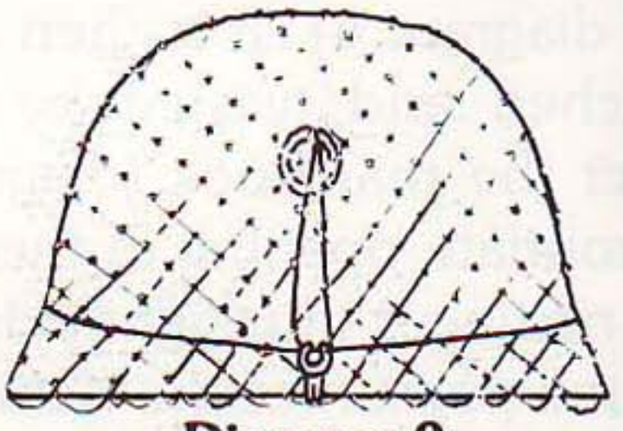


Diagram 9: The ring is inserted through the netting

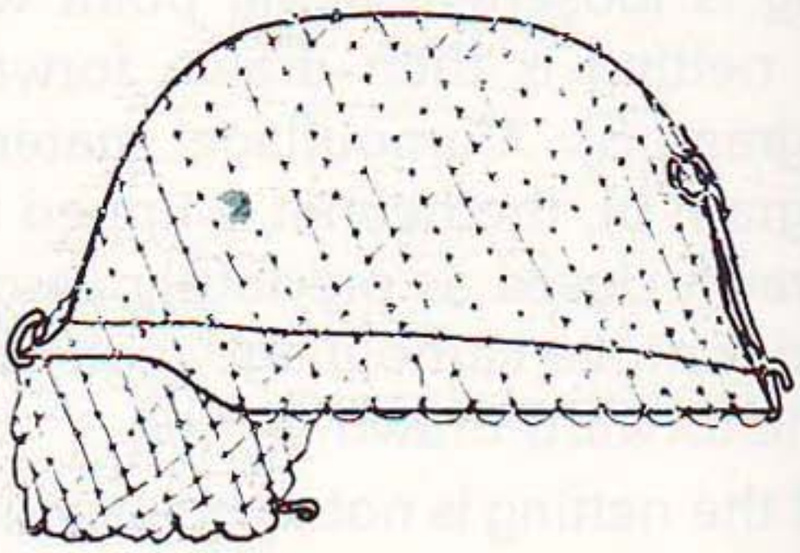


Diagram 10: Helmet with camouflage netting

5. Camouflage Materials:

The most delicate materials are quite suitable to serve as camouflage materials: dry leaves, dry ferns, moss, short grass or similarly beet leaves, heather, corn leaves, reeds, small pieces of bark, leaves and pieces of cloth.

In order to make the camouflage particularly effective, the inserted material should be drawn out through the individual openings in the mesh. Further, care should be taken that longer pieces of grass or corn leaves lie under the net in the same direction as those found in the actual surroundings of the wearer.

In order to camouflage the shoulders (if the surroundings permit this), the individual leaves, twigs or clumps of grass may be inserted under the drawstring in such a manner that they hang down over the sides of the helmet.

Illustrated Usage of Netting and Chicken Wire

Bundesarchiv



Helmet with camouflage net and elastic.

Knight's Cross holder Otto Bösel wearing netting on his helmet.

Bundesarchiv



Helmet with haversack strap.



M 35/40 double decal Luftwaffe helmet with full chicken wire cover and hooks.

J. Stone

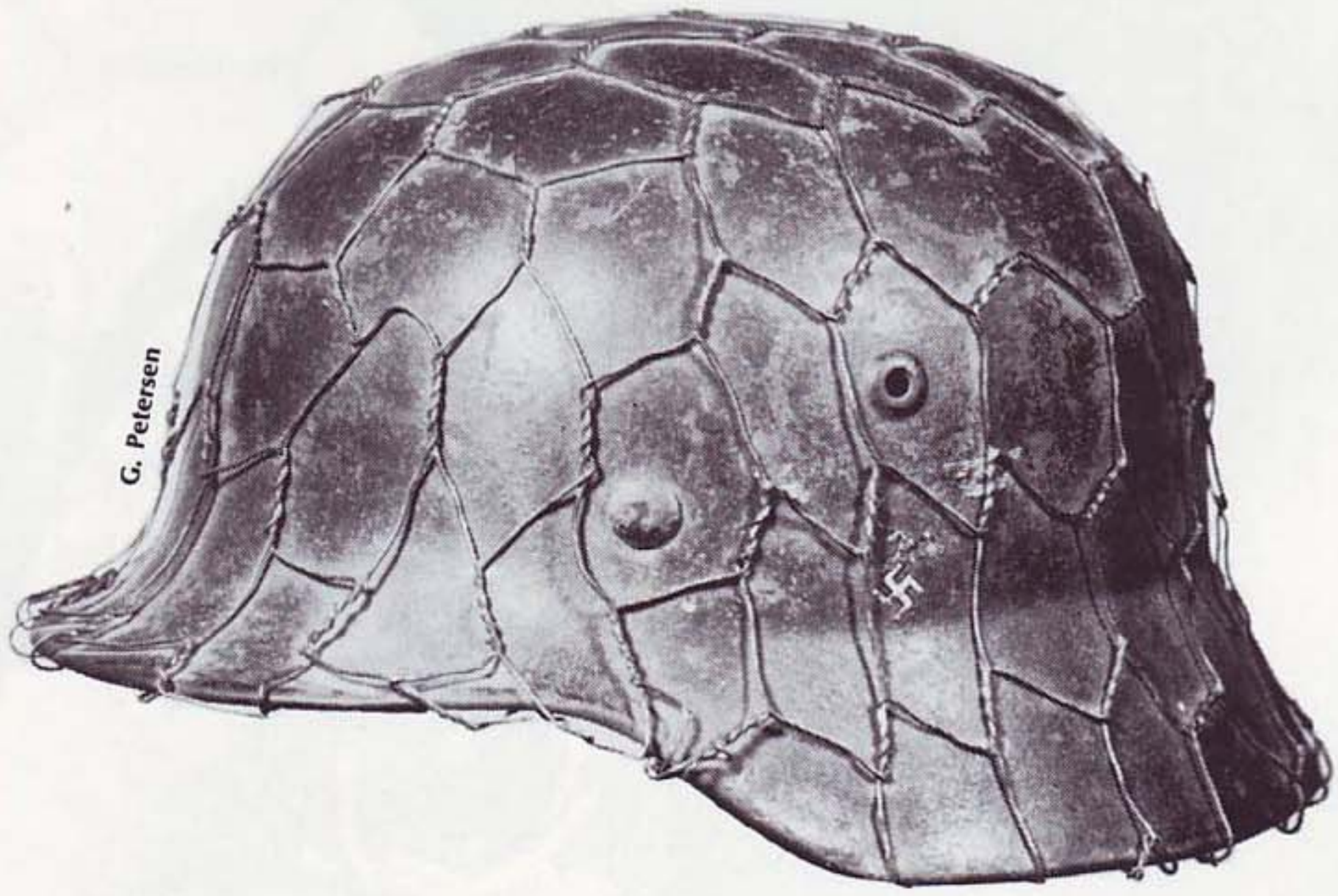


J. Jensen





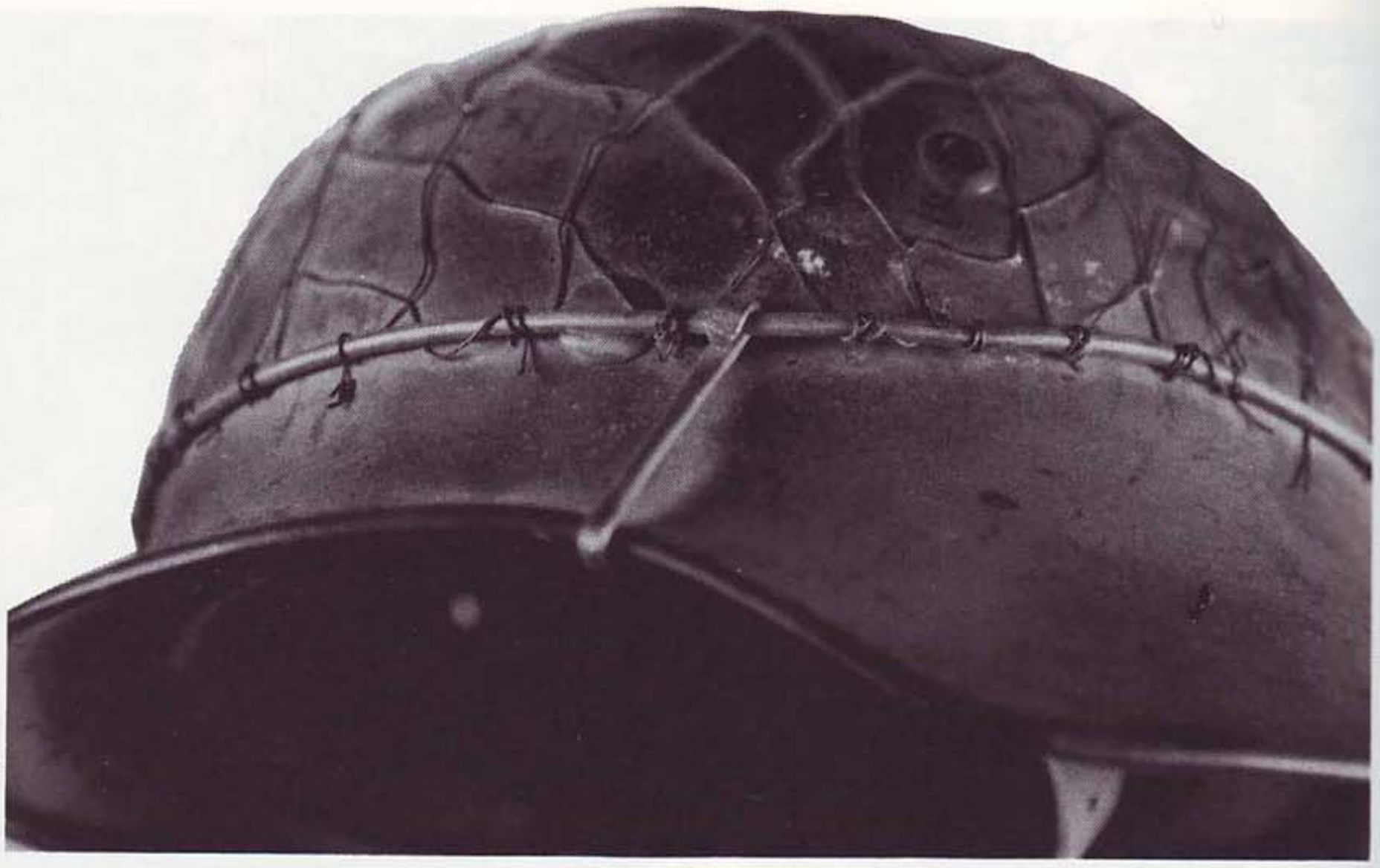
Rommel inspecting troops at Normandy. Note strips of camouflage material attached to wire framework.



G. Petersen

M 35/40 Luftwaffe helmet with chicken wire cover.

Grenadiers in thick brush near Lothringen on 29 November 1944.



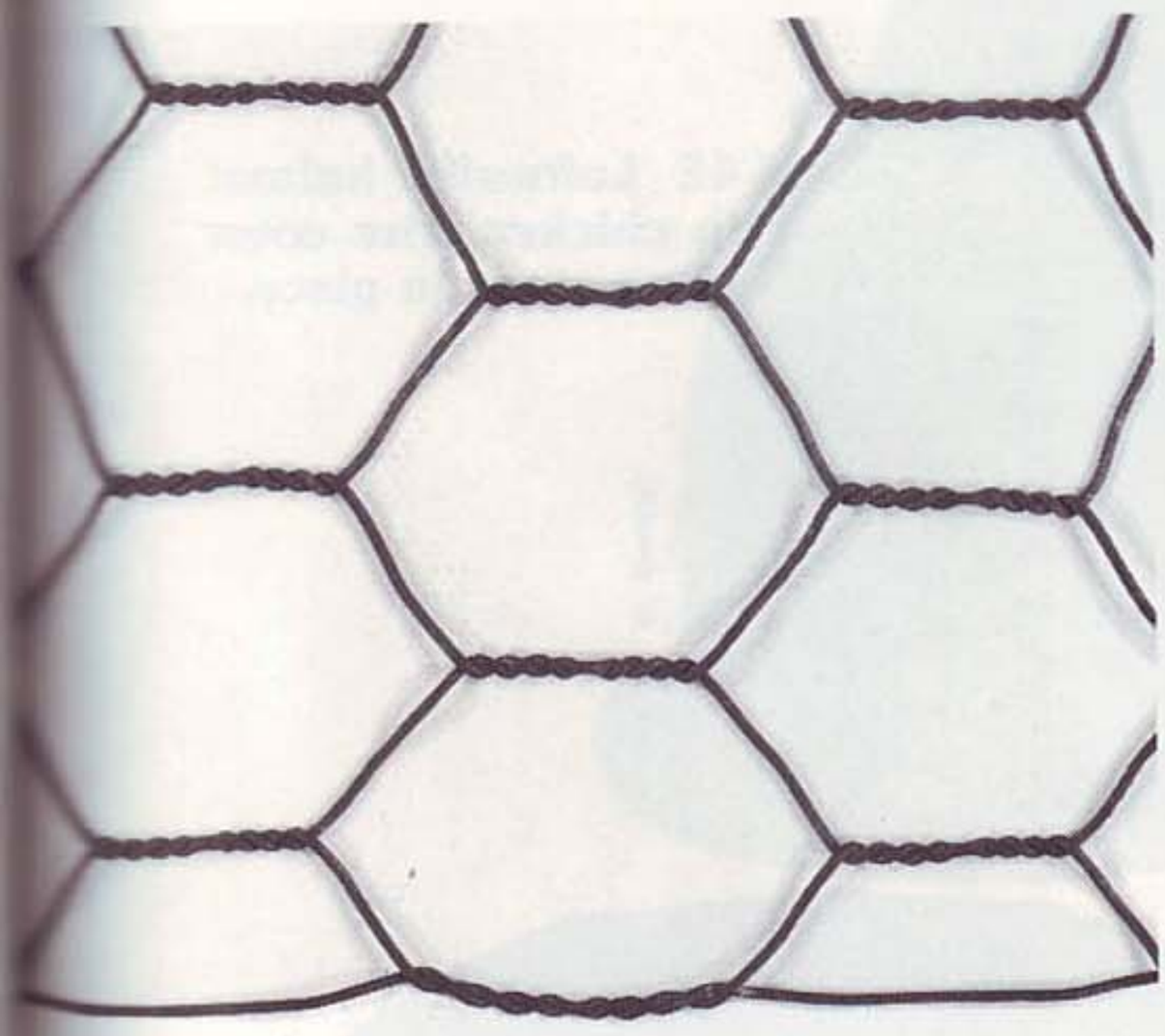
G. Bandy

Detailed photo of camouflaged Luftwaffe helmet with chicken wire cover (note special helmet hook).





L. Hardy



Illustrated at far top is an example of World War II era, European chicken wire and below is American chicken wire which is currently is use. Note twist differences.

J. Stone



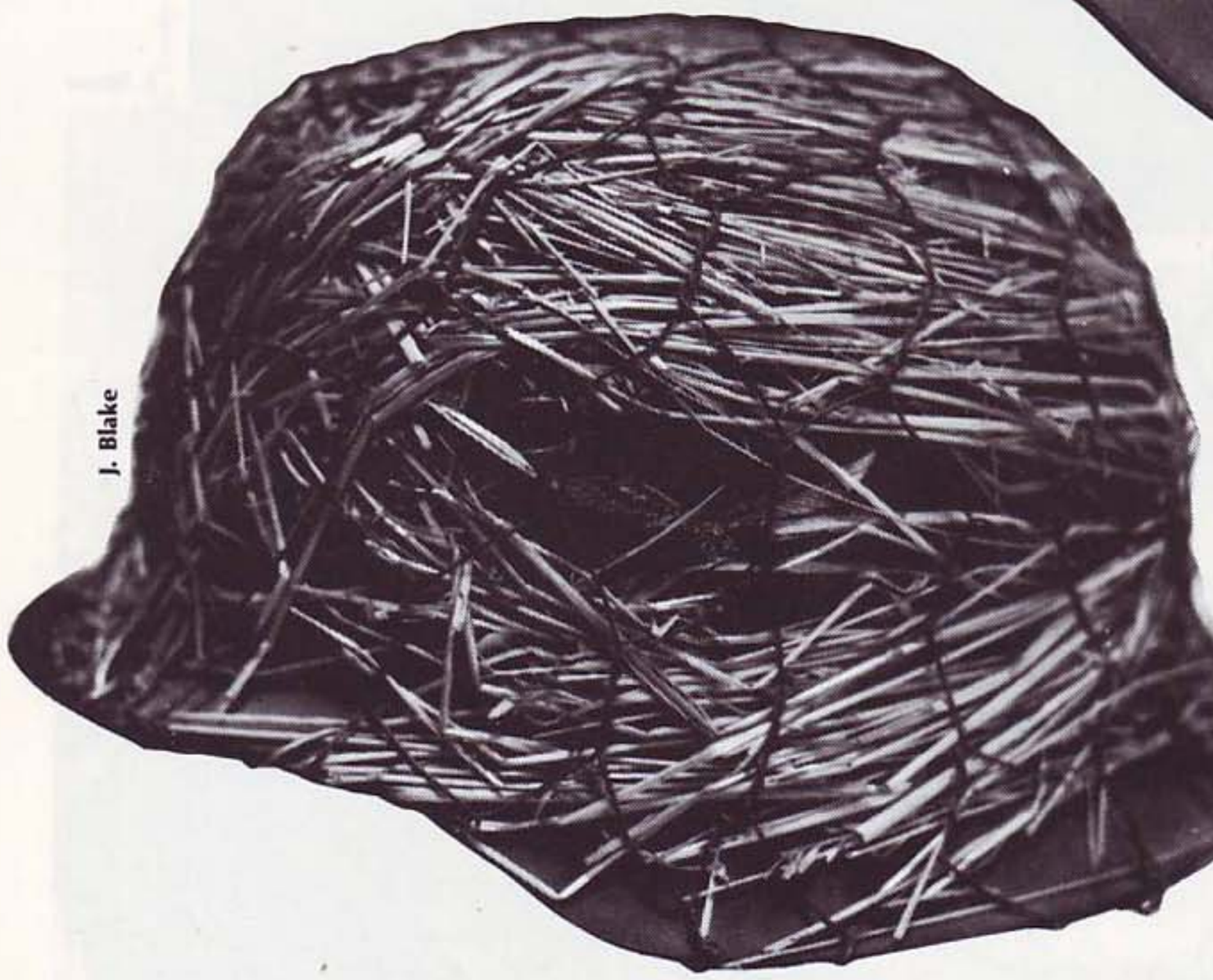
Chicken wire covering in use.

A German soldier wearing a hand-made chicken wire cover with hooks, is shown aiding a wounded British paratrooper.



J. Blake

M 42 with specially constructed framework for holding foliage.



J. Blake

M 42 Luftwaffe helmet with chicken wire cover holding straw in place.



J. Blake

M 35/40 with chicken wire cover held on by thick helmet hooks.

Different types of camouflage colors and patterns used during the war by German troops.



M 42, sprayed tan over green.



M 35/40, geometrical tan pattern over green.



M 35/40, tan/light green/dark green.



Wm. Morris

M 35 double decal Kriegsmarine helmet overpainted in tan for use in tropical areas.



J. Blake

M 35/40 single decal Army helmet overpainted in white for winter warfare.

M 35 single decal Army helmet, originally overpainted in tan, now with a hand-brushed dark grey finish.



J. Coy

L. Hardy

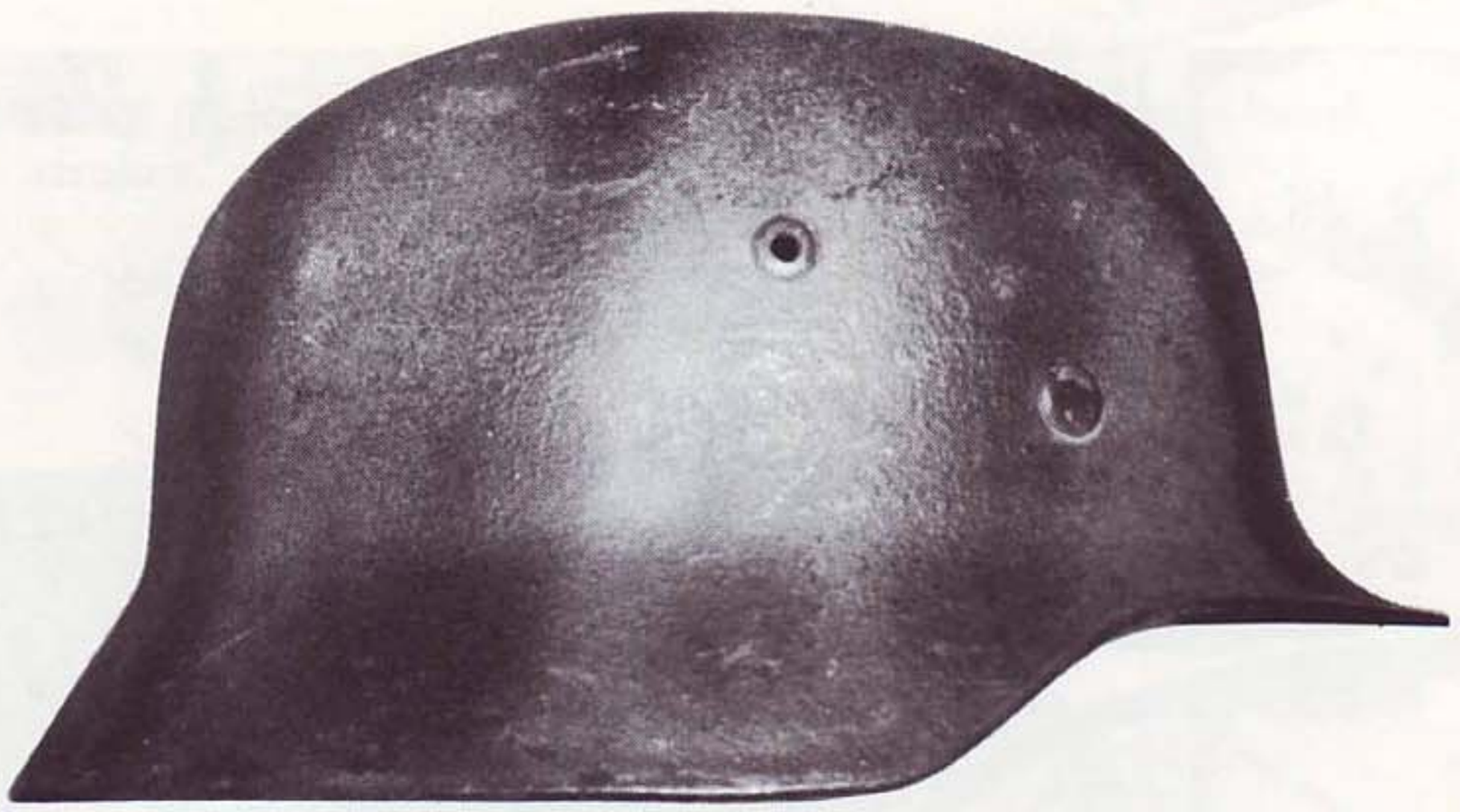


Coastal artillery member wearing camouflaged Kriegsmarine helmet.

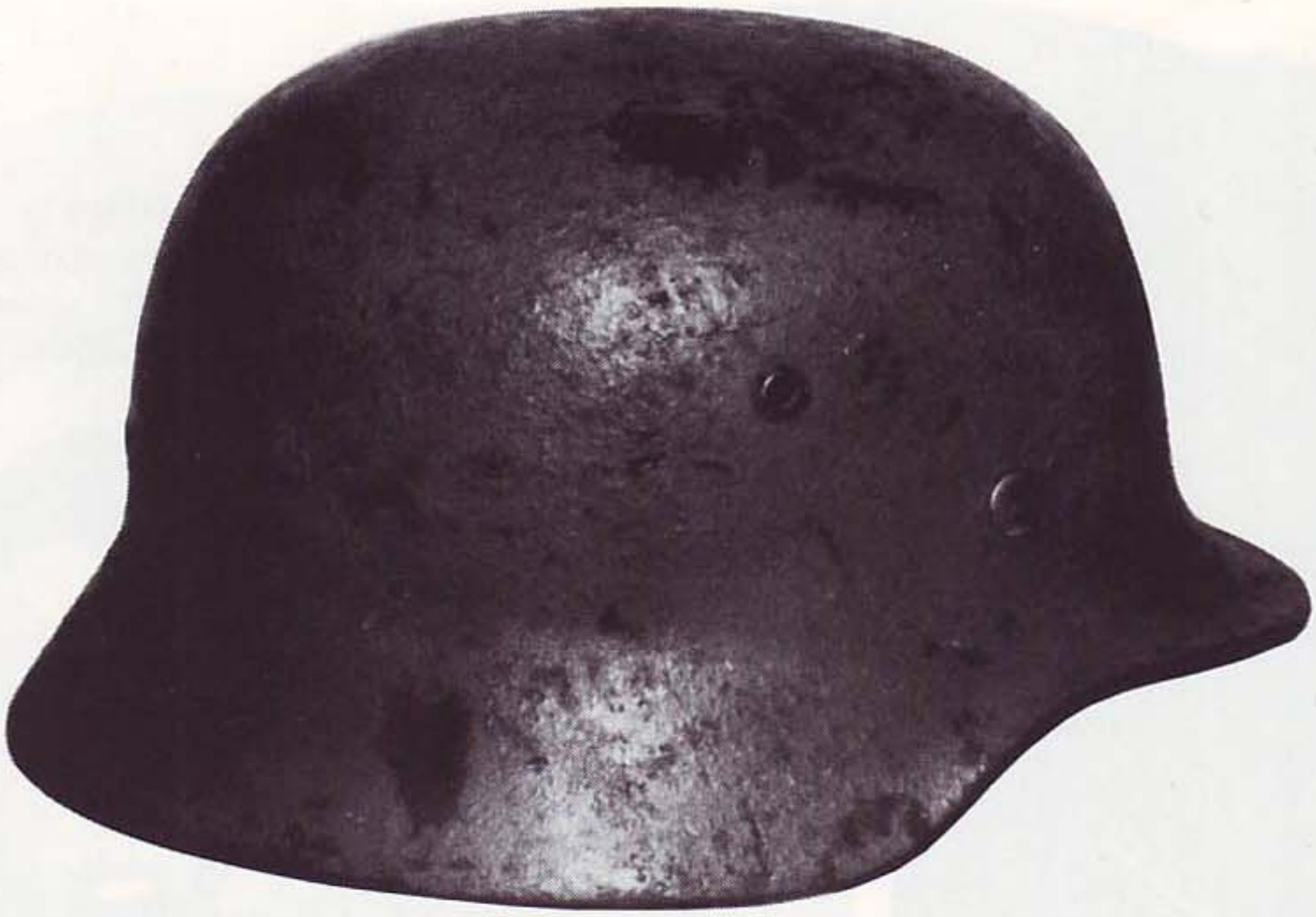
Bundesarchiv



A soldier of a Luftwaffe Field Division.



M 35/40, sprayed green/brown/tan.



M 35/40, reddish tan.



M 42 Luftwaffe helmet, sprayed tan/green.





W. Maertz

M 42 single decal Luftwaffe helmet. The eagle is painted carefully around with whitewash. The same type of painting was utilized on Army and Waffen-SS helmets as well.



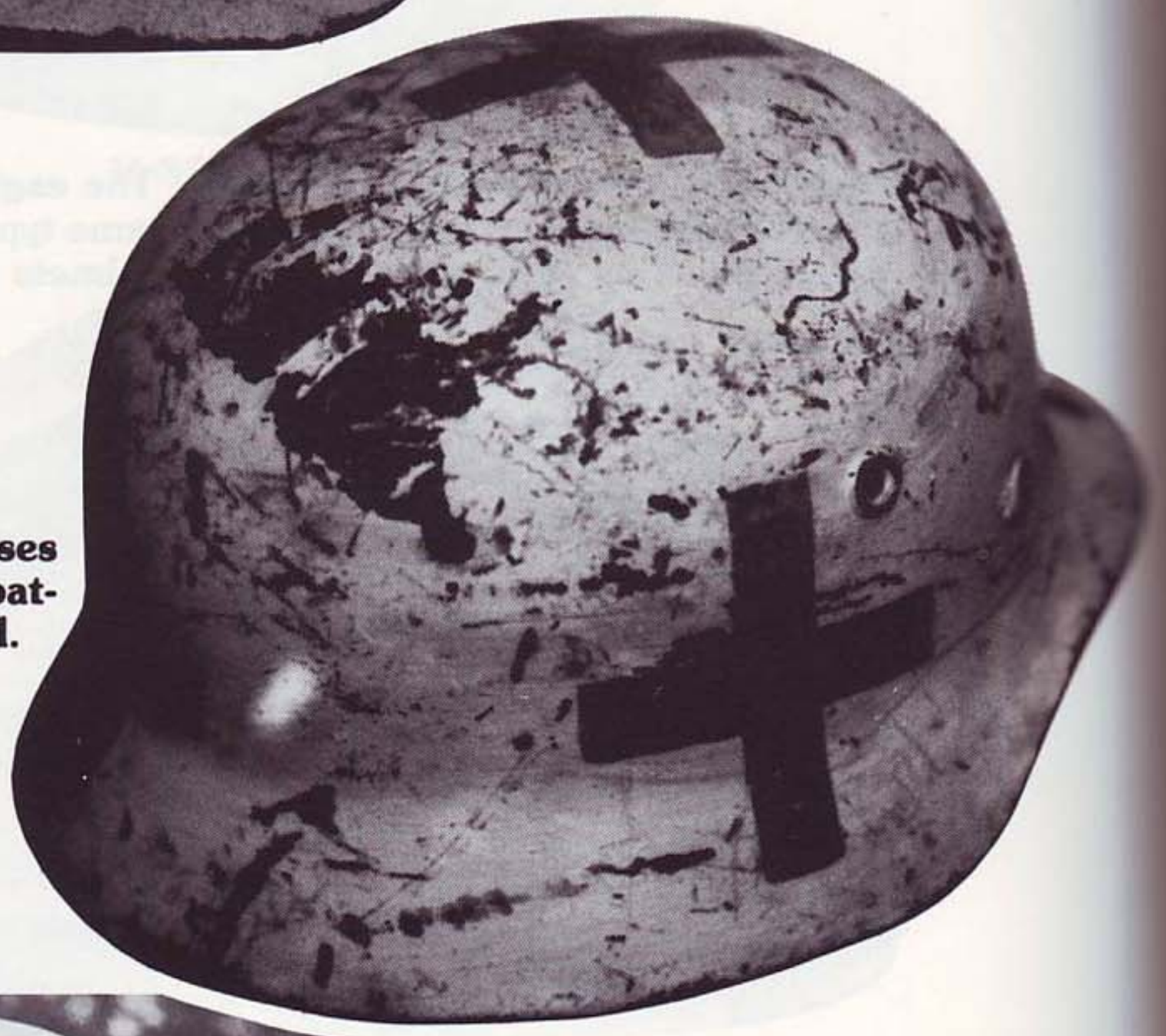
G. Petersen

M 42 (Luftwaffe) overpainted with white and green brush strokes.

German sniper with white painted helmet (note Army eagle has been painted around).



M 35/40 for use during the winter.



M 35/40 with five red crosses on white, one of several patterns used, but not official.



Hauptmann Wilhelm Drewes wearing a white painted helmet.

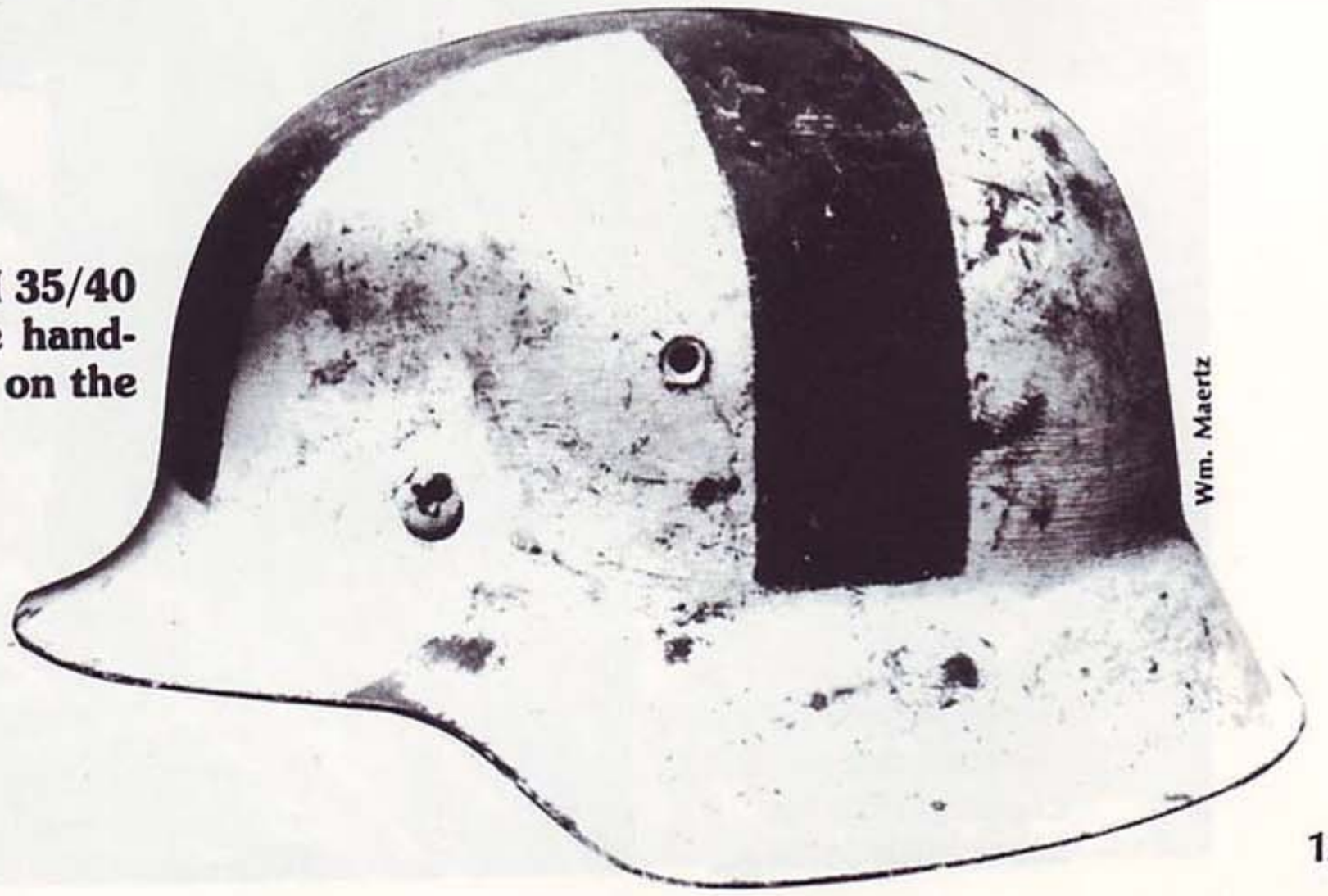


P. Templeman

White painted M 35/40 helmet, as worn by military field medics, with a large hand-painted red cross on the front.



D. Powers



Wm. Maertz

White painted M 35/40 helmet with large hand-painted red cross on the top.

Helmet Covers



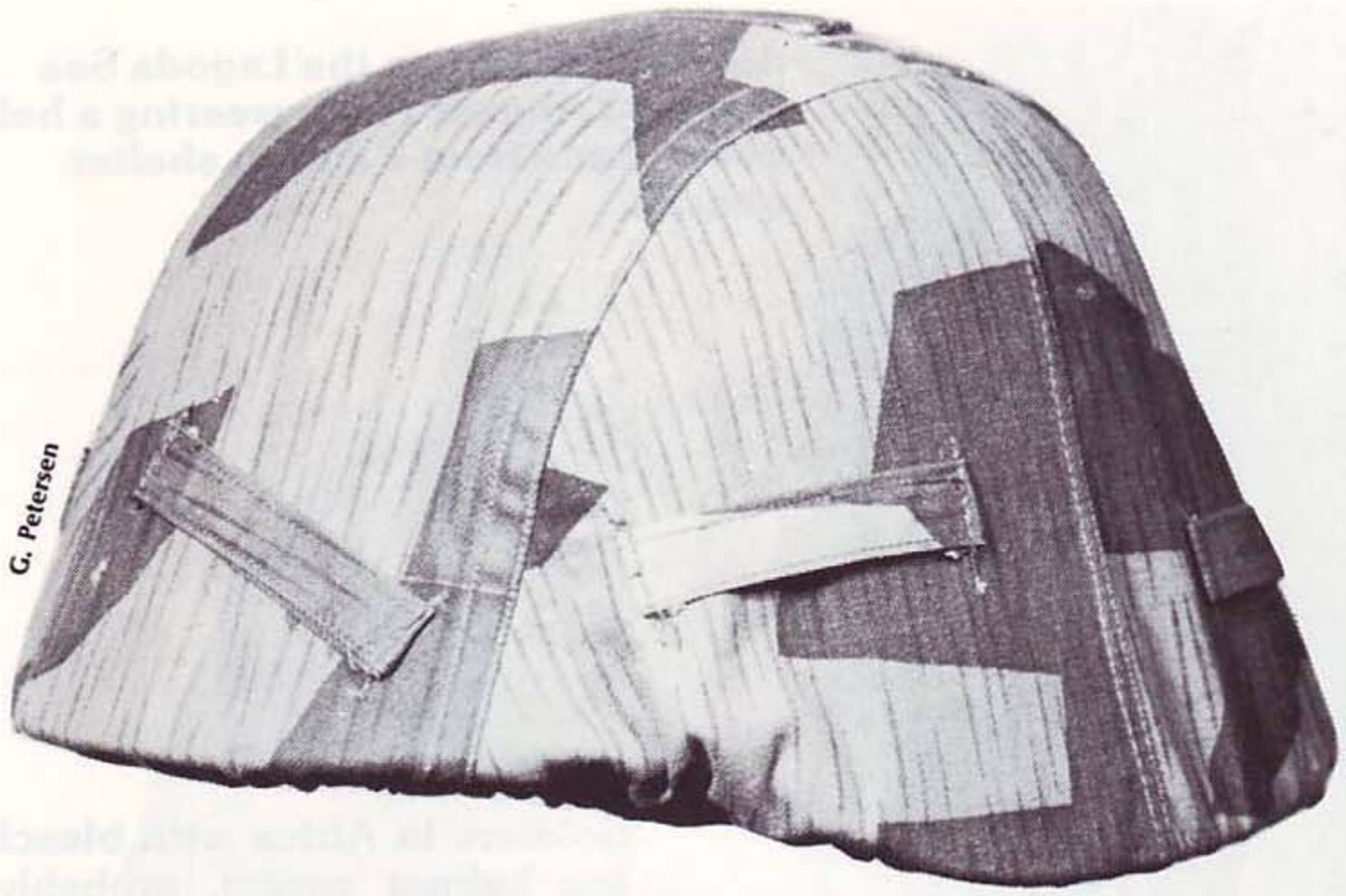
Bundesarchiv

Army helmet cover, first model of "splinter" camouflage material (note lack of cloth strips for attaching foliage).



Bundesarchiv

Army helmet cover, second model with cloth strips for attaching foliage.



G. Petersen

Helmet cover, Army 2nd model.

NOTE:
The above model was not factory made of "water" pattern camouflage material, but field made specimens do exist.



Bundesarchiv

Field-made helmet cover made of Italian camouflage material.

G. Petersen

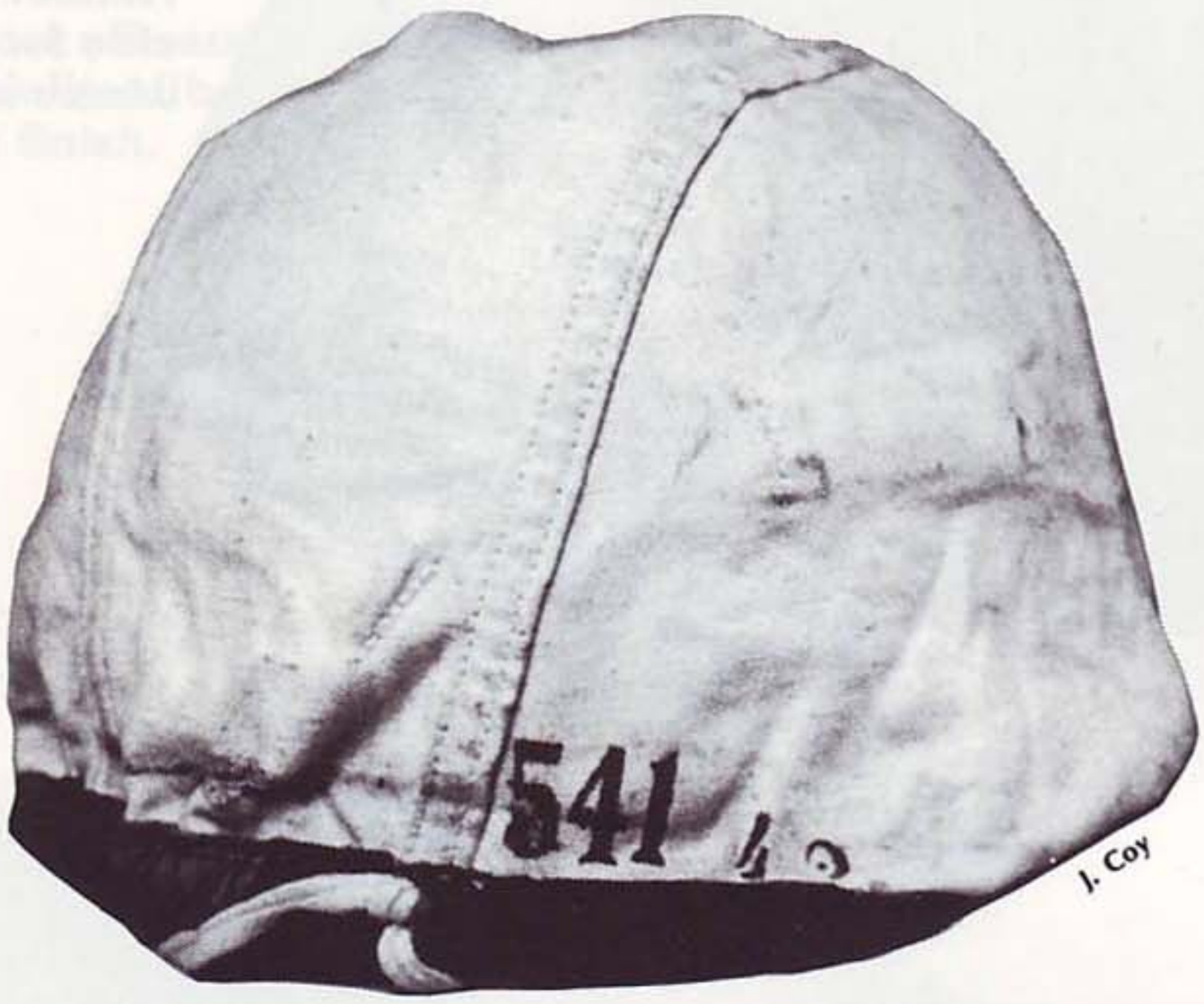


An infantryman on the Lagoda Sea front (30 August 1943) wearing a helmet cover made from a cut-up shelter quarter.

Soldiers in Africa with bleached-out tan helmet covers, probably made from shirt material.

A. Mollo





"Splinter" pattern camouflage helmet cover, reversible to white.



Tan helmet cover, with six rim clips, found folded in the liner of a helmet picked up on the Normandy front.



Helmet cover, white side for use during winter warfare.

R. Smeets



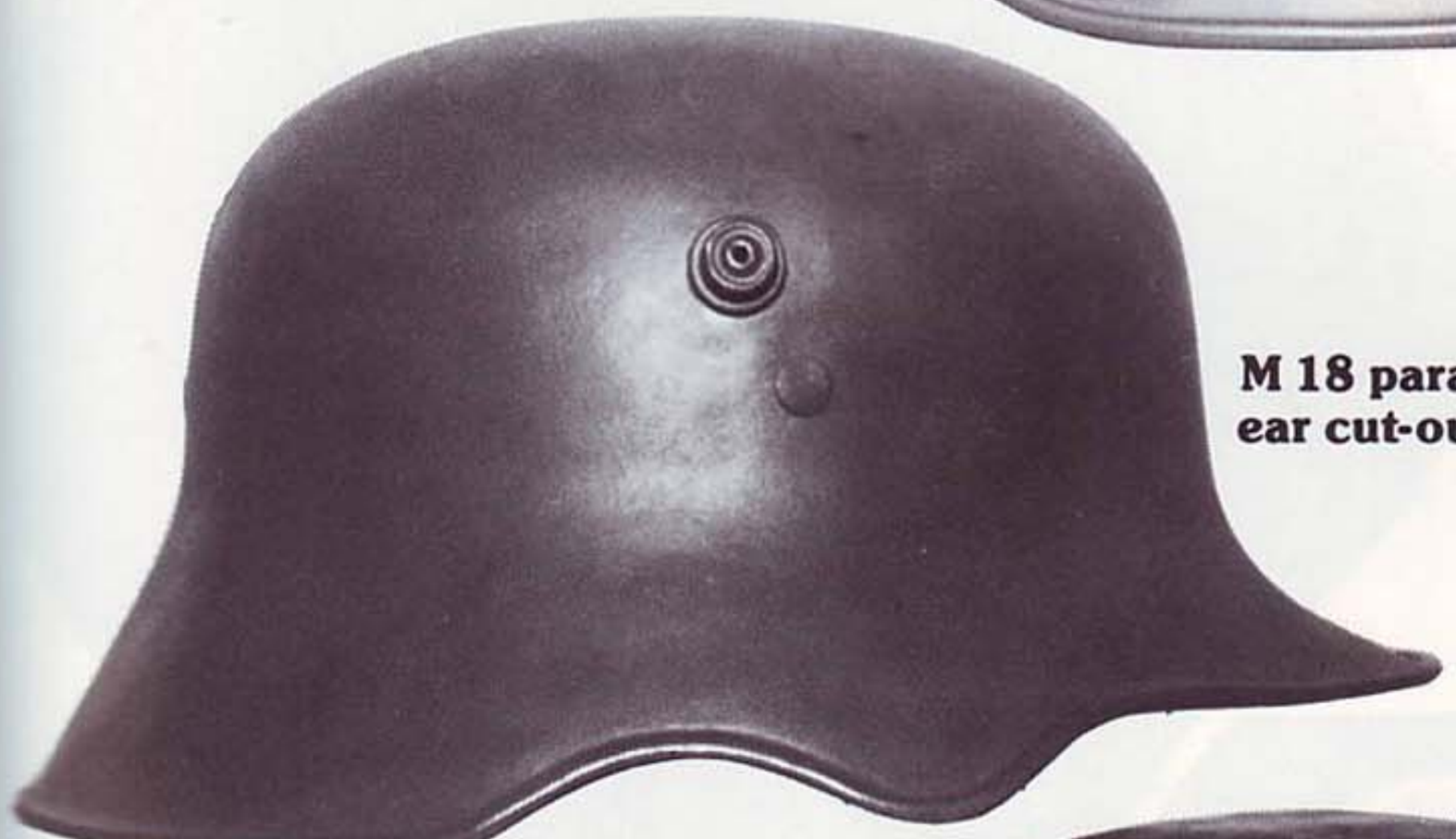
Combat troops wearing white winter suits and helmet covers.

LIGHTWEIGHT PARADE HELMETS

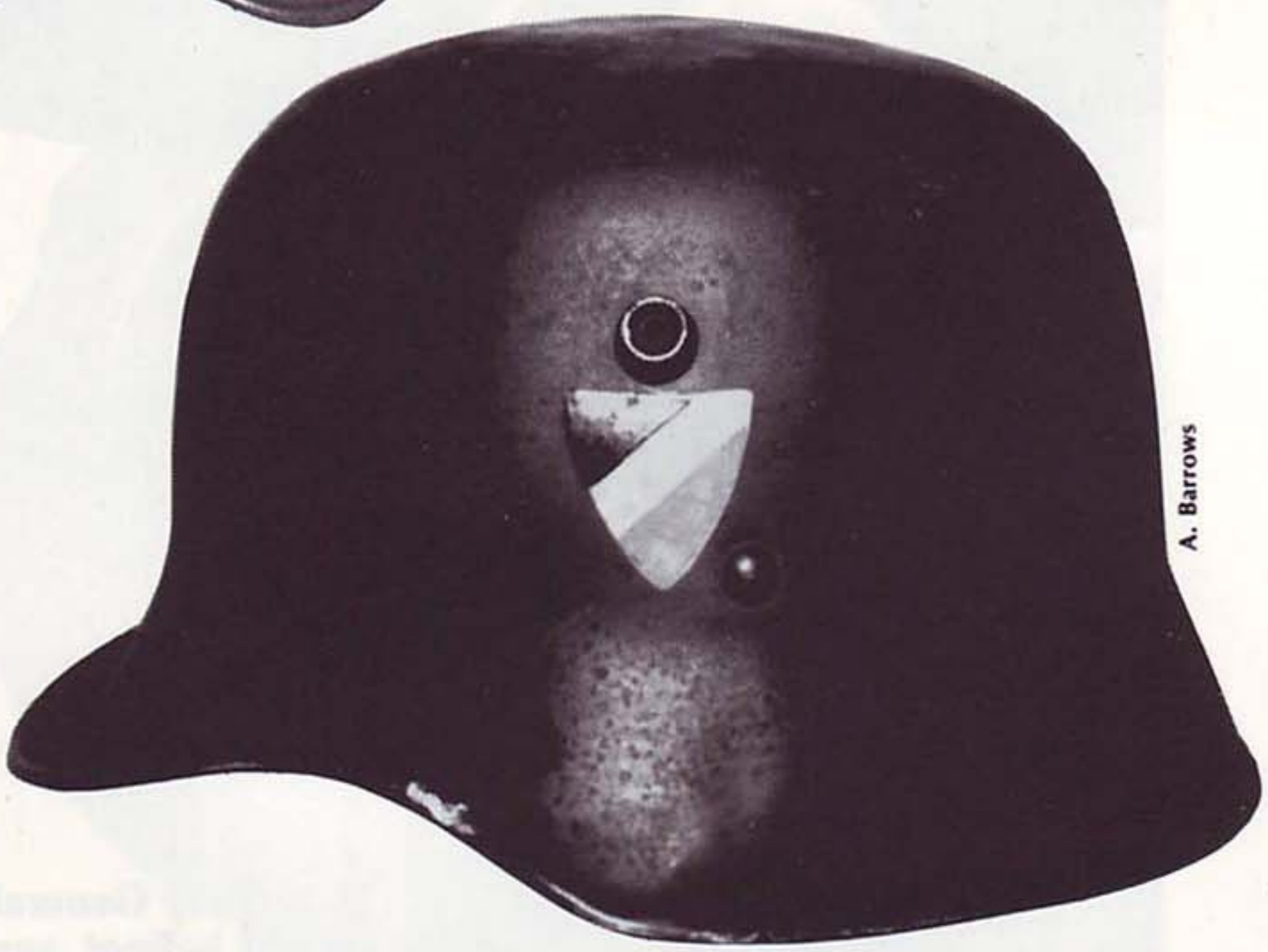


Double decal officers' parade helmet (Vulkanfiber) with light green finish.

v. Hungen



M 18 parade helmet with ear cut-out.



A. Barrows

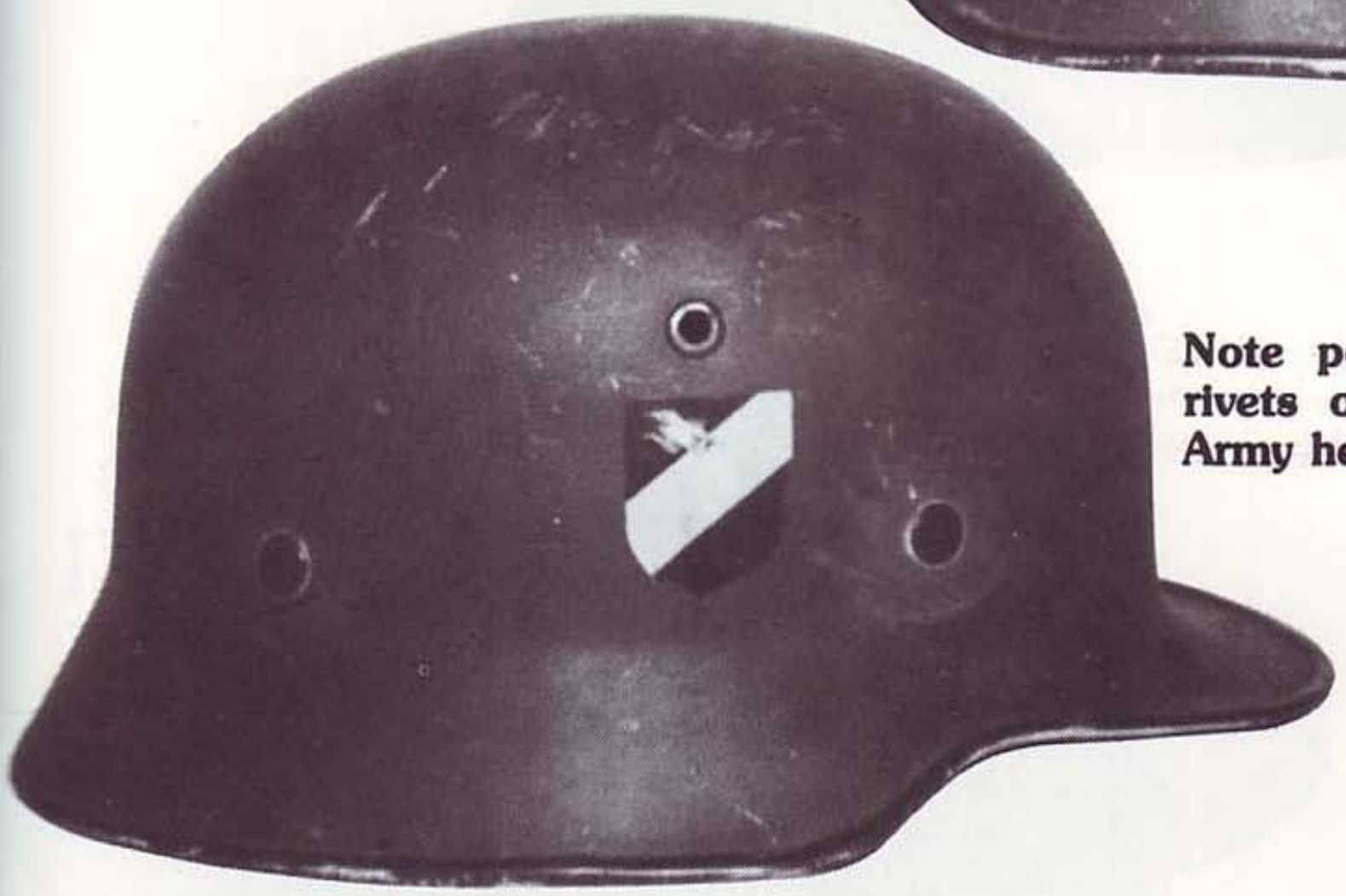
Aluminum parade helmet with stenciled national tri-colors on the left side (Weimar era).



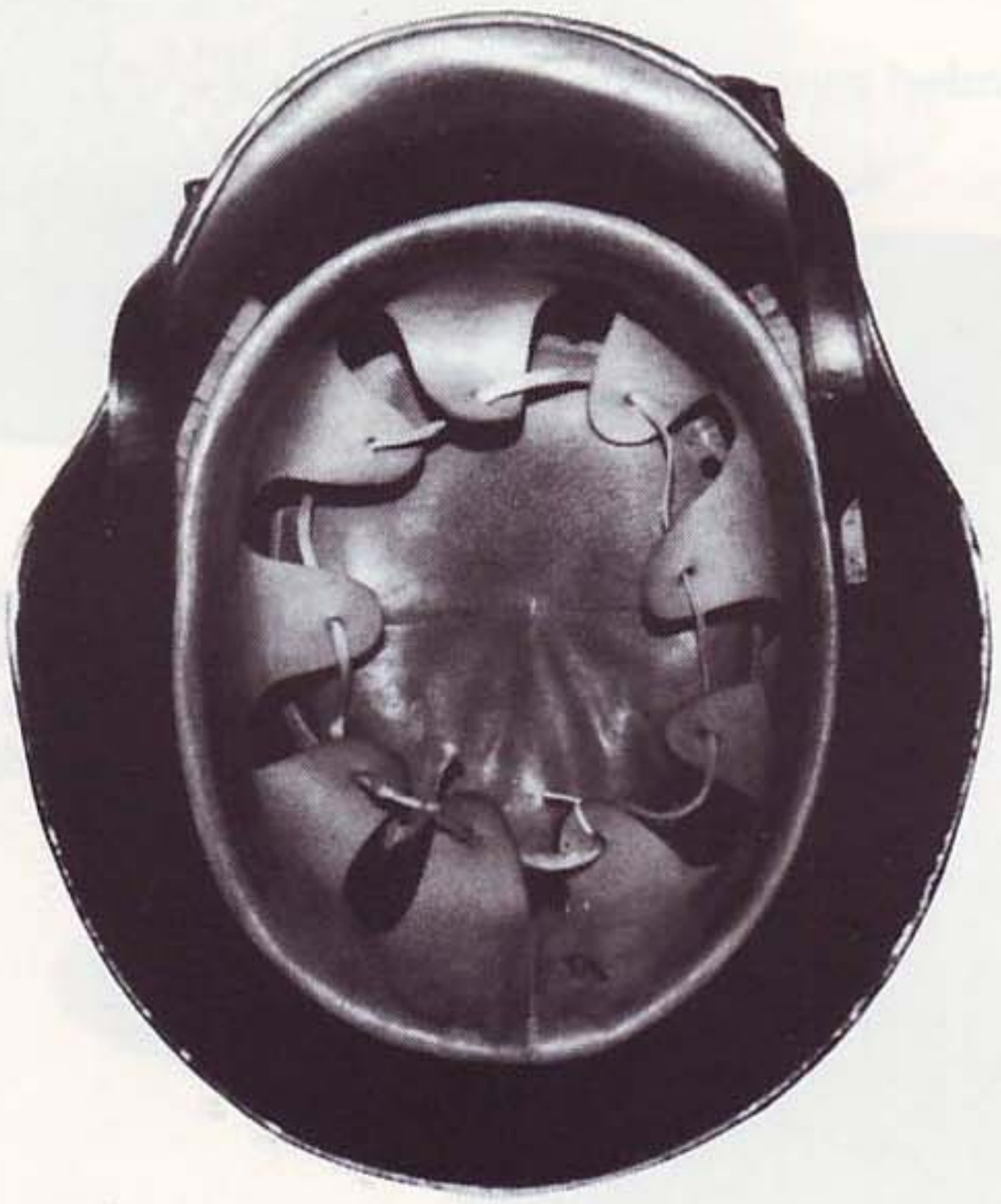


This Army General wears a light-weight helmet, very similar to the one illustrated above.





Note positioning of liner rivets on this lightweight Army helmet.



Liner of a lightweight helmet.



Note different air vent on this helmet in comparison to one on previous page.



M 35 aluminum Army officers' helmet, double decal.

J. Bandy



J. Bandy

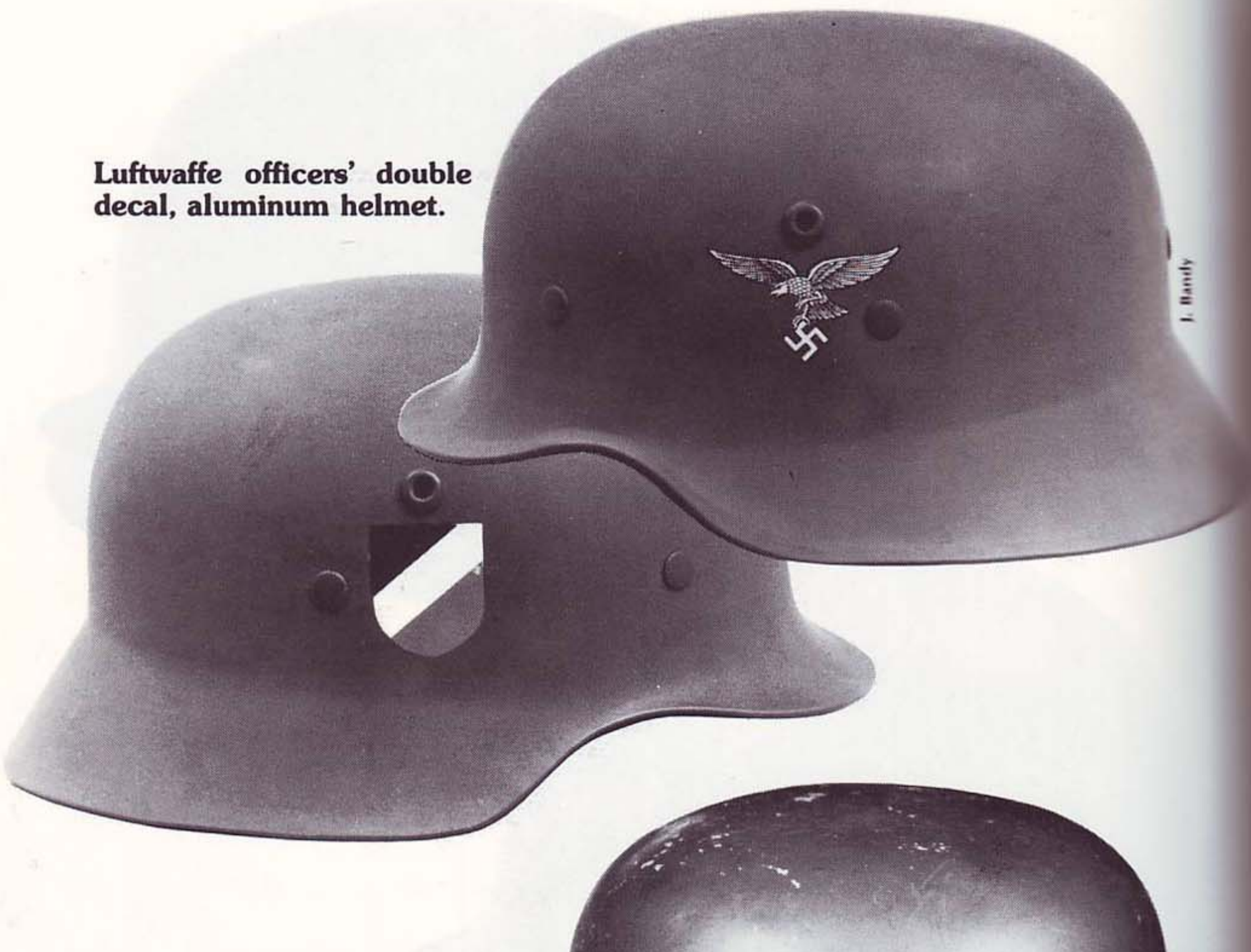
Army officers' double decal, aluminum helmet.

M 35 style, double decal, Army officer's helmet (Vulkanfiber) with screen vents. Finish is light green.



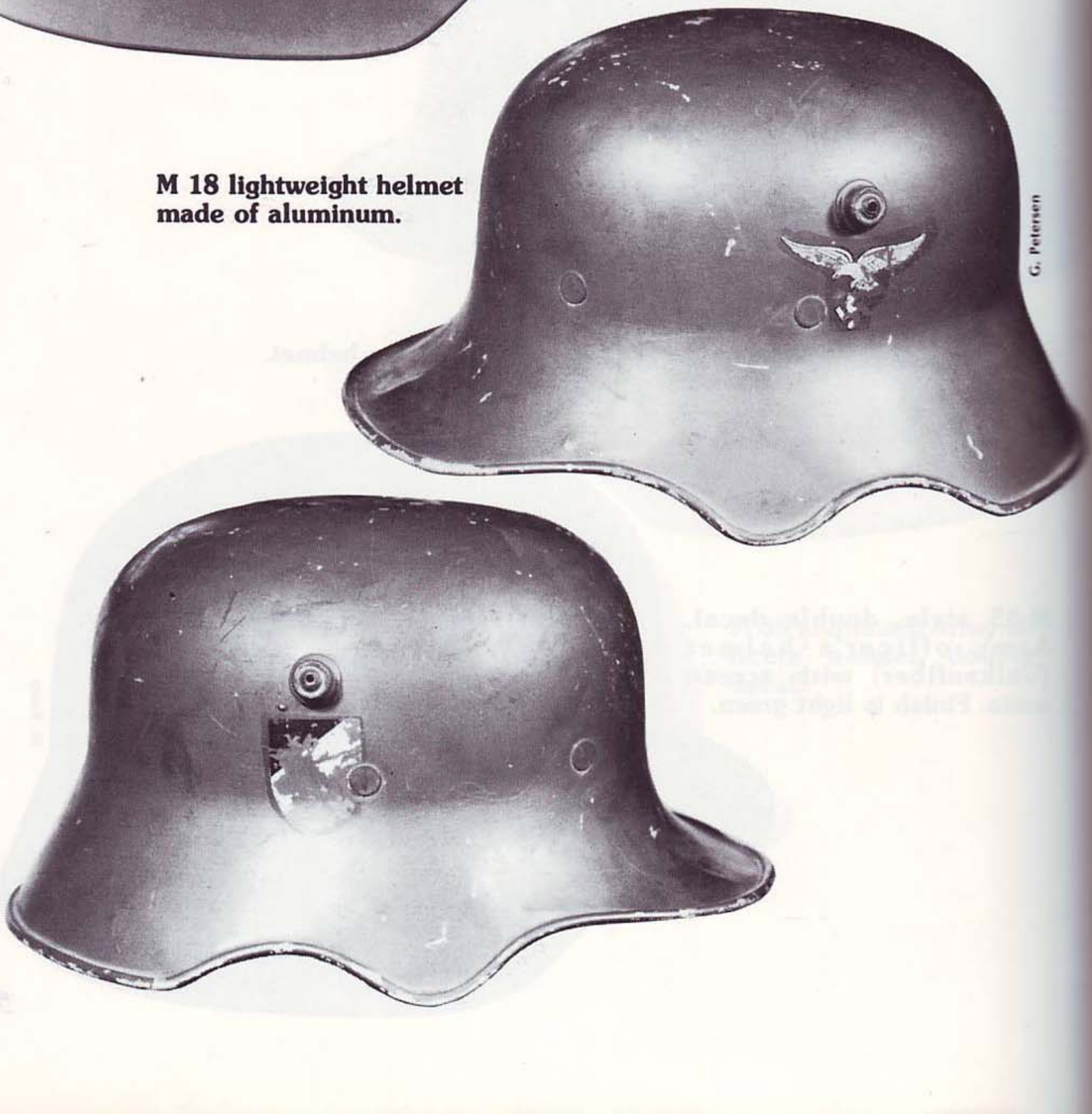
W. Rentz

Luftwaffe officers' double decal, aluminum helmet.



J. Bandy

M 18 lightweight helmet made of aluminum.



G. Petersen

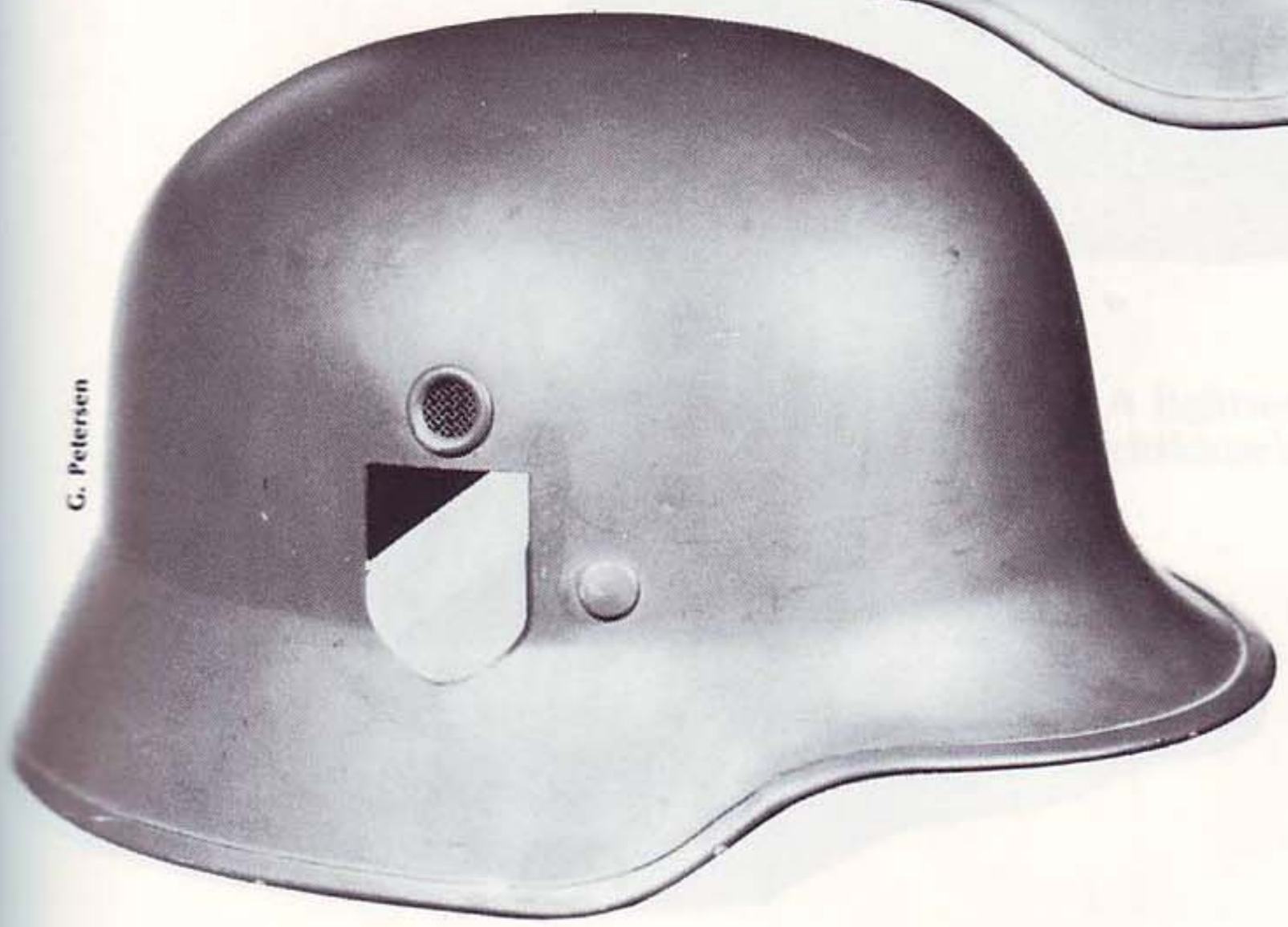


G. Petersen

Luftwaffe lightweight helmet with 1st style eagle.

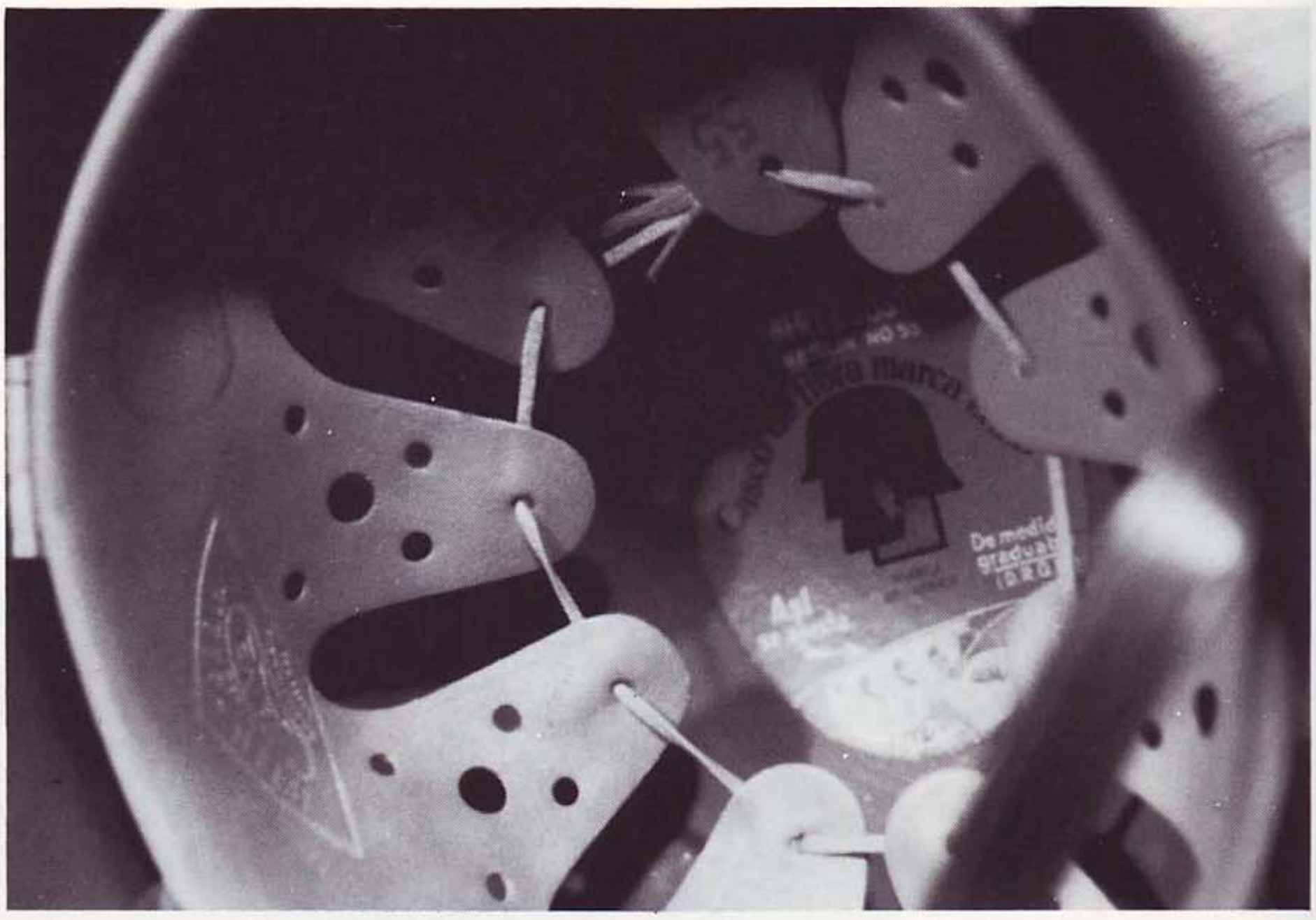


Lightweight helmet made of fiber plastic.



G. Petersen

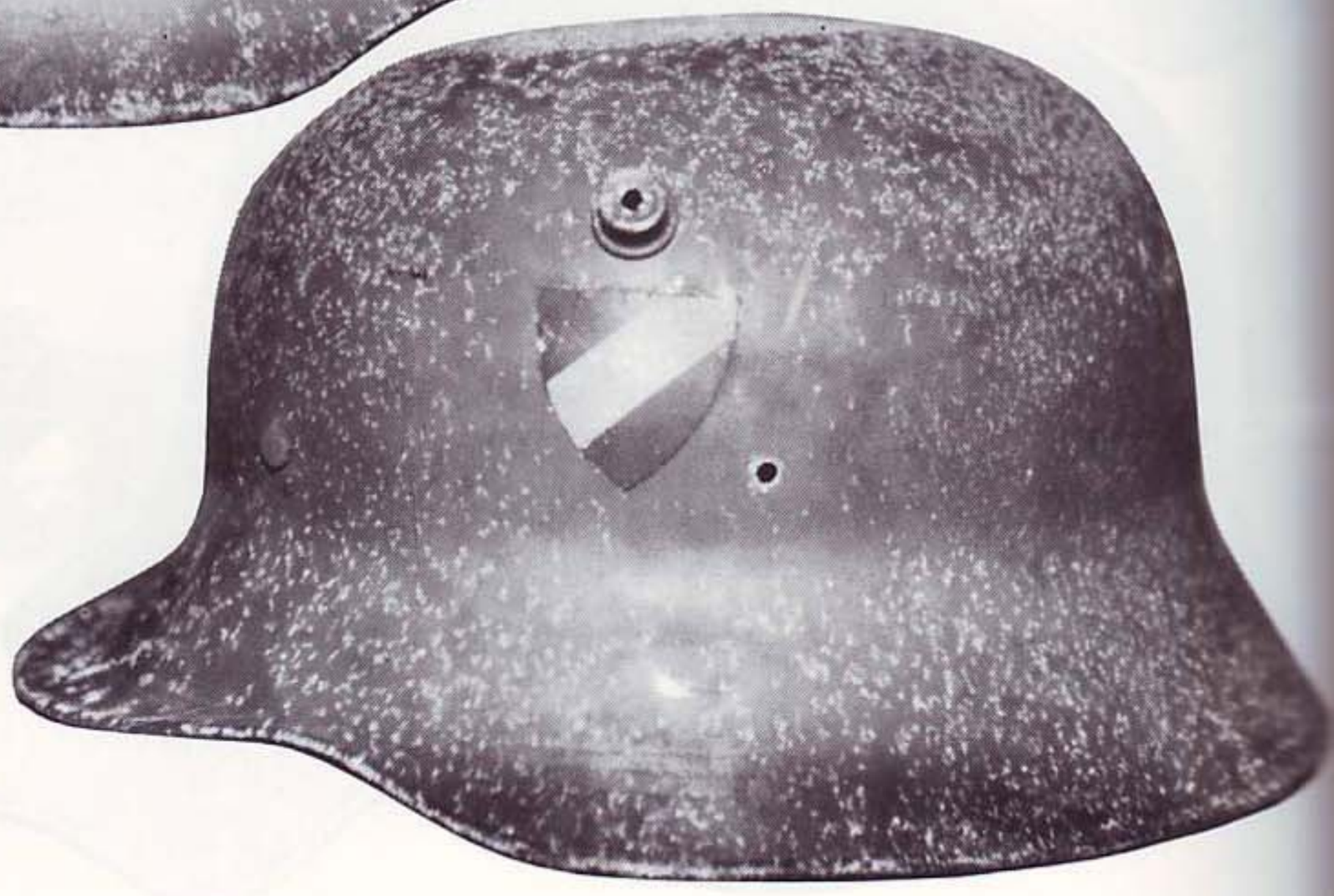
G. Petersen



Liner of the Vulkanfiber helmet.



M 18 double decal, lightweight children's helmet.



G. Petersen



A lightweight Luftwaffe helmet being worn.

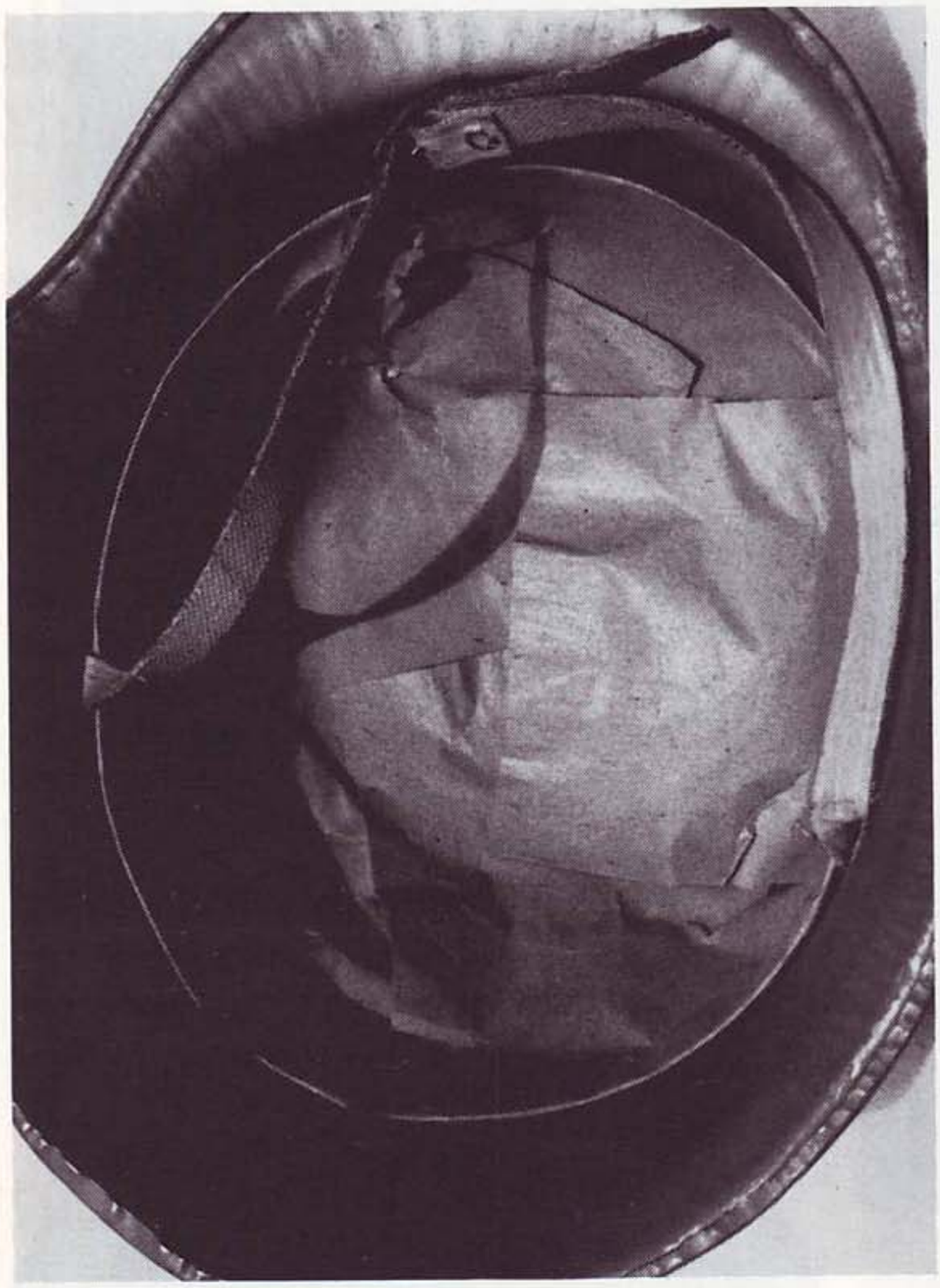
L. Hardy





A lightweight children's helmet.

L. Hardy



Liner of a lightweight children's helmet.

NOTE:
Other liner patterns were also used.

A. Barrows



M 35 style children's helmet made of paper mache, with double paper insignia, polished paper liner and oilcloth chinstrap.

A. Barrows

M 16 style children's helmet made of tin.

THE HELMETS OF THE ALLGEMEINE-SS, THE SS-VERFÜGUNGSTRUPPE AND THE WAFFEN-SS

The history of the SS reaches back into the early 1920's. Its final institution took place in 1929 when Heinrich Himmler was named Reichsführer-SS by Hitler. Prior to this, the "Stabswache," which had been established in 1925, were renamed "Schutzstaffeln" in the summer of 1925 and were destined to become the elite troops of the National Socialist Party. By 30 January 1933, the SS had 25,000 members. One "Stabswache" in particular was re-organized. It was first called the "SS-Sonderkommando Zossen" and later called the "SS-Sonderkommando Jüterbog." On 17 March 1933, this unit was renamed the "SS-Stabswache Berlin." On the Reichsparteitag (Reich's Party Day) in September of 1933, the unit received its final designation as the "Leibstandarte-SS Adolf Hitler." Further SS-Sonderkommando units were established in other cities and were called "Kasernierte Hundert-schaften bwz. politischen Bereitschaften" (Barracked Hundred-Man Political Squads). These units were later to become the "SS-Verfügungstruppe" and finally the "Waffen-SS."

For guard duty and on parades, black-painted Model 1916 or 1918 helmets were worn. On the left side of the helmet, a white-bordered, black swastika was applied. The beam length of the swastika was 3.5 centimeters and the upper corner was located 1 cm under the vent lug on the left side of the helmet. White swastikas were also used, although many helmets had no insignia at all. The Leibstandarte-SS did not wear the swastika for a long period of time, since the silver SS runes on a black field were first introduced for wear on 23 February 1934. This insigne was positioned on the right side of the helmet. The exact date when the color pattern of the shield was altered is not known, since the necessary documentation is lacking. In any case, the shield was now silver and the runes were black. In both of these cases, a black/white/red shield was found on the left side of the helmet. The other SS formations wore runes in a round field on the helmet's right side and a white-bordered, black swastika on the left.

Since it was obvious that the old stocks of helmets were not sufficient in number, the "Reichszeugmeisterei" (or RZM, the Reich's Equipment Office) placed an order for new SS helmets which were different in form, weight and appearance from the M16 and 18 helmets. In these helmets, the liner was no



J. Schneider

M 16, used by the "SS-Standarte Oberbayern" in 1933/34.



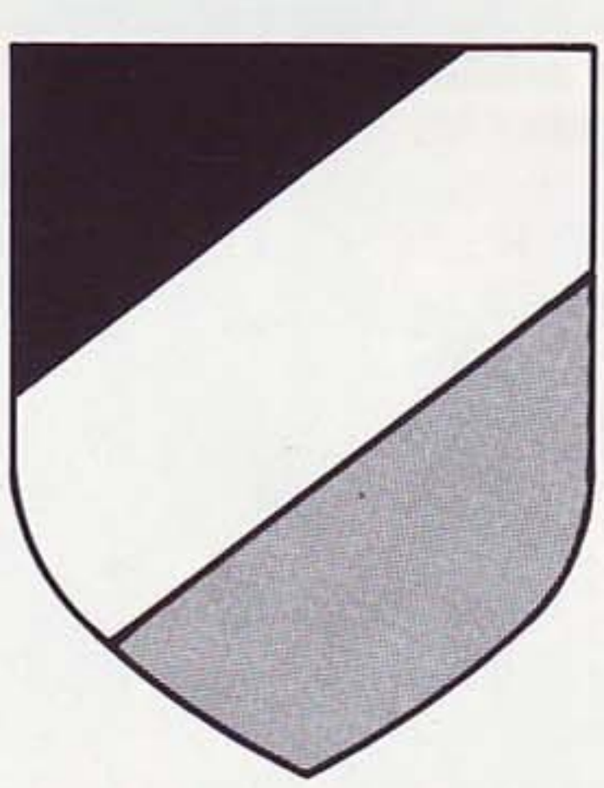
National Archives

An LAH member before his locker, showing his issue uniforms and equipment. Note helmet above locker.



An SS formation with M 18 helmets.





Insignia of the "Leibstandarte-SS Adolf Hitler."





Insignia of the "Liebstandarte-SS Adolf Hitler," 2nd pattern.



LAH members wearing the 1st pattern helmet insignia (white runes on a black shield).



BA Stiftung Preuss. Kulterbesitz



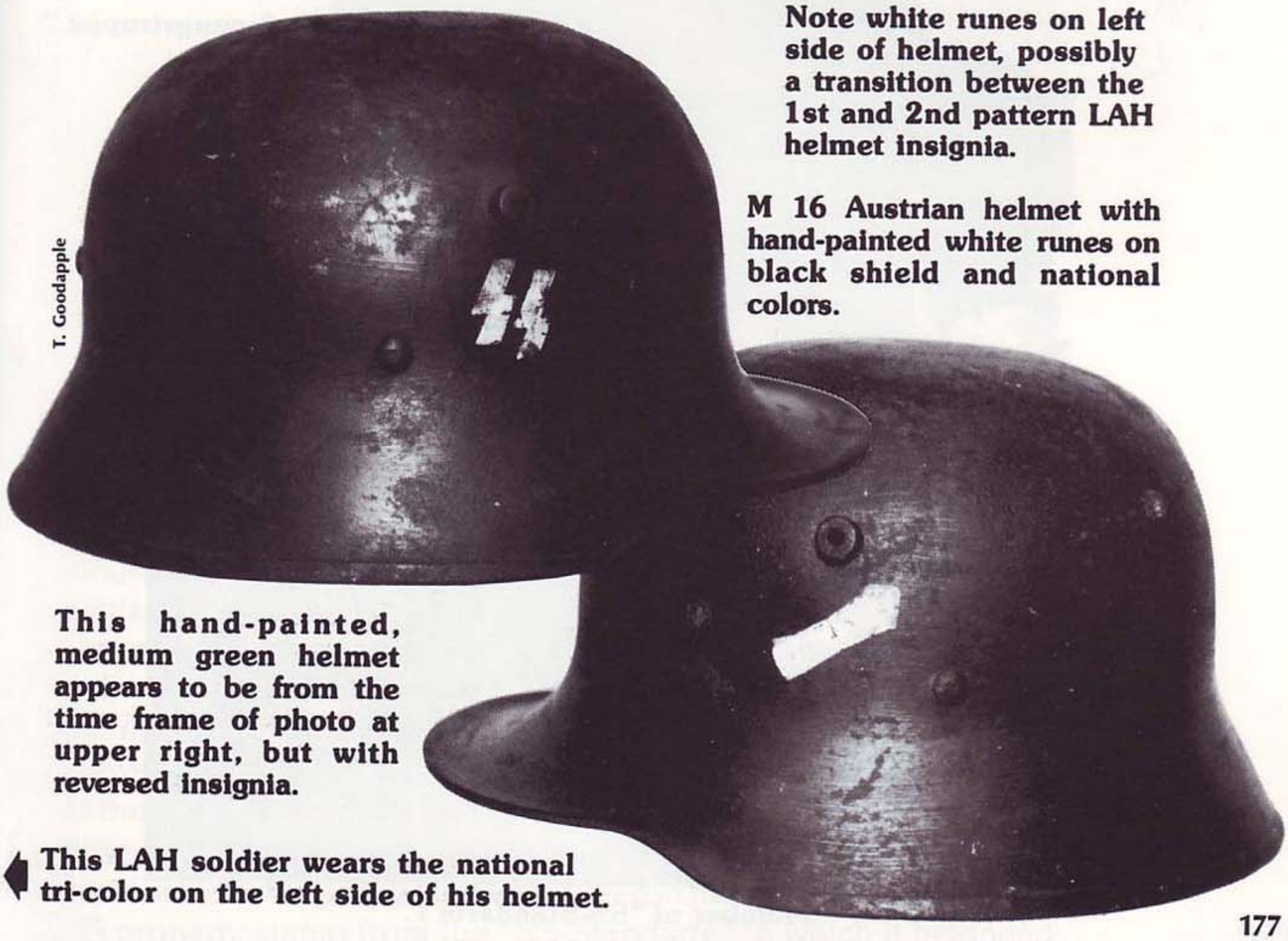
"Leibstandarte-SS Adolf Hitler" on parade, Berlin 1 May 1934.



Note white runes on left side of helmet, possibly a transition between the 1st and 2nd pattern LAH helmet insignia.

M 16 Austrian helmet with hand-painted white runes on black shield and national colors.

T. Goodapple



This hand-painted, medium green helmet appears to be from the time frame of photo at upper right, but with reversed insignia.

This LAH soldier wears the national tri-color on the left side of his helmet.



The 2nd pattern helmet shields are shown being worn at right.



Insignia of the "SS-Verfügungstruppe."



Member of "SS-Standarte 1."



Both helmet insignia of the SS-VT are shown being worn.



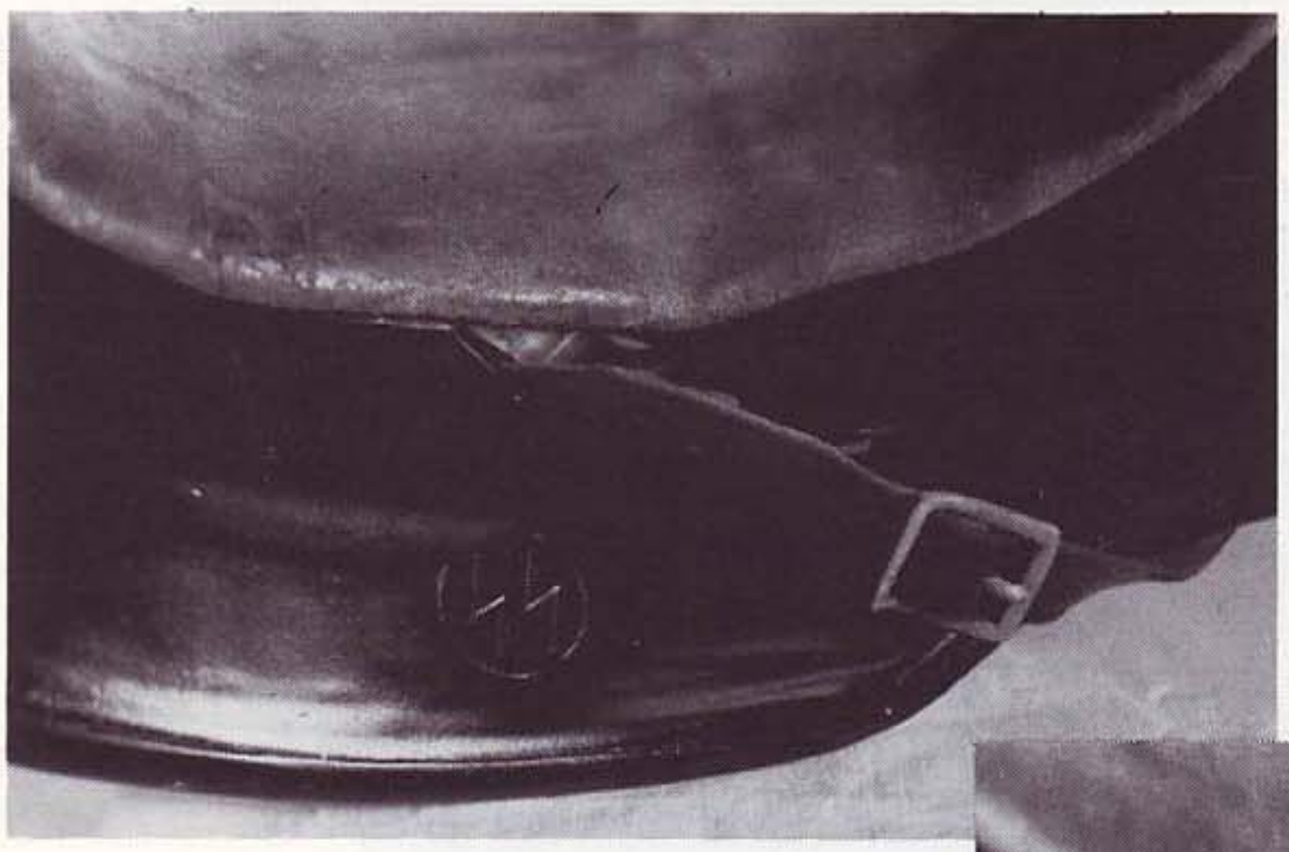
J. Schneider

M 16 Austrian helmet with the handpainted insignia of the "SS-Verfügungstruppe."

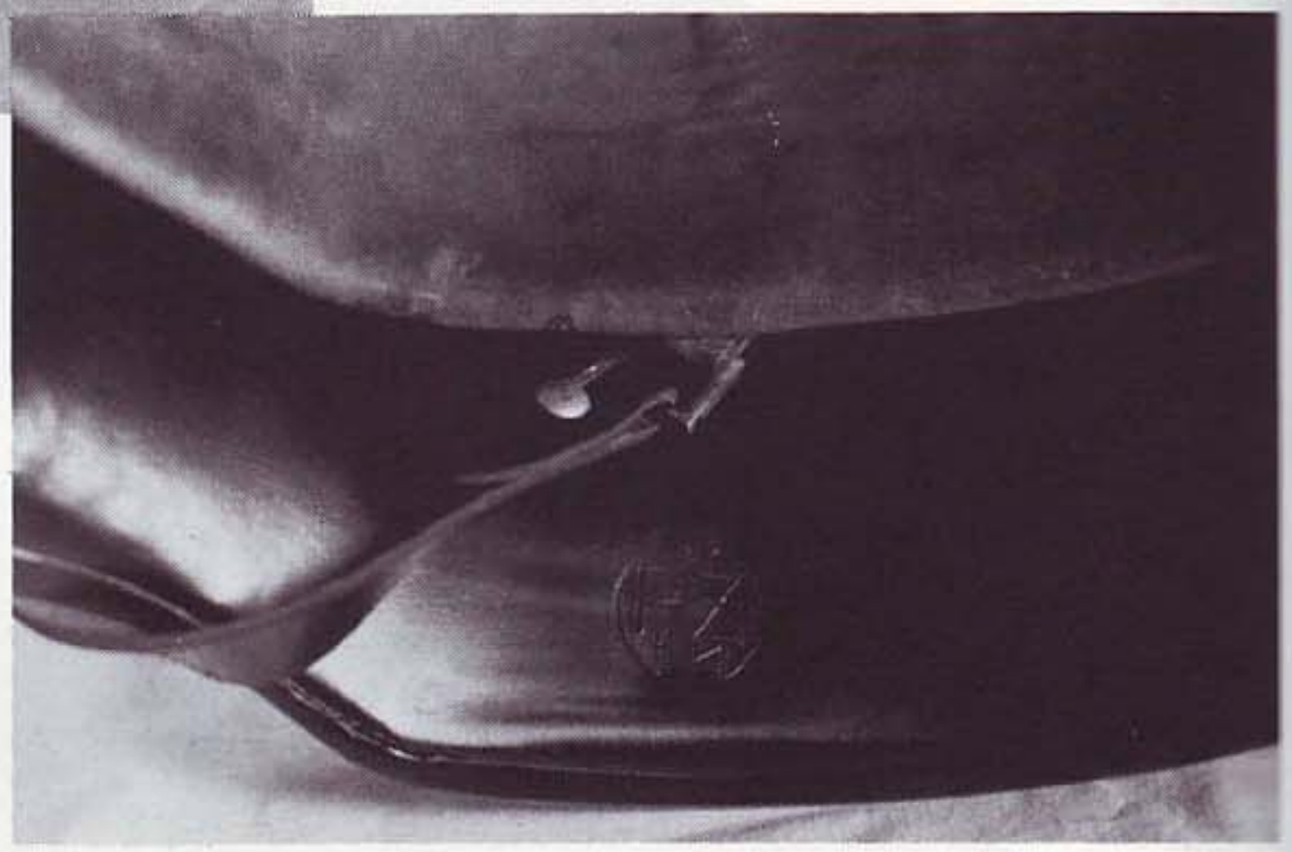
longer attached by two-tailed rivets, but was now attached by solid-core rivets. A model number cannot be ascertained for this helmet from SS High Command documents and only the following description can be found: the helmets were made of chromium steel (the reference to chromium steel helmets doubtless refers to those left-over helmets of WW I vintage); other alloys were also used; the RZM helmets had two stampings on the underside of the apron, one on each side. On the right side was a proof stamp of the SS runes within a circle and on the left was the RZM stamp. On the leather liner band, which was generally like that used in the First World War, was a square SS property stamp from the "SS-Standarte" to which it belonged.



M 18 helmet of the SS, RZM-Model 1934.



Liner of the RZM-Model and proof markings.



On 12 August 1935, the SS Headquarters decreed that all units of the "SS-Verfügungstruppe," the Guard detachments and the leadership schools were to apply an insigne consisting of black runes on a silver shield to the right side of the helmet. On the left side, the swastika shield was to be applied. Originally, the insignia were to be painted on and were to be in place by the time of the opening of the Reichsparteitag. Only two days after this initial order, a modification was made. Accordingly, the insignia were to be in the form of decal transfers as opposed to being hand-painted. These transfers were ordered from a Nürnberg company under the auspices of the SS Adminis-

trative Office. The cost of these transfers was 25 Reichsmark per 1000 pairs. The design of the insignia was the work of Professor Hans Haas.

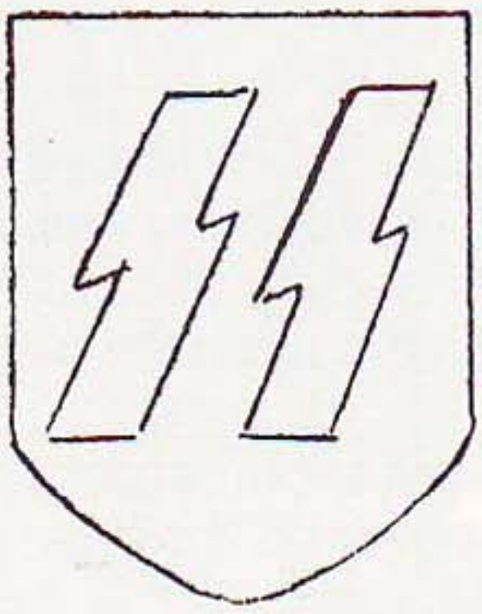
"Chief of the SS-Headquarters Berlin
I A/O I No. 013 570 12 August 1935
Regarding: Painting of Steel Helmets
To: SS-Upper Sections South, Southwest, Rhein, West, Northwest, North, East and Central
All units of the SS-Verfügungstruppe to the Sturm level
All Guard units to the Sturm level
SS-Leadership Schools Tölz and Braunschweig

The Reichsführer-SS has ordered that the members of the SS-Verfügungstruppe, the Guard units and the SS-Leadership Schools are to wear on their helmets the insignia as indicated. These consist of a shield with the SS runes on the helmet's right side and a shield on the left with the swastika. Size and shape are to follow the patterns below.

The shields are to be painted in oil colors on the steel helmet. This task is to be carried out in all haste so that on the Reich's Party Day, all members of the SS-Verfügungstruppe, Guard units and the SS-Leadership Schools will have these insignia on their steel helmets.

For the Reichsführer-SS
(signed)
SS-Sturmbannführer

Field: silver
Runes: black

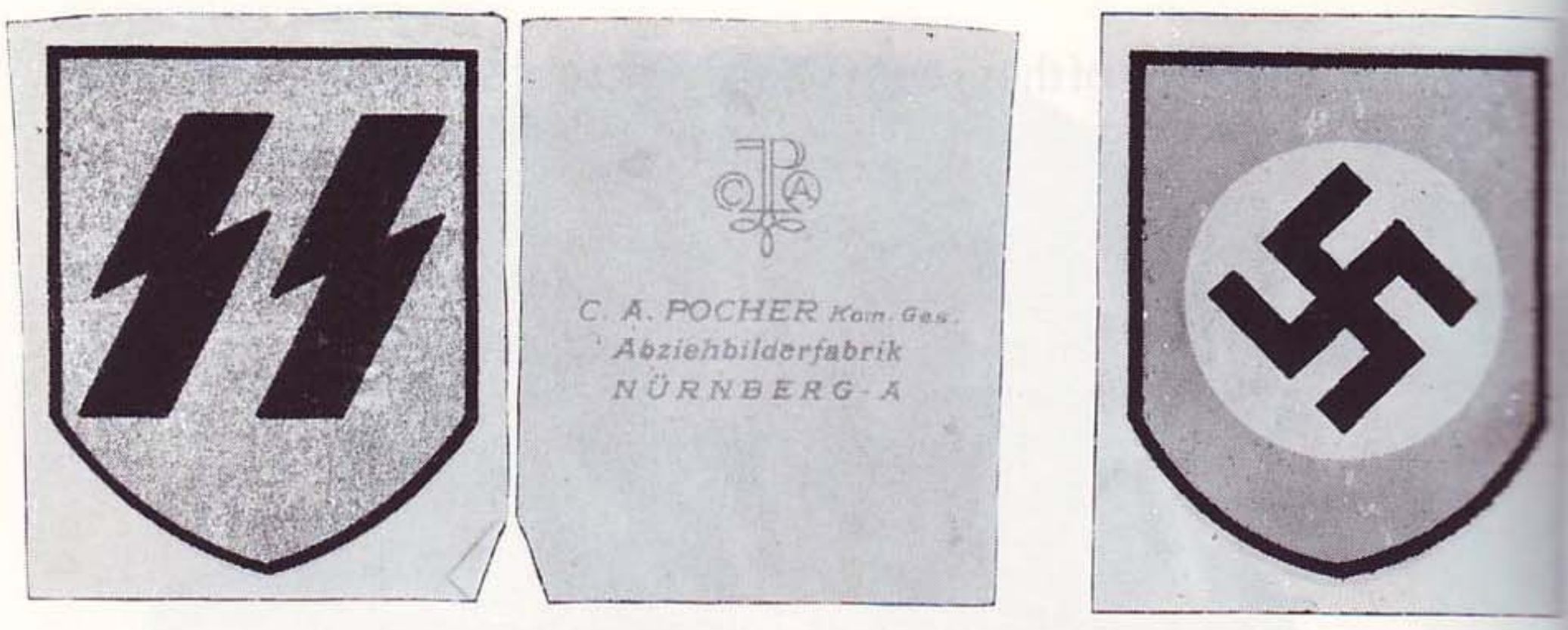


Chief of the SS-Headquarters
(signed) Heissmeyer
SS-Gruppenführer

Field: red
Inner Field: white
Swastika: black



On 1 November 1935, a comminique from the Reich's War Ministry to the SS Headquarters indicated that an apportioning of the new Model 35 helmets was assured. For this reason, the introduction of a field grey cloth cover for the black helmet was abandoned. The Leibstandarte's nine infantry companies received grey-colored M35 helmets on 11 May 1936. SS-Standarte 2 also received new helmets at this same time. This has been established from a letter dated 5 June 1936 from the second battalion of SS-Standarte 2 to the SS-Oberabschnitt Rhein. The comminique stated



Insignia of the "SS-Verfügungstruppe/Waffen-SS from 12 Aug. 1935 until 8 May, 1945.

that their helmet shipment from the Eisenhüttenwerk Thale was insufficient and many of the liner-retaining rivets were weak and prone to shearing. Because of this, 1000 two-tailed rivets were supplied free by the company. In the course of the following months, all SS units were supplied with Model 35 helmets. On 6 July 1939, the LAH (Leibstandarte Adolf Hitler) withdrew all of their old model black helmets and these were replaced by the new model which was painted grey-black.

The following is a translation of the communique between the 2nd Battalion of SS-Standarte 2 and the SS-Upper Section Rhein.

"Office Staff
II/SS-Standarte 2 of the SS-VT
Daily Memo #196B/B6/304 Sb.

Arolsen/Waldeck
5 June 1936

Regarding: Complaints about the grey steel helmet
Reference: 3 June 1936, Section Ia, Daily Memo No. 9912/36
To: SS-Upper Section Rhein in Arolsen

A shortage of the grey steel helmets which were supplied by the Eisenhüttenwerk in Thale/Harz has already taken place. This has been caused by the fact that many of the rivets which retain the liner have been shearing.

We are requesting that you arrange the replacement of at least 1000 rivets to us at no charge, so that the liners may be reattached inside the helmets.

The Administrative Leader
II/SS-Standarte 2 of the SS-VT
(signed) SS-Hauptsturmführer



This LAH machine gun crew wears grey M 18 helmets during mid-1930's training.

C. Bruner



An early photo of the SS-Totenkopfstandarten, showing the death's head on the helmet, 1935/36.



L. Hardy

Inside view of helmet at left with liner marking of Standarte 2.



M 18 double decal Allgemeine-SS helmet with black satin finish.



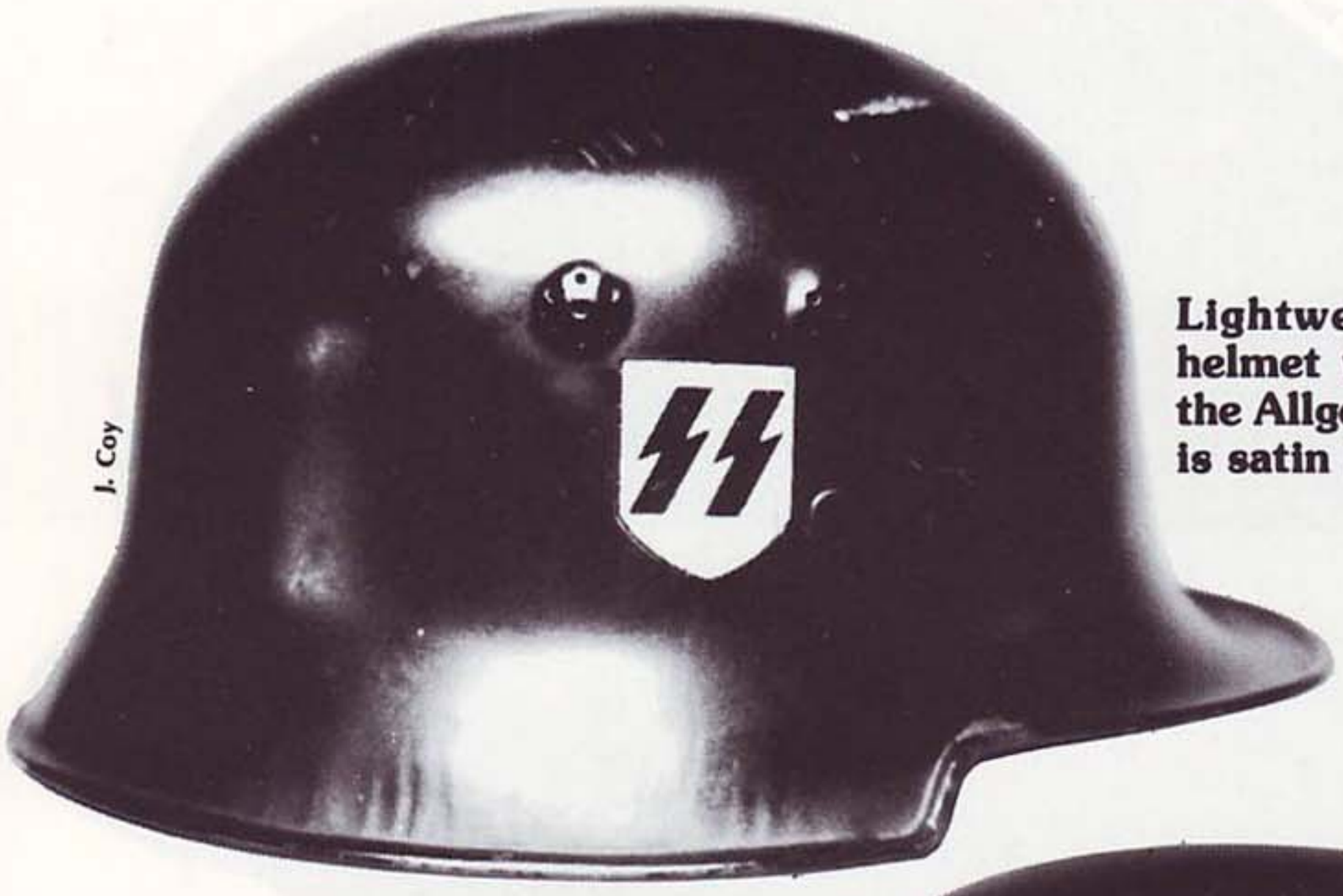
BA Stiftung Preuss. Kulturbesitz

The LAH in formation.

L. Hardy

T. Goodapple

M 16 Austrian helmet, with 3-pad liner, originally a black double decal Allgemeine-SS helmet but repainted medium green and reissued to the SS-Verfügungstruppe. Note early pattern runes.



J. Coy

Lightweight double decal helmet worn by members of the Allgemeine-SS. The finish is satin black.

NOTE:
Specimens exist of this helmet with tabs to retain the leather neckflap, indicating possible use by SS fire brigades at SS barracks or at government and SS buildings retaining "sensitive" files.





H. von Hungen

Chin strap marking on a lightweight, light green SS helmet indicating that it was produced at the Buchenwald concentration camp.



L. Hardy

Lightweight double decal helmet worn by members of the SS-VT/SD. The finish is light green.





The SD (Sicherheitsdienst) men at left are shown wearing the above style helmet.



Wm. Maertz

M 18 double decal SS-VT helmet. This reissued light green helmet was originally satin finish black (Allgemeine-SS).

A. Barrows

M 35 double decal Allgemeine-SS helmet with satin black finish.

J. Goodman



Later style runes decal with thick, black border.



Spronk

Jakob Grimminger, bearer of the Blood Flag, wearing a black M 35 Allgemeine-SS helmet.



J. Bandy

M 35 double decal Waffen-SS helmet with later style runes decal, and parade green finish.





J. Bandy

M 35/40 single decal Waffen-SS helmet with early runes decal.



M 42 single decal Waffen-SS helmet with later style runes decal.

J. Bandy

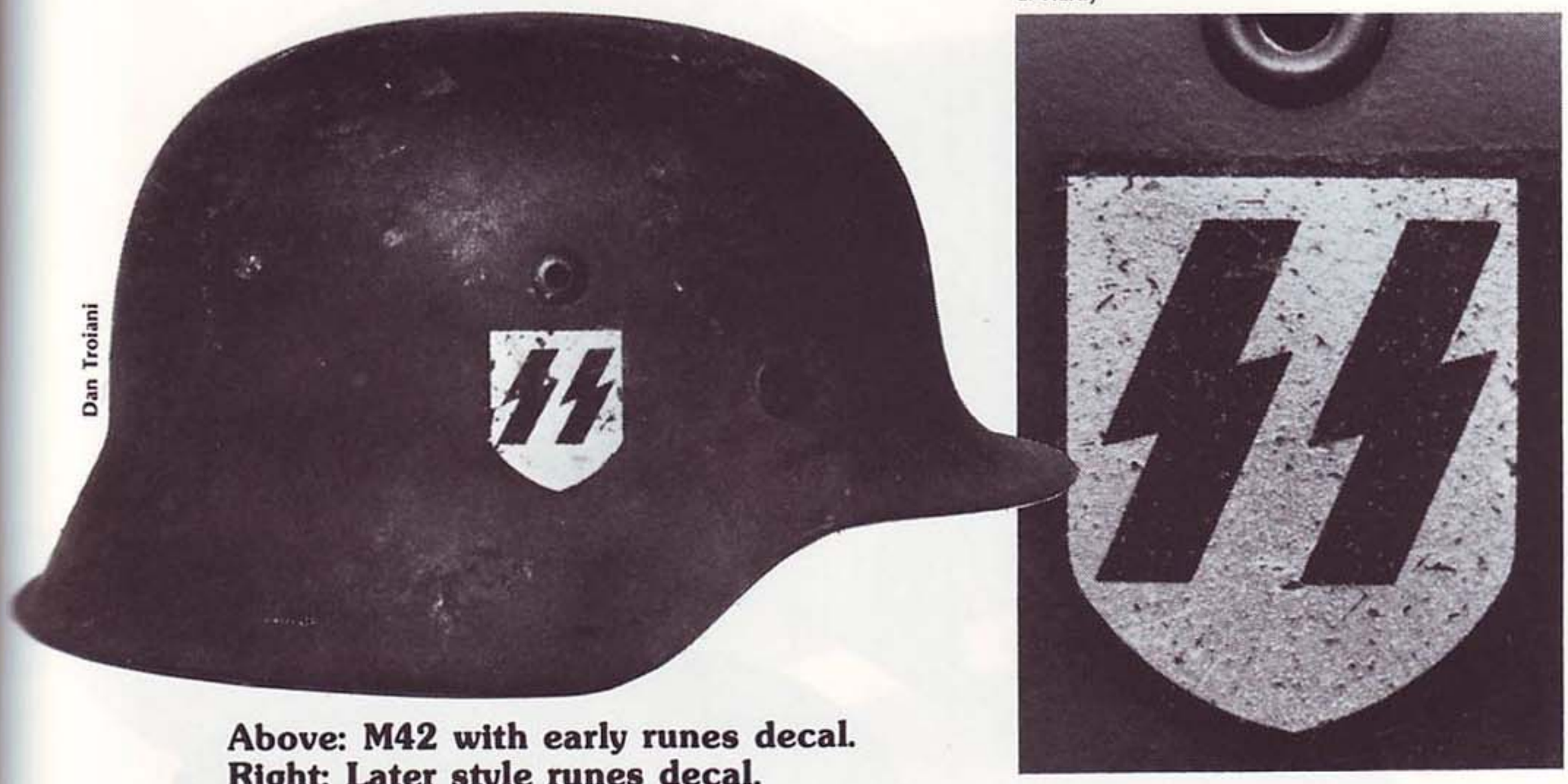
During the war the Waffen-SS received the same helmets as the Army. As of March 1940, the swastika shield was removed from the helmets. In March of 1941, the SS-Adminisitrative Office ordered that the old model helmets (M16 and 18, as well as the RZM model) were to be withdrawn from service.





Dan Troiani

L. Hardy



Above: M42 with early runes decal.
Right: Later style runes decal.

Ray Embree



As shown above, the swastika shield was still worn in the later war years.

From 1 November 1943, the SS runes (Sigrunen) were no longer applied to the helmet. This is not to say, however, that helmets did not retain existing decals, but rather that helmets were now supplied by the factory without any insignia. The same was true for the swastika shield.

A. Barrows



Vulkanfiber, double decal Allgemeine-SS helmet with gloss black finish and full visor.



A. Barrows

M 35 double decal Waffen-SS helmet, spray painting in light green and tan paint for camouflage purposes.



Wm. Maertz

M 40 single decal Waffen-SS helmet, with white wash finish for winter warfare.

L. Clark



The 1st pattern Waffen-SS helmet cover being worn.

The units of the Regiment "Deutschland" of the SS-Verfügungstruppe were already outfitted with camouflage clothing and helmet covers in 1937. These were developed by Sturmbannführer (and Doctor of Engineering) Wim Brandt. The patent for this camouflage cover was issued to the Reichsführer-SS, Heinrich Himmler, on 3 February 1937. The remainder of the units of the SS-VT received helmet covers in 1939. From 1942 onward, the helmet covers were equipped with loops through which additional camouflage materials could be inserted.



J. Schneider

Helmet cover of the Waffen-SS, 1st pattern.

NOTE:
The 1st pattern helmet cover also exists with a front hook (see Patent section).



Helmet cover 1st pattern.



Note different camouflage patterns on the above 1st model Waffen-SS helmet covers.

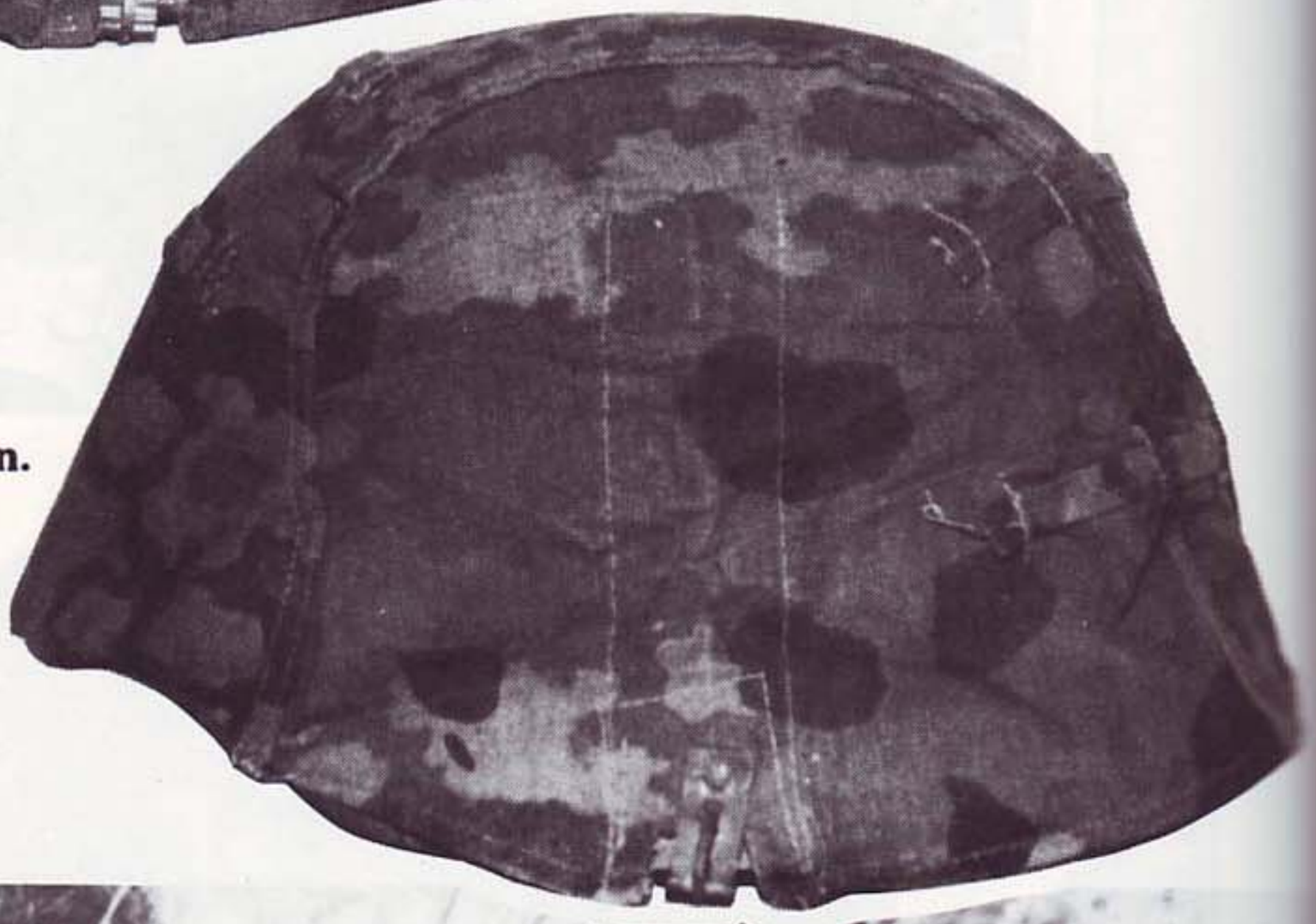




Above and at left: 1st pattern helmet cover with various camouflage schemes.



Helmet cover, 2nd pattern.



Helmet cover, 2nd pattern, different pattern.









Various views of the camouflage face mask in use.



Detailed photo of the camouflage face mask.

Waffen-SS helmet covers, 2nd pattern and camouflage face masks being worn.



J. Blake



J. Blake

The four illustrated W-SS helmet covers depict different camouflage patterns used and slightly different manufacturing styles.



J. Blake



J. Blake



A camouflaged SS helmet.



A grenadier from the SS Division "Hitler Jugend" at Normandy.



Above: This machine gun crew from SS Division "Handschar" wears the helmet decals reversed, i.e., runes on the left side of helmet.
Below: The Waffen-SS NCO at right also wears reversed decals. No official explanation has to date been discovered.



This Waffen-SS NCO wears an army issue helmet, probably because of wartime supply problems.





An SS-Sturmmann wearing standard Luftwaffe issue paratrooper equipment; a 2nd model helmet without decals and a 3rd model jump smock in the "splinter" camouflage pattern.



SS paratroopers.

THE STEEL HELMET FOR PARATROOPERS

The Luftwaffe established the first German parachute unit on 29 January 1936 with orders from Hermann Göring, Commander-in-Chief of the Luftwaffe, that volunteers from Regiment "General Göring" were to be assembled into a parachute battalion based at Stendal near Berlin. The German Army followed on 1 April 1937 with the formation of a parachute infantry company which was to be trained at the Luftwaffe parachute training school at Stendal.

The newly created Luftwaffe was charged with the task of research and development of special parachute equipment and uniforms. The first jump smocks, parachutes and boots were styled on civilian models then in use, and were modified to military specifications. Since no steel helmets suitable for jumping existed at this time, an entirely new model had to be developed for use by Germany's newest combat arm. It was believed that the first model helmet was merely a cut-down, modified version of the M1935 prototype. Upon examining surviving examples, however, it is clear that the first model helmets were not modified pieces but were actually manufactured in that configuration.

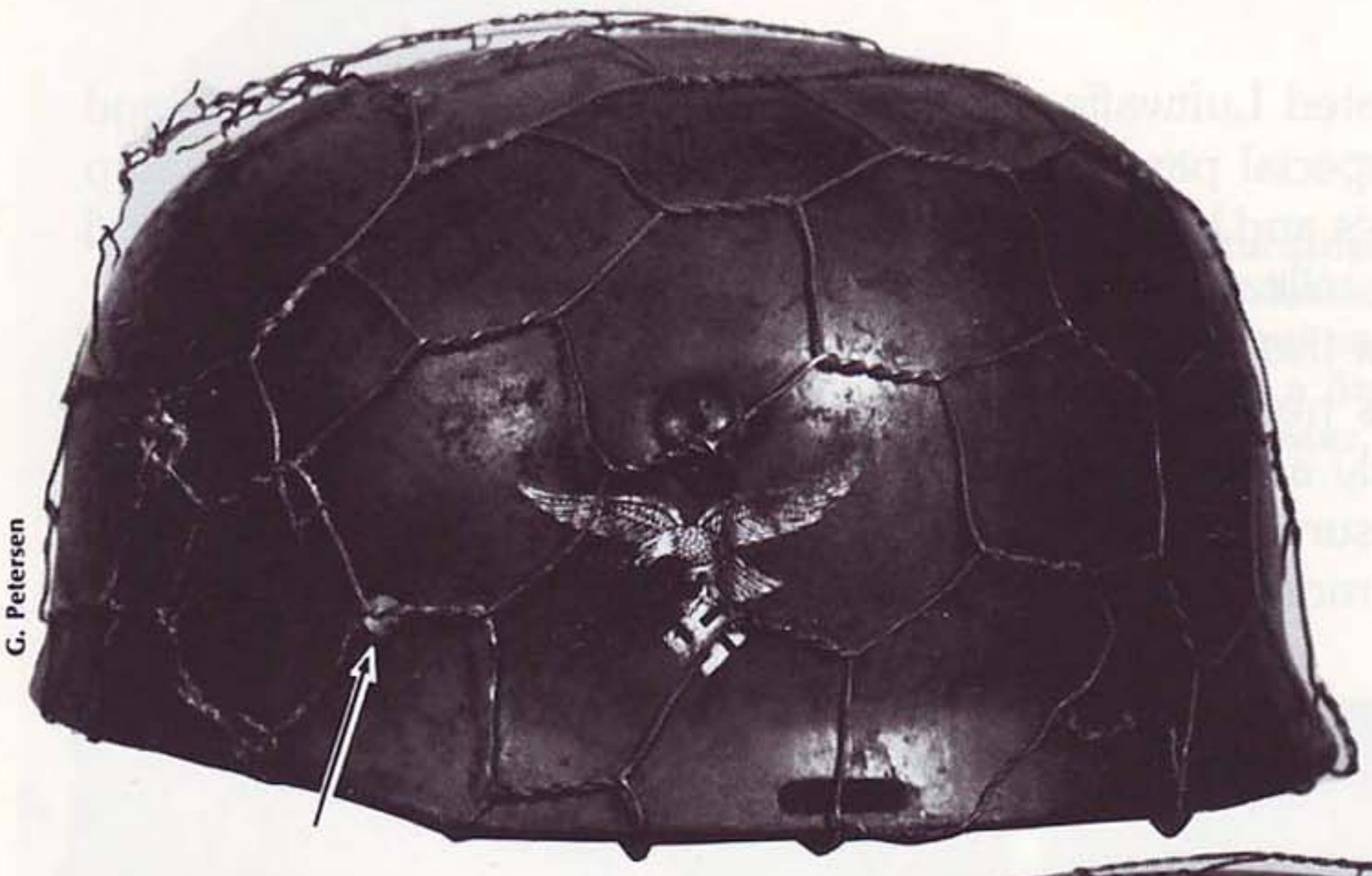


Army paratrooper wearing a 1st model helmet.

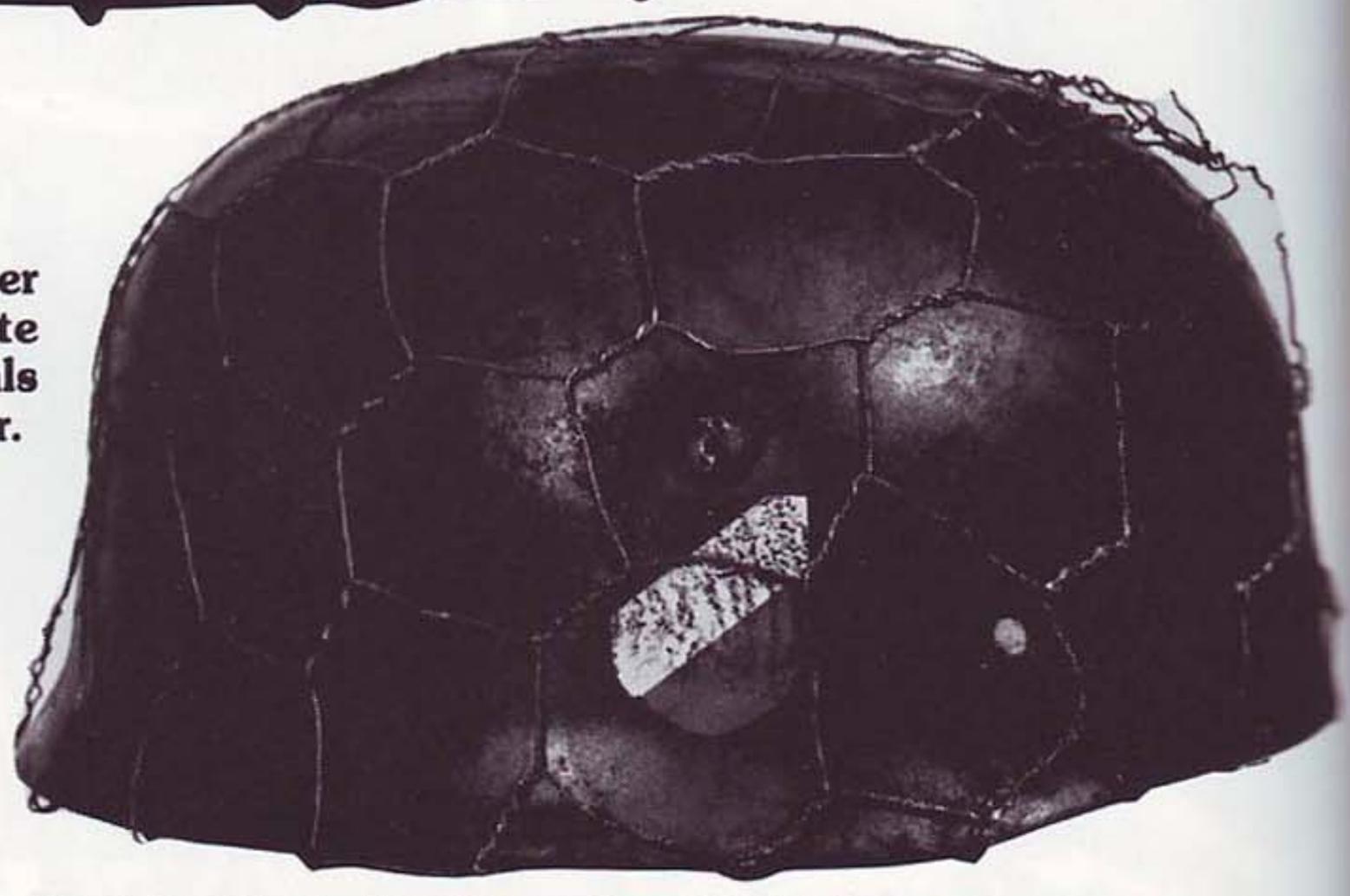




Army paratrooper wearing the 1st model helmet with 1st style Luftwaffe eagle.



G. Petersen



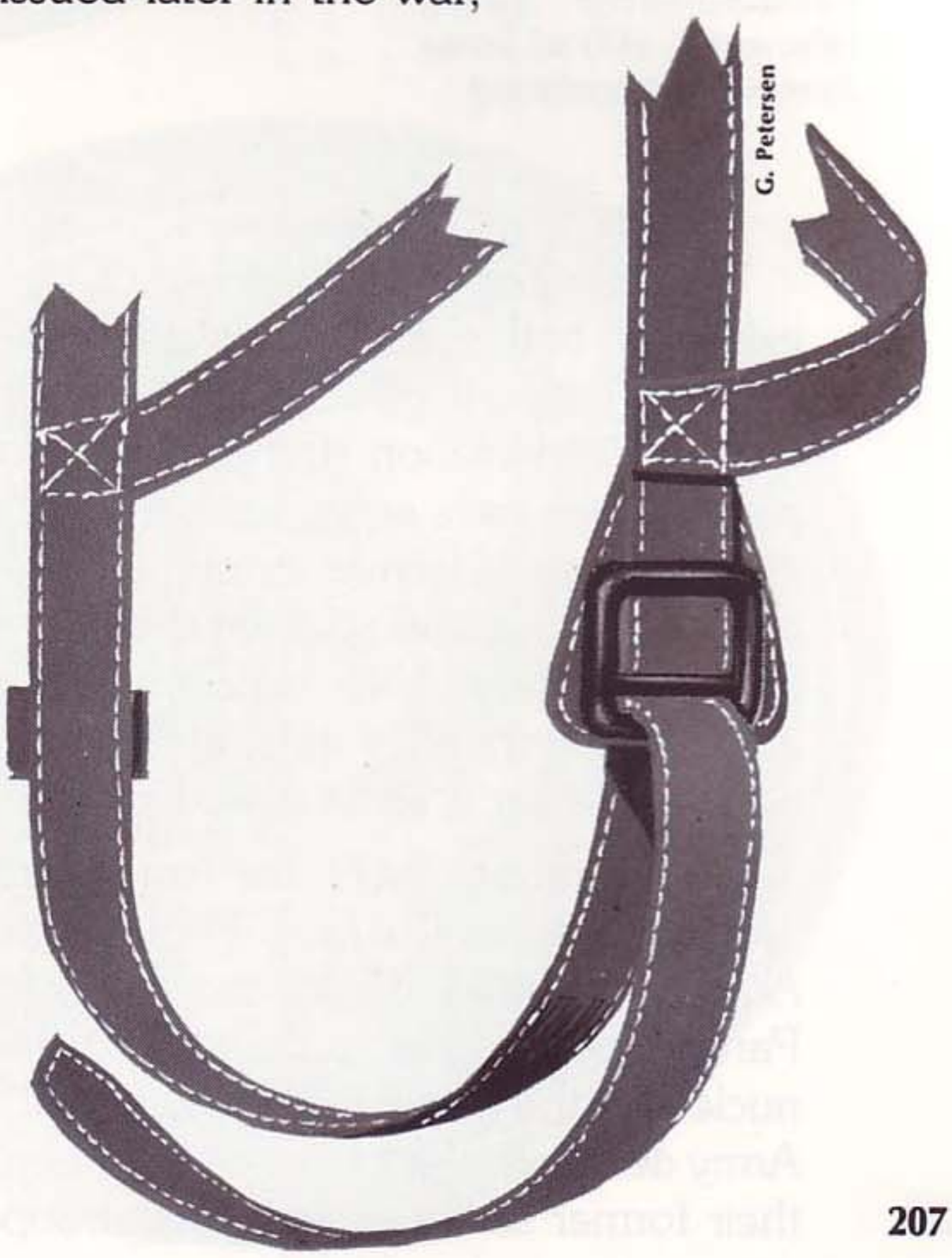
NOTE:
This example had a later style liner added. Note holes in front of decals used with 1st style liner.

1st model helmet with 1st style Luftwaffe eagle and chicken wire cover.

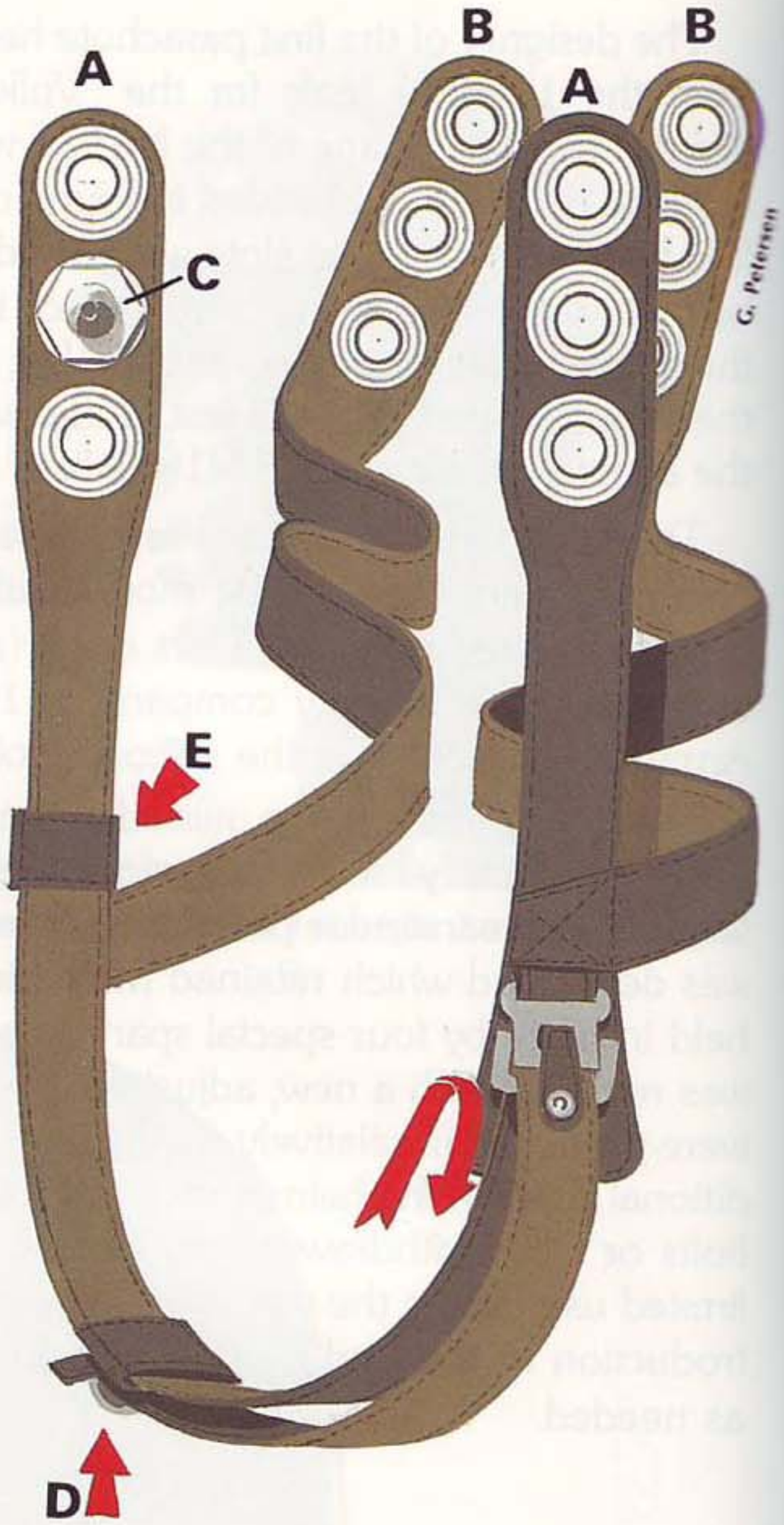
The designer of the first parachute helmet utilized key information gathered from the 1933-34 trials for the "Vulkanfiber" and M1935 helmets in his design. The new shape of the M1935 was adopted but with its rim and sides reduced and side slots added as found only on the "Vulkanfiber" test helmets. It is believed that these slots were used to snap the special chin strap to the helmet when not on jump status, since the slots are positioned in proximity to the normal chin strap attachment. Also, the snaps and chinstrap fit readily into the slots. The design of the first model paratrooper helmet was completed with the addition of a modified M1931 liner and a unique quick-release chinstrap.

The first model was issued sometime in 1936 and was finished in smooth, field grey paint with the 1st model Luftwaffe eagle decal (left side) and the black/white/red national colors decal (right side). When the Army formed its own parachute infantry company in 1937, the helmet was issued with the Army eagle decal plus the national colors.

The liner and chinstrap utilized in the 1st model paratrooper helmet did not prove satisfactory for jumping since the three split pins used to hold the liner tended to shear under pressure. Therefore, a 2nd model helmet and liner was developed which retained the basic helmet shell but with a sturdier liner held in place by four special spanner bolts. The existing chinstrap with snaps was replaced with a new, adjustable chinstrap. The 1st model helmets, which were produced in relatively small numbers, were either modified by drilling additional holes in the helmet shell and then inserting the new liner with spanner bolts or were withdrawn from service. The modified 1st model helmet saw limited use during the war, and some of those which were stored after the introduction of the 2nd model were reissued later in the war, as needed.



Early model chinstrap initially proposed for the 2nd model jump helmet without snaps to hold the loose ends of the chinstrap. Only a slip-through loop was used and this proved unwieldy and did not hold the loose end of the strap when jumping or in action. This model can also be found in late-war helmets, perhaps for economy measures.



Production model chinstrap as normally found on 2nd model paratrooper helmets. Aluminum alloy rings at the end of the straps ("A" & "B") were attached to the liner by a spanner bolt ("C"). The lower portion of the chinstrap went through a quick-release buckle and then snapped onto an adjustable slide loop ("D"). If this was not sufficiently tight, it was snapped onto the upper slide loop ("E"). This held the helmet firmly to the head when jumping or in action and could be quickly released or loosened when needed.

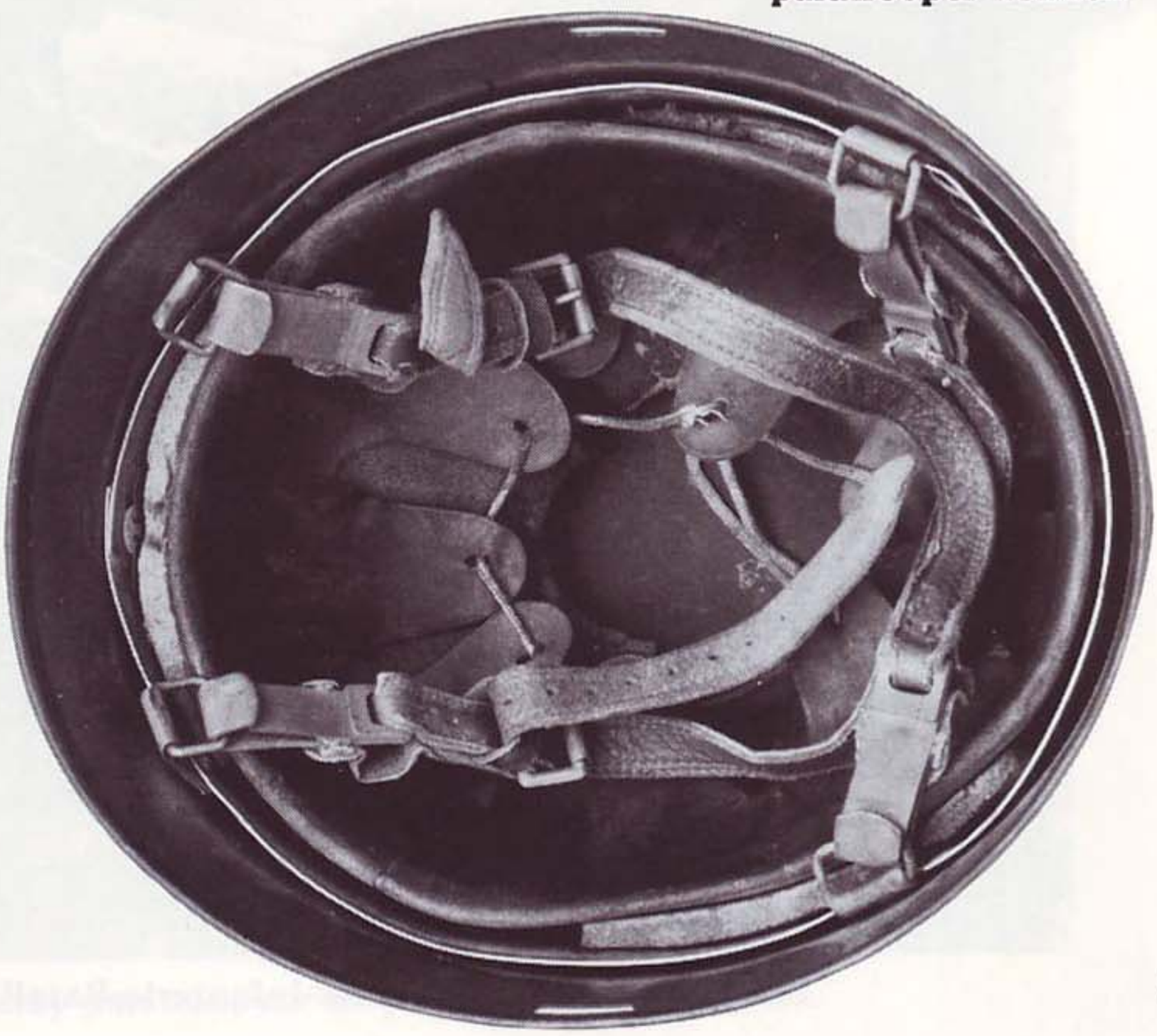
The new 2nd model helmet was finished in a smooth field grey paint and exists with both styles of Luftwaffe eagle decal (early and late), the Army decal and the national colors decal. The Army parachute infantry company was enlarged to battalion strength on 1 June 1938 and many of the new Army paratroopers were equipped with the 2nd model helmet with Luftwaffe decals. According to a former Army parachute battalion member, the original first company in general retained the helmet with Army decal while the newly formed companies of the battalion used the helmet with Luftwaffe decals. This would account for the rarity of the 2nd model helmet with Army decals as they were is use for a short period of time.

On 1 January 1939, the Army parachute battalion was incorporated into the Luftwaffe as II/FJR 1. Photographs indicate that there was a mixture of Army and Luftwaffe uniforms and helmets worn during this transition period. Paratroopers of the 2nd Battalion, Fallschirmjäger-Regiment 1 became the nucleus of the new FJR 3 in June 1940 with some members still retaining their Army decals, breast eagles on the jump smock, and Army belt buckles to show their former status as Army paratroopers.



J. Bandy

Note the unique chin strap arrangement used in this 1st model paratrooper helmet.



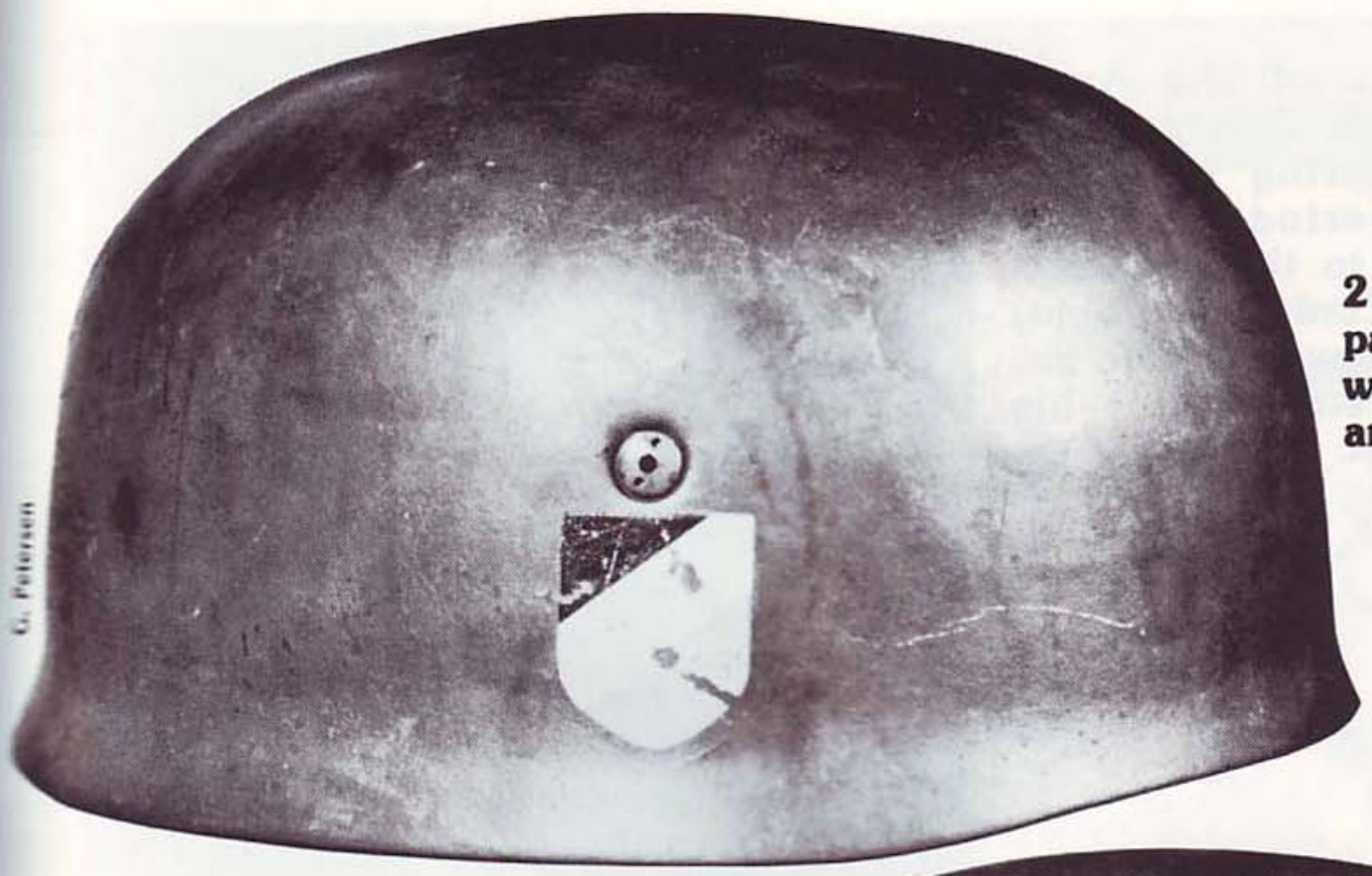
Mike Stacey



An Army paratrooper wearing the 1st model paratrooper helmet, 1936/1937.



Soldiers of the "Fallschirm-Infanterie-Bataillon."



2nd model paratrooper helmet with Army decals and spanner bolts.





Army paratroopers on parade, Stendal, 1937.

Two NCOs of the Army parachute battalion (engineer section) during the transitional period of being transferred to the Luftwaffe. Feldwebel Cord Tietjen (right) wears his new Luftwaffe uniform but still retains his Army helmet.





An Army paratrooper with the normal Luftwaffe paratrooper helmet.



K. Peters



Above and at right: Major Prager, commander of II./Fallschirmjäger-Rgt. 3.

On the basis of the introduction regulation of 15 March 1938, the paratroop helmet had to be worn for at least 15 years before it could be withdrawn from service. In the Luftwaffe's official decrees compendium, a statement of the cost of the helmet was made. In the fiscal year 1937-38, the helmet shell cost 7.26 Reichsmark.

Regarding the helmet and band, the following are the particulars from the Luftwaffe service regulations of 1938:

"Steel Helmet for Paratroopers.

Pattern 142 - 7A

A. Materials:

1. Helmet Shell: see figures 1-3. Deeply-drawn sheet steel 1.15 mm thick with the following content: Carbon - 0.35 to 0.40%; Manganese - 0.60 to 0.80%; Chromium - 0.25 to 0.40%. The tempering strength is approximately 200 kg/mm^2 and has a tensional elongation at break of about 5%.
2. Liner System:
   a) Aluminum alloy approximately 30 mm by 1 mm. Attachment ends are riveted as in figure 5 or spot welded as in figure 6.
   b) Foam rubber about 10 mm thick (see figures 7-9).
   c) Insert strips between the leather sweatband and the foam rubber, about 35 mm by 2 mm made of split or synthetic leather.
   d) Sweatband made of tanned, natural-colored sheep leather about 1.0 mm thick (see figure 7).
3. Helmet Strap Assembly:
   a) chin and neck straps of grey goat skin and the same colored chamois skin beneath (see diagrams 10 and 11).
   b) one clamp buckle see diagram 12).
   c) fourteen metal eyelet inserts, 8.5 mm in diameter (see diagrams 10, 11, and 14).
4. Attachment for the Liner and Straps to the Helmet Shell:
   a) four hollow-bored bolts with brass, convex heads, thread M6 x 0.75. Bolt length approximately 6.5 mm, thread length approxi-

Abb. 1

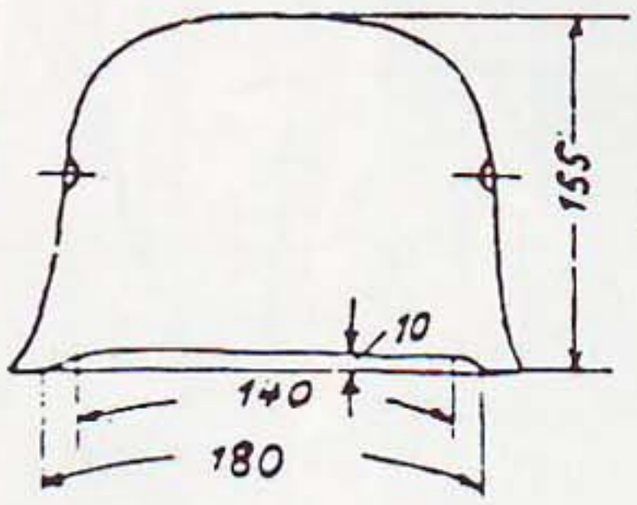


Abb. 2

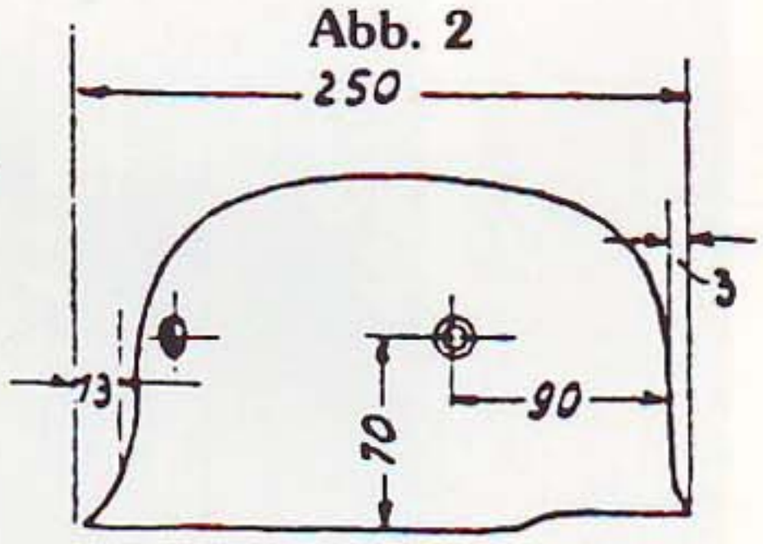
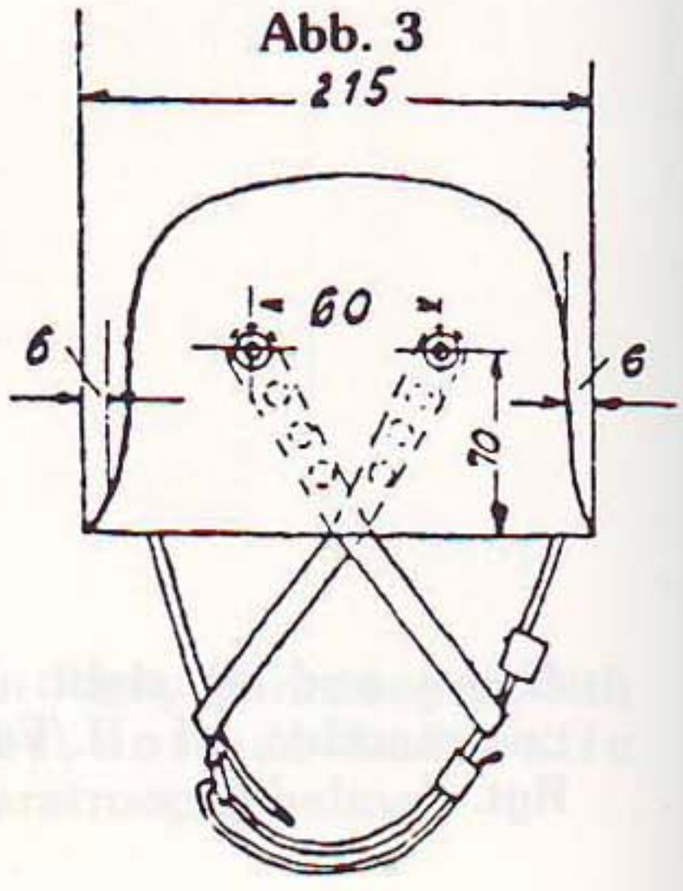


Abb. 3



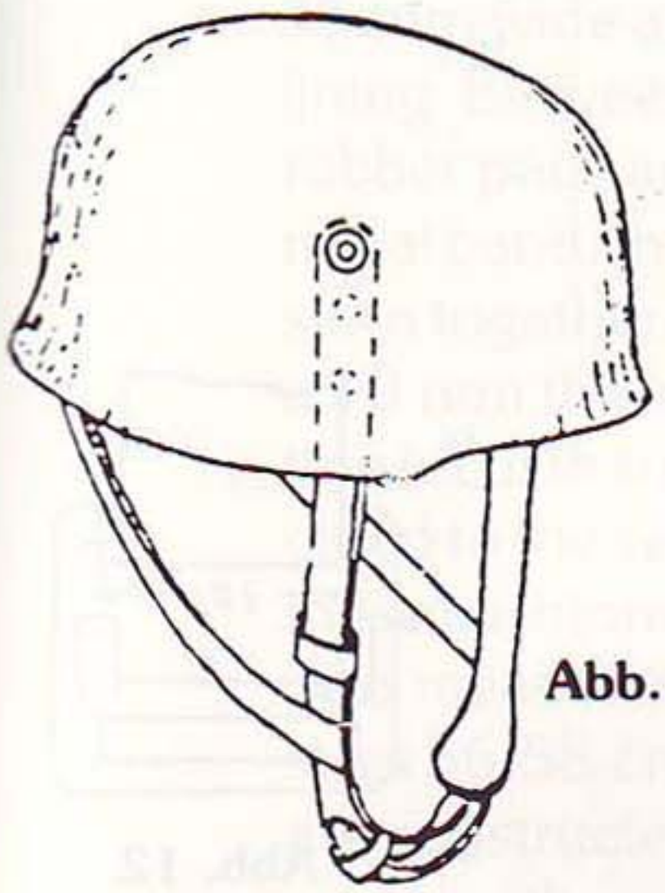


Abb. 4

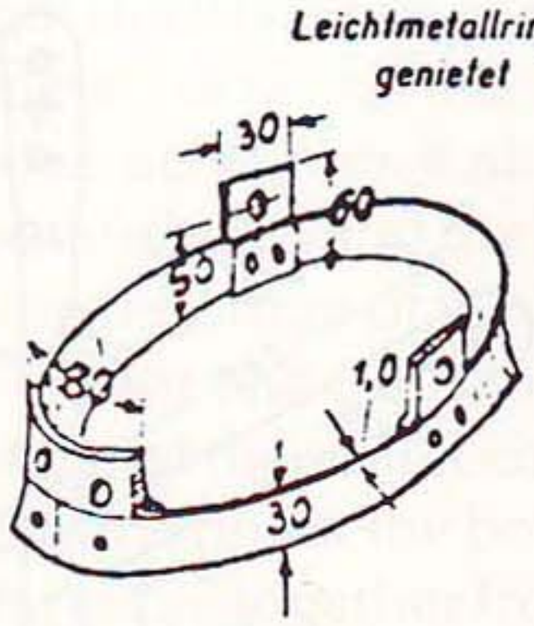


Abb 5



Abb. 6

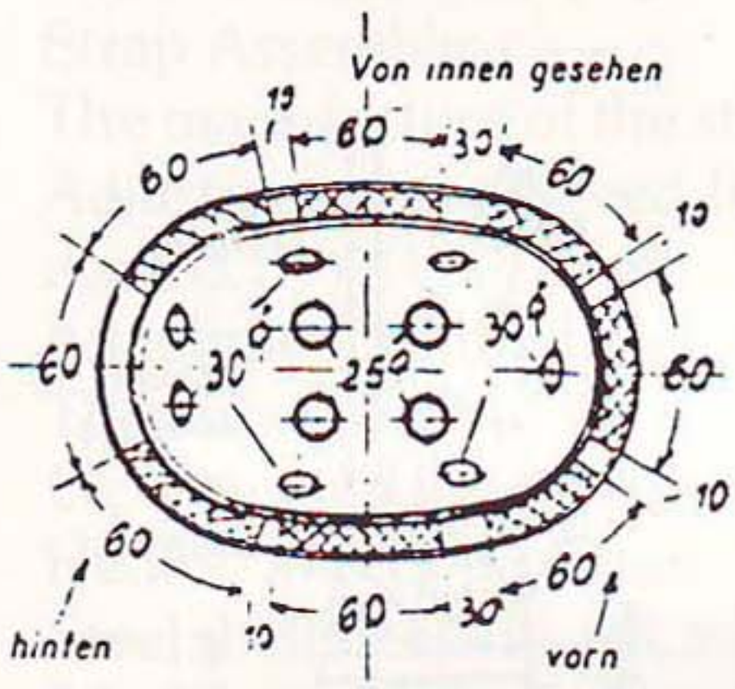


Abb. 7

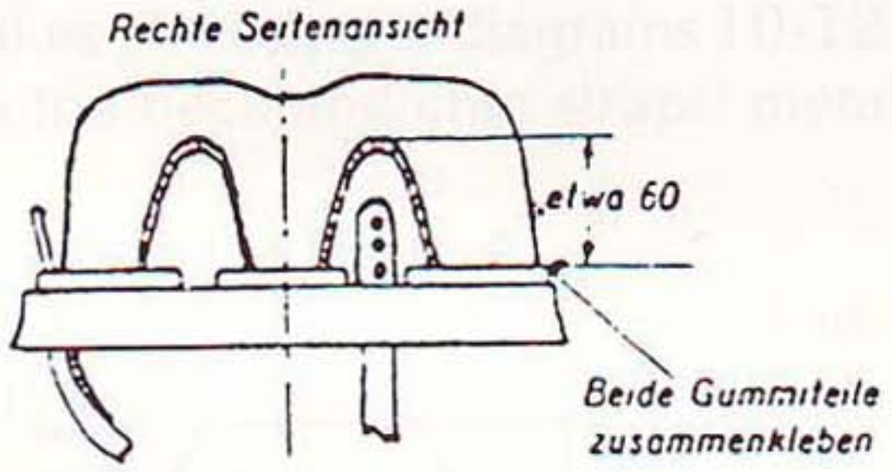


Abb. 8

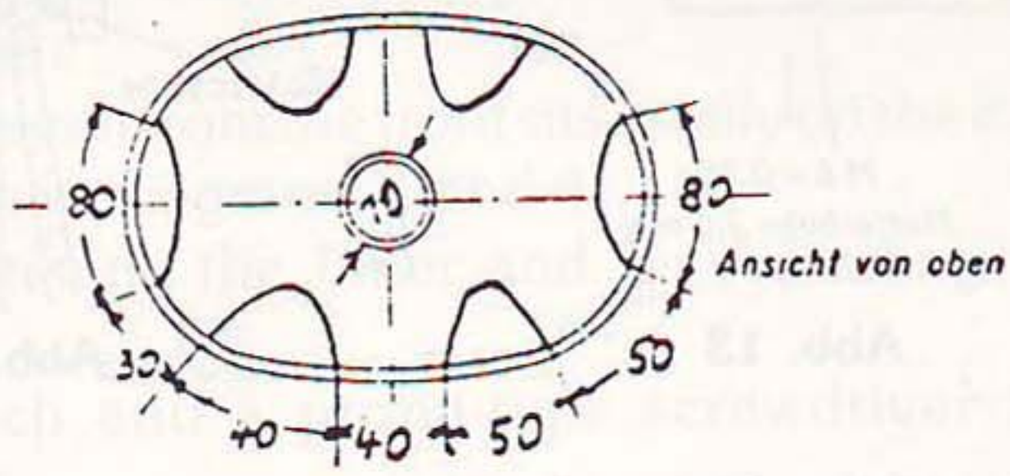


Abb 9

mately 4 mm. Diameter of the bore is approximately 3.5 mm. Two holes, 2 mm in diameter, are bored through the bolt for the use of a prong-type screwdriver (see diagram 14).

b) four lock washers made of steel (FZA M8).

c) four nuts made of brass (M6 x 0.75), wrench diameter of 14 mm (see diagram 14).

B. Helmet Color:
field grey.

C. Shape:
dome-shaped, oval with smooth vision cut-out like that in the sealed test (see figures 1-4).

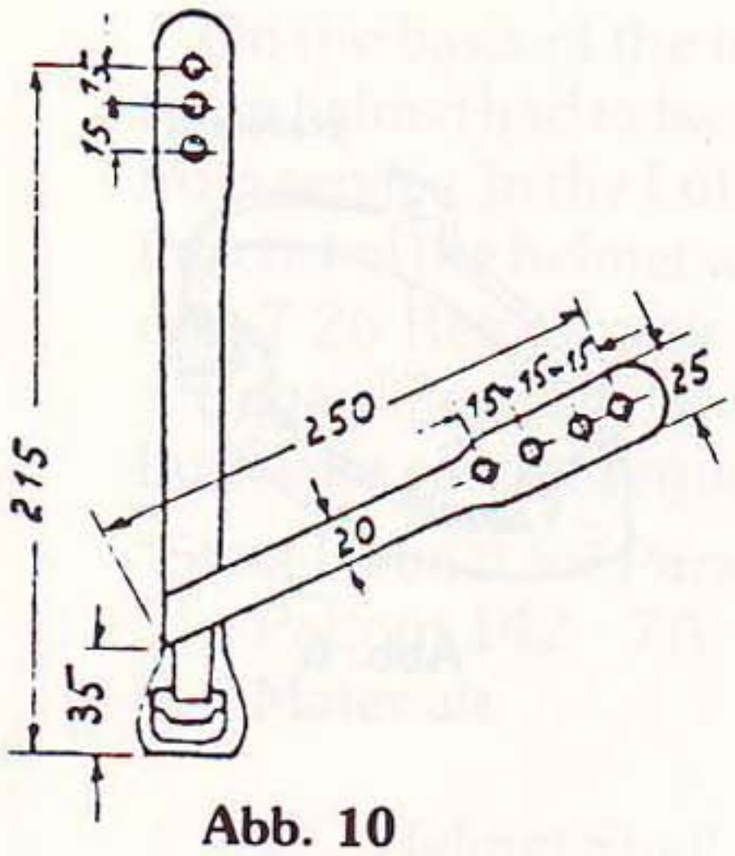


Abb. 10

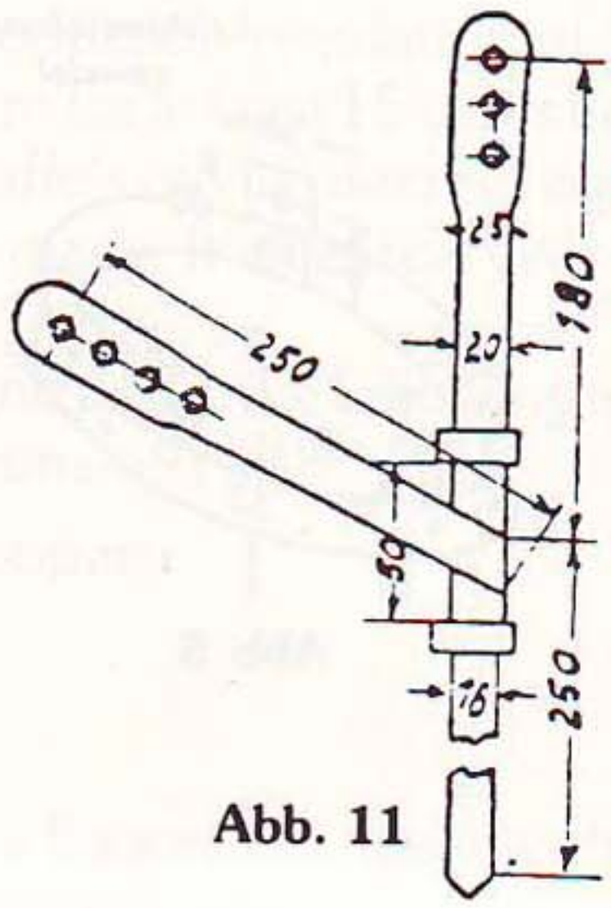


Abb. 11

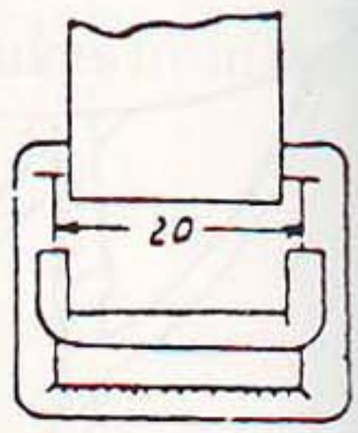


Abb. 12

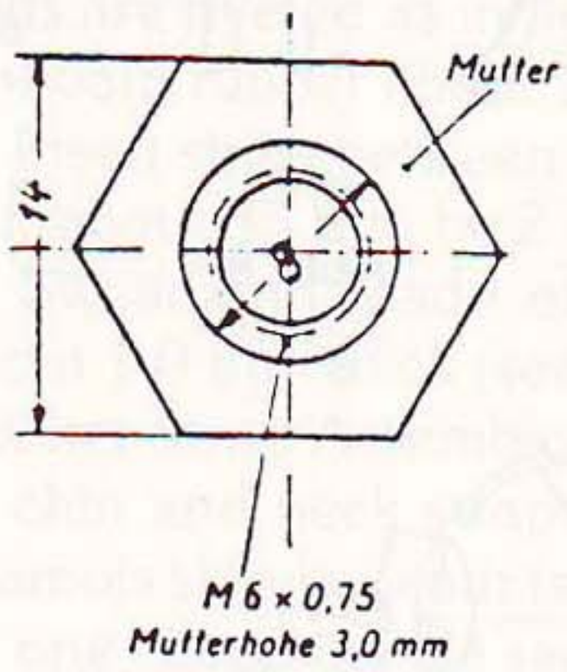


Abb. 13

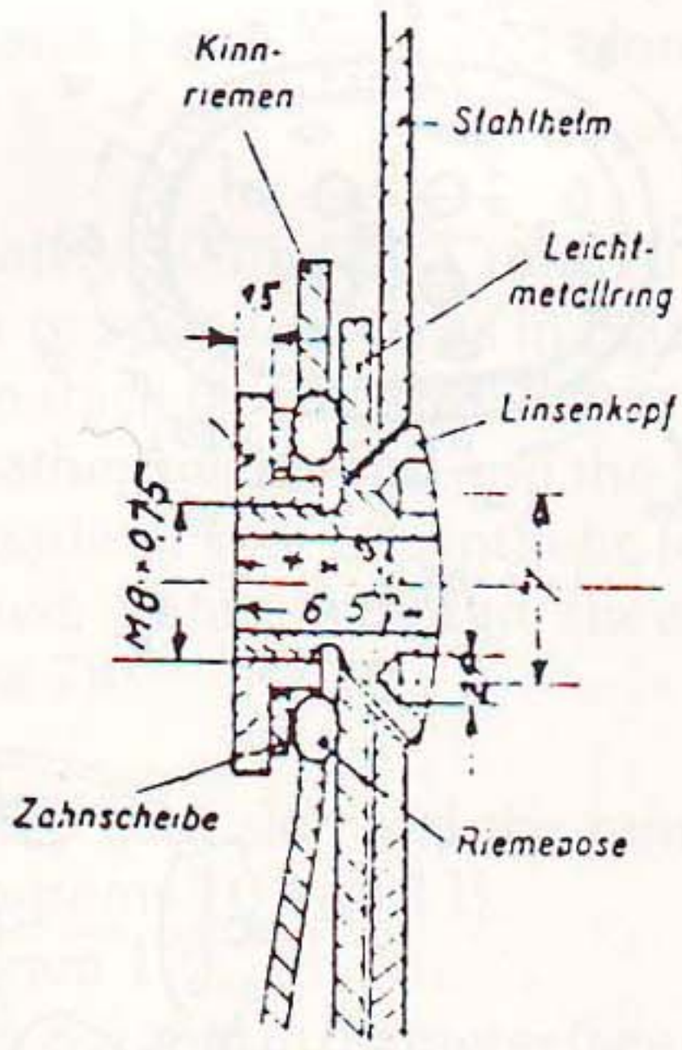


Abb. 14

D. Description of the Helmet's Design:

1. Steel Shell:
   The shells are one-piece stampings in sizes 66, 68, and 71. The lower rim is crimped inward about 4 mm. The liner and strap attachment is accomplished by the four convex bolts with a 6 mm diameter (see diagrams 2-4 and 14). Both service insignia are located directly beneath the side bolt openings. The four liner-retaining bolts are bored through in a lengthwise manner so that they may serve as ventilation holes, as well.
2. Liner System:
   The attachment between the steel shell and the liner assembly takes place through an aluminum alloy ring which is fastened to the liner and has the same shape as the inside of the helmet shell (see diagrams 5 and 6). The leather sweat lining is shaped to fit the cranium and is equipped with four vent holes of 25 mm diameter and seven of 30 mm diameter (see diagram 7). A support strip

35 mm wide and 2 mm thick is inserted at the bottom of the sweat lining. Between the metal band and the leather lining, seven foam rubber pads are fitted to act as shock absorbers. At this point, the metal band, the rubber cushions and the balance of the liner are all sewn together. The upper portion of the head is also cushioned by a 10 mm thick foam rubber pad (see diagrams 8 and 9). This section is cut in such a way that the shank ends match up with and are glued to the seven rubber strips at the bottom of the liner. Some of these cushions may be glued together from several smaller pieces. The measurements stated in diagram 7 are only valid for head sizes 56-58 cm and for helmet size 68 cm. The seven rubber pads are constructed so that they are more than 10 cm thick for size 56 and less than that for 58.

3. Strap Assembly:
   The manufacture of the straps takes place as per diagrams 10-12. Adjustment is achieved by both the neck and chin straps' metal eyelets.
4. Attachment of the Liner and Straps to the Helmet:
   The dimensions of the nuts and bolts are seen in diagrams 13 and 14. The attachment of all parts is seen in diagrams 3, 4, and 14.
5. Helmet and Liner Sizes:
   Steel shell sizes: 66, 68, and 71. Head sizes: 53, 54, 55, 56, 57, 58, 59, 60, and 61. For head sizes larger than 61, specially-made helmets must be supplied. For sizes smaller than 53, the interior cushioning may be made thicker.

E. Method of Wear:
   The helmet as seen from the front sits levelly on the head. The strap closure is seen in diagrams 3 and 4.

F. Tools for Fastening the Liner and for Adjusting the Chin and Neckstraps:
   14 mm wrench and a prong-type screwdriver for the liner-retaining bolts.

G. Weight of the Complete Helmet:
   Approximately one kilogram (2.2 pounds).

The Helmet Band

A helmet band was introduced at the same time as the helmet and like the helmet it belonged in the category of "special equipment." The maneuver band was described as follows:

> "A double-sided, woven band, red and yellow in color (Atlas Binding), 4 cm wide with an approximately 2 cm long triangular point at one end and a friction buckle at the other end. The overall length is approximately 75 cm.
>
> The friction buckle is made of matte colored aluminum alloy wire, sweated together in the center of the long side and sewn in place with a 4.5 cm seam. The

exposed long side is depressed. The movable, flat, center bar is 4.8 cm long and its ends are folded around the short sides of the buckle. The length of the buckle is 4.6 cm and its width is 1.1 cm.

A grey strap, 1.5 cm wide and 8 cm long is positioned in the inner fold of the helmet band, immediately next to the stitched-in buckle's long side in such a way that it extends about 2.5 cm below the band. This measurement discounts the length of the hook on the end of the strap.

In addition, three other grey straps of the same dimensions are attached to the helmet band in such a way that their spacing insures secure attachment to the helmet. Pockets 1.7 cm wide are woven into the band to accept these straps. After the straps are inserted into the pockets, they are then stitched around the edges and crosswise. A matte-grey painted, spring steel hook is attached to the end of each strap with linen thread.

The helmet band is conically woven (2 cm cone). Positioning: the band lies beneath the air vents; the hooks are fastened under the border of the helmet.

The helmet band's pointed end is to be secured through the friction buckle in the following manner: the pointed end is to pass through the buckle near the sewn seam. It is then drawn around the vertical, sliding shank and is then inserted through the other side of the buckle. After this, the band is placed on the helmet and is drawn tight.

Weight: approximately 20 grams."

Willi Duchow



Oberjäger Willi Duchow wearing the red/yellow maneuver band over his olive green helmet cover.

On 16 June 1938, the pattern description was slightly modified in several areas:

"2. Liner System:
a) aluminum alloy band about 30 mm x 1 mm with attachment shanks.
b) sponge rubber about 10 mm thick for sizes 53, 54, 55, 57, 58, 60 and abut 13 mm thick for sizes 56, 59, and 61.

3. Straps:
c) twelve metal eyelets with an 8.5 mm inner diameter.

4. Attachment of the Liner and Straps to the Steel Shell:
four convex steel bolts, each with two nuts in accordance with the designation.

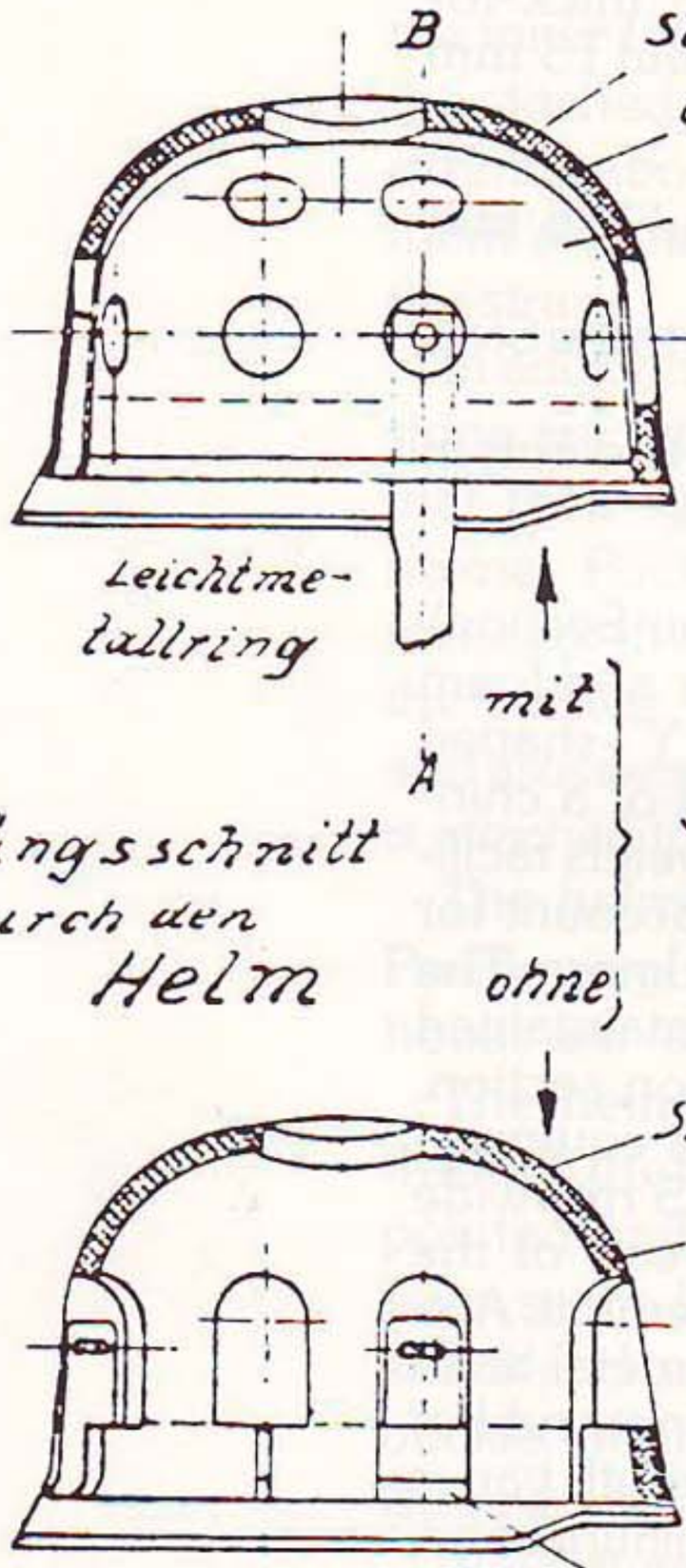
D. Design

2. Liner System (see also Designation Section)
The liner system consists of a leather and foam rubber shell for the head and two "Y"-shaped enclosure straps. Each strap consists of a chin-strap and a slanted neckstrap. The eyelets facilitate the adjustment of the straps to account for ear length, face length, and neck thickness. The thickness of the hollow rivets is to be maintained exactly as described in the designation section. The sweat lining is cap-shaped and is equipped with vent openings. An insert about 35 mm wide and 2 mm thick is attached to the end of the leather lining and serves as a reinforcement. Acting as shock absorbers between the metal band and the sweat lining are seven sponge rubber cushions about 35 mm high. Their length varies according to the helmet size. The aluminum band, rubber cushions, and the inner liner assembly are all stitched together. The upper portion of the head is protected by a further foam rubber pad about 10 mm thick. The shank ends of this pad are glued to the seven rubber strips using a rubber solvent. This rubber pad may be made of several pieces attached to form a unit.

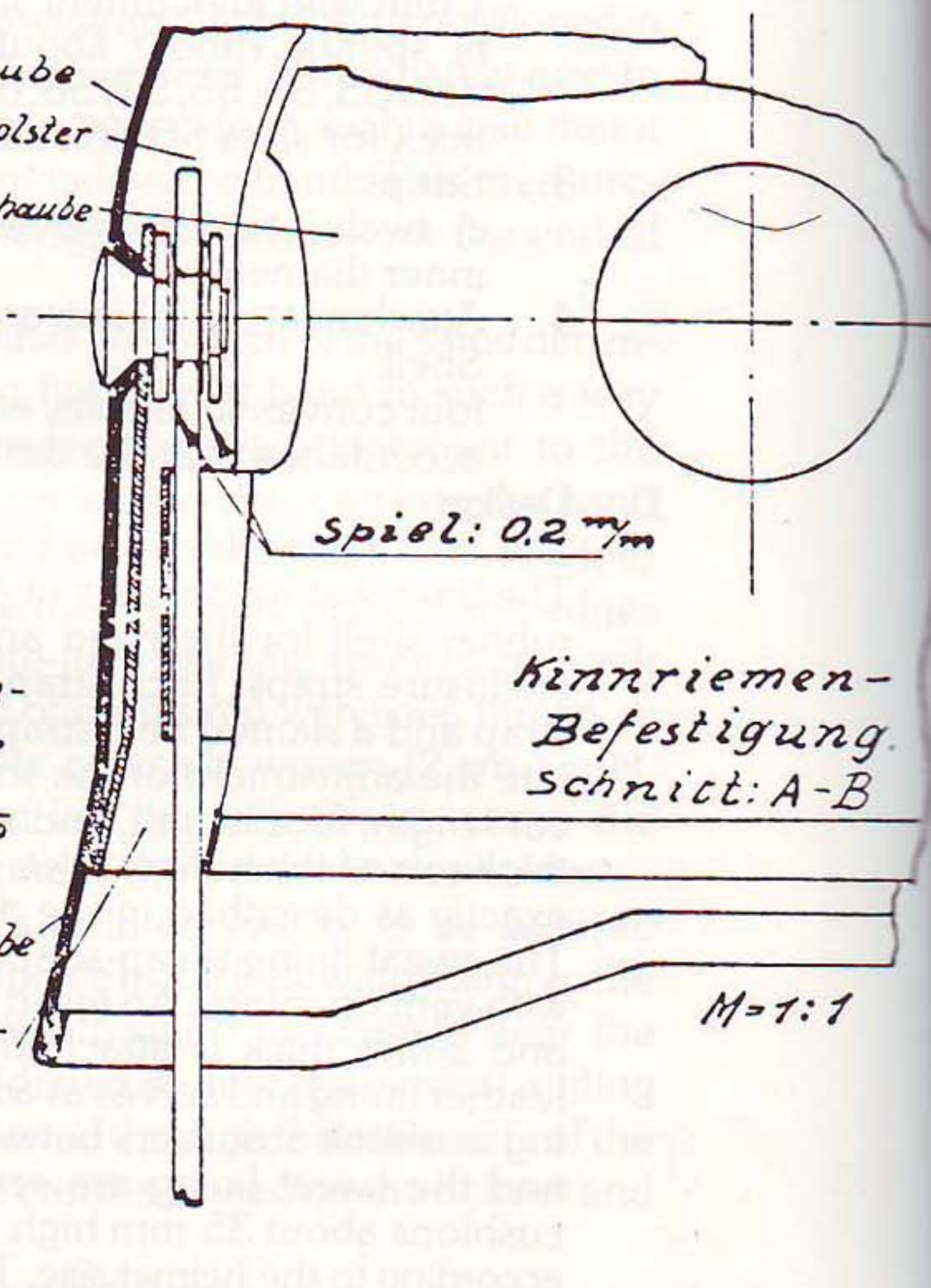
3. Installation of the Liner in the Helmet:
The chin and neckstraps must be installed in such a way that they do not interfere with the ears of the wearer. In order to insure the proper positioning of the helmet, the ends of the leather straps are to be drawn through the sleeves provided. The neckstraps are to be so attached that they cross beneath the lower edge of the metal band. The metal band is then pressed into the shell and is fastened with the four bolts. Now the ends of the straps are to be correctly adjusted by means of the second set of threaded nuts. The straps must be allowed to pull lightly on the eyelets."

Stahlhelm für Fallschirmschützen

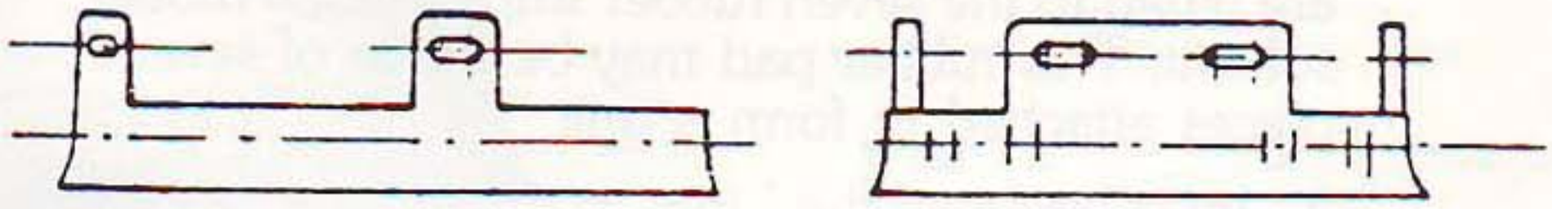
Baumuster: 142—7 A



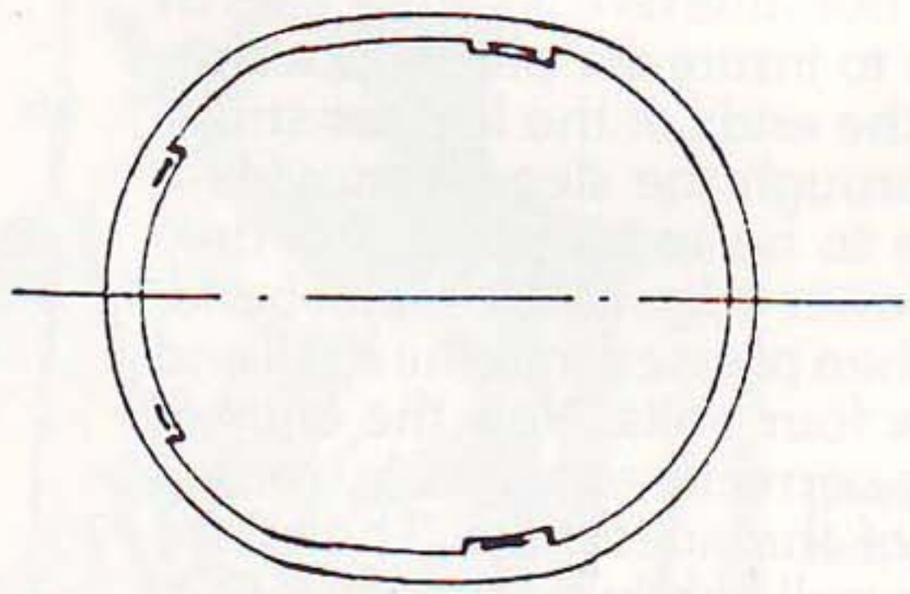
Längsschnitt durch den Helm

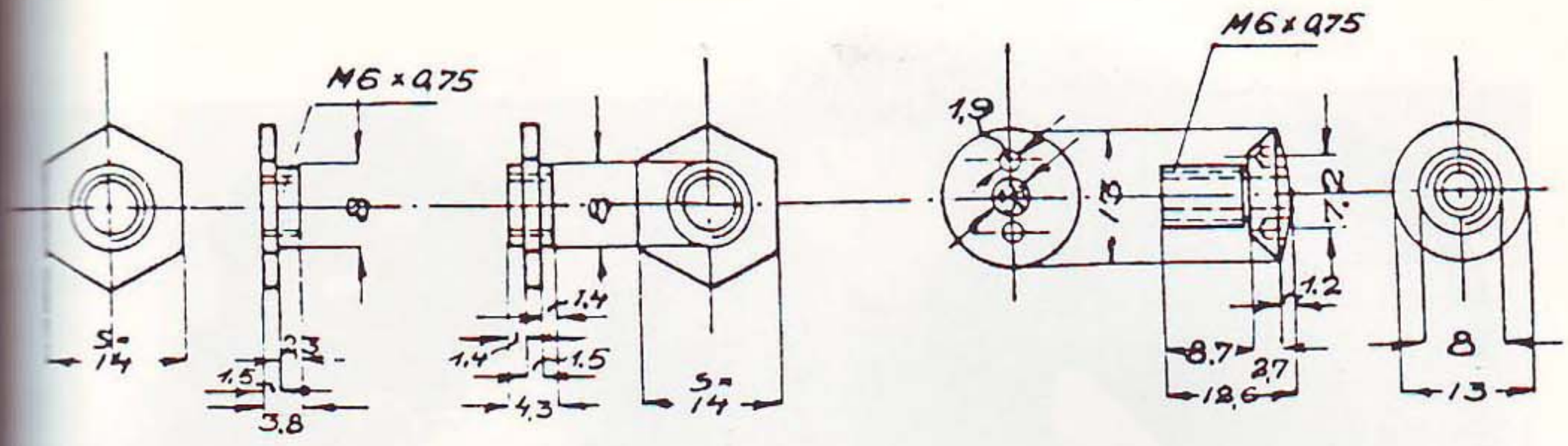


Kinnriemen-Befestigung
Schnitt: A-B
M=1:1



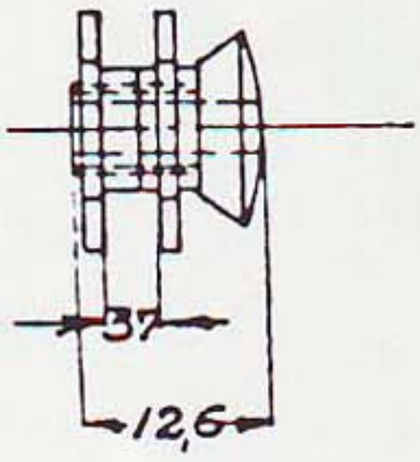
Leichtmetall-Ring
[7 m/m Al weich]
M=1:5

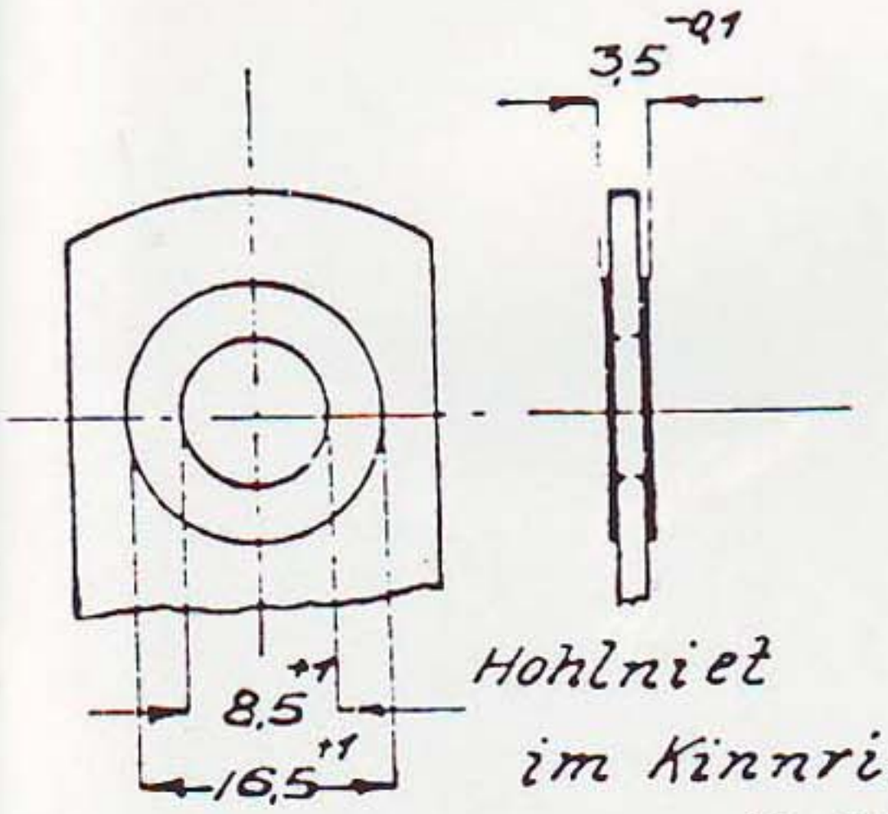




Kinnriemen-Befestigung

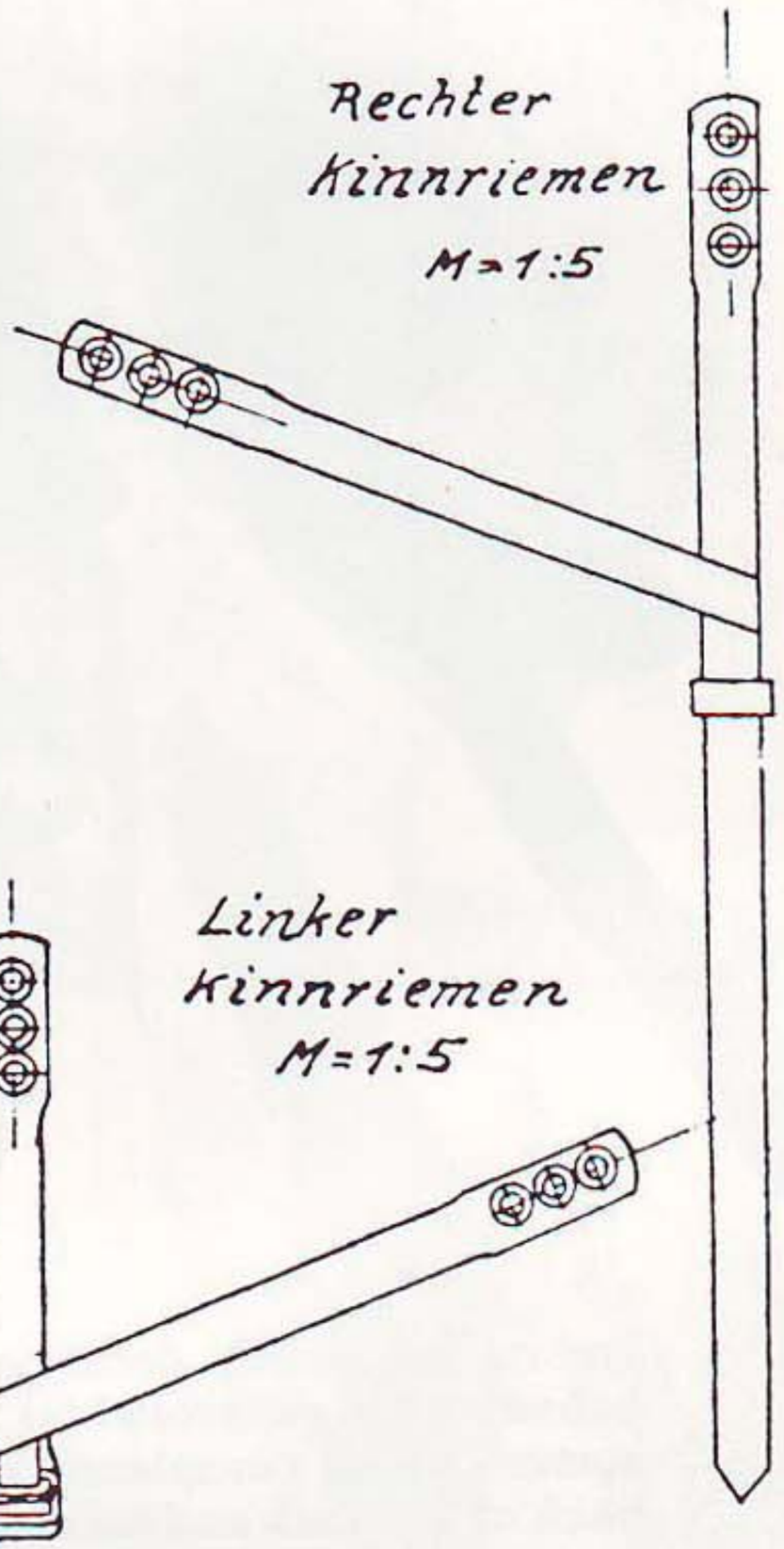
M - 1:1



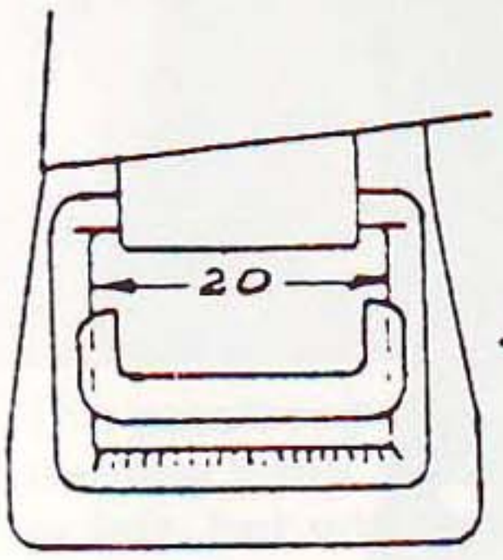


Hohlniet
im Kinnriemen
M=1:1

Rechter
Kinnriemen
M=1:5



Linker
Kinnriemen
M=1:5



Schnalle
am Kinnriemen.
M=1:1



2nd model, double decal paratrooper helmet with experimental chinstrap system which completely covers the back of the neck and ears (note flared openings for hearing).



The paratrooper above helps boxer Max Schmeling roll up his parachute after a training jump. Note he wears a helmet with full neck and ear cover, similar to that at left, but with a grommetted hole by the ear for hearing.

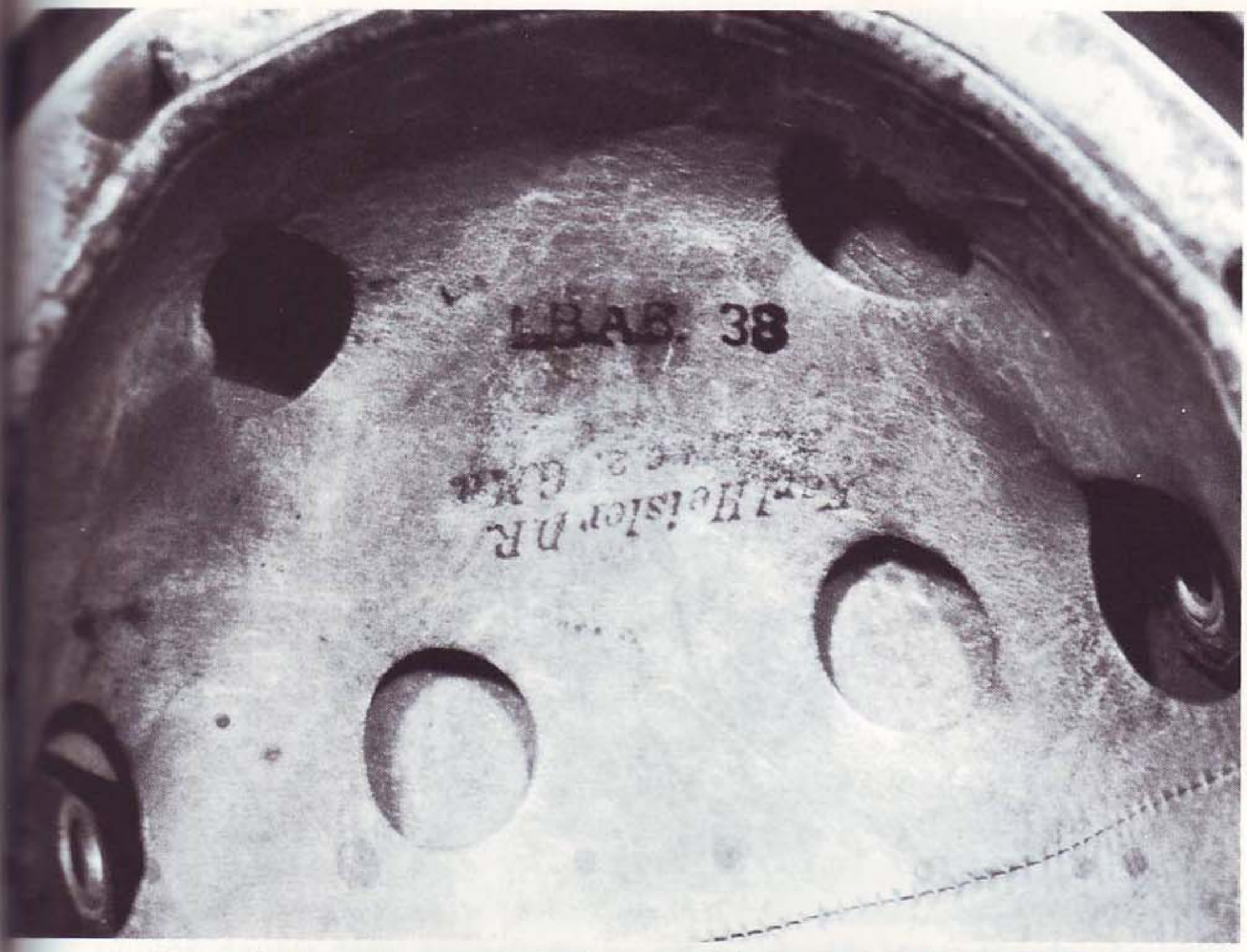


G. Petersen

Double decal helmet with 2nd style Luftwaffe eagle.

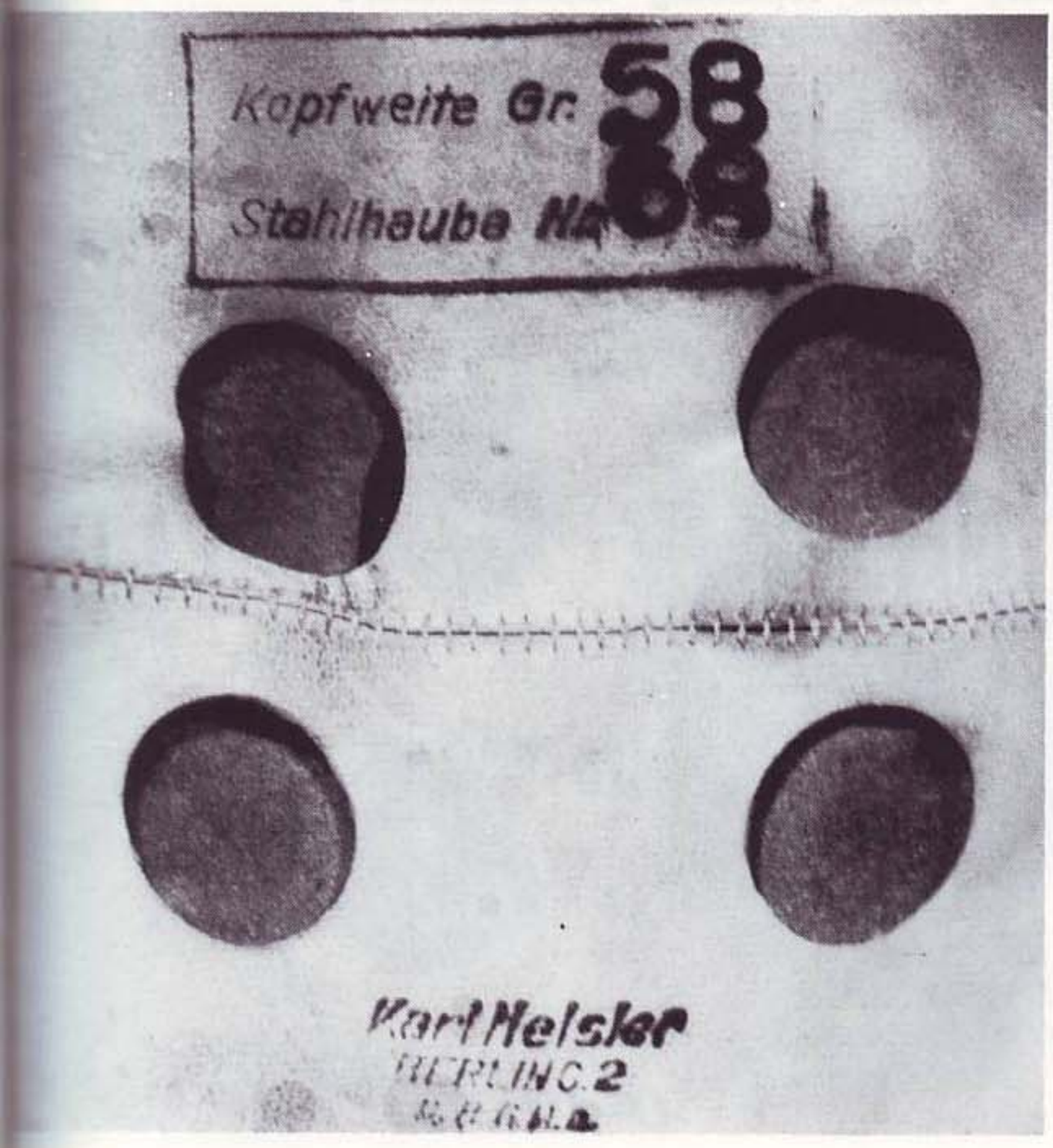
Originally, the leather liner was made of sheep leather, but on 19 March 1940, the Luftwaffe Minister and Supreme Commander of the Luftwaffe decreed that pigskin could be used as a replacement, if necessary. Also, the use of jointed, multi-piece pigskin was permitted. The glue points had to be pared down and only a waterproof glue (Cohesan) was to be used. Pre-war liners were marked with the makers' name along with the luftwaffe clothing office acceptance stamp and year of manufacture. Liner and helmet shell sizes were also normally found. Early war helmets were marked similarly but sometimes without the acceptance stamp. In late 1942, the Reichsbetriebsnummer (factory code number) was introduced and replaced the makers' name and address. The liner and helmet shell size continued to be stamped on the liner.

The paratroop helmet chinstrap, as adopted in 1938 for the 2nd model helmet, was adjustable to the wearer's basic head size. According to the official drawings of the new 2nd model helmet on page 216, the first chinstraps did not have the snaps on the end to hold it in place. It is assumed that this early strap did not acceptably hold the helmet in place so the snaps were added to the end of the chinstrap. The few helmets found with this chinstrap without snaps are of the late war variety and leads to the speculation that this style was again manufactured or that old stocks were used as an economy measure.



G. Petersen

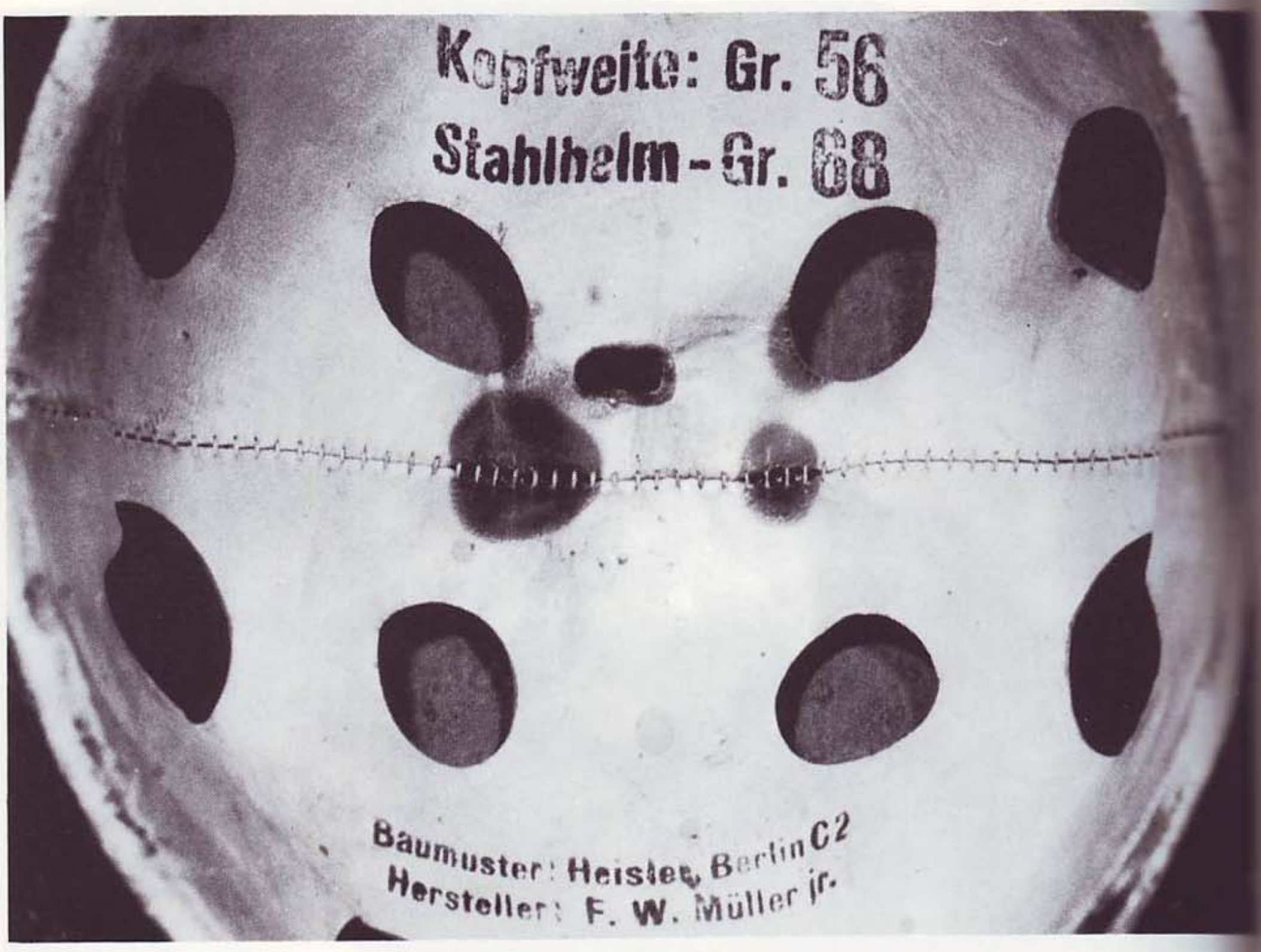
1938 dated helmet liner with "Luftwaffebekleidungsamt (Berlin)" stamp, which was used in pre-war helmets.



G. Petersen

Example of liner markings used in early war helmets.

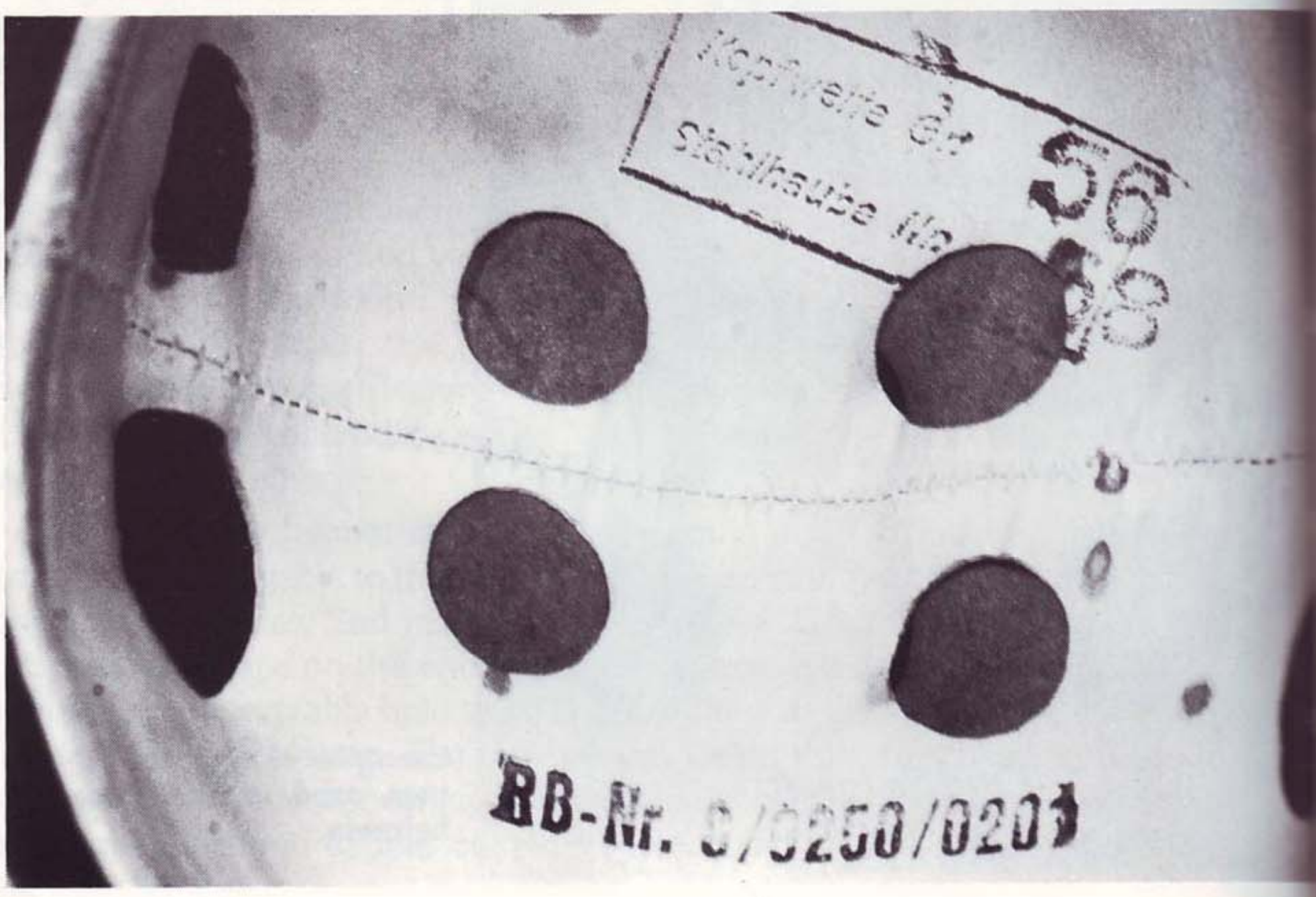
G. Petersen



Above: Another example of early war liner markings.
Below: Liner with "RB"* number, believed to be used from late 1942 to the end of the war.

***Reichsbetrieb (factory code replacing manufacturer's name/address for security reasons).**

G. Petersen



Since the late war paratroops were not on jump status and fought basically as ground soldiers, this less reliable chinstrap was sufficient.

Three basic styles of liner bolts were used in the 2nd model paratrooper helmet (the 1st model had the standard split pin attachment as in the M1935 helmet). The first type was a hollow-bored "spanner" bolt with an air hole for ventilation. Since a special two-prong spanner wrench was not always available, helmets with this bolt were sometimes hard to repair. Thus, a second type was adopted with an air hole and slot that could take a standard screwdriver. Finally, a third type was developed and used in later war helmets (and as a replacement on earlier helmets) in the form of a slotted bolt with no air hole. These bolts were held in place with lock washers and a nut, and later with two nuts.

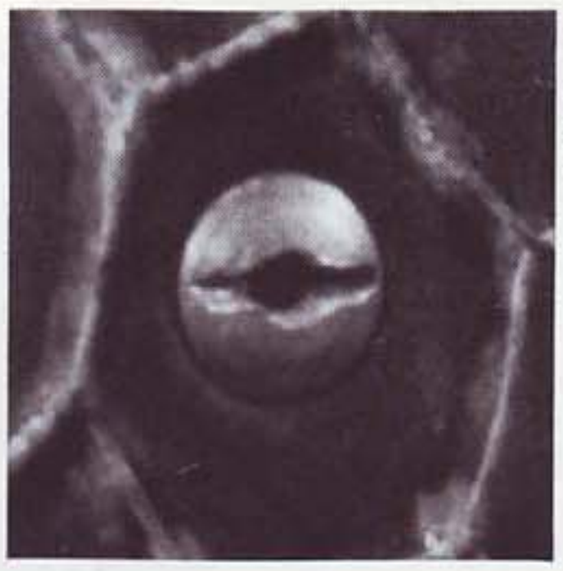
During combat action in Holland and Belgium, some paratroopers desired a rougher textured finish on their helmets and achieved this by sprinkling sand or sawdust over a coat of moist paint and then overspraying the helmet again. This practice became popular and was used on all fronts during the war.

Although the initial order stated that helmets were to be finished in field grey, an order dated 12 June 1940 decreed that the surface was to be painted blue-grey and was to have a slightly rough textured finish. That same order stated that the national colors were to be removed from the side of the helmet for the duration of the war. This was not always adhered to, especially by units not engaged in combat, i.e. training and garrison home station units. In period photos, double decal helmets can be observed worn late in the war, probably because a paratrooper from a home garrison unit had been transferred to the front or older stocks of helmets were issued because of pressing war conditions.

Front line conditions required some form of camouflage to be added to a soldier's helmet. Until paint was issued to add texture to the helmet's surface,



Early spanner bolt. The very first versions were of brass, later steel.



G. Petersen

Mid-war vented and slotted bolt (aluminum).



Late war solid, slotted bolt (initially made of aluminum, later steel).



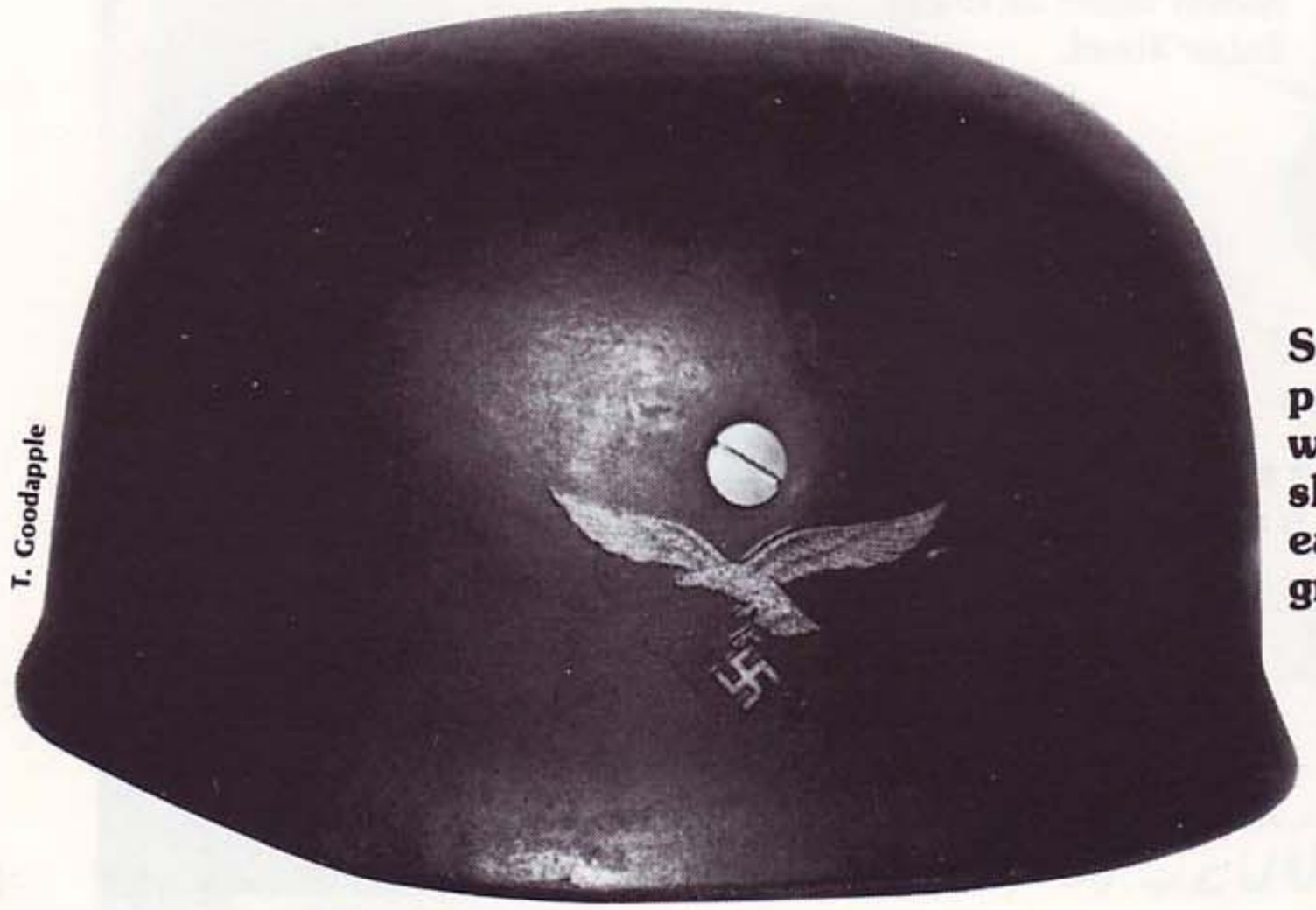
J. Bandy

Single decal paratrooper helmet with early spanner bolt.



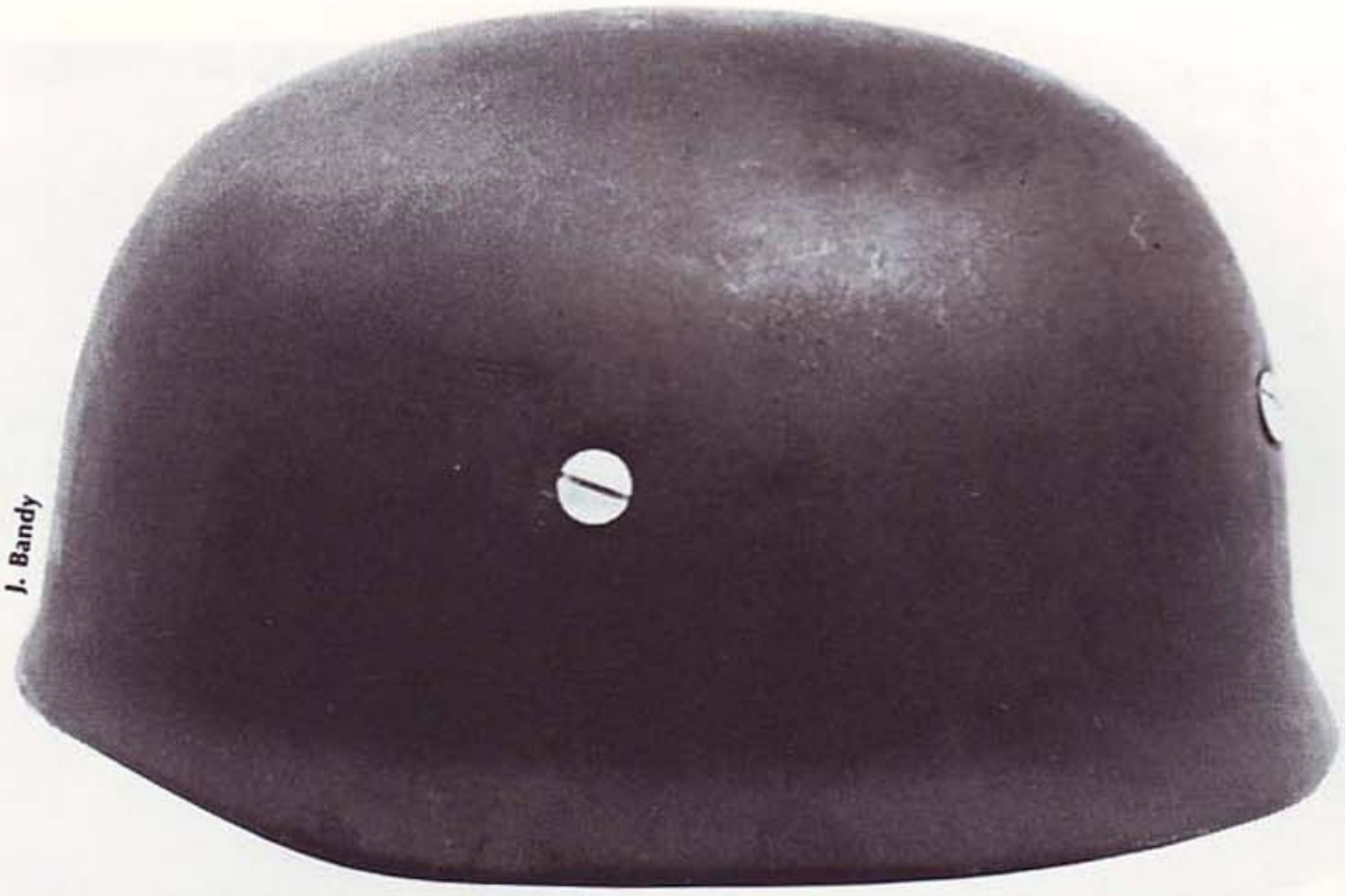
J. Bandy

Single decal paratrooper helmet with mid war vented and slotted bolt.



T. Goodapple

Single decal paratrooper helmet with late war, solid, slotted bolt. Luftwaffe eagle is subdued blue-green.



J. Bandy

No decal paratrooper helmet with late war, solid, slotted bolt.

paratroopers camouflaged their helmets with earth or any other available material.

In the fall of 1940, an olive-green cover was issued which matched the color of the jump smock. These covers had an additional grey band sewn around the side and a smaller cross band on the top for inserting twigs and foliage, and was held in place by six hooks which attached to the rim of the helmet. In the spring of 1941, sometime before the invasion of Crete, a new helmet cover made of "splinter" camouflage material was issued. It was of the same design as the olive-green model, with side and top bands and held on by hooks. They matched the new camouflage jump smocks which made their first appearance during the Crete invasion.

Later production "splinter" pattern covers were issued with a drawstring rather than the hooks, which tended to break off. The later covers came with both wide and narrow side bands, and with and without the crossed top straps. "Water" pattern camouflage covers were not issued, but it is possible that field-made speciments exist.

The individual paratrooper often utilized any available camouflage material when an issue cover was not available to him. This ranged from Italian camouflage material to captured US camouflage parachute silk to captured British mesh scarfs. During winter fighting, field-made white covers were utilized, but whitewash directly on the helmet was normally used.

Besides the cloth camouflage covers used, a variety of wire arrangements and string netting was utilized. "Chicken wire," which was found throughout Europe, was easy to mold to the form of the helmet shell and was excellent for the attachment of foliage. Heavy rubber bands were sometimes placed over the chicken wire to hold it securely and to attach larger twigs.

Helmets were also painted in a color or colors which blended with the surrounding terrain. In Africa and Italy, shades of tans, yellows and ochre were



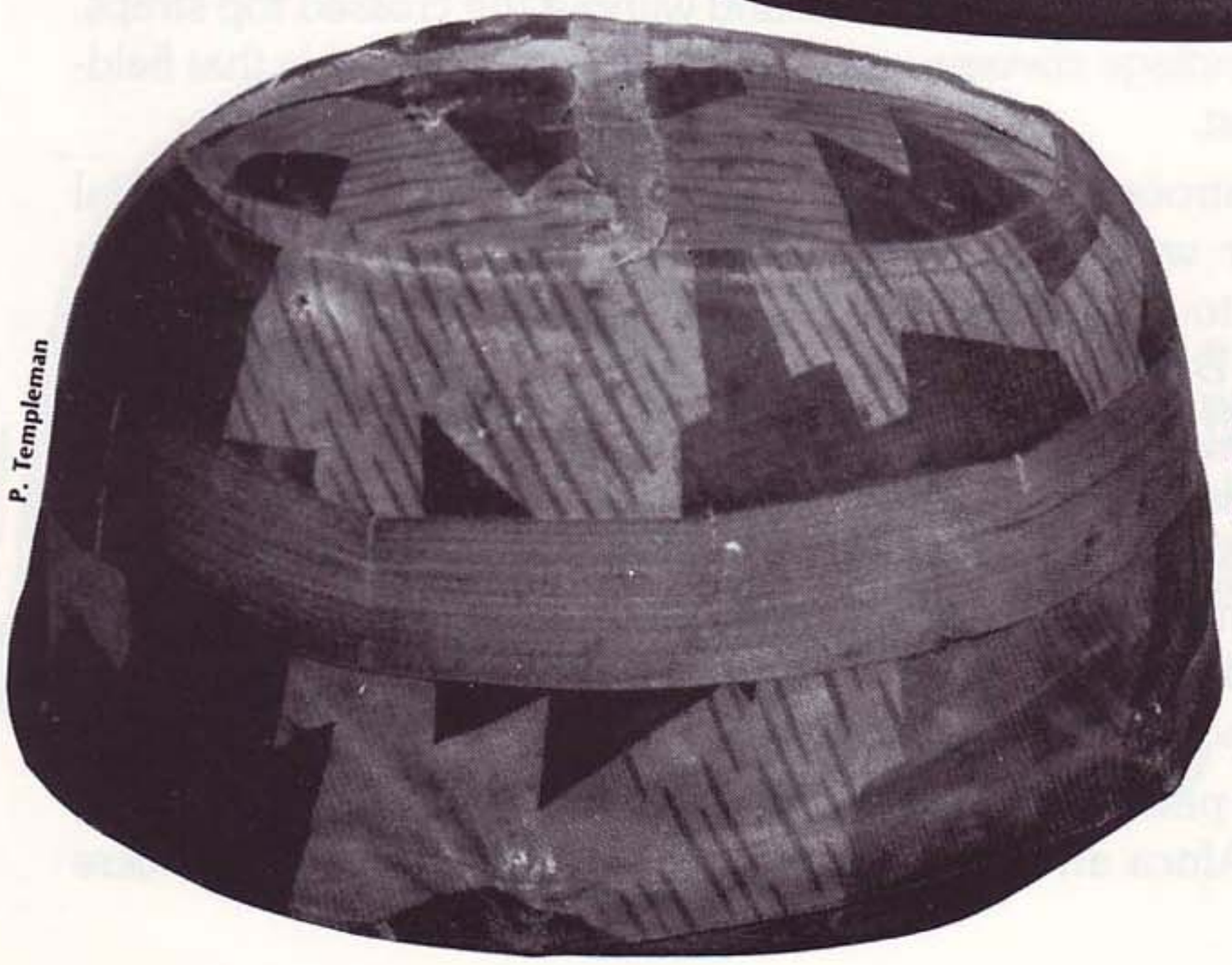
G. Petersen

Olive green helmet cover, 1st model, with hooks.



"Splinter" pattern helmet cover, 2nd model with drawstring.

Came with and without cross webbing on top (see below).



P. Templeman

2nd model helmet cover with hooks and cross webbing on top.



A paratrooper on Crete wearing the 1st model, olive green helmet cover with hooks.

Bundesarchiv



Helmet cover, 2nd pattern with drawstring.



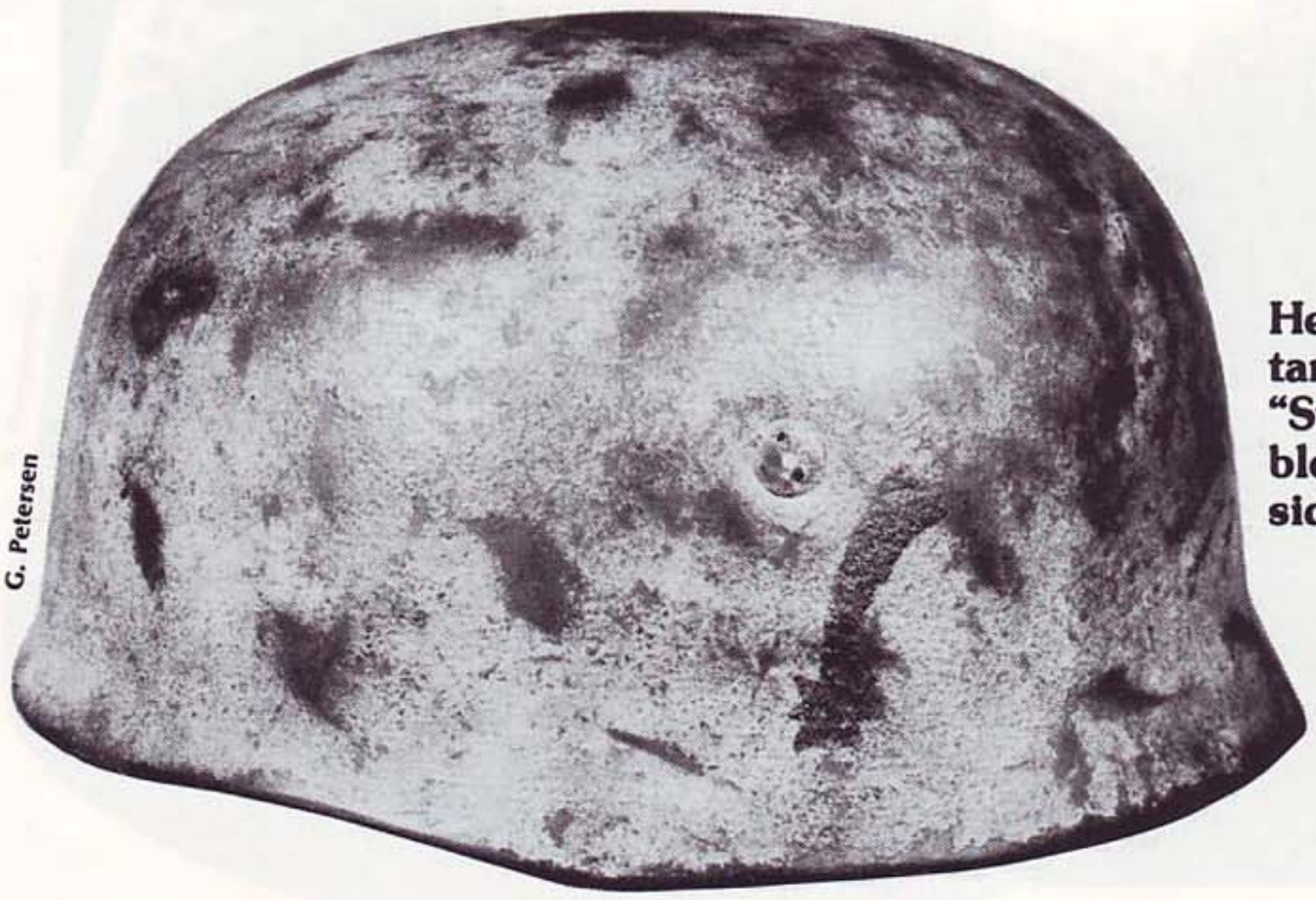
Helmet cover, 2nd model with hooks.



A variation of the 2nd model helmet cover with wider side band. Note the hook attachments and top cross-webbing.

used while white was utilized in Russia and other fronts during winter fighting. Combinations of greens, tans, reds and browns were used in a variety of patterns. These patterns were normally done by the individual paratrooper. Sand or sawdust was often added to the paint to add a rougher textured finish. In some cases, unit insignia were added to the helmet, such as the "shooting star" emblem used by the Sturm-Regiment (later the 4th Parachute Division in Italy).

In the summer of 1944, the Schuberthwerke in Braunschweig produced 90,000 liners which were sent to Thale. The Eisen-und Hüttenwerke A.G. in Thale was thought to be the only producer of steel shells for the paratroop helmet. Most liners were fabricated by the firm of Karl Heisler in Berlin and by the Schuberthwerke in Braunschweig. The Schuberthwerke liners bear the company's Reich Factory Number (RB Nr.) 0/0471/0048. The number 0/0250/0201 stands for Karl Heisler, Berlin.



G. Petersen

Helmet overpainted in tan and green. Note "Sturm Regiment" emblem painted on left side.



G. Peterson

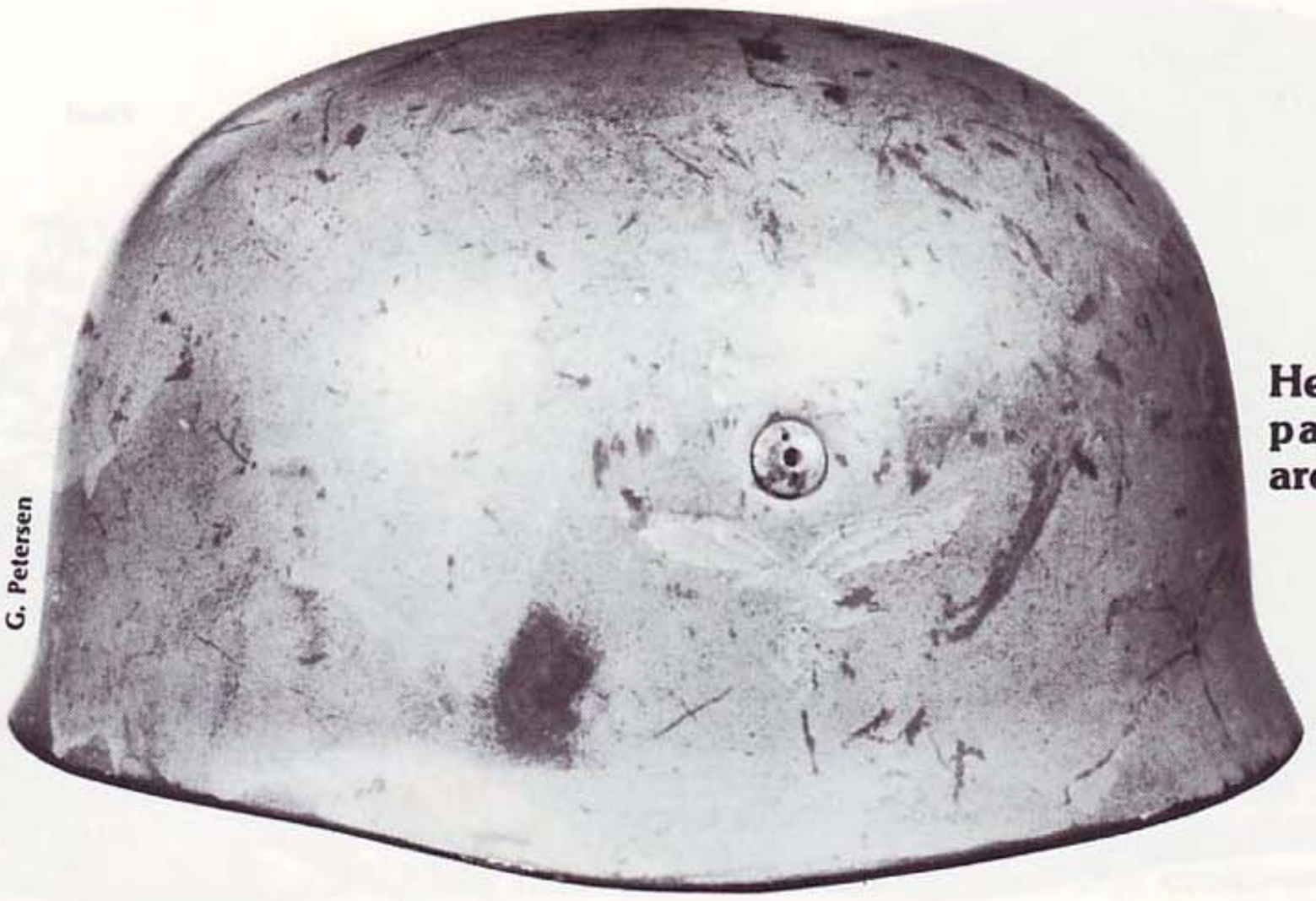
Helmet overpainted in white for winter warfare.

Finzel



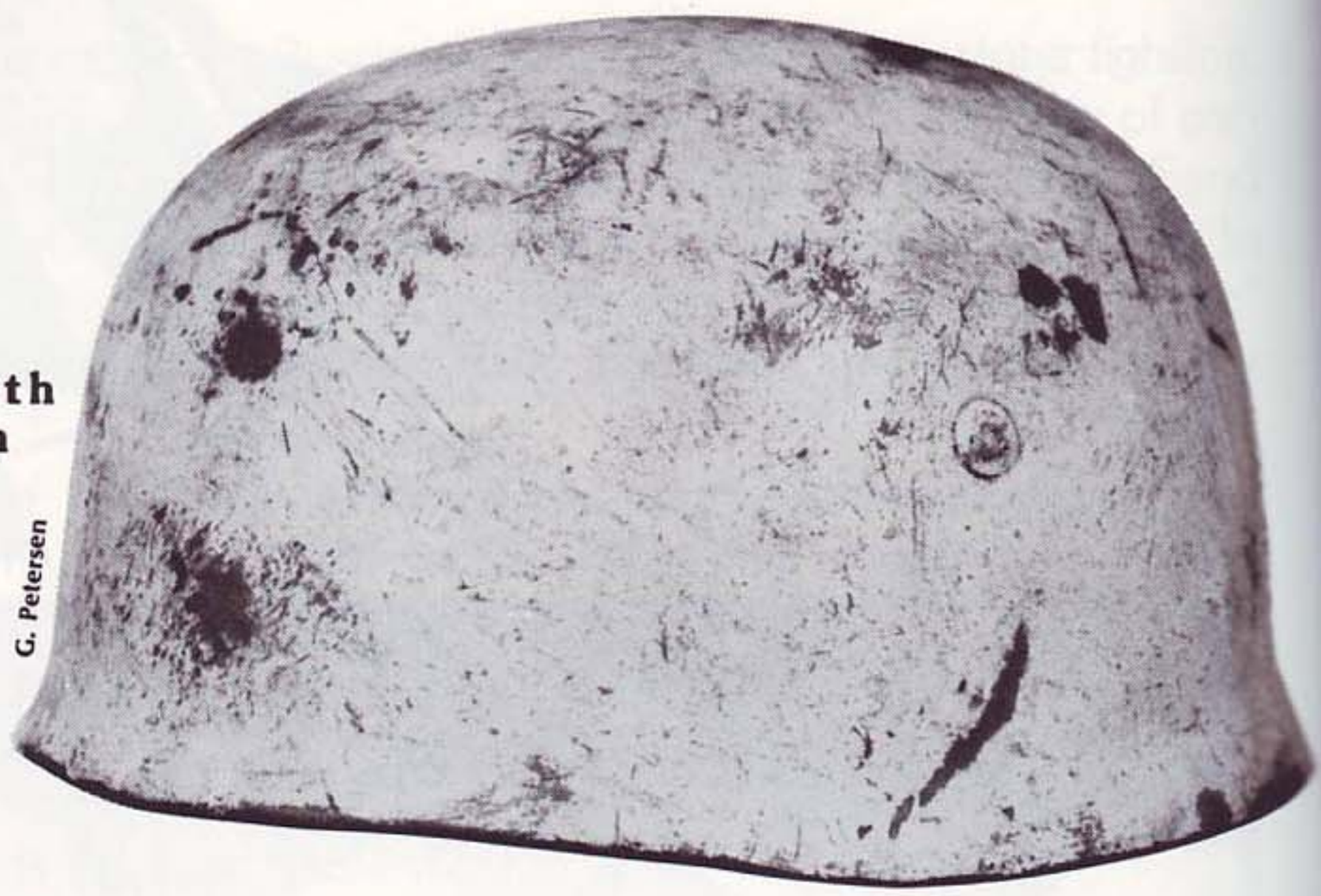


Paratroopers during the Russian winter.



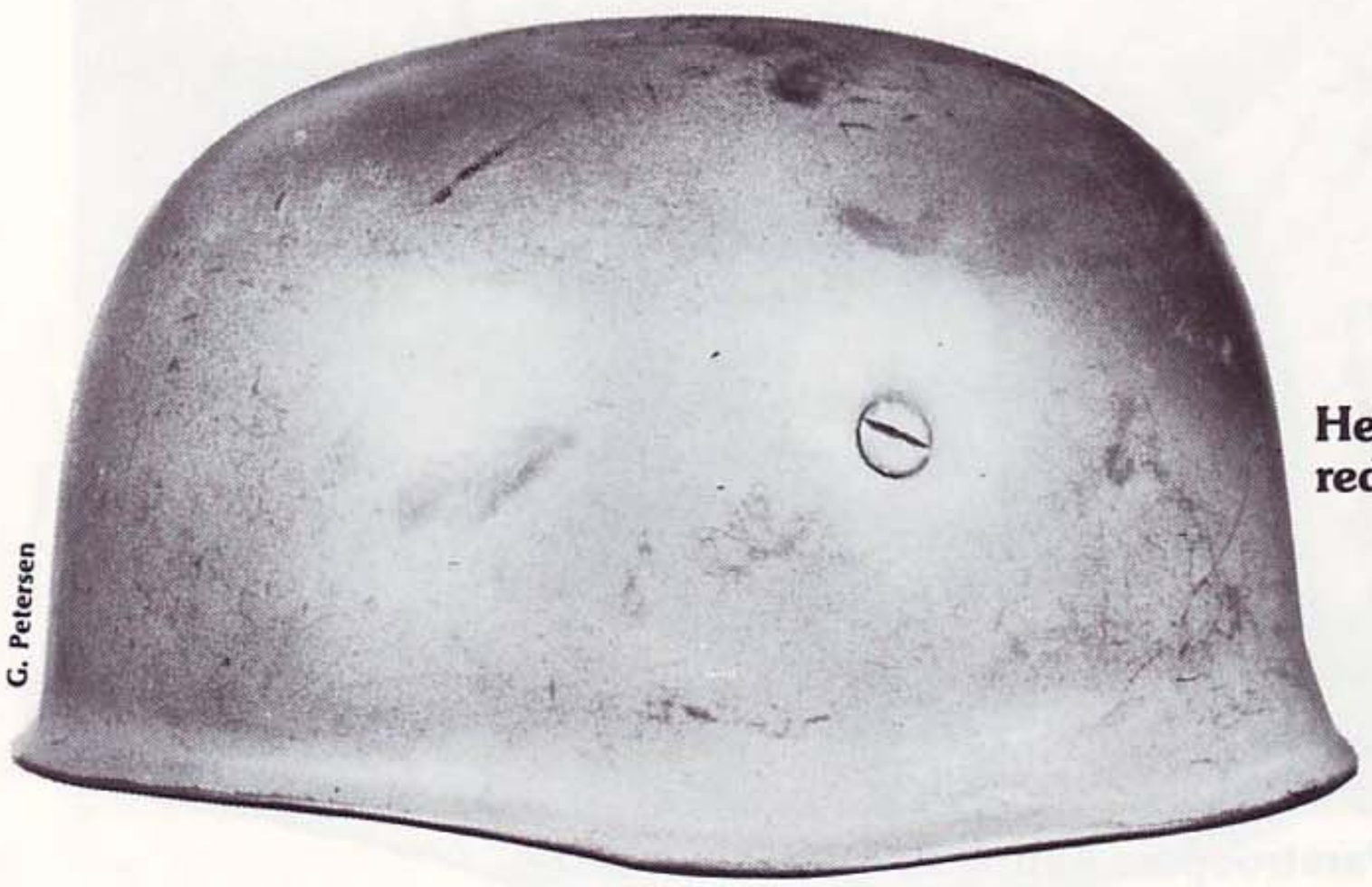
G. Petersen

Helmet with tan overpaint for tropical areas.



G. Petersen

Helmet with yellowish-tan finish.



G. Petersen

Helmet sprayed with reddish-tan paint.

Paratrooper with a helmet in camouflaged colors, Italy.



Bundesarchiv

Bundesarchiv



Helmet with yellow paint camouflage in Italy.



Note tan-painted splotches on helmets above, a pattern used predominantly in Italy.



G. Petersen

Brown, light green and dark green painted rough camouflage finish.



Rough dark green and brown painted camouflage finish.

G. Petersen

Bundesarchiv



Helmet with rough paint finish.

Bundesarchiv



Paratrooper with irregular, multi-colored camouflage helmet.

G. Petersen



Helmet with tan and green irregular splotches.



G. Petersen

Helmet with heavy wire for attaching foliage.



Helmet with cover and heavy wire for attaching foliage.

Bundesarchiv



Helmet with foliage attached.



W. Reuter

2nd pattern paratrooper helmet with hand-painted "cloud" pattern in tan.



Rough tan and green painted camouflage.

G. Petersen



G. Petersen

Dark green sprayed splotches.

Bundesarchiv



Paratrooper wearing 2nd model helmet cover clearly showing drawstring attachment.

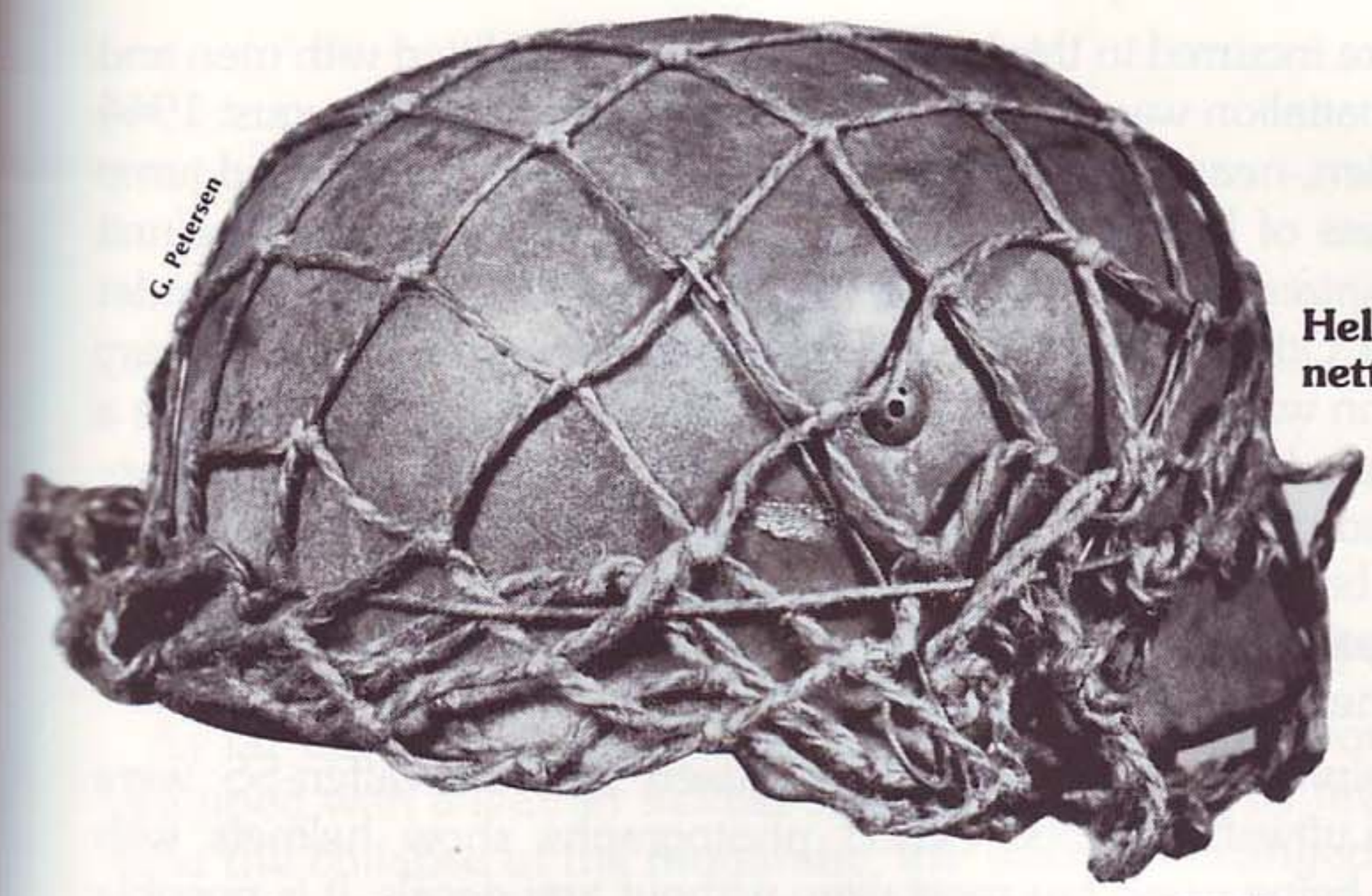
Bundesarchiv



Helmet with cover and heavy wire for attaching foliage.

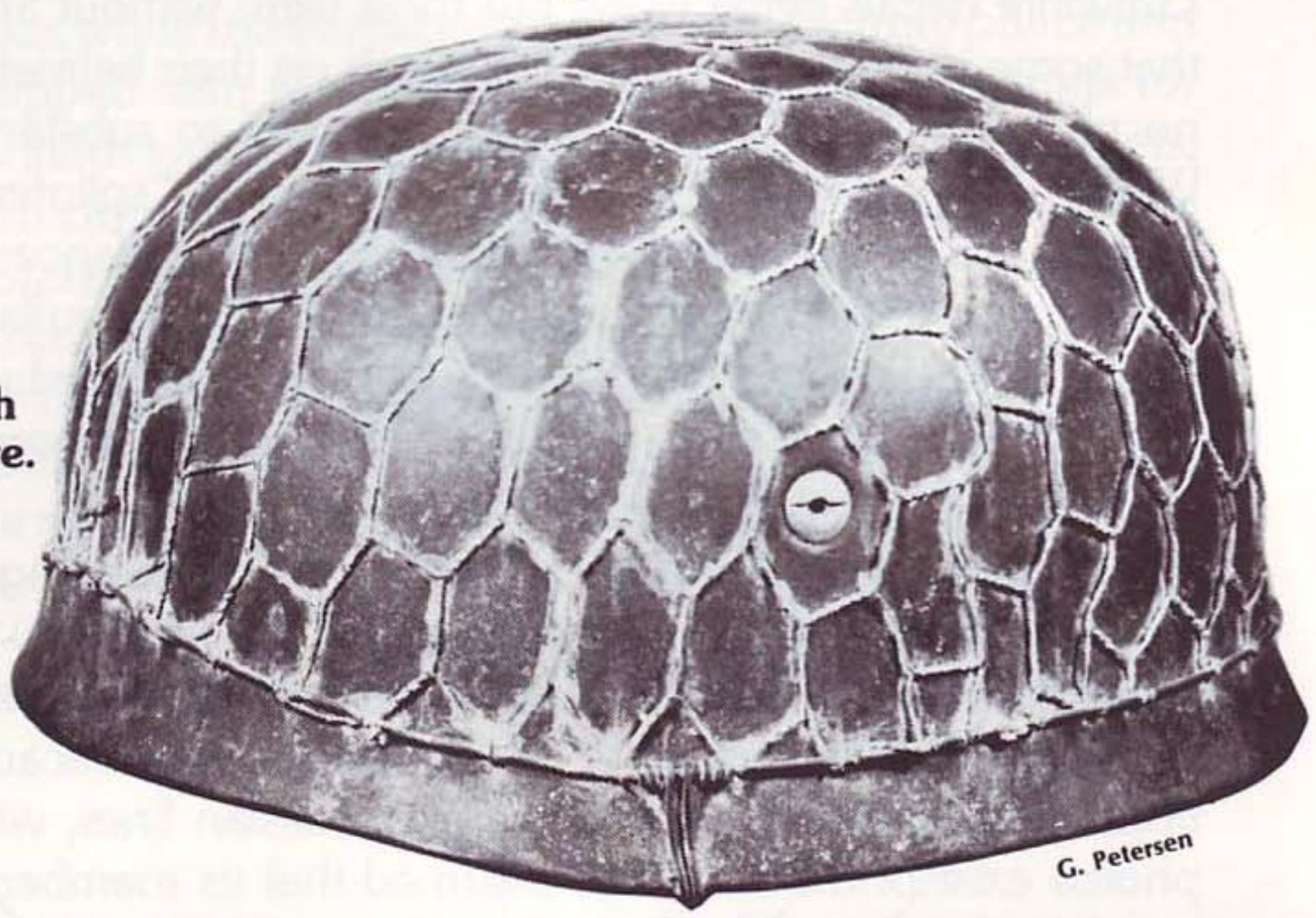
Paratroopers wearing make-shift helmet covers of Italian camouflage material.

In addition to the Luftwaffe paratroops, there were also special paratroop battalions of the Waffen-SS and the Army. In the fall of 1943, a Waffen-SS parachute battalion was established for use in "special missions" and was given the designation number 500. Its members trained at Luftwaffe Jump School III in Kraljevo, Jugoslavia, with later replacements coming from the jump school at Papa, Hungary. In May 1944, the unit's first engagement took place against Tito's headquarters in Dvar, Jugoslavia in a combined parachute/glider attack.



G. Petersen

Helmet with netting.



Helmet with chicken wire.

G. Petersen

Bundesarchiv



Paratroop Military Police wearing netting and chicken wire covers.

Heavy losses were incurred in this battle and after being refitted with men and equipment, the battalion was transferred to the Kurland area in August 1944 and then to Baden, near Vienna, on 14 October 1944 for the planned jump against the fortress of Budapest, an action which never took place. The unit was again reorganized and refitted, given the number 600, and placed under the command of Otto Skorzeny for the Ardennes offensive. In mid-January 1945 the battalion was reassembled at Neu-Strelitz and then sent to secure a Russian bridgehead at Schwedt/Oder. The SS paratroopers were continuously engaged on this front until March 1945 when they were withdrawn, refitted and sent back to the Oder front near Berlin. They fought rearguard actions while retreating toward the Hagenow area where 180 survivors surrendered to the Americans in late April 1945.

All jump equipment, including helmets, used by the Waffen-SS were received from Luftwaffe stocks. Period photographs show helmets with Luftwaffe decals being worn, but most were without any decals. It is possible that some individuals applied SS decals on their helmets, but as of this writing, no photographic evidence has been found to substantiate that assumption. Waffen-SS paratroopers did utilize the issue "splinter" pattern camouflage helmet cover, but again, no photographic evidence exists to support the assumption that helmet covers made of SS camouflage material were ever issued. It should be noted that a number of reproduction covers, made of original Waffen-SS camouflage material, have appeared on the US collectors' market in the late 1970s.

A small number of Army paratroopers were also engaged in combat during the war. In 1940, the first paratrooper "Zug" (platoon) was created within the special purpose unit "Brandenburg." It was expanded to company strength in 1941, and battalion strength on 11 March 1944. Because of the secret operations of Brandenburg, mostly behind Russian lines, very little information or photos exist of this unit. It is assumed that its members wore Luftwaffe-issue jump equipment and standard paratrooper helmets with or without Luftwaffe decals. Late war helmets exist with Army decals which could have been worn by the Brandenburgers or applied by former Army personnel when transferred to Luftwaffe paratroop units during the war.



Late-war model of the paratrooper helmet with an unknown insignia.

D. Powers

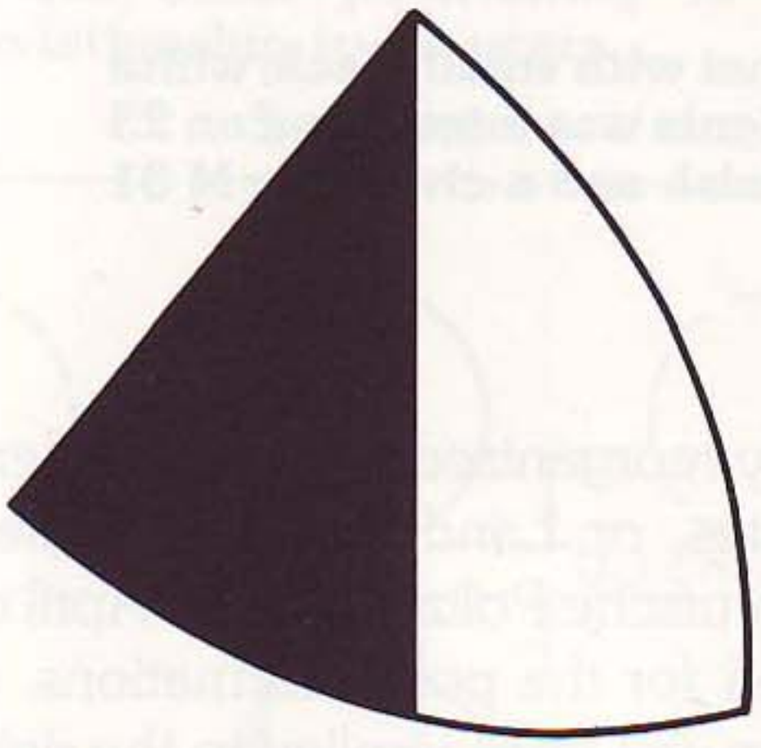
THE STEEL HELMETS OF THE GERMAN POLICE

As far as can be determined, the German police prior to 1918 were equipped with a leather helmet similar to that used by the Imperial Army. After the collapse of the monarchy, the situation changed and patrolmen began to wear the shako, while the barracked units of the security police and state police were equipped with Model 1916 and 1918 steel helmets for special duty. In part, shields with the state colors were worn on the helmets, but further information cannot be ascertained because of missing archival data. The Bavarian State Police had no helmet insignia, while the State Police of Prussia utilized several different patterns of insignia.

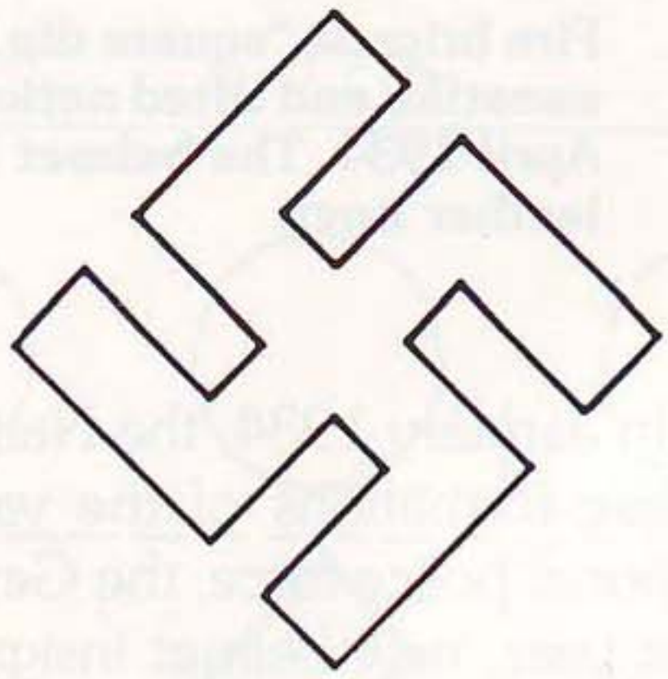
After the National Socialists came to power in 1933, the Prussian Minister-President ordered that all units of the Prussian Police were to apply a white swastika to the right side of their helmets and the Prussian colors to the left.

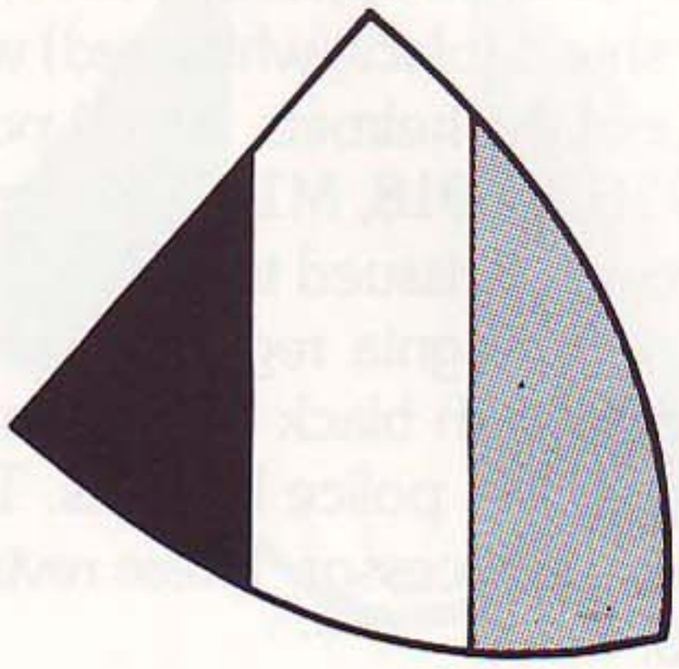
Helmet insignia of the Prussian/German Police from 1933-1934.

left side **right side**

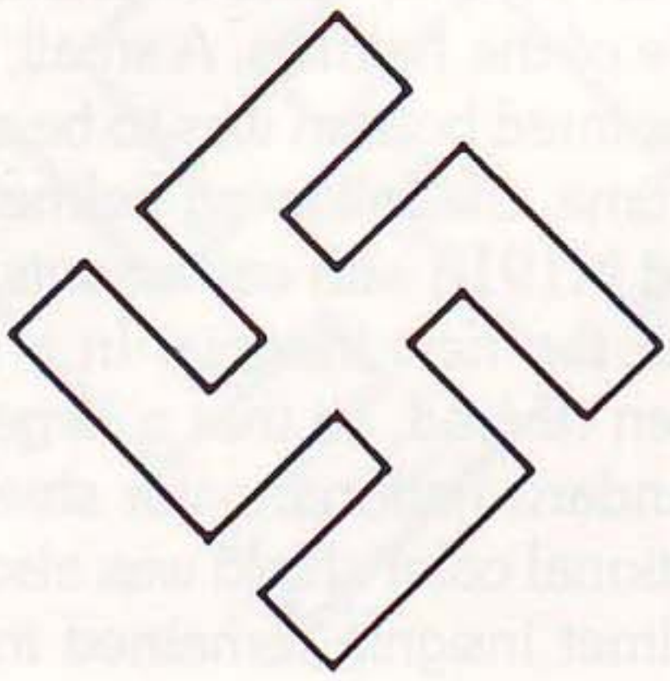


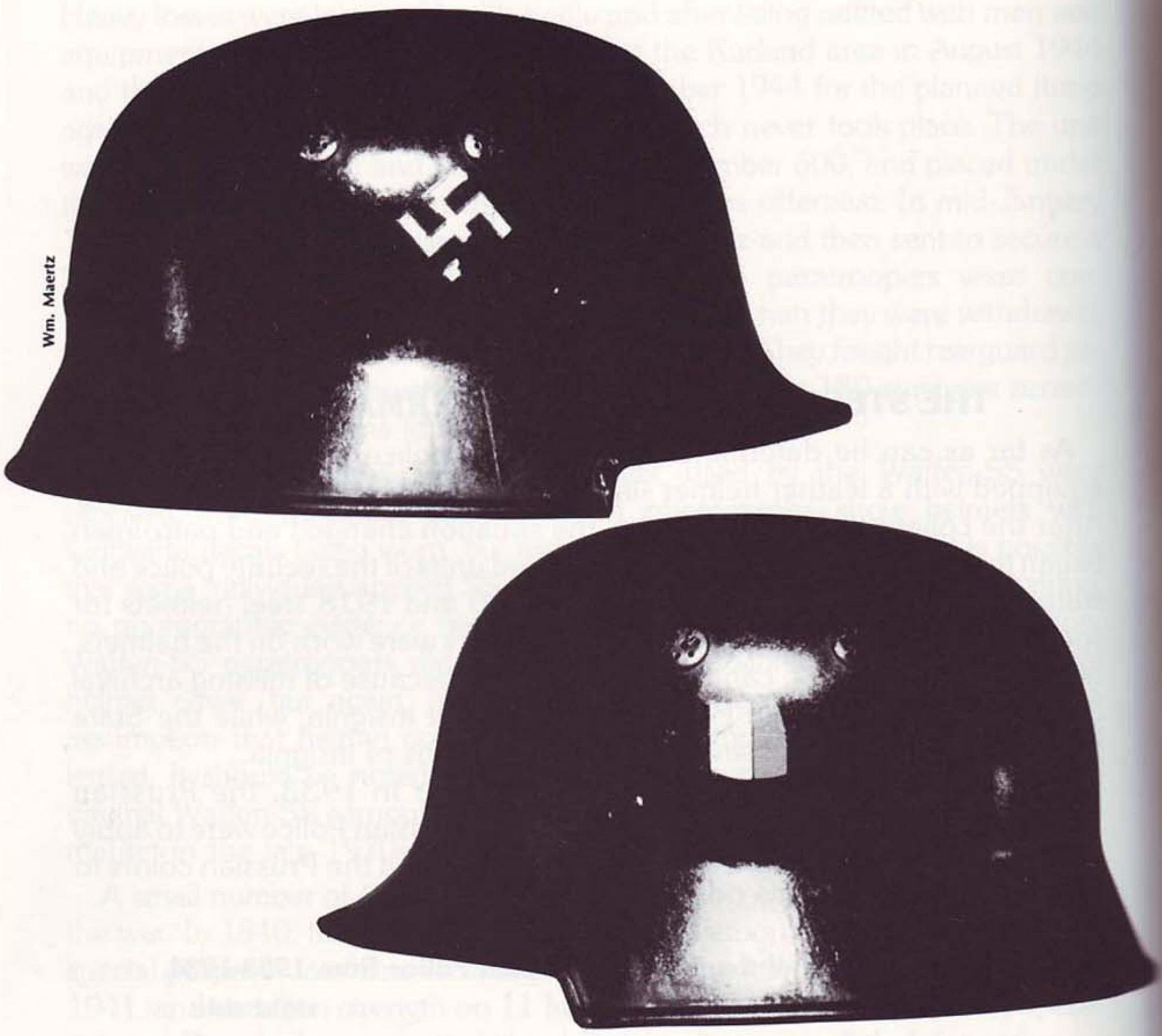
1933 until 23 April 1934





23 April 1934 until July 1934





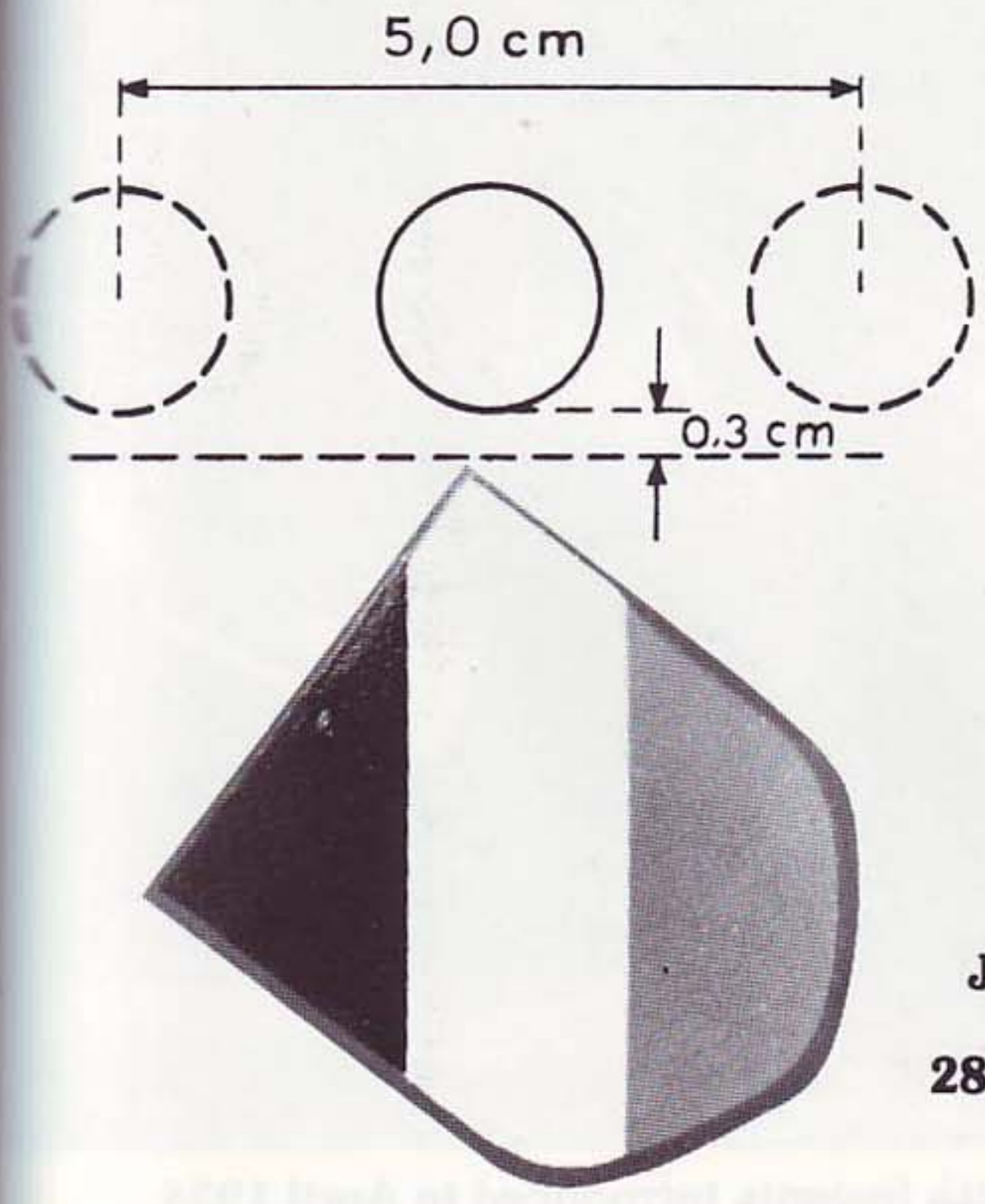
Fire brigade "square dip," double decal helmet with small black/white swastika and tilted national colors. This insignia was introduced on 23 April 1934. The helmet has a satin black finish and a civil style M 31 leather liner.

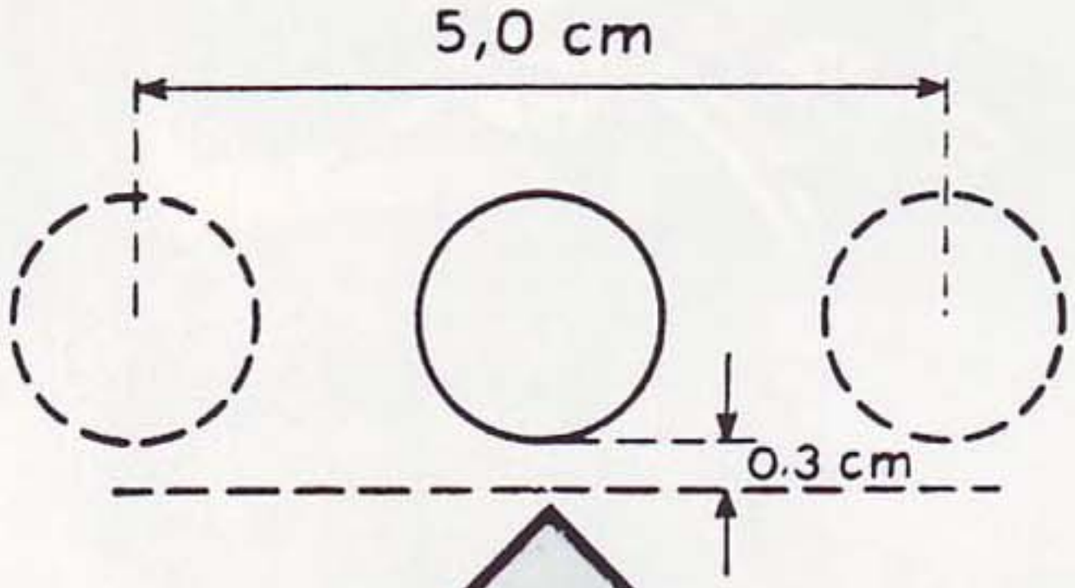
In January 1934, the National Socialist Party reorganized the independent police formations of the various German states, or Länder, into a unified national police force, the German Police (die Deutsche Polizei). On 23 April of that year, new helmet insignia were introduced for the police formations. A small, mobile, white swastika with a black border was to be applied to the right side of the helmets. A small, tilted, national color shield (black/white/red) with a pointed bottom was to be applied to the left side of the helmets. At this point in time, the following helmets were utilized: M1916, M1918, M1916 Austrian and M1918 with ear cutouts. All of these helmets were reissued to police units with the new insignia. In a mere three months, the insignia regulations had been revised, so that a larger, mobile, white swastika with black border and a standard national color shield were now in place on all police helmets. This national color shield was also tilted, as had been its predecessor. These revised helmet insignia remained in use until July 1936.



As helmet at left but with later style larger swastika and national colors.

Note decal positioning in relationship to air vents.

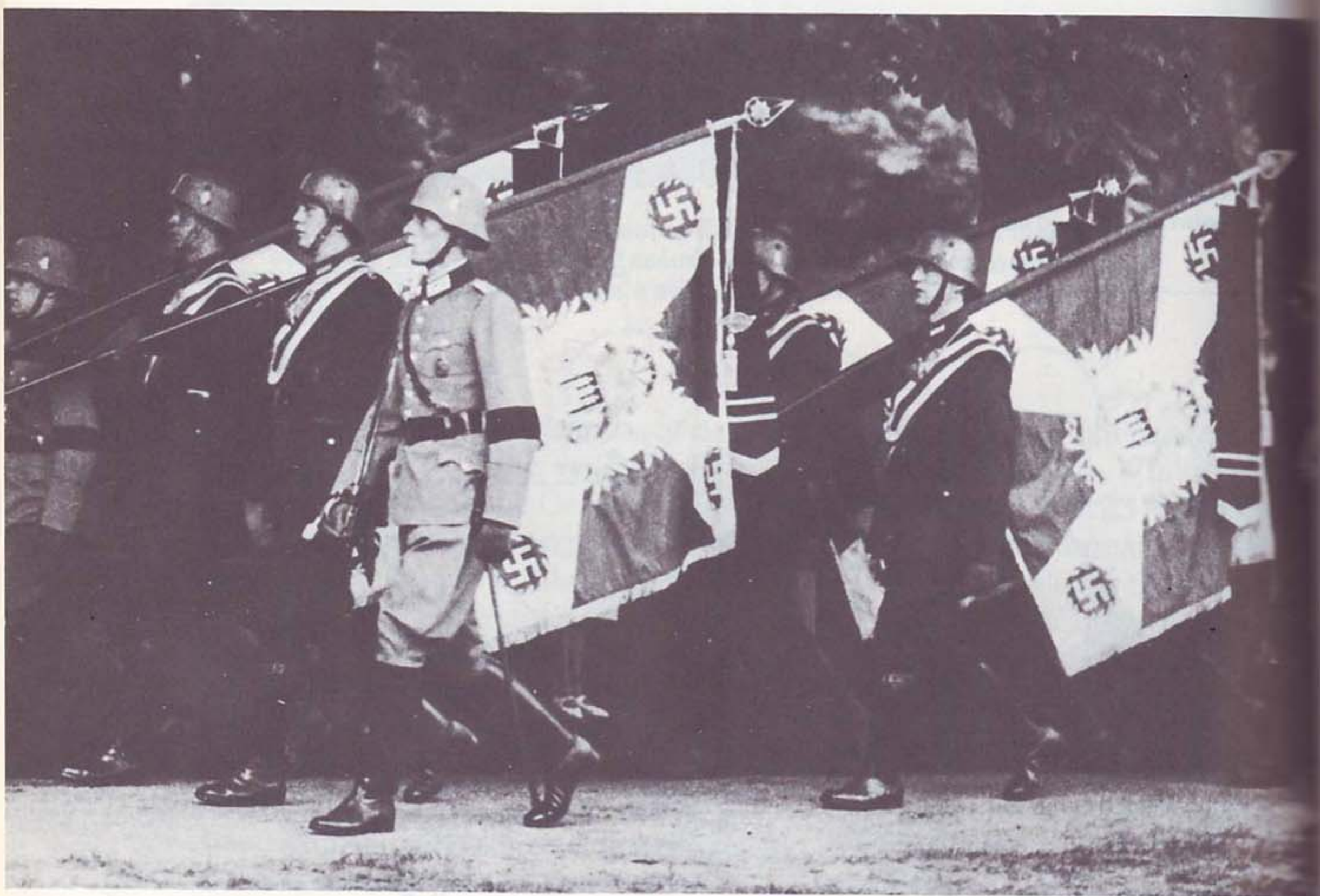




July 1934 until 28 July 1936

Ray Embree

M 18 police helmet with later style decals and satin black finish.



246 **Police of Hamburg wearing M18 helmets with insignia introduced in April 1934.**



Ed Owen

M 16 (Austrian shell) police helmet with later style decals and satin black finish. Note national colors are vertically mounted and not tilted as per regulations.



L. Hardy

M 16 (Austrian style) helmet as worn by "Landespolizeigruppe General Göring" as well as other Landespolizei units. It has screened air vents and a light green parade finish.

Bundesarchiv



The "Preussische Ministerpräsident" passing in front of the police of Potsdam, March 1934.

The State Police Group General Göring (Landespolizeigruppe General Göring), consisting of National Socialist Party members, also used the second pattern insignia, applying it to their helmets which were painted either in a light green or medium green smooth finish. The helmet models used by this group

Wm. Maertz



M 16 double decal "Landespolizeigruppe General Göring" helmet with later style police insignia and light green parade finish.

were the same as those listed for regular police formations. Another police formation, the SA Field Police (SA-Feldjägerkorps) utilized a different set of insignia on their helmets. This organization used a large, mobile, white swastika (often handpainted or stencilled) on the right side of the helmet and a Prussian Police (Preussische Polizei) sunburst on the left. This sunburst took the form of a black Prussian eagle in the center surrounded by a gold-colored, six-pointed sunburst. In some cases, the insigne took the form of a decal, while in others, an actual metal device was attached to the helmet.

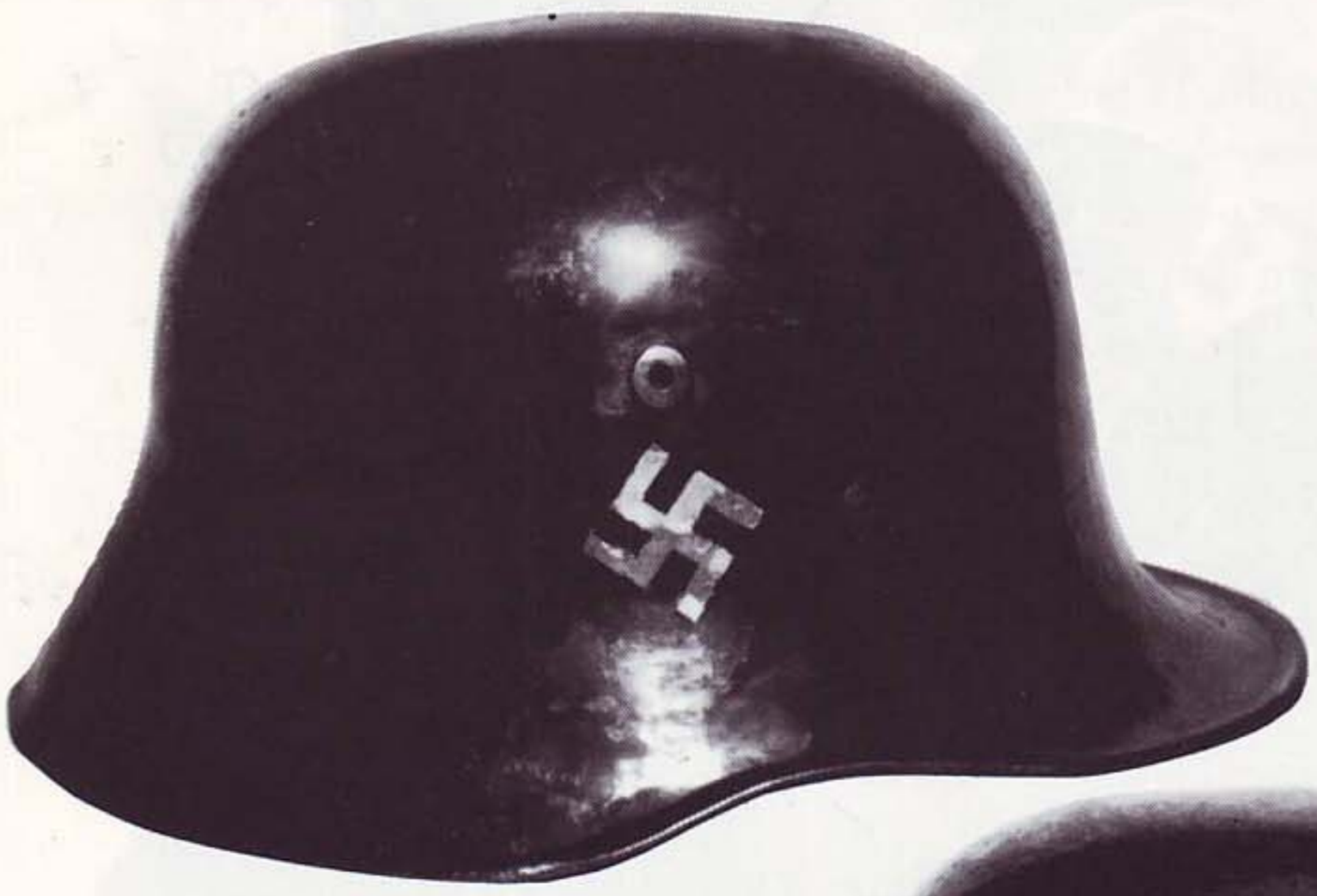


Members of the SA-Feldjägerkorps taking an oath of allegiance, January 1936. Note different styles of helmets worn.



H. von Hungen

M 16 SA-Feldjägerkorps helmet in a medium green finish with a metal Prussian Police sunburst insigne.





Medium green M 18, with the insignia of the SA-Feldjägerkorps (note sunburst is a decal).



Light green helmet of an unknown style with the insignia of the SA-Feldjägerkorps.

SA-Feldjäger

On 28 July 1936, new helmet decals for the police and fire brigades were introduced. A small, silver, spread-winged eagle inside an oval oakleaf wreath, perched on top a small circular wreath enclosing a mobile swastika, all on a black shield, was now applied to the left side of the helmets. A party shield in the form of a black, mobile swastika positioned in a white circle on a red shield with a black border was to be applied to the right side of the helmet. The eagle decal which was used by Feuerwehr formations was slightly different in that it had a thin silver border, apparently to set it off from the black surface of the fire helmet. For some undetermined reasons (perhaps a misinterpretation of official directives), some police units reversed the decals on the helmets. This situation lasted only a few months, until all decals were positioned as per regulation.



28 July 1936 until 8 May 1945



J. Bandy



Wm. Maertz

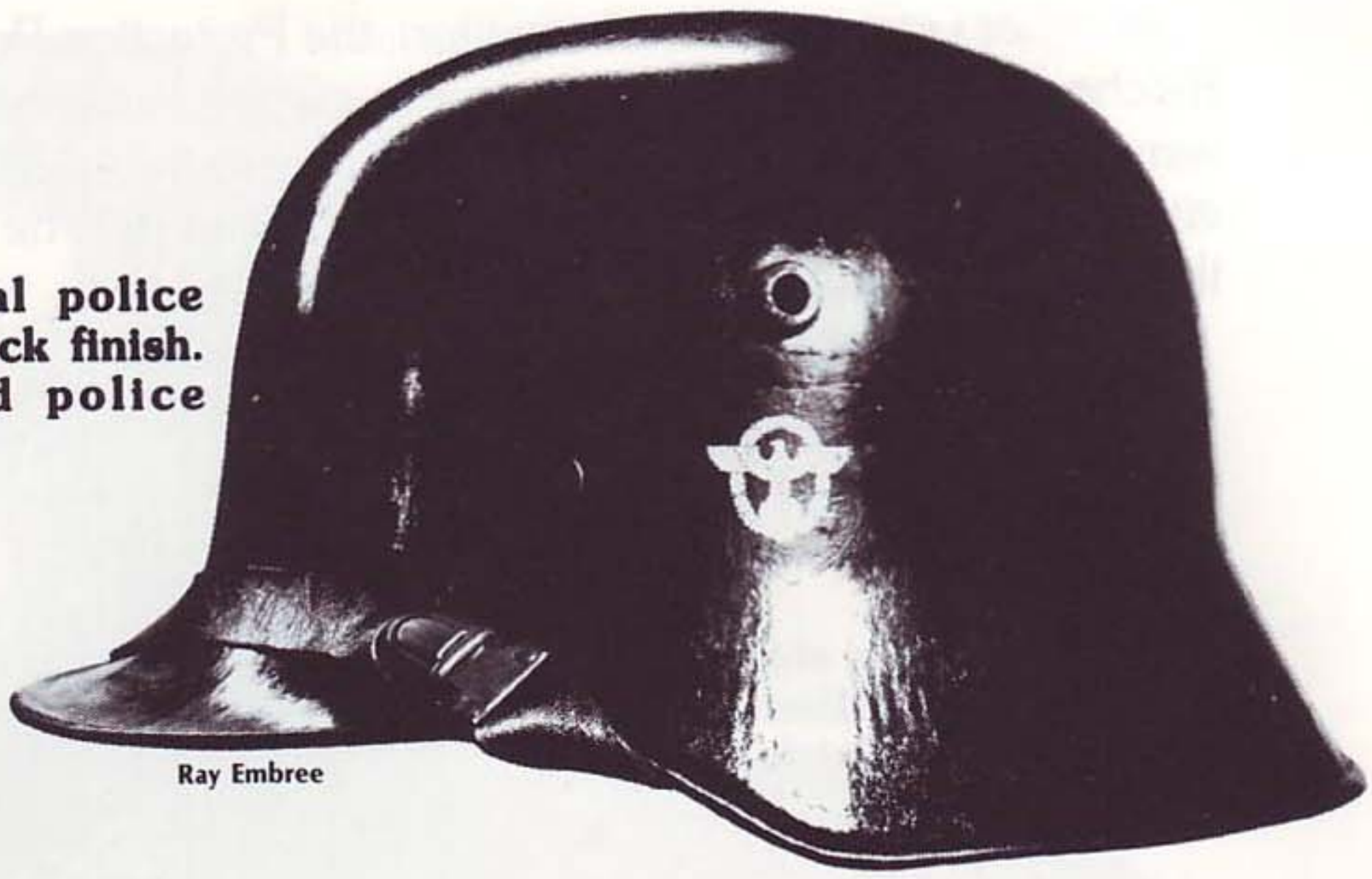
Standard Feuerwehr eagle decal with silver border.

Note police eagle/wreath variations illustrated below.



Wm. Maertz

M 18 double decal police helmet in satin black finish. Note unbordered police decal.

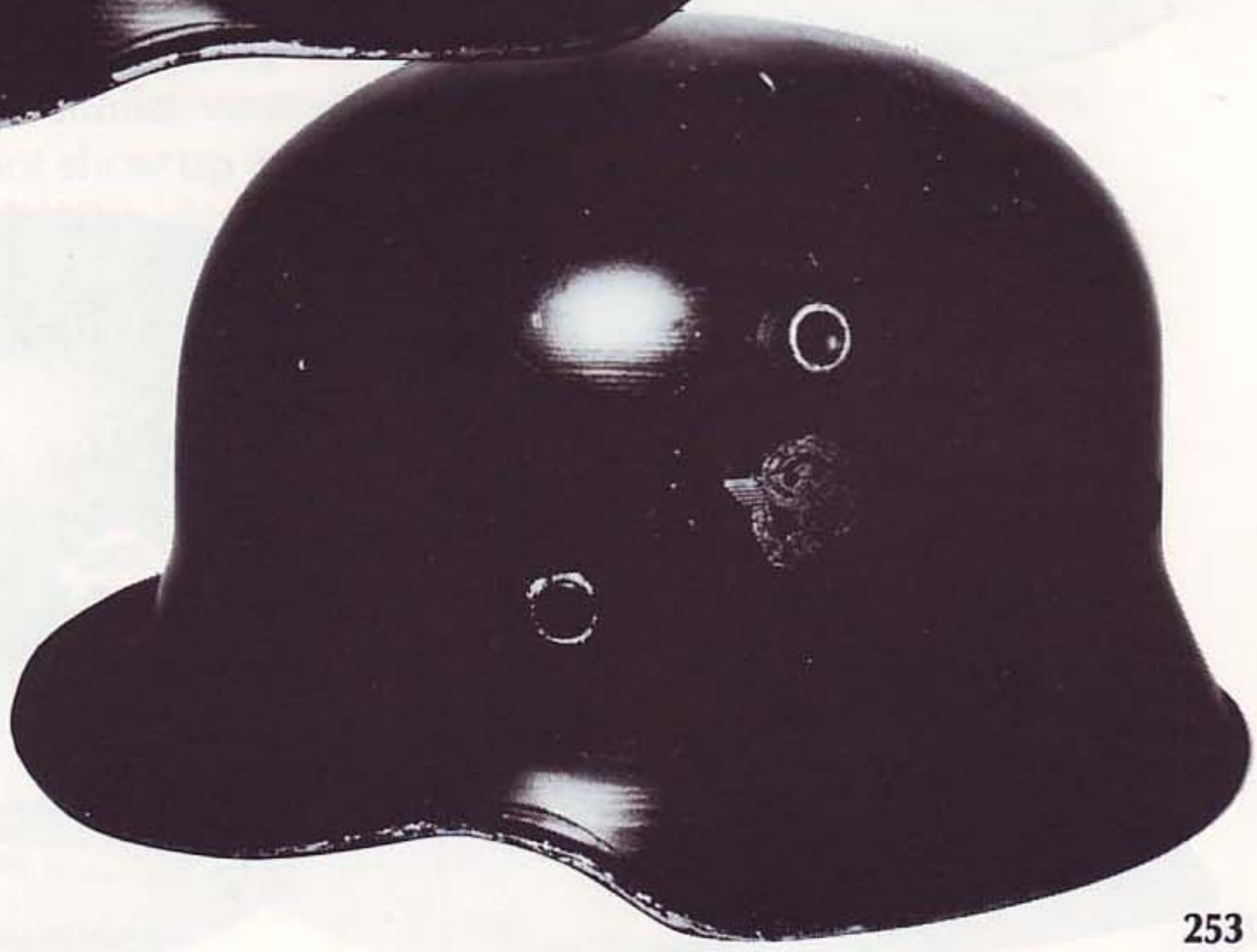


Ray Embree



A. Barrows

Lightweight, double decal police helmet with satin blue-grey finish.



Another German police formation, the Protection Police (Schutzpolizei des Reiches), also used the same insignia starting in July 1936. These personnel were issued M1916, M1918, M1916 Austrian and M1935 helmets painted either in blue-green or light green smooth finish. The police eagle decal on these helmets also lacked the silver border.



M 16 (Austrian shell) double decal Schutzpolizei helmet in a light green finish.

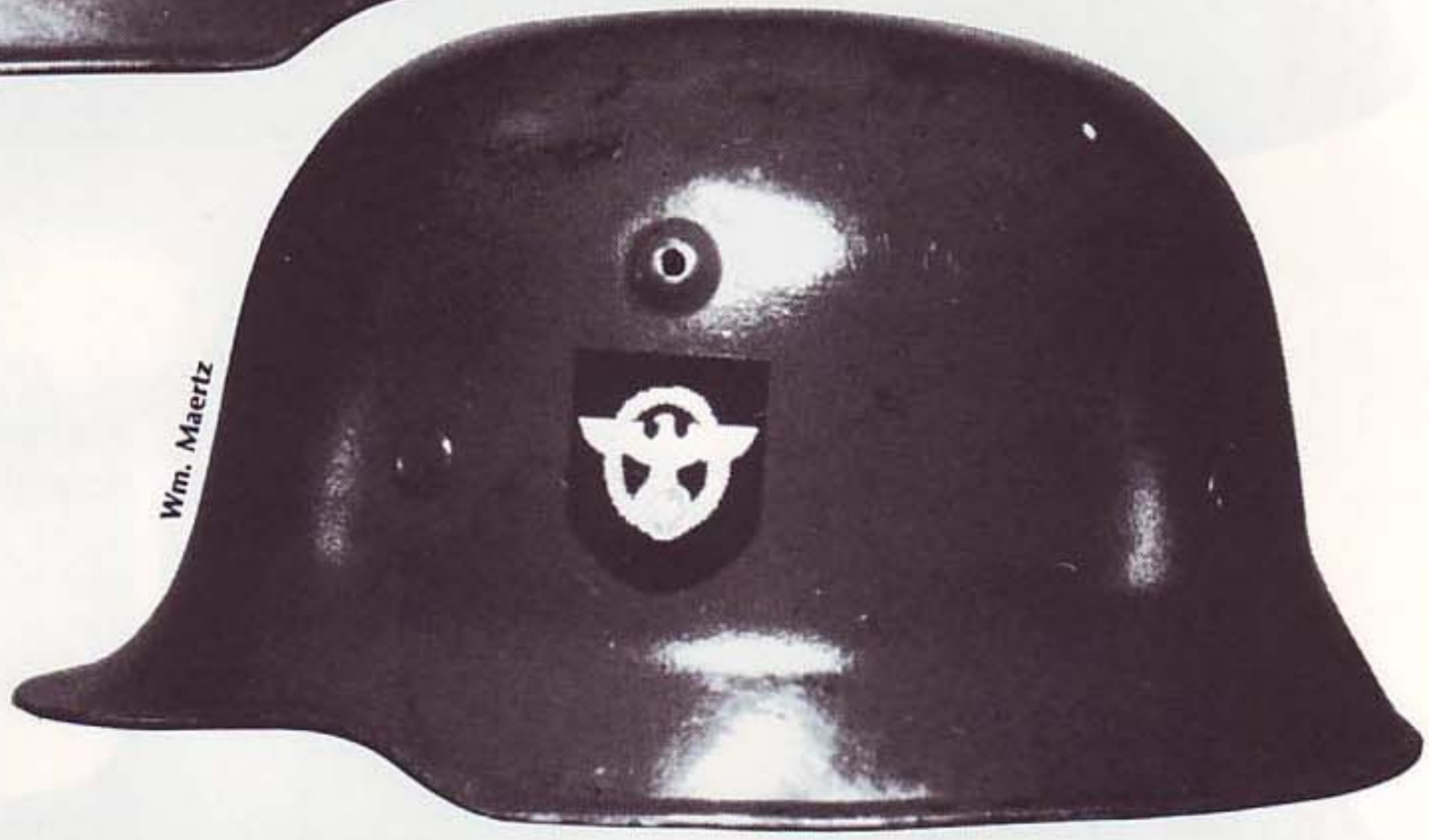
J. Bandy

M 16 Austrian, double decal Schutzpolizei helmet with brush-painted light field-grey finish. Note hole in front of decal originally used for flaming bomb device.

Wm. Maertz

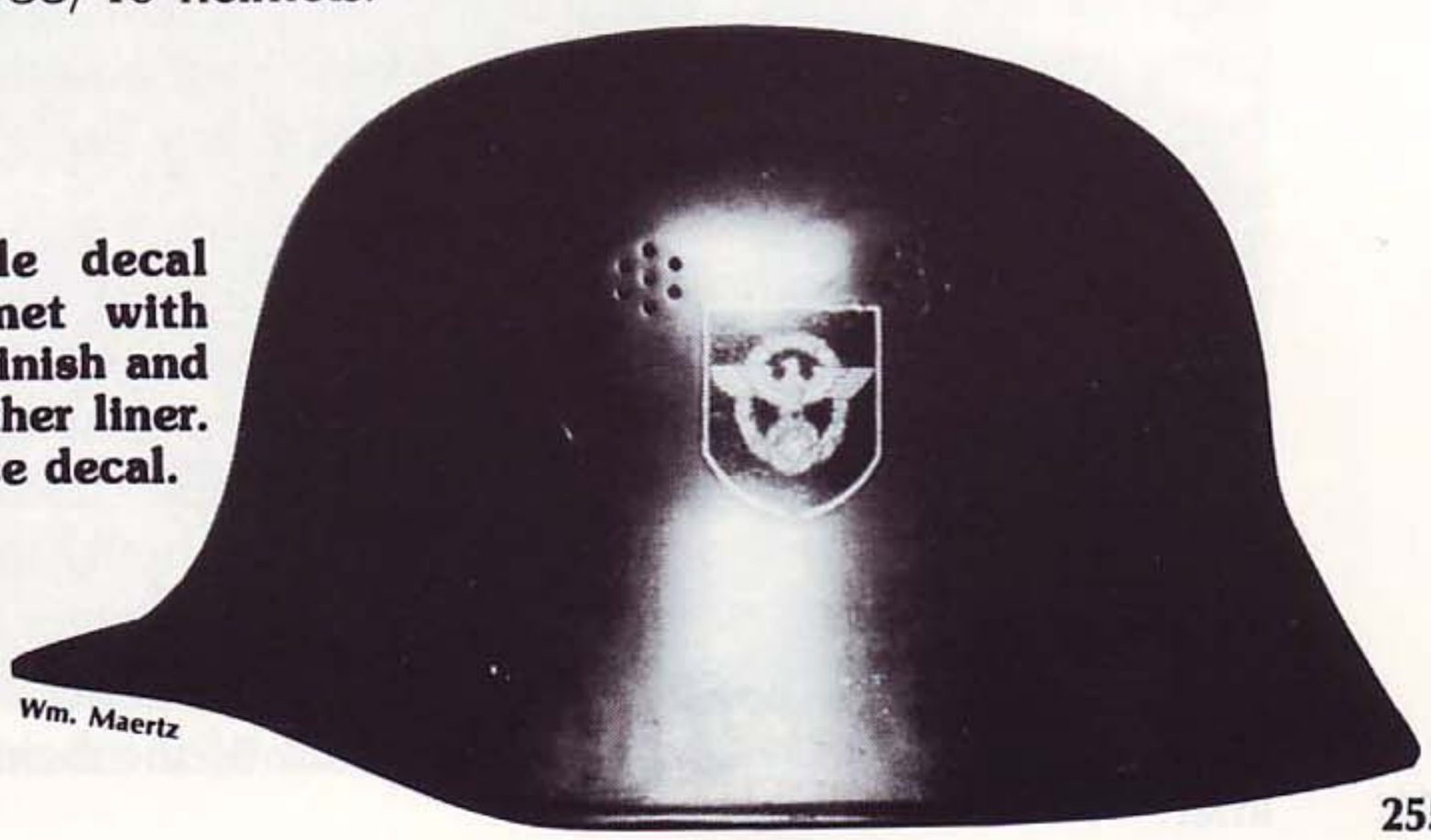


M 40 style, double decal Schutzpolizei helmet with light green parade finish and a civil M 31 style leather liner.



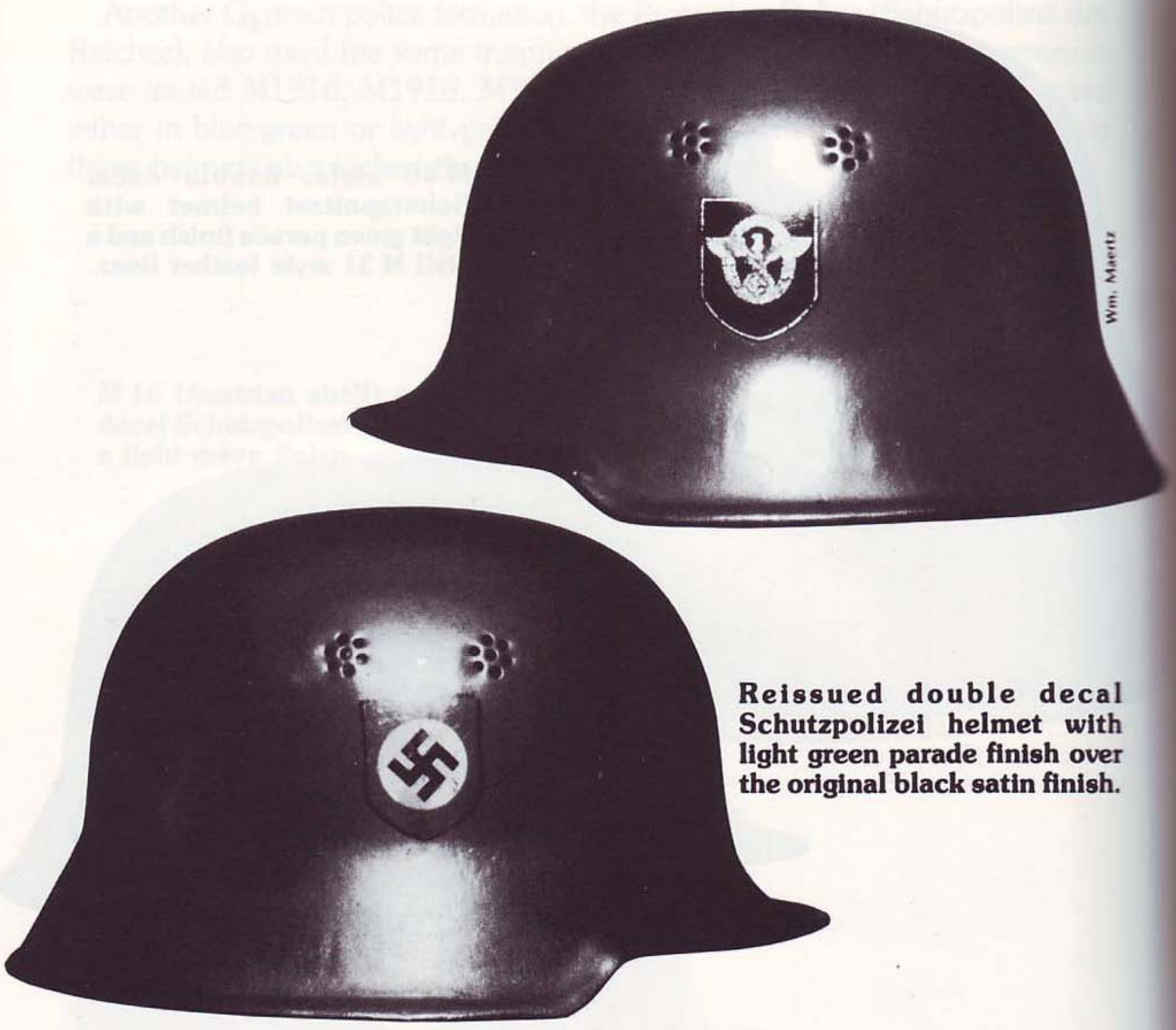
Wm. Maertz

In mid-1941, the unbordered police eagle decal was discontinued on the Schutzpolizei helmets and only the bordered decal was used. The reasons for this change were twofold. First, at this point in the war, it was uneconomical to produce two marginally dissimilar versions of the same decal. Secondly, the unbordered version did not show up well on the new, rougher field grey painted surface of the M1935/40 helmets.



Lightweight, double decal Schutzpolizei helmet with light green parade finish and civil M 31 style leather liner. Note bordered police decal.

Wm. Maertz



Reissued double decal Schutzpolizei helmet with light green parade finish over the original black satin finish.

NOTE:
The police received their helmets through the "Wehrmachtbekleidungsamt" without decals. Police decals which were stocked by the "Bekleidungsamt der Polizei," were applied by that office.

The police combat helmets were issued with double decals (i.e., both the police eagle and party color shield) right up to the end of the war. However, after November of 1943, many of the helmets which were issued to the police came with no decals at all. When decals were available, even well into 1945, both decals were always applied. The police eagle decal was never used without the party color shield.

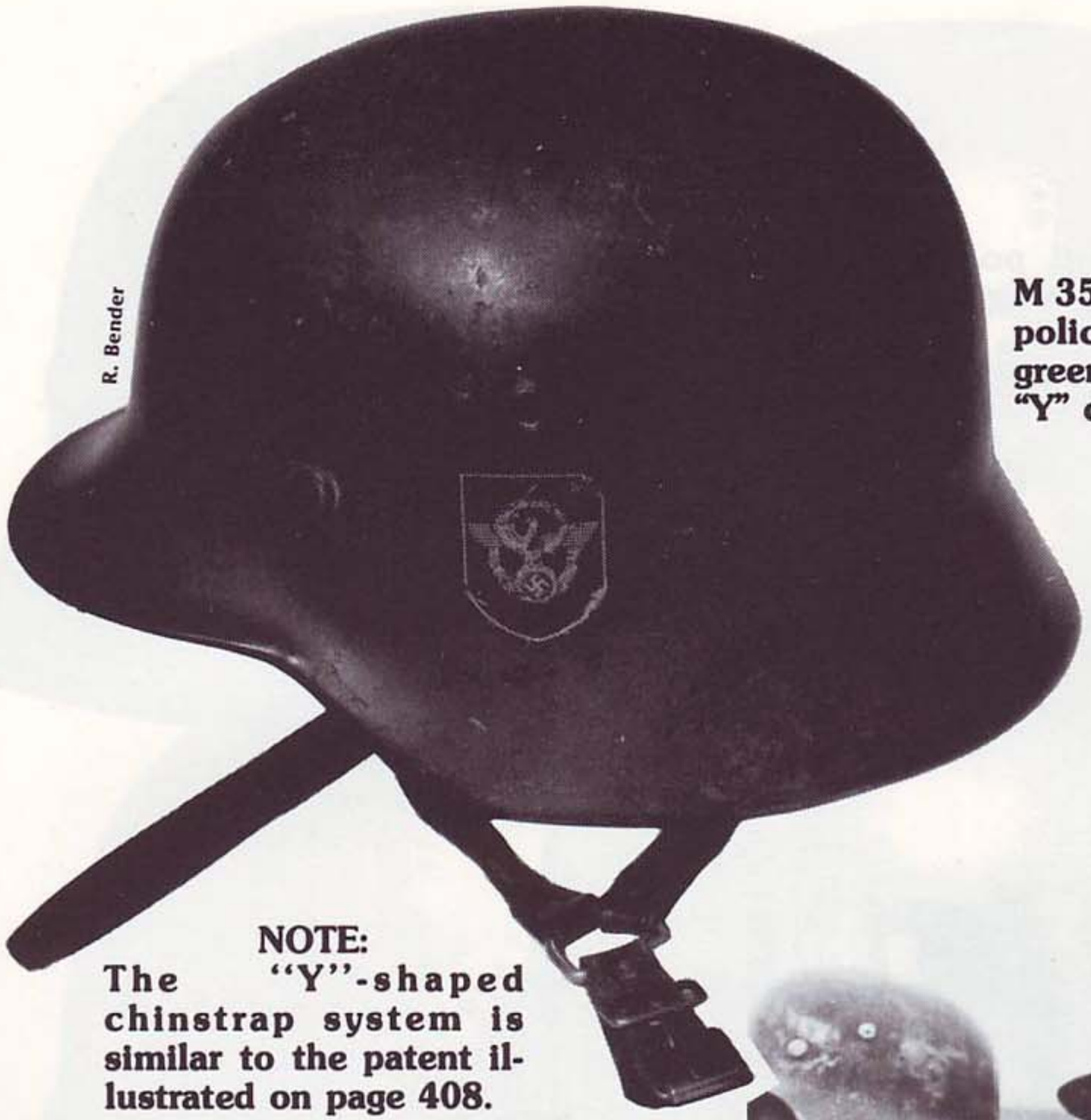
The 4th and 35th SS-Polizei Divisions used the same insignia as the Schutzpolizei. The reason for this stems from the fact that a large portion of the manpower in these two divisions had been drawn up from the ranks of the police and thus, they were allowed to wear the "traditional" insignia on their helmets. For this reason, however, it is virtually impossible to determine whether a particular helmet was used by the police or by one of the SS-Polizei divisions. The only means of differentiation would be through any possible units markings painted on the underside of the helmet or inscribed on the liner.

M 35 double decal police helmet with field-grey finish.





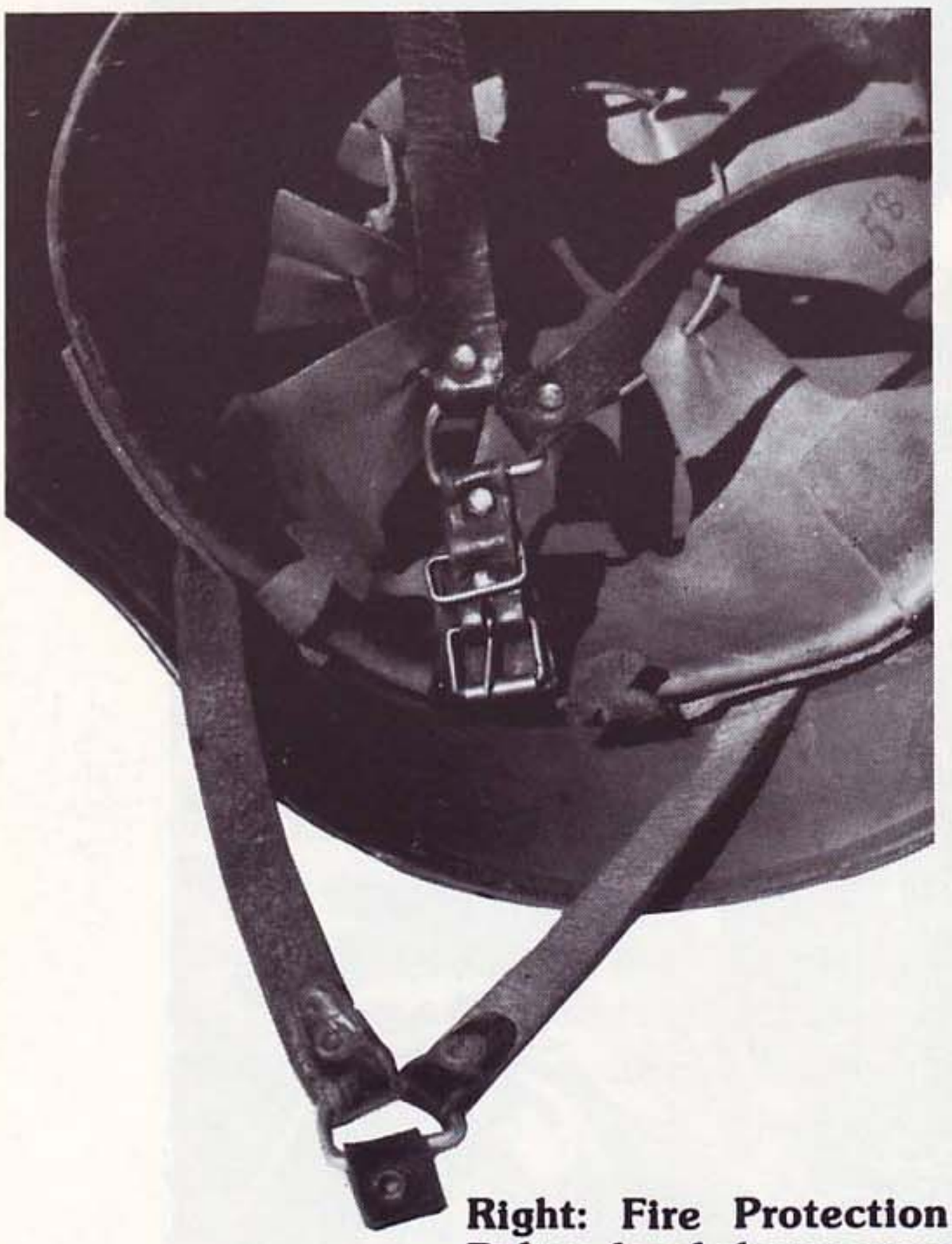
An SS-Oberschütze of the 4th SS-Police Division wearing the M35 helmet with unbordered eagle decal.



R. Bender

M 35/40 double decal police helmet with light green finish and unique "Y" chinstrap system.

NOTE:
The "Y"-shaped chinstrap system is similar to the patent illustrated on page 408.



Right: Fire Protection Police decal shown worn in the field.

Bundesarchiv





Wm. Maertz

M 35/40 double decal police helmet with rough textured grey-green finish and unbordered police decal.

J. Bandy

M 35/40 double decal police helmet with grey-green finish and bordered police decal.



Ray Embree

M 42 double decal helmet with rough field grey finish and bordered police eagle decal.



J. Bandy

M 42 camouflage police helmet with mustard-yellow finish. Bordered police decal is painted around while the party decal has been painted over.

The Rural Police (Gendarmerie), under the auspices of the Schutzpolizei, utilized the same insignia on their green-painted helmets, but to a much more limited extent. Most of their helmets, when issued at all, came without decals of any sort.

The Marine Coastal Police (Marine-Küstenpolizei) and the Water Protection Police (Wasserschutzpolizei) used the same insignia as the other police formations, but the police decal on the left side of the helmet was gold-colored. The reason for this color different was that traditionally, naval insignia were rendered in a gold color (viz,--the gold-colored eagle used by the Kriegsmarine), and since these formations were set up to perform duties on the water, their insignia were gold-colored. Both bordered and unbordered examples are known to exist.



R. Bender

M 35 double decal Water Protection police helmet with light green parade finish. The police decal illustrated at right has a gold eagle and wreath.

The police of the Free City of Danzig (today Gdansk, Poland) were lead and equipped in the German fashion. A white death's head (Totenkopf) was worn on the right side of their model 1916 and 1918 helmets. This insigne was conferred upon the Danzig police and gendarmerie in commemoration of the 1st and 2nd Life Guard Hussar Regiments (Leibhusarenregimenter), which were garrisoned at Danzig-Langfuhr until the beginning of the First World War. These troops wore a similar death's head on the front of their fur



Two police officers of the "Freie Stadt Danzig," 1938.

busbies. It was probably in February or March of 1936 that Danzig's regulations were published officially. After this time, the police wore a white-bordered, red shield on the left side of their helmets. This shield had two white crosses in the center, one positioned above the other, surmounted by a yellow crown. In 1939 the Danzig police were absorbed into the German police and received the Model 1935 helmet but with a smaller death's head.





Bugler, police of Danzig.



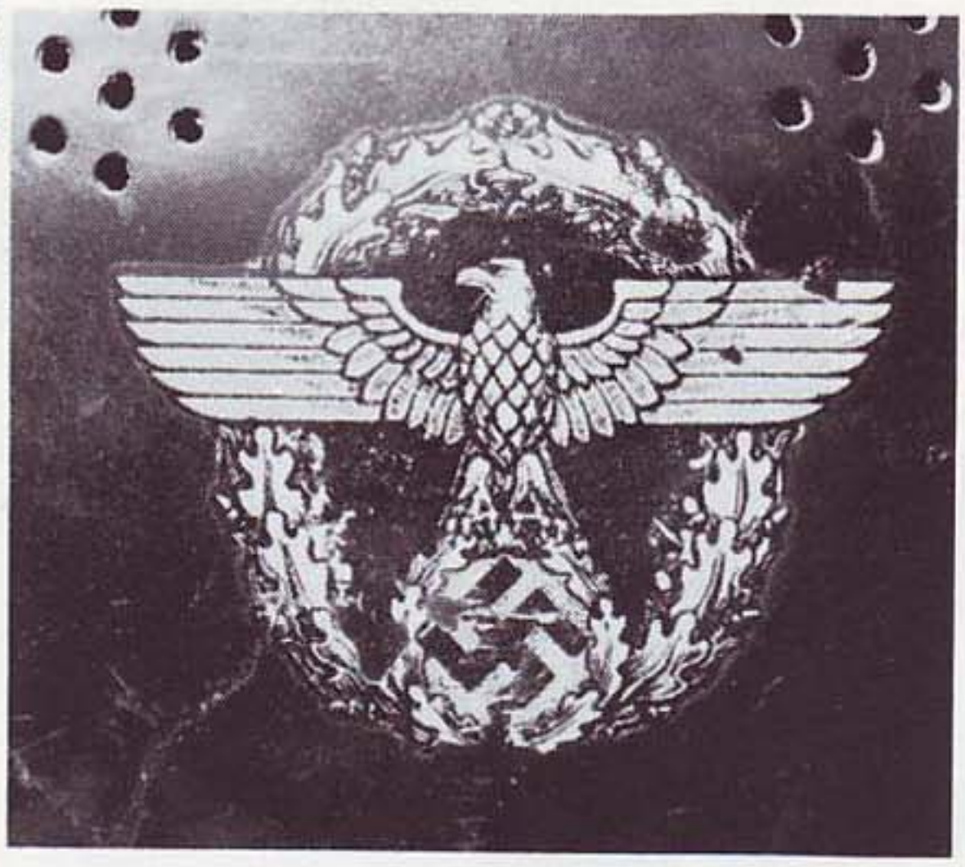
M35, police of Danzig, 1939.

Police of Danzig, 1937.

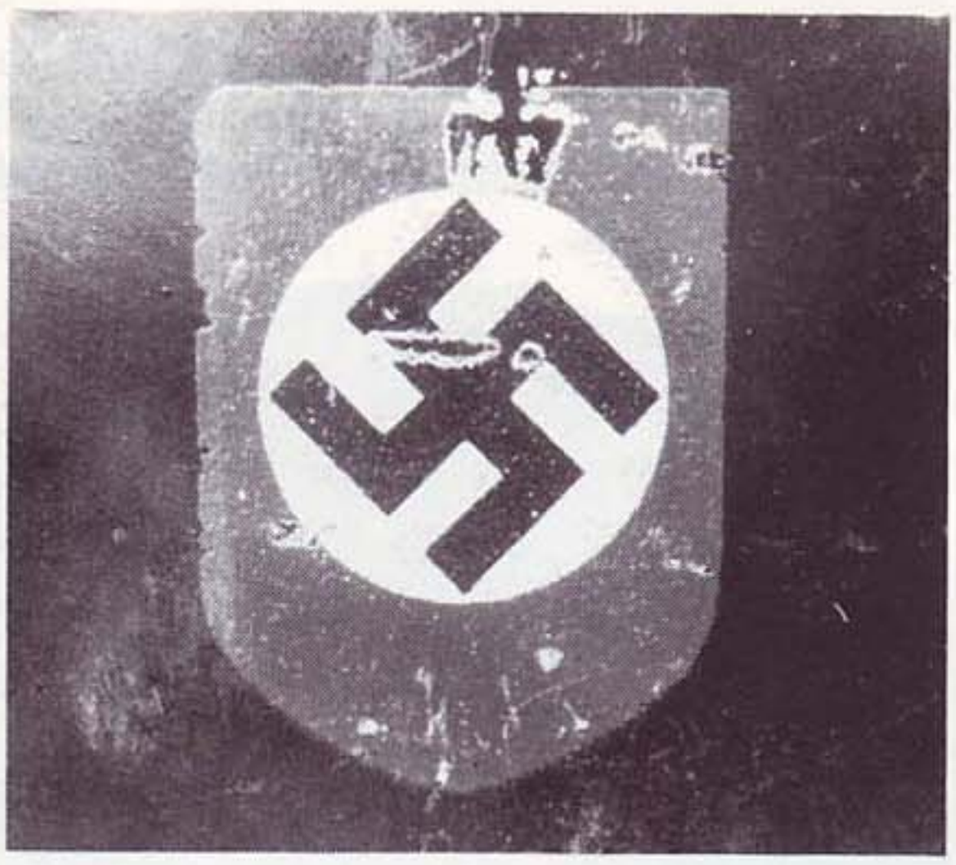
A final variant must be mentioned here. An unusual police eagle has been noted on several types of helmets. The decal itself depicts a large, highly-detailed police eagle in an oakleaf wreath, but without the surrounding shield. This type of insigne has been observed on the front of "flat rim" Luftschutz-style helmets used in Austria after the Anschluss. It has also been observed on M1934 square transition helmets. When found on these helmets, a variant, though very similar, party shield decal was used on the right side of the helmet. Unfortunately, the purpose of this rather impressive insigne is presently unknown.



R. Bender



R. Bender



The above black, lightweight police helmet has a large police eagle decal and elongated national shield (possibly Austrian-made).

Members of the German "Zollgrenzschutz" (Customs Border Guard) wearing regular Army helmets with both insignia. The photos were taken in 1942 in the Netherlands.



Ray Embree

"Flat rim" Luftschutz-style helmet, as used in Austria, with a satin black finish. Note large police eagle decal.

In some cases, police decals were placed on captured military helmets, notably the Model 1932 Czechoslovak helmet. Such helmets were used only in rear areas where their silhouette would not cause the wearer to be mistaken for an enemy soldier. These helmets were generally painted in a dark field grey, dark field green or a grey-black color with a smooth finish.

M 32 Czech helmet with unbordered police decal.





HELMETS OF THE GERMAN FIRE BRIGADES

Prior to 1929, all German fire brigade units were equipped with leather protective helmets. These helmets were reminiscent of the helmets used by the Imperial Army, except that a metal comb of sheet metal was substituted for the normal spike device. It was determined that these helmets did not offer the fireman sufficient protection and therefore work on a new, more protective helmet was begun. Field trials on the new helmet prototype were carried out in Dortmund in 1929.

In 1932, the Berlin Fire Brigade was issued a prototype helmet made of vulcanized fibre. After field testing, the helmet was shown to be unsuitable and was subsequently abandoned.


National Archives

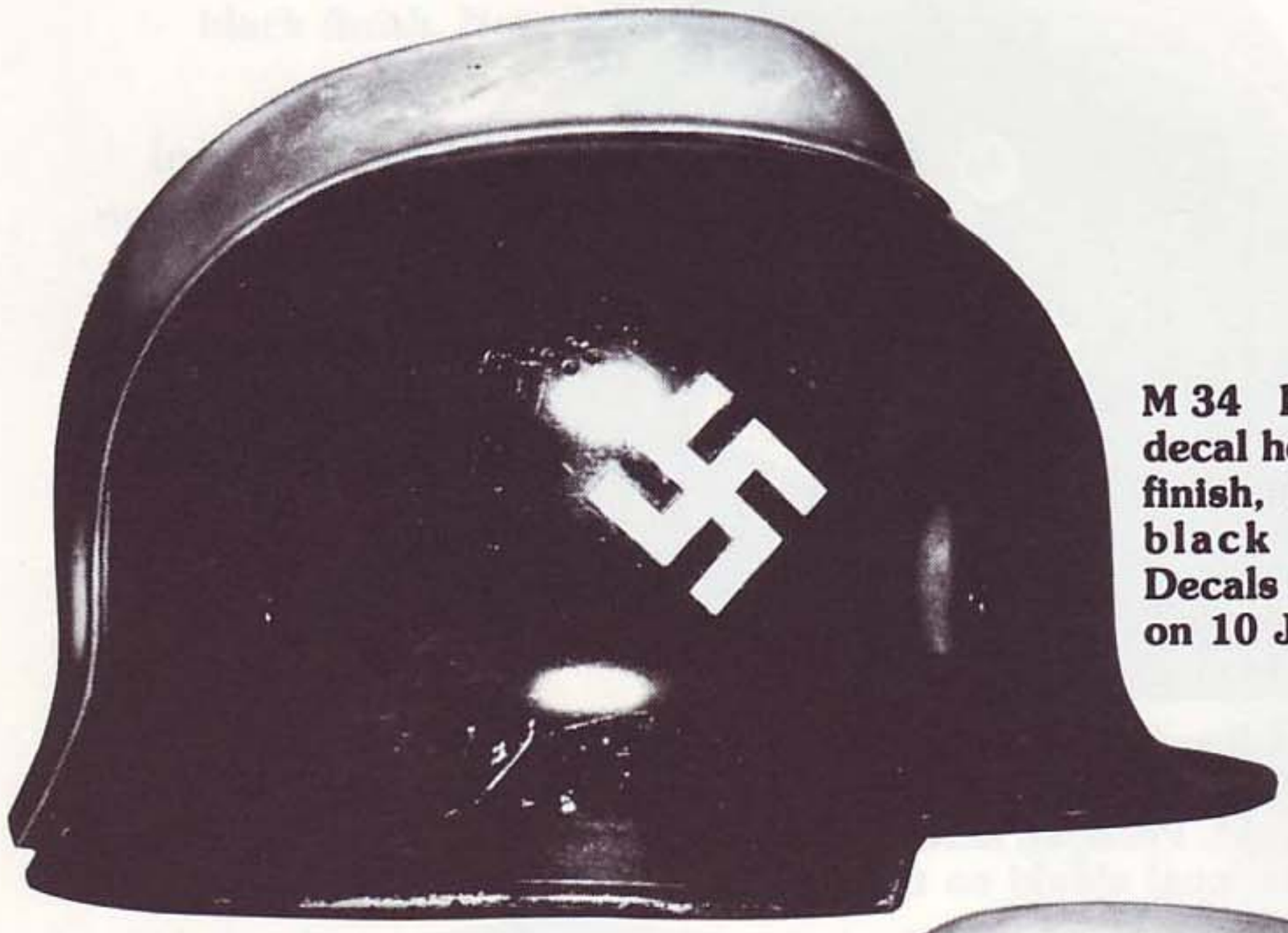
Vulkanfiber helmet of the Prussian Fire Protection Police with Berlin crest on the front, Prussian shield on the left side and national shield on the right.

Further studies in Dortmund finally led to the introduction of a helmet made of a chromium-nickel steel alloy. The first units to accept this new helmet were elements of the Berlin Fire Brigade in 1934. A directive by the Prussian Interior Ministry (No. II D 2059) dated 6 February 1934 instituted the general use of a metal fire helmet. This directive stated that the helmet must be made of steel or aluminum and must conform to the design of the prototype helmet which was at that time located in the Berlin Fire Headquarters. The helmet was to be painted black, although a chemical browning of the metal was also permissible. The helmet was to have screened vent openings on each side. National insignia were to be applied to the helmet's sides in accordance with the same regulations which governed police helmets.

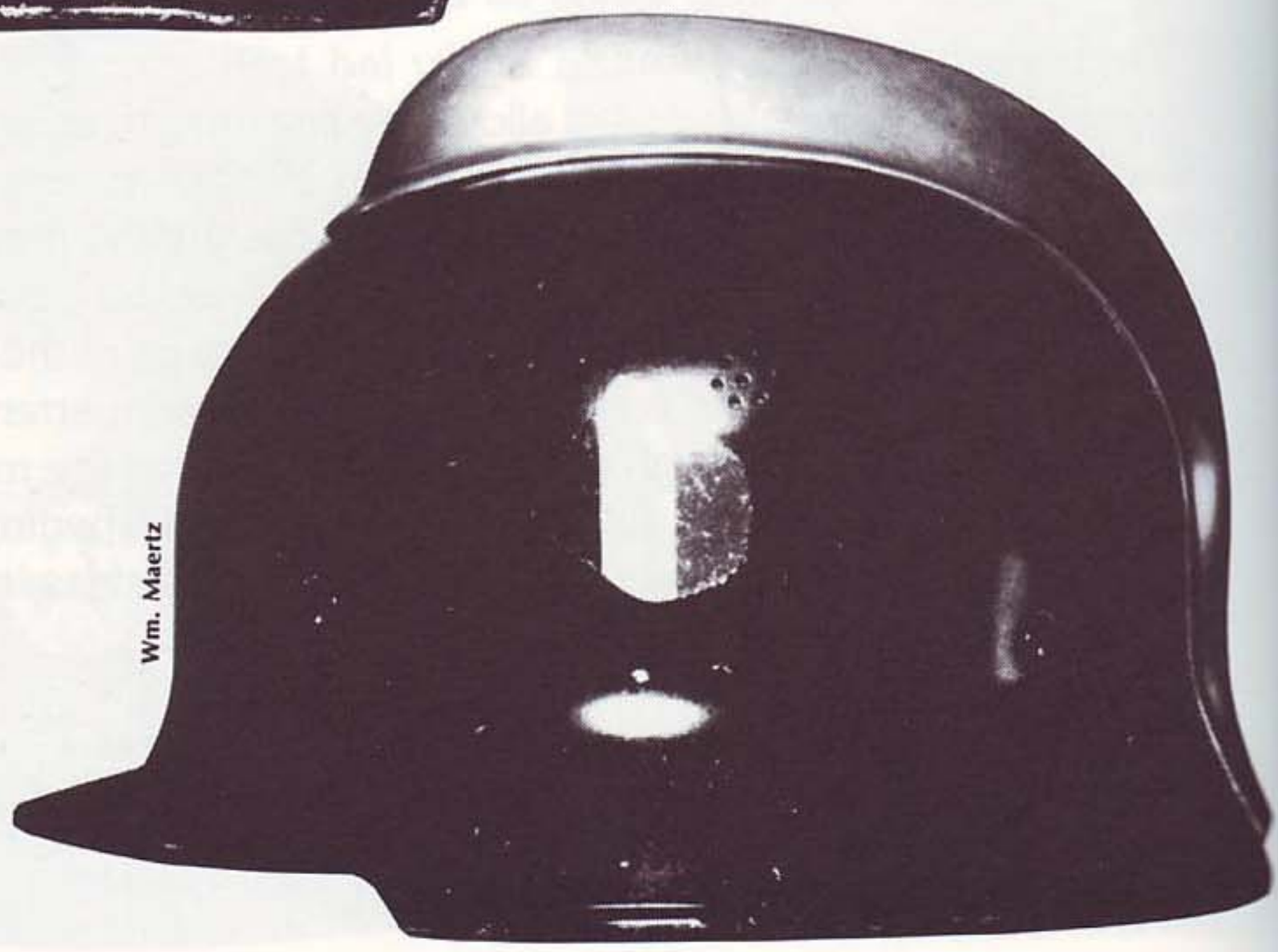
A private (Kareivis) of an unidentified Latvian Schutzmannschafts battalion on the Leningrad front in 1942. He wears a Czech steel helmet with a German police transfer (decal) on its left side. The rifle is a Russian Vintovka obr. 1891/30g.

The following is a time line in tabular form of the various arrangements of fire helmet insignia and their dates of introduction. Using this data, it is relatively simple to pinpoint the date of use of any particular Feuerwehr helmet.

DATE	LEFT SIDE OF HELMET	RIGHT SIDE OF HELMET
28 April 1933	"Land" shield	black/white/red shield
26 April 1934	tilted black/white/red pointed shield	mobile swastika (white with black border)
10 July 1934	larger mobile swastika (white with black border)	tilted black/white/red shield
28 July 1936 to 8 May 1945	police eagle shield, but with a thin, silver border	party shield (black mobile swastika in a white circle on a red shield



M 34 Fire Brigade double decal helmet with satin black finish, aluminum comb and black leather neckflap. Decals are those introduced on 10 July 1934.



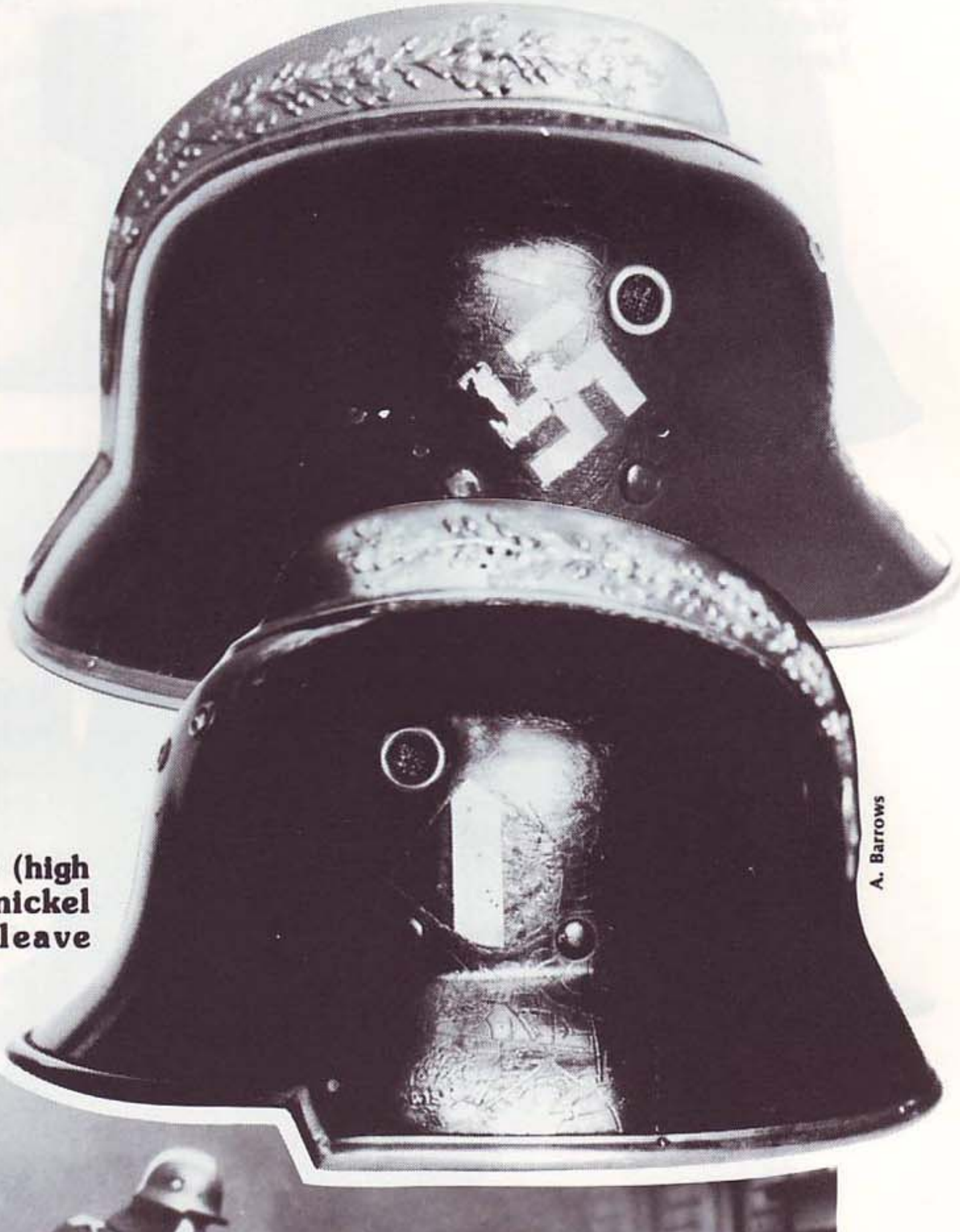
Wm. Maertz

NOTE:

It should be noted that the chart at left was not strictly adhered to. Almost all early helmets with the 10 July 1934 insignia tended to be positioned as that of the 26 April 1934 insignia, i.e., large white swastika on the right, national colors on the left, and not vice versa. This may be due to the fact that police helmets retained the old positioning and fire brigade commanders may have wanted to follow suit.



Police decal with border designated for use by Fire Protection Police personnel but used indiscriminately on police and police combat helmets during the war.



A. Barrows

Vulkanfiber Fire Brigade (high official) helmet with nickel comb and brass oakleave decoration.



Joe Stone

Bomb drill in Berlin, September 1937.



M 34 Feuerwehr double decal helmet with aluminum colored finish for a Wehrführer (Fire Defense Leader).

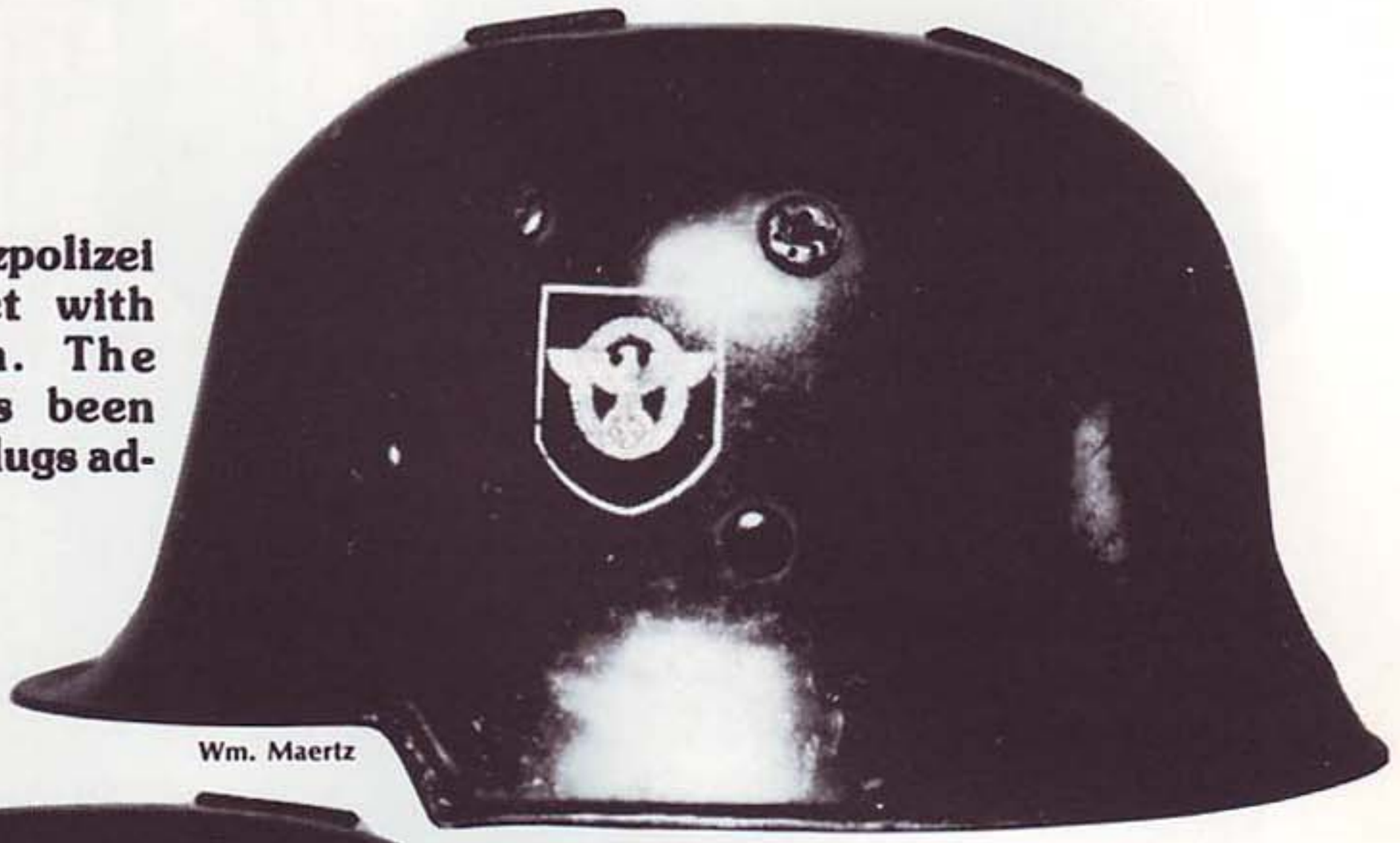
M 34 Feuerwehr double decal helmet with satin black finish, aluminum comb and leather neckflap.

Ray Embree

On 29 June 1938, a further directive stated that "fire brigade officers in direct service to the Reich" were to wear a helmet which was the same color as the uniform trim material (wine red). The comb was to be aluminum-colored. For officers of general rank, the comb was to be gold-colored.

Until 1938, all firefighting personnel within the Reich fell into one category, the Fire Defense (Feuerwehr). However, as of November of that year, an ancillary force was drawn up--the Fire Protection Police (Feuerschutzpolizei). Some sources also refer to this formation as the Feuerlöschpolizei. It is

generally accepted that these latter personnel were issued standard Feuerwehr helmets painted black, but without the metal comb. Metal plugs of various types were used to fill the three openings on the crown and apron of the helmet left vacant by the removal of the comb.



M 34 style Feuerschutzpolizei double decal helmet with satin black finish. The aluminum comb has been removed and leather plugs added.

Wm. Maertz





M 34 Feuerschutzpolizei double decal helmet with satin black finish and civil M 31 style leather liner.

L. Hardy

G. Petersen



Note that the Feuerwehr personnel above wear the issue helmets but without aluminum combs.

A uniform ordinance revision dated 3 January 1940 stated that the combless helmets which had been worn by some fire brigades were now authorized. Moreover, during the course of the war, many combless helmets were indeed used by Feuerwehr personnel. This is largely due to the fact that large stocks of unused combless helmets were made available. Later in the war, the deteriorating economic conditions of the Reich obviated the further production of combs for fire helmets.

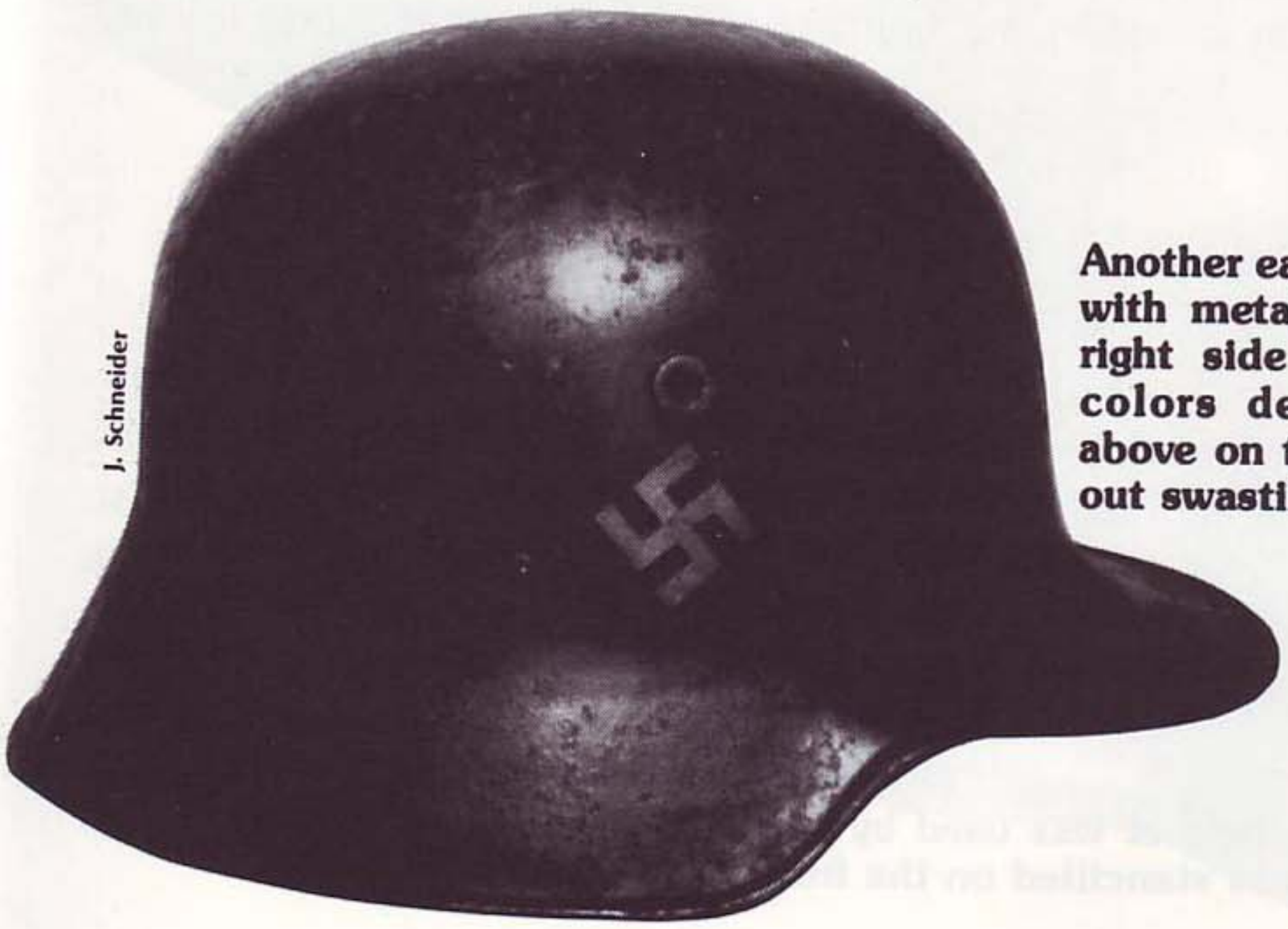
A few words should be said here about the variations of helmets used by the Feuerwehr and Feuerschutzpolizei. A great many minor variations exist in the shape and composition of the metal shell of the helmet. One of the earliest German Feuerwehr helmets was actually manufactured in Austria. Its overall configuration was quite like the Austrian M1916 Army helmet, but for the ventilation system and the alloy used in making the shell. Rather than the standard vent lugs found on the military model, these helmets came equipped with either a pair of screened, circular vents or with four sets of seven-hole vent rosettes. The steel used in these helmets was of a noticeably lighter gauge that than used in its military counterpart. The first insignia to be used on this helmet was a pair of metal devices which were attached to the sides of the helmet by means of wire pins. On the left side of the helmet was found a small shield with the colors black/silver/red and on the right, a circular, silver-colored disc with a black, mobile swastika. After 28 July 1936, these helmets were applied with the standard police decals. Examples of this helmet exist both with provisions for a

(Below and right) Two Feuerwehr helmets with metal insignia as illustrated in the F.W. Assmann & Söhne insignia catalog.



D. Dahl

NOTE:
The credit for compiling the supporting text for the Feuerwehr/Feuerschutzpolizei section of this book appreciatively goes to William Maertz and Dan Dahl.



J. Schneider

Another early Feuerwehr helmet with metal swastika device on right side and metal national colors device as illustrated above on the left side. The cut-out swastika is brass colored.

comb and without. By far the most common is the type which has come to be called the M1934, although no actual authorization has ever been discovered for this. It is solely based upon the known date of introduction of the helmet. The helmet is characterized by the squared transition, or "dip," between the visor and the neck apron. A variety of vent openings were used in this model. They range from four clusters of seven-hole openings, to screened openings, to the "salt shaker" vents (named thus because of their resemblance to the cap of the typical salt shaker found in restaurants). In approximately 1938, another type of Feuerwehr helmet was manufactured. This type had a smooth transition from visor to apron, exactly like that seen on the M1935 steel helmet. Various other helmet types were also produced. The Edelstahl helmet had a distinctly downturned visor and a rather flat crown. The word "Edelstahl" can often be seen stamped under the right side of the apron. A further variation, always seen without comb, is often referred to as the "short visor" model. This helmet also has a noticeably reduced neck apron, thus giving it a rather squat appearance. This helmet was a late-war variant and often came equipped with a black plastic chinstrap.

The liners in these helmets also exhibited wide variation, although most had the same basic elements: a horsehair-stuffed crash pad covering the inside of the crown, a sweatband made of leather with from seven to nine tabs, the ends of which were pulled together by a drawstring (Zugschnur). The chinstraps of these helmets fell into one of three general categories: a two-piece strap with a prong buckle, a one-piece strap with two slider buckles for adjustment, and finally a "Y" type strap which was anchored into the four split pins which held the liner to the shell. This last type was adjusted by means of a prong buckle.

Most of these helmets had four openings for the insertion of split pins to retain the liner. These openings were placed near each temple of the wearer and behind each ear. Some Feuerwehr helmets have been noted with only three openings, exactly like those found in the M1935 helmet. One peculiar helmet actually has five openings for the split pins, the fifth hole being found at the rear of the helmet, but hidden by the tail of the comb, another evidence of the extreme variation found in the helmets used by the firefighting forces.

HELMETS OF THE GERMAN POLICE AFTER 1945

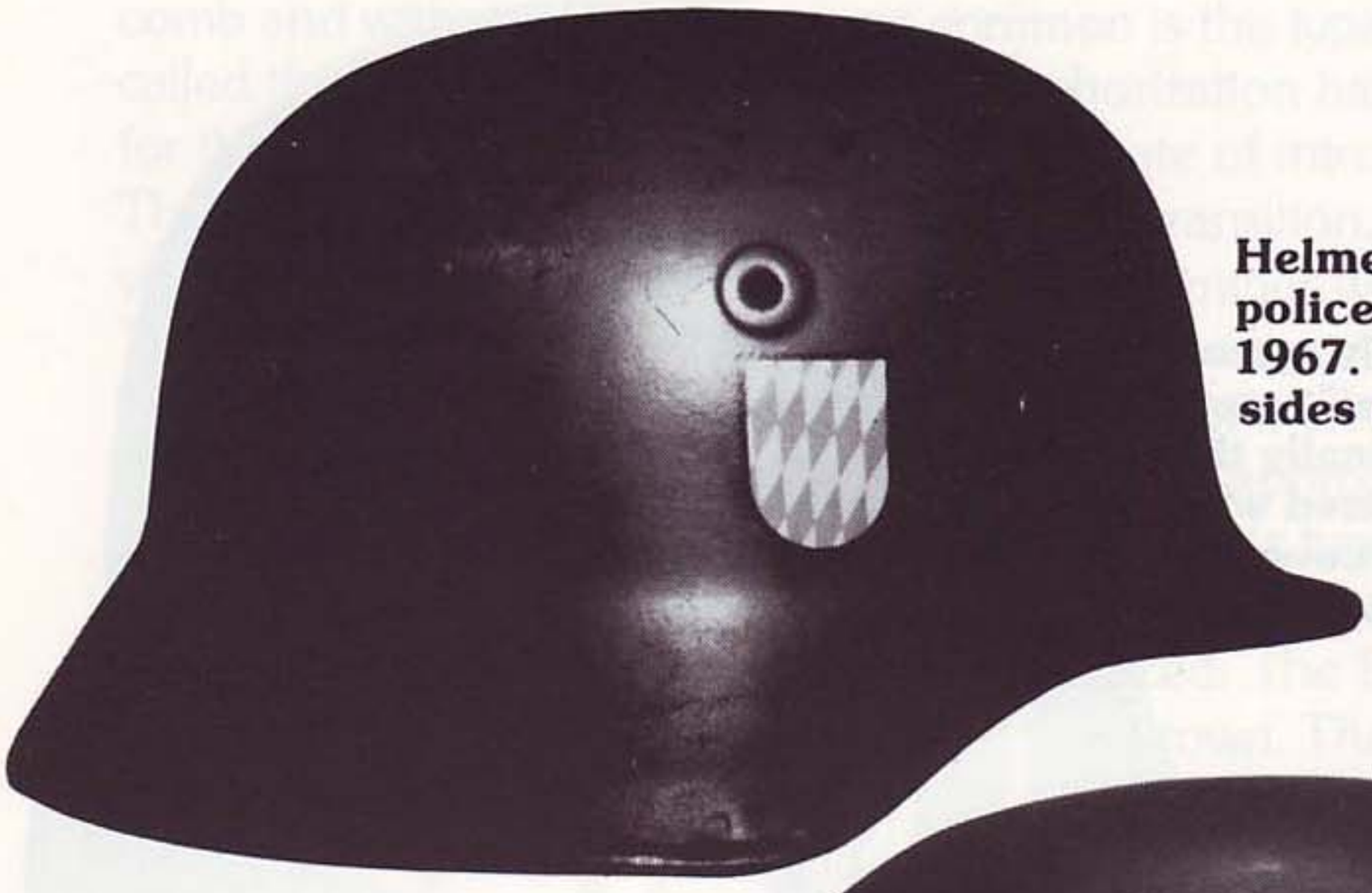
Immediately after the end of hostilities in 1945, the German police was re-established on orders of the Allies. The previous uniform had to be "denazified" and then could be worn once again. The steel helmet was also worn, but the word "POLIZEI" was stencilled in white across the front of the shell for purposes of identification. Helmets of this type, among others, were also used in the state of Hessen.

NOTE:
When the helmet was used by firemen, "Feuerwehr" (Fire Service) was stencilled on the front.

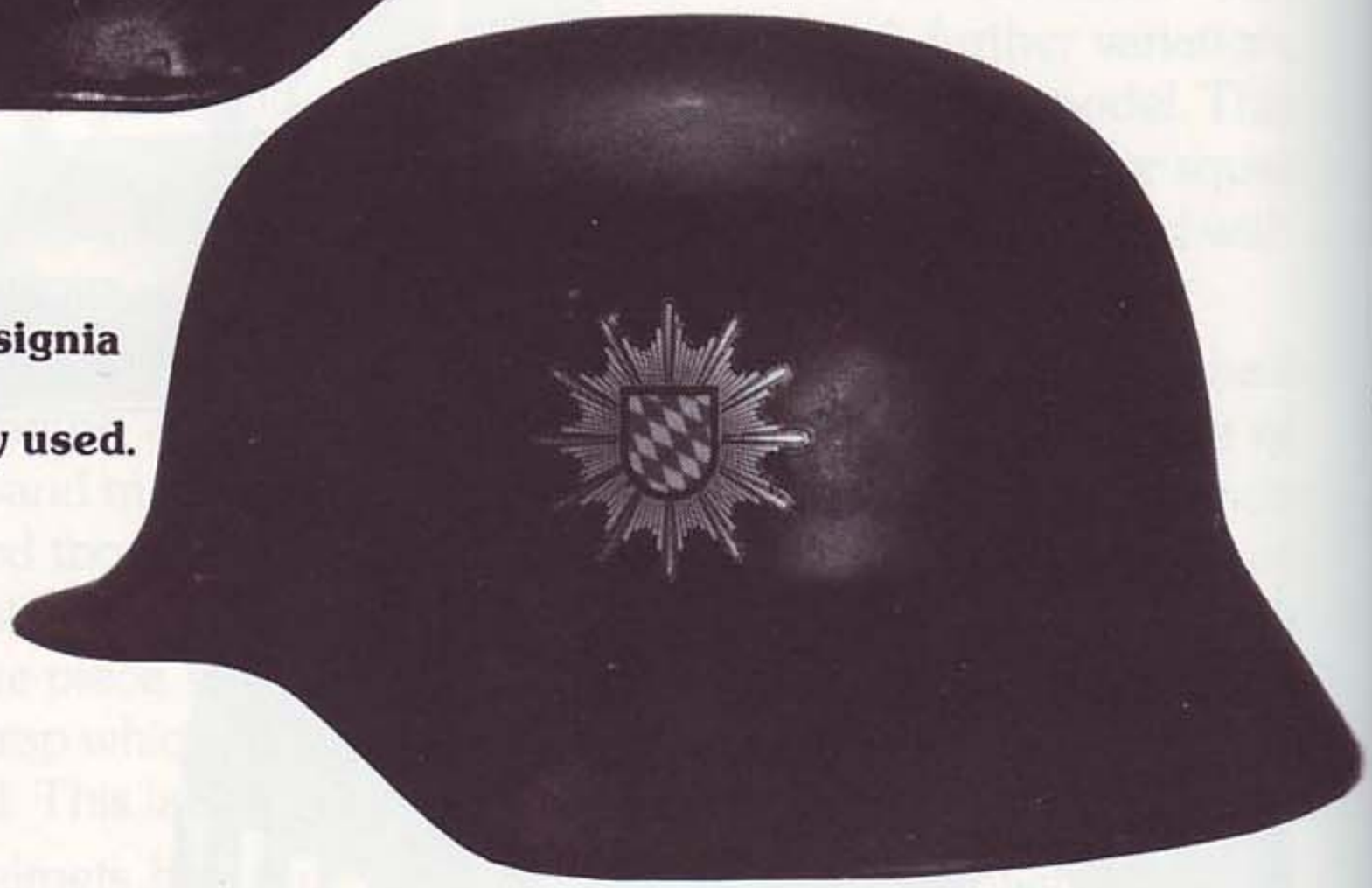
Denazified lightweight, green helmet with "Polizei" stencilled in white. Originally the two decals were covered with a glued-on paper covering which have since been removed.



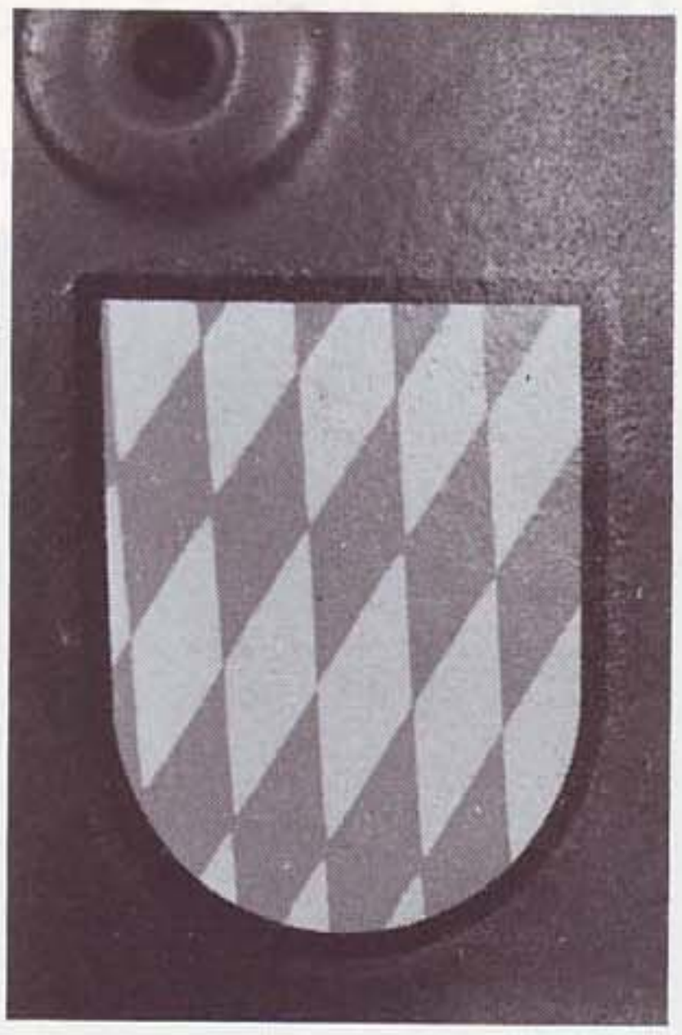
R. Bender



Helmet with the insignia of the police from "Bayern," used until 1967. The insignia was on both sides of the helmet.

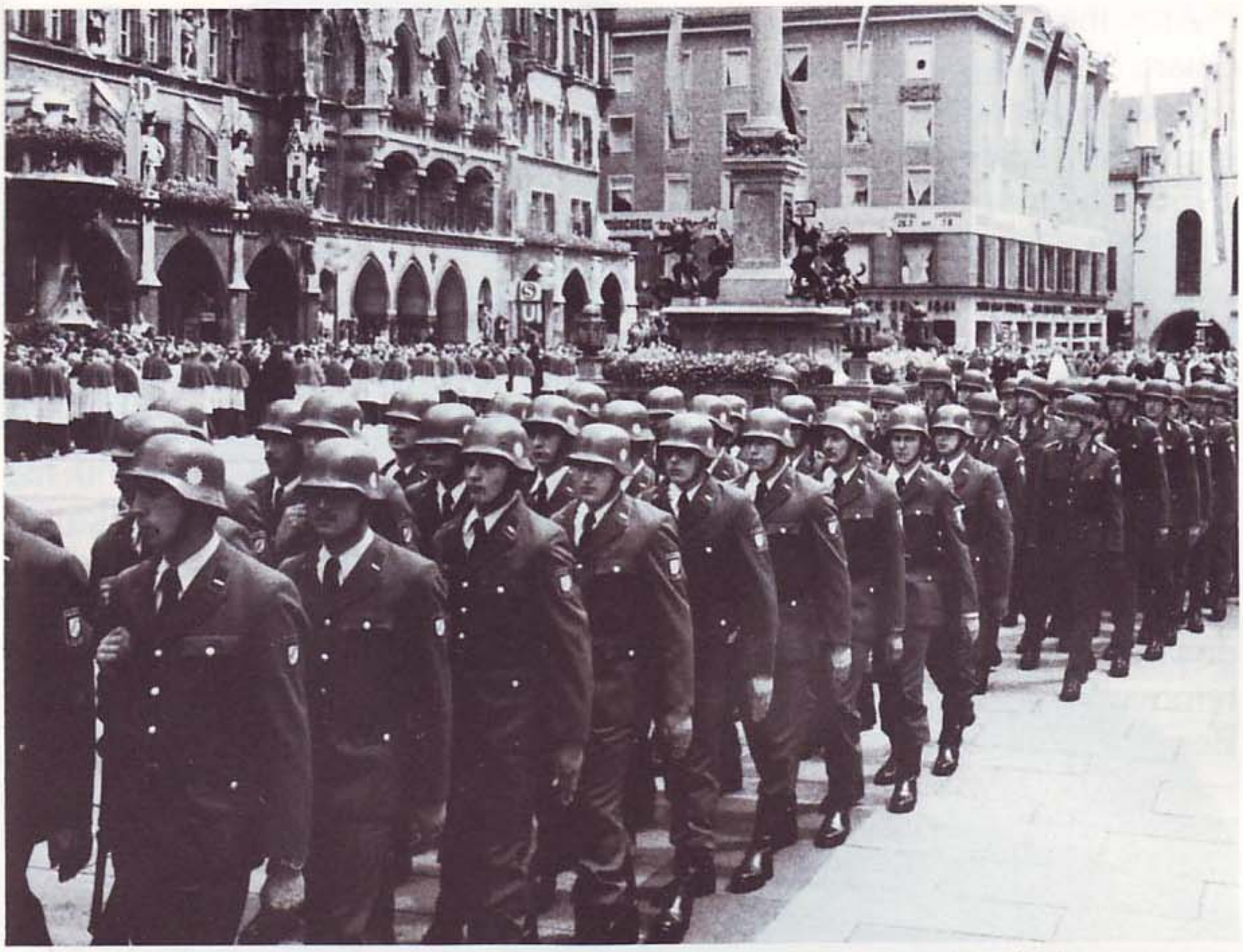


Helmet with the insignia of the police from "Bayern," presently used.

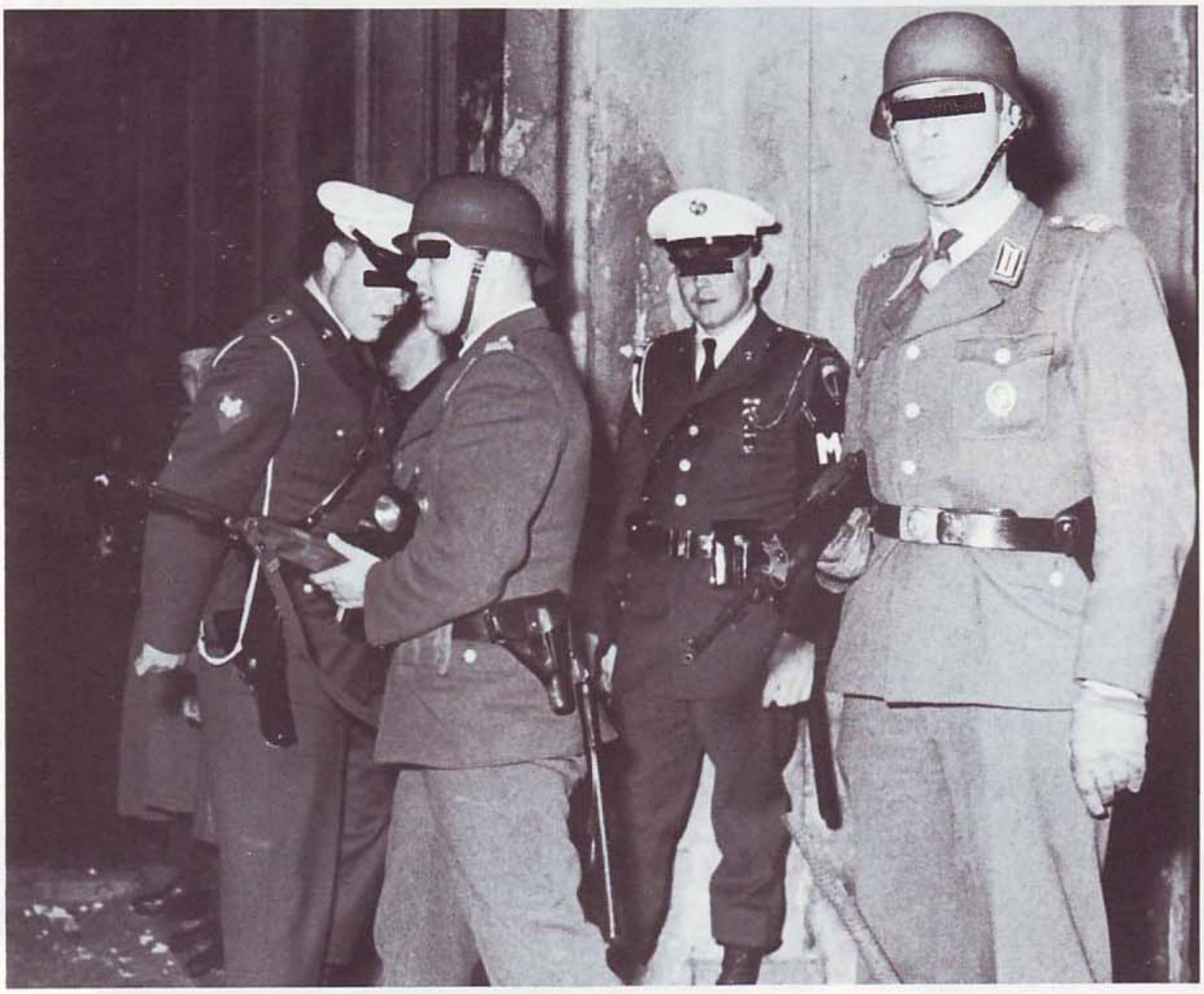


The Bavarian coat of arms is blue/white.





Bavarian Police and Federal Border Police in Munich, 1976.

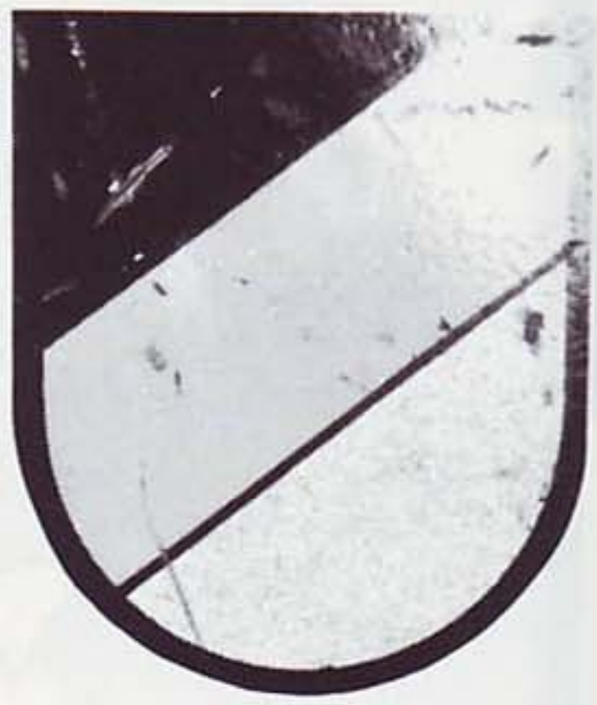


Police of Berlin on duty, 1963.

After the foundation of the German Federal Republic, the Federal Border Guard (Bundesgrenzschutz) and the barracked police squads (Bereitschaft-polizei) of the states were established in the early 1950's. The strength and equipment were determined in an official agreement dated 27 October 1950, which dealt with the establishment of the barracked police squads in the various West German states. The old German helmet was once again a part of the standard equipment and was used essentially for special duties, for shooting practice and on parade. The following states presently have heraldic crests on their helmets: Bavaria, Baden-Württemberg, Bremen and Hamburg. In 1967, the original lozenge crest of Bavaria was replaced by the police sunburst. Today, the old German steel helmet is rarely used, with the exception of the Border Guards who still wear it on watch duty. Like the current Bundeswehr helmet, the liner is no longer held in place by three split-tailed rivets, but rather is secured by a central bolt which protrudes downward into the interior of the shell. At the same time, the air vents were removed, but this did not prove to be successful and the current model of the Border Guards' helmet once again has these vents.



National shield is black/red/yellow.

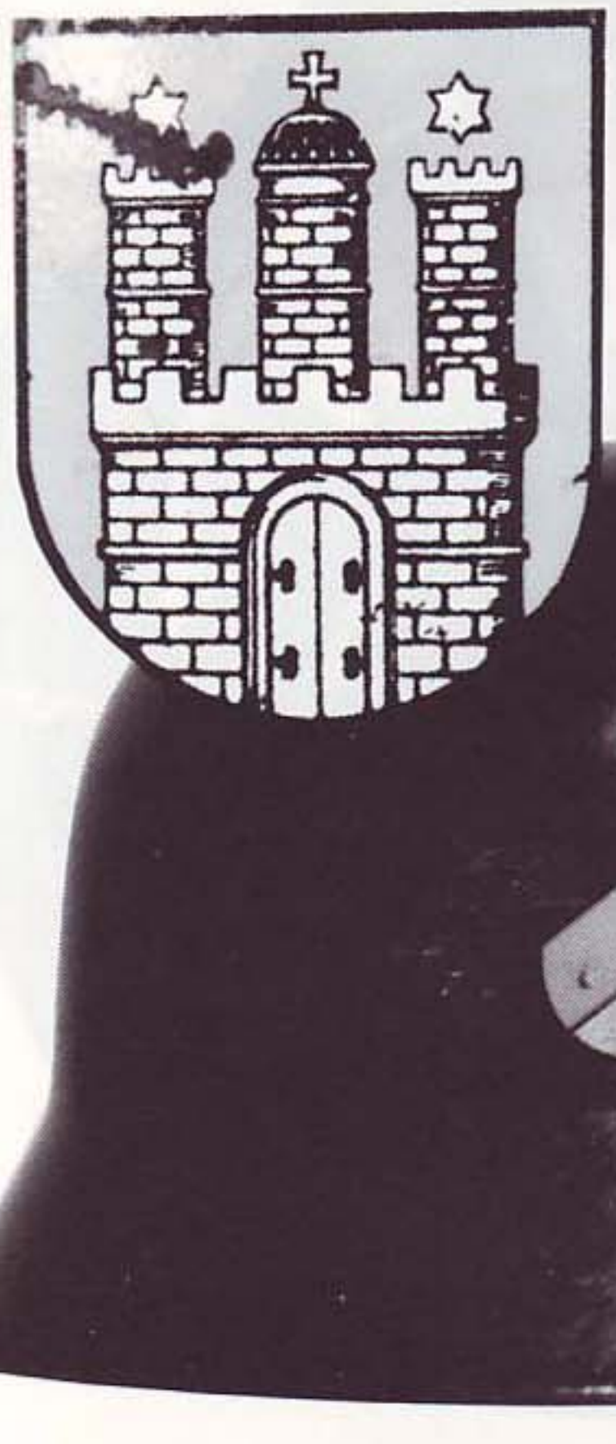




Helmet with the insignia of the police of Bremen (red/white).

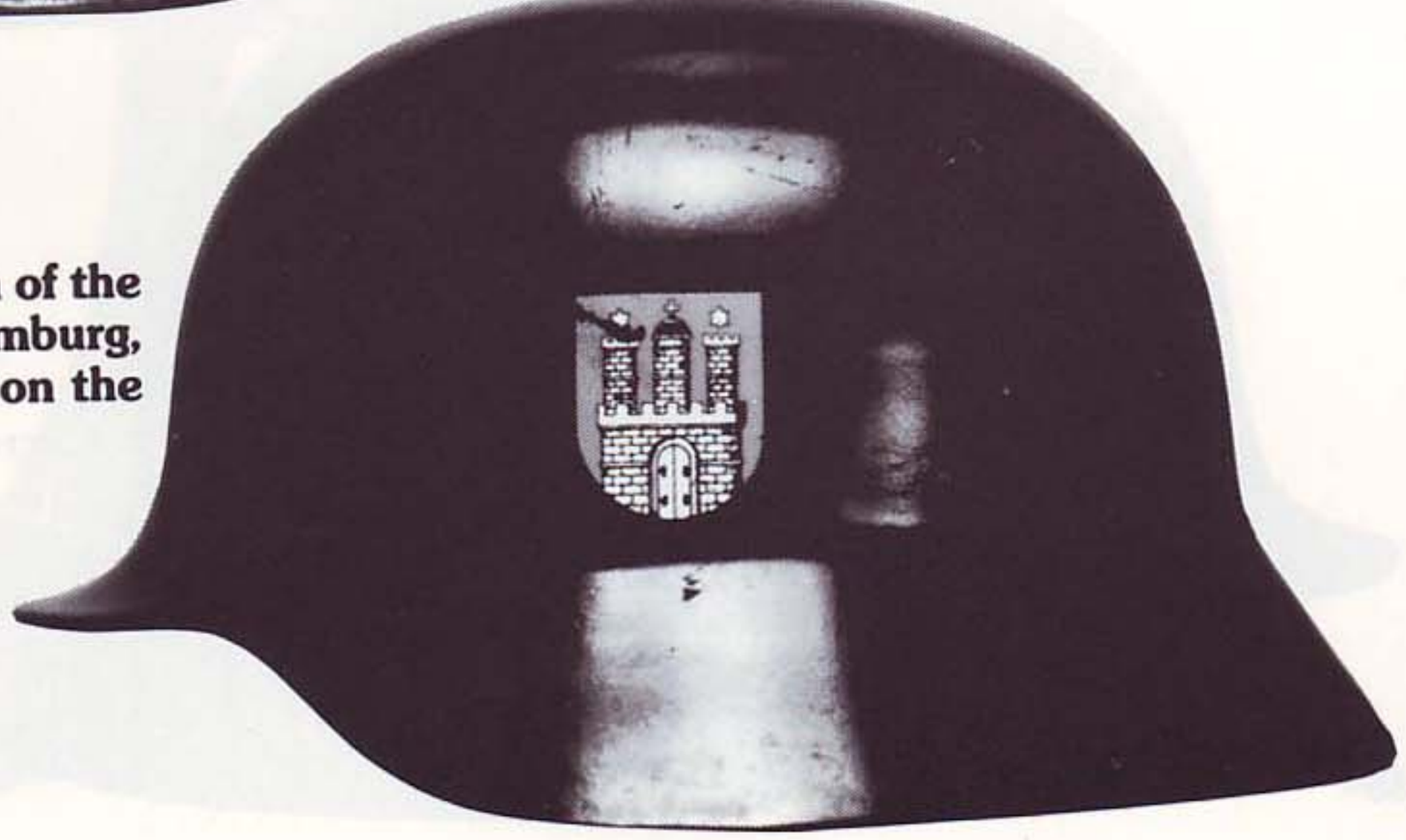


Helmet with the insignia of the police from "Baden-Wurttemberg."



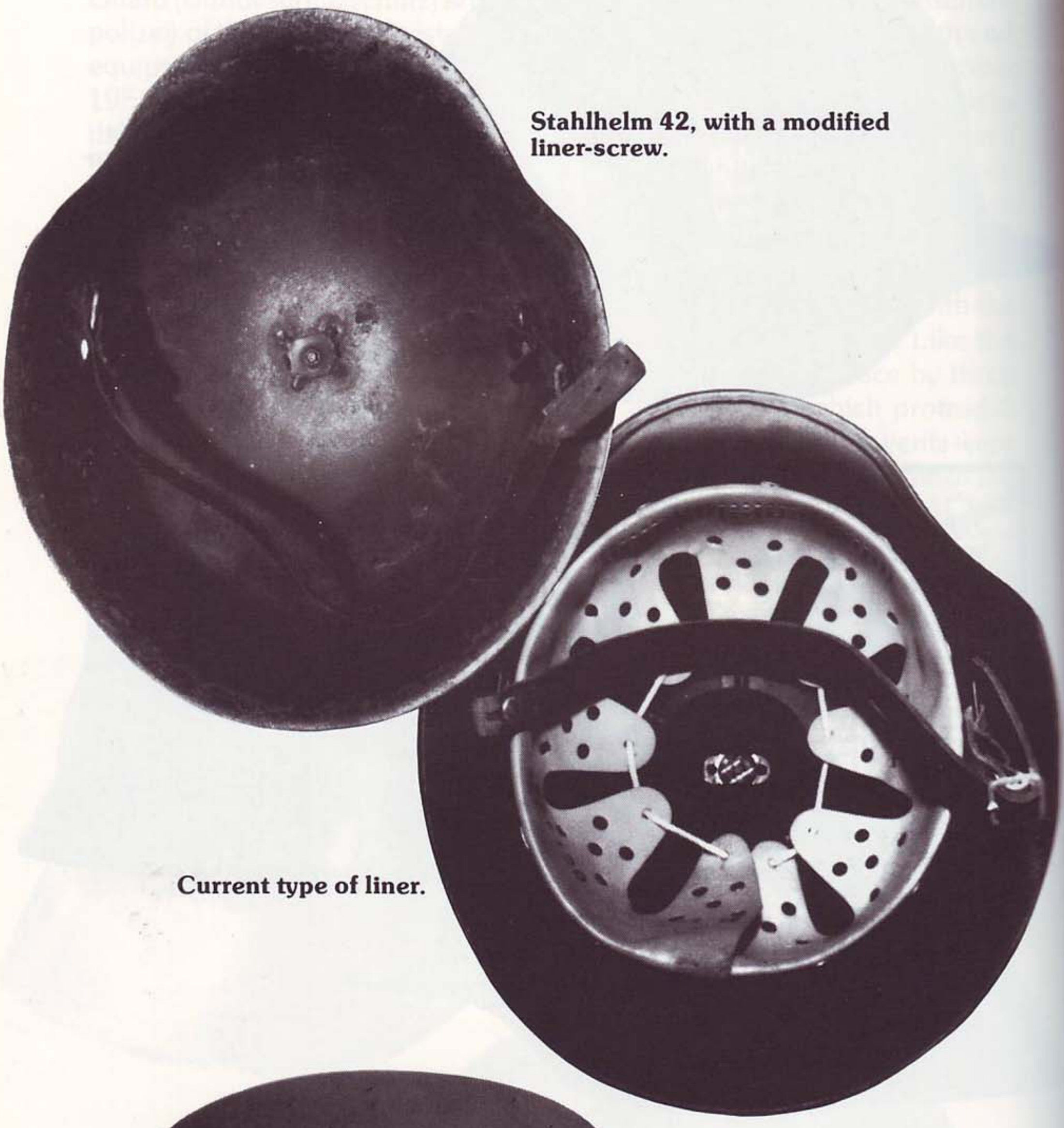
Black and white on red.





Helmet with the insignia of the police of the City of Hamburg, still in use. The helmet on the right is without vents.

Helmets of the "Bundesgrenzschutz," from 1952-present

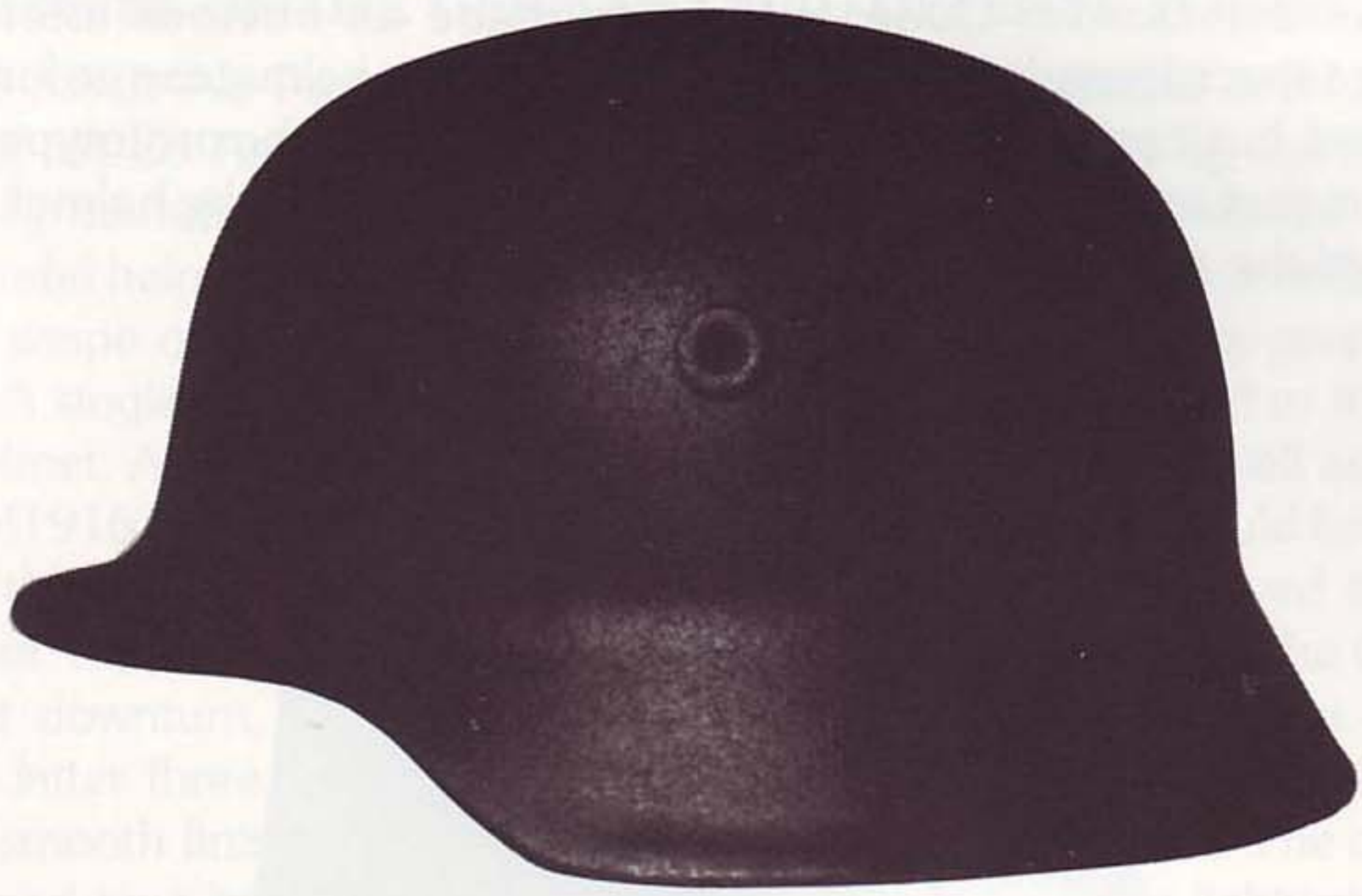


Stahlhelm 42, with a modified liner-screw.

Current type of liner.



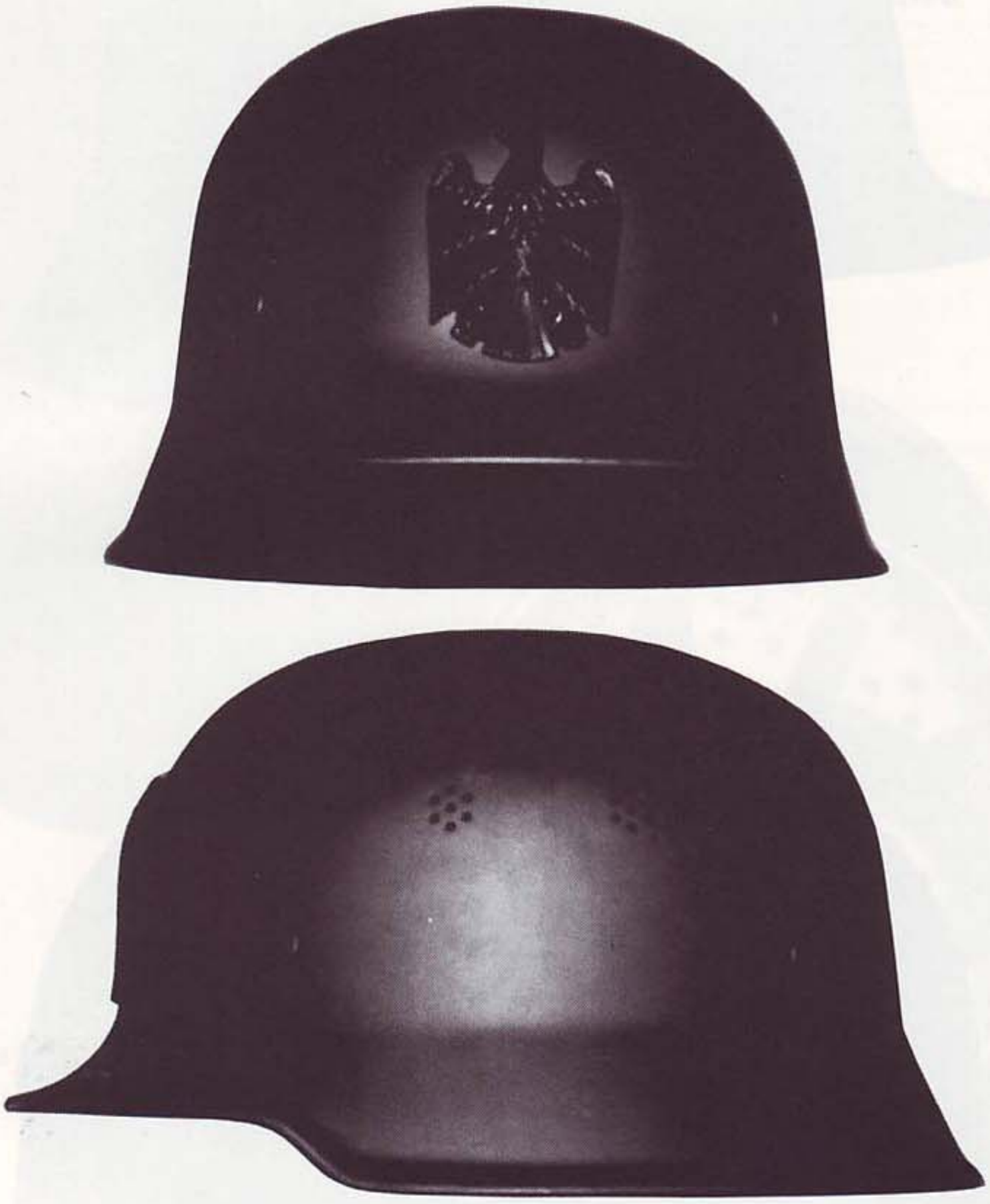
Current type of helmet



New model for the BGS.

Helmet for the "GSG 9."

The Federal Border Guard units also made an obvious attempt to introduce a special parade helmet. Particulars about the helmet can no longer be established, but it appears to have never gotten beyond the prototype stage. It is known that a stylized federal eagle graced the front of the helmet, much like that of the Austrian Guard Batallion of 1935.



A prototpe of a parade helmet for the "Bundesgrenzschutz."

HELMETS OF THE GERMAN CIVIL DEFENSE FORMATIONS

The Reich Air Protection League (Reichsluftschutzbund or RLB) was instituted on 28 April 1933. The first helmets to be used by the RLB were specially manufactured Austrian M1916 style lightweight helmets and early civil model helmets referred to as the "duck bill" helmet by some collectors due to the shape of its visor. These helmets were painted in a grey-green smooth finish. A single blue and silver RLB sunburst decal was applied to the front of the helmet. At a later date, civil model Edelstahl helmets as well as the standard M1916 and M1918 helmets were also used. A word should be said here about the Edelstahl helmet. Its composition was of an improved steel alloy, however, the helmet is best known for its rather unusual shape. The visor has a distinct downturn, thus giving it the name "droop bill" by many collectors. These latter three types of helmets were painted both in the standard grey-green smooth finish as well as in the light green smooth finish. The connected three pad type liner was used in the Austrian M1916 style lightweight shells. The standard M1917 type liner was used in M1916 and M1918 shells. The various civil helmet models used the connected three pad liner system as well as the more common liner which greatly resembled the leather portion of the M1931 liner. This particular type was generally found without the top crash pad of the type so often found in the helmets used by the fire brigades. In the late 1930's, many of the original RLB helmets were repainted and reissued to the newly-reorganized Luftschutz formations. Some of these helmets retained their old RLB decals during the repainting process, while others seem to have been totally repainted and then were redecalled with the new Luftschutz insigne.



L. Hardy



T. Goodapple

M 18 style lightweight helmet with the RLB star decal and smooth grey-green finish.

J. Korompilias



M 34 RLB helmet with sunburst decal and satin dark blue finish over the original light grey-green paint. Note apron markings below.



M 34 RLB helmet with sunburst decal and satin light green finish.

L. Hardy



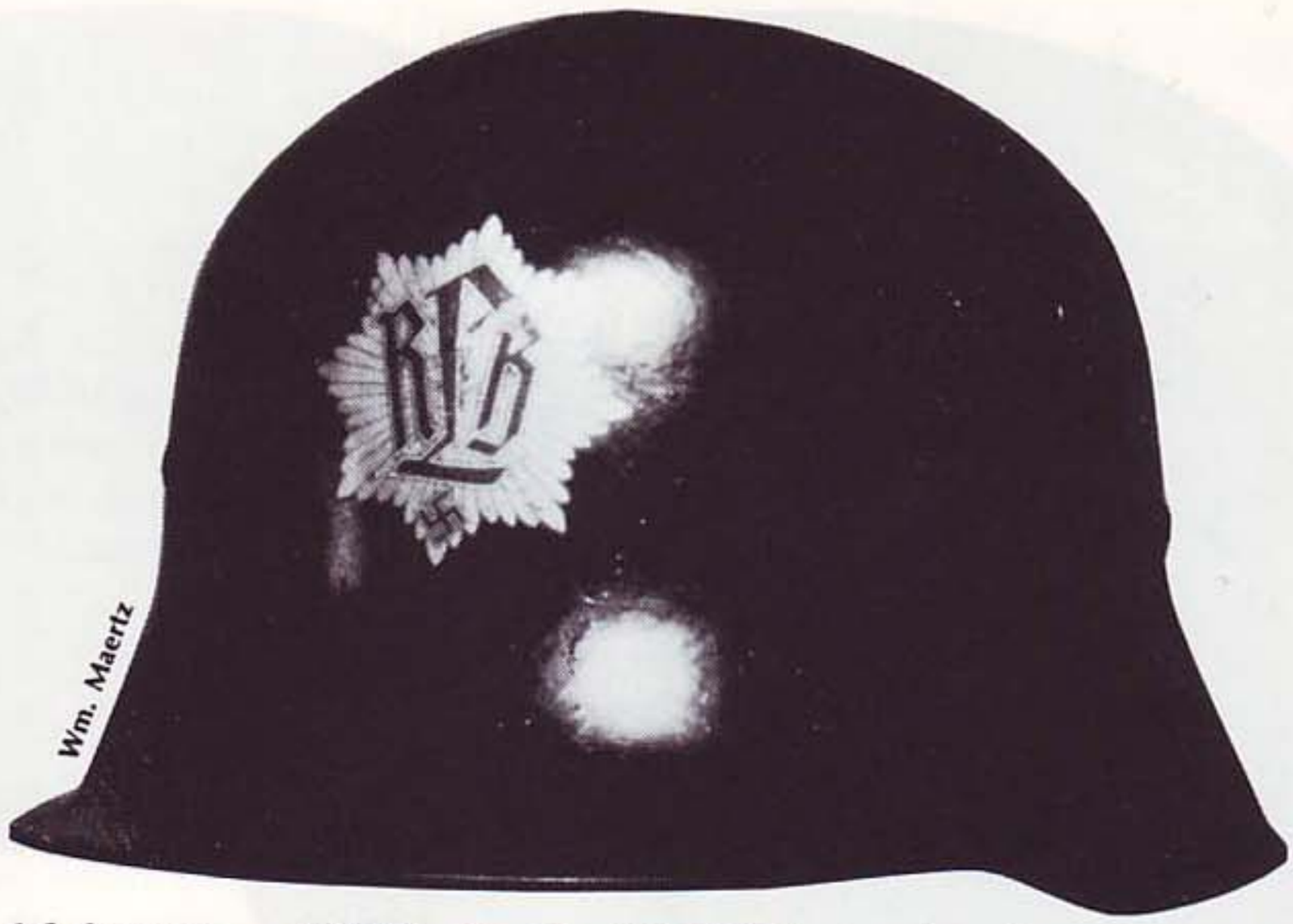
L. Hardy

M 16 Austrian style RLB helmet with screened vents and satin medium green finish.



M 16 Austrian Luftschutz helmet with 1938 winged decal and medium green finish. Note this is the "droop bill" model.

L. Hardy



Wm. Maertz

M 16 Austrian, RLB helmet with RLB star decal and smooth grey-green finish.

The first use of the new silver Air Defense (Luftschutz) winged emblem is believed to have taken place in 1938, when it appeared on the three-piece civil Luftschutz helmets. This particular model of helmet is sometimes referred to as the "gladiator" helmet because of its resemblance to the helmets worn by ancient Roman gladiators in the arena. Gold-colored versions of the Luftschutz winged decal also exist. It still remains unclear whether they were intended to be used by naval wharf or port air defense crews, or if they are nothing more than a manufacturer's variation.

L. Hardy

These three-piece Luftschutz helmets are immediately recognizable by their elongated neckguards and their long, sloping visors. This type of helmet was made from three separate components. The front visor and the rear neckguard were spot- or seam-welded together directly above the wearer's ear. The crown was then added to this assembly, being welded to it from the inside.

These three-piece Luftschutz helmets were used by the Security and Assistance Service (Sicherheits- und Hilfsdienst or SHD) and were usually items of private purchase, either by individuals or by groups. This accounts for the price/property decals which are often found beneath the rear neckguard. In 1939, the first two and one-piece Luftschutz helmets were produced. The two-piece helmet was designed exactly like its predecessor, except that the



J. Coy

Front view of a 3-piece M 38 Luftschutz helmet with smooth grey-green finish, probably a redecalled carry-over from the RLB days.



Side view of a 3-piece M 38 Luftschutz helmet with a smooth dark blue finish and decal on left side--purpose unknown.

A. Barrows



M 39 2-piece Luftschutz helmet with smooth dark blue finish.

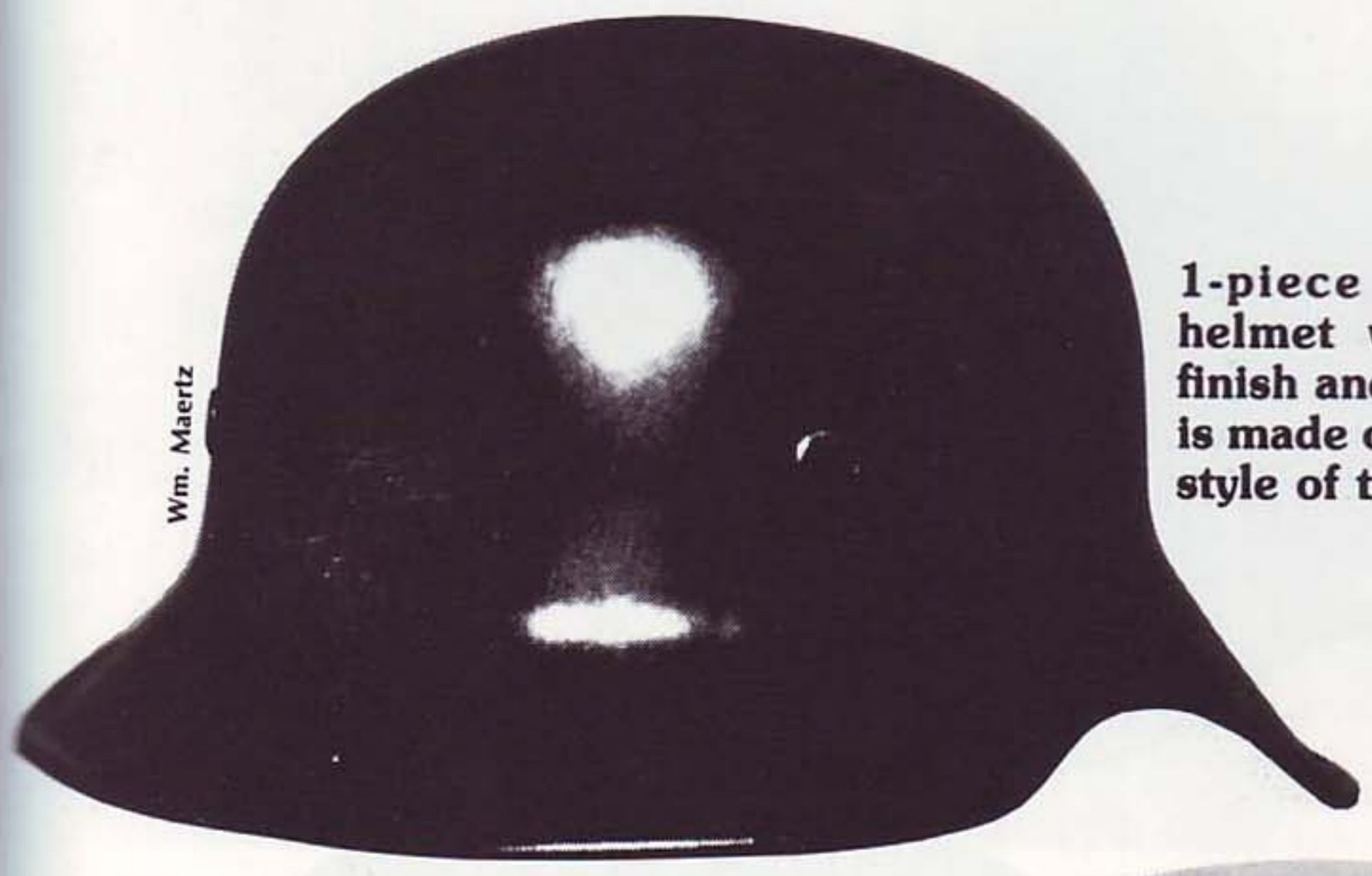
seam above the ear was lacking. The visor/neckguard component was now one piece. This was welded to the crown at the horizontal bead, as in the previous model. The one-piece helmet still retained the embossed bead which ran around the base of the crown. Production of these helmets lasted until late 1940, when their production was terminated because of war-related shortages of steel and a pronounced need for the increased production of M1935/40 helmets for the armed forces.

Floch



This female member of the Luftschutz closes a gas and splinterproof door. Note 2-piece helmet being worn.

The one-piece, late model Luftschutz helmet (lacking the embossed bead) was first manufactured in 1944, but unlike its predecessors, it was normally issued without the Luftschutz decal. This was due to late-war regulations against the application of decals in a move toward economy. While both the three-, two- and one-piece beaded luftschutz helmets were painted in a dark blue finish, the one-piece Luftschutz helmet of 1944 was usually painted a black satin finish. The liner of this last model varied from the previous types also. The earlier models were fitted with a wide variety of liners, ranging from elaborate M1931 combat and civil liners to simple, three-pad leather and vinyl examples. The one-piece 1944 helmet usually came fitted with a cheap, off-white cotton cloth liner cut in the style of the M1931 civil liner. The helmet also had a clear plastic chinstrap with a prong buckle, differing radically from the various black leather chinstraps which adjusted by means of slider buckles, as are to be found in earlier examples. Of the few one-piece 1944 Luftschutz helmets that were issued with the Luftschutz winged decal in the front, the color of the paint remained the same as that found on the earlier models, that being dark blue satin finish. It is also important to note that many of the earlier model Luftschutz helmets were reissued from 1941 to 1943 with poorer quality liners, replacing those that had worn out from use.



Wm. Maertz

1-piece M 44 Luftschutz helmet with a satin black finish and no decal. The liner is made of cotton cloth in the style of the M 31 civil liner.



J. Coy

1-piece M 44 Luftschutz helmet with a white finish and red crosses and a black number 5. Presumably worn by Red Cross or medical personnel during bombing raids.

During the course of the war, many of the personnel who formed the Luftschutz-SHD stopped wearing the standard Luftschutz helmet and were issued a more protective combat style. This was also true for the personnel of the Air Raid Warning Service (Luftschutzwarndienst or LSWD). Now, the beaded versions of the M1935, M1935/40 and M1942 were issued to these groups. These failed to pass the stringent Wehrmacht acceptance tests for ballistic integrity. These helmets were reworked by the addition of the embossed, horizontal bead, so that they could not be confused with satisfactory helmets. These substandard helmets were deemed to be ballistically sufficient for home front personnel. When such helmets are encountered, the trained eye will readily spot a variety of surface flaws in the steel (scaling, reticulation, etc.). As with the previous types, these substandard combat helmets were also painted with a dark blue satin finish and had a winged Luftschutz decal applied to the front. The liners ranged from actual M1931 liner systems (found primarily in beaded M1935 shells), to M1931 style civil liners made of cloth, vinyl or leather (usually found in the beaded M1935/40 shells), to M1931 liners made of low-quality leather or vinyl (usually found in the beaded M1942 shells).



M 35 "beaded" Luftschutz-SHD/Luftschutzwarndienst helmet with Luftschutz decal and satin dark blue finish.



M 35/40 "beaded" Luftschutz-SHD/LSWD helmet with Luftschutz decal and satin dark blue finish.

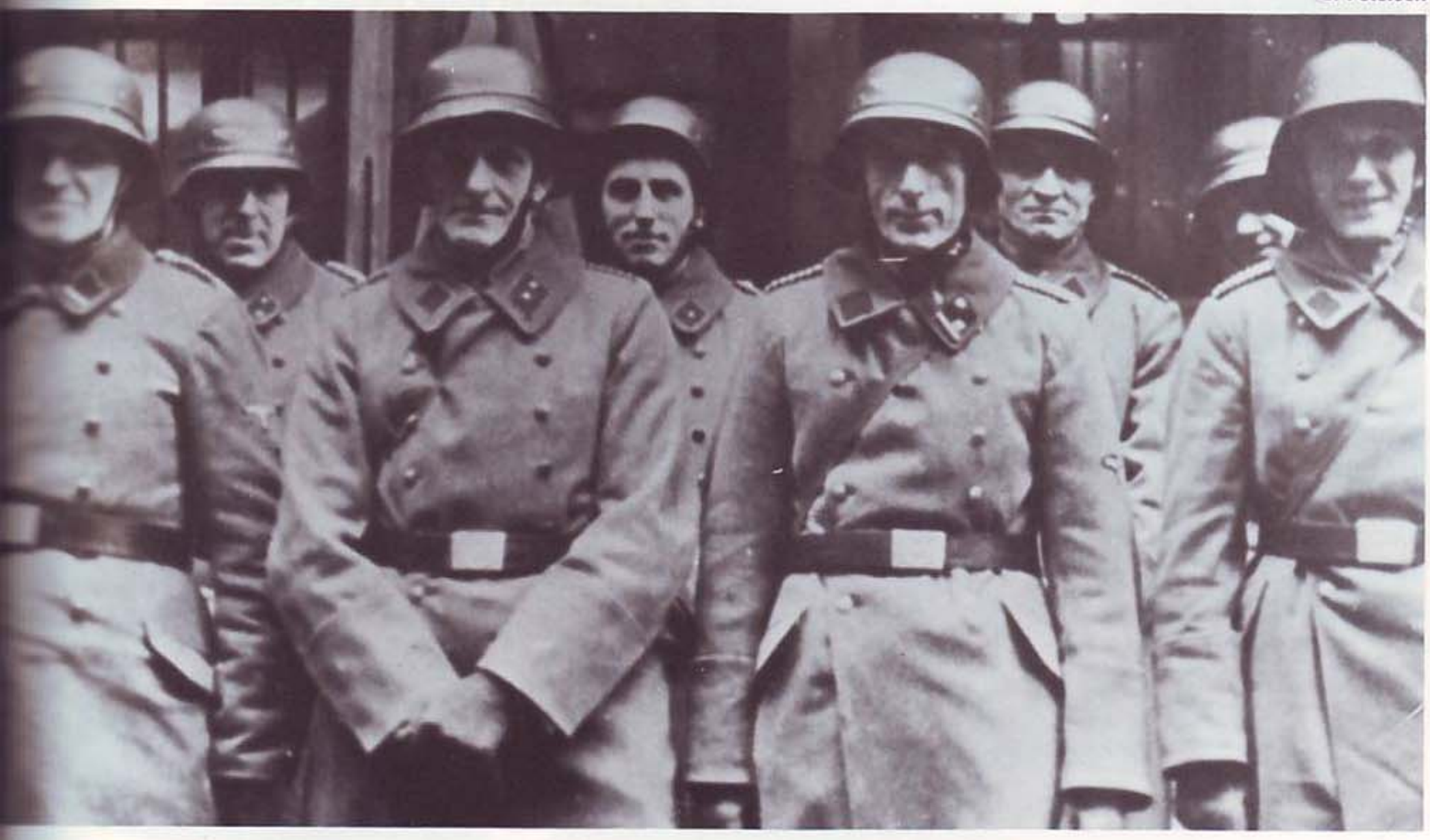
L. Hardy



Wm. Maertz

M 42 "beaded" Luftschutz-SHD/LSWD helmet with Luftschutz decal and satin dark blue finish.

G. Petersen



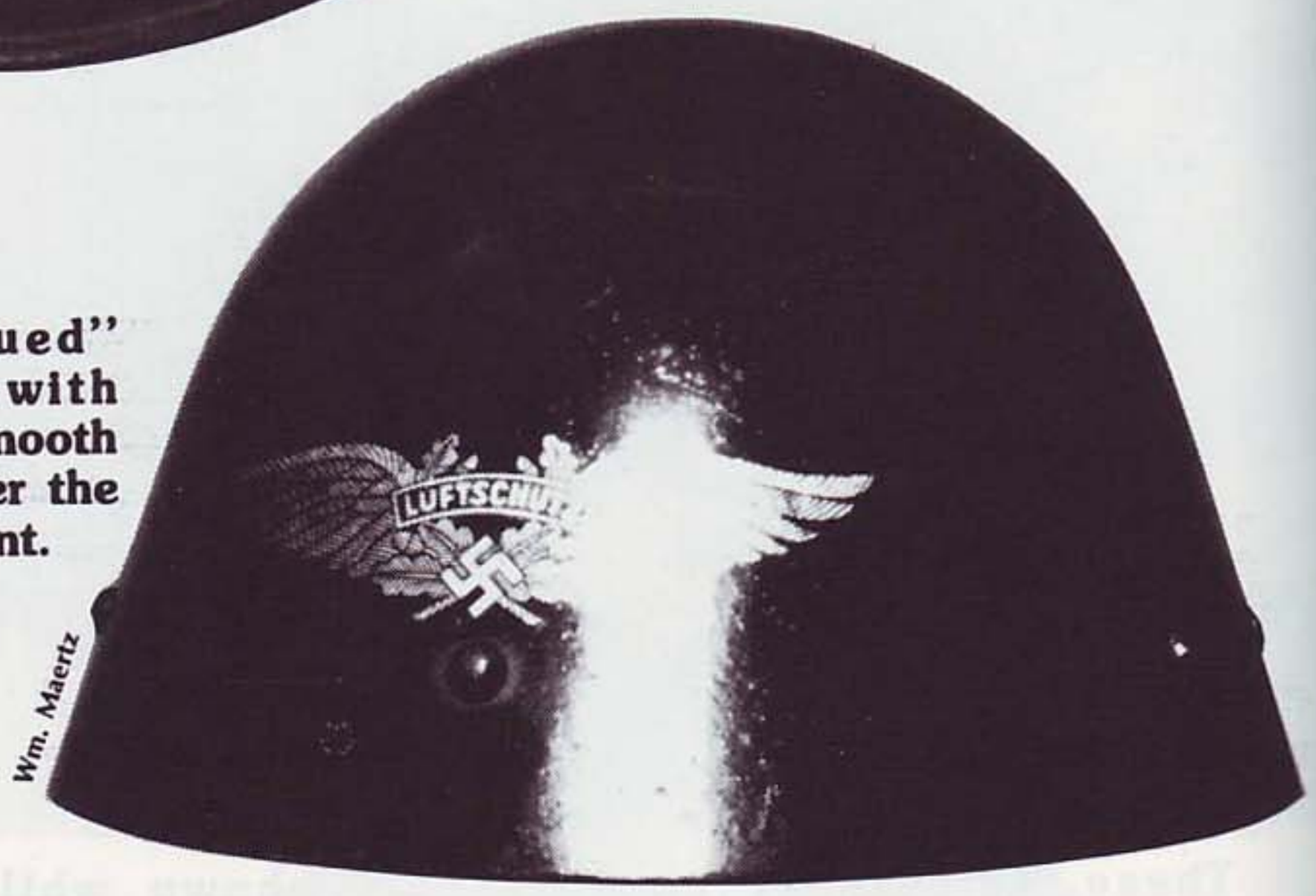
These Reichspost members are shown while serving with the Luftschutzwarndienst. Note they are wearing 3, 2 and 1-piece Luftschutz helmets as well as "beaded" M 35 and M 42 helmets, all with the winged Luftschutz decal.

Many captured foreign helmets and a large number of varieties of old or unused German civil and combat helmets that became available were repainted and reissued with the Luftschutz winged decal on the front. This practice was begun by reason of the economics involved. It was much more inexpensive to repaint an existing helmet than to manufacture a new one. The captured foreign helmets were either painted in a dark blue satin finish, a medium grey smooth finish, a black satin finish, or were merely left in their original issue color. Among these captured and subsequently reissued helmets are the Danish M1923 and M1923/39, Dutch M1916 and M1928, French M1915 and M1926, Czech M1932, Polish M1931, Soviet M1936 and M1940 and

Hungarian M1917. Almost all of these helmets have had the Luftschutz decal applied to the front of the crown. The bulk of the reissued German helmets were repainted in a dark blue or black satin finish. These helmets were also affixed with the winged decal. In late 1944, for reasons unknown, the Luftschutz color requirements were changed and all helmets either produced or reissued from that point in time were painted in medium grey smooth finish or tan-grey satin finish.



M 26 French "reissued" Luftschutz helmet with Luftschutz decal and a brush-applied grey-blue finish over the original light khaki brown paint.



M 32 Czech "reissued" Luftschutz helmet with Luftschutz decal and smooth medium grey finish over the original light brown paint.



M 40 Russian "reissued" Luftschutz helmet with Luftschutz decal and smooth medium grey finish over the original light green paint.



3-piece Luftschutz helmet with black/gold decal, stainless steel comb and black leather neckflap. This reissued helmet has a smooth medium grey finish over the original satin dark blue finish.

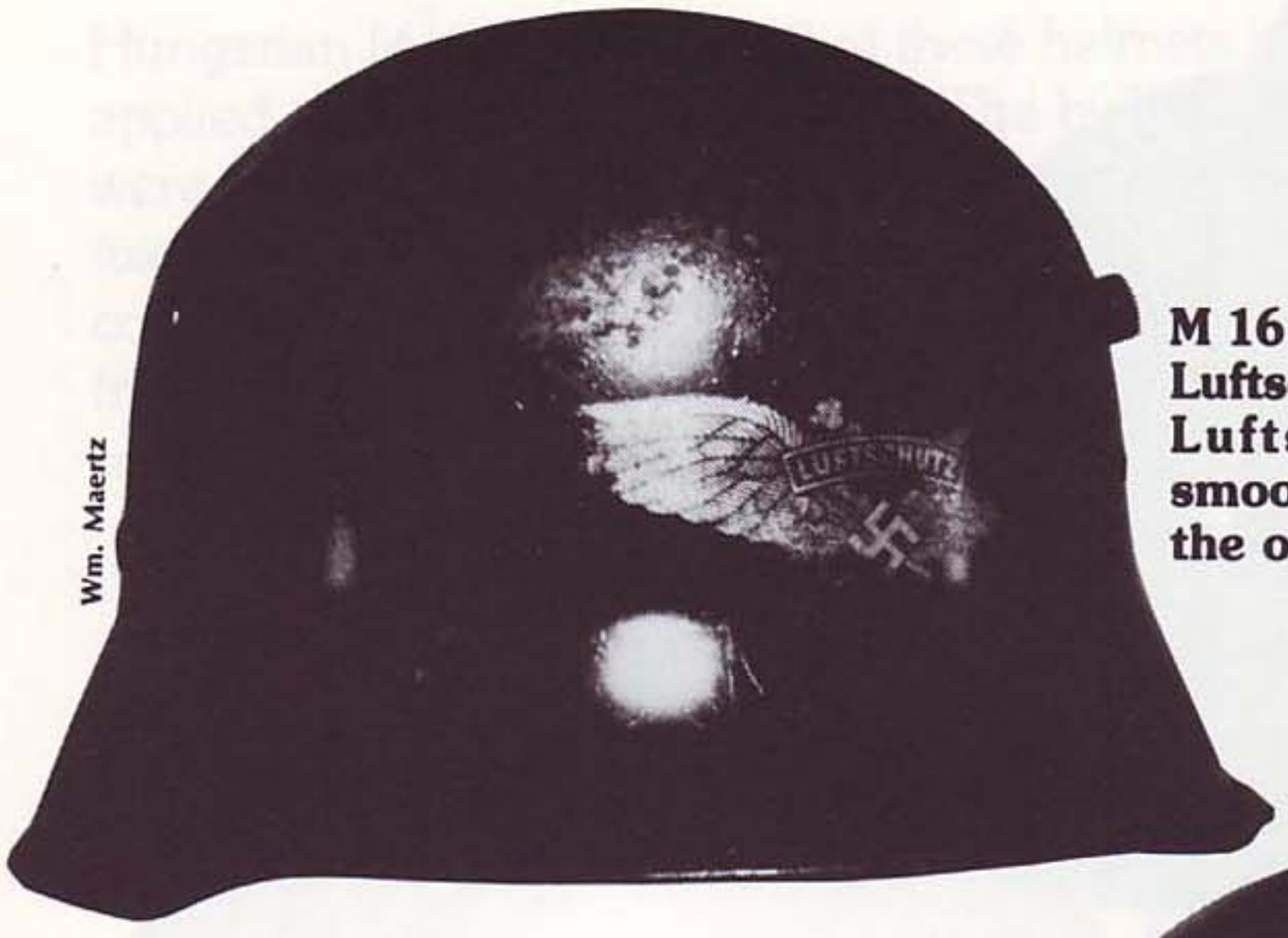


This reissued piece had the comb and neckflap added and was utilized by the Dresden Feuerwehr. Note "Dresden" printed on front and L.S. Feuerwehr on both sides (Luftschutz Feuerwehr).

Other style helmets utilized by the Luftschutz



M 16 style Luftschutz helmet with Luftschutz decal and smooth light green finish.



Wm. Maertz

M 16 Austrian style "reissued" Luftschutz helmet with the Luftschutz decal and a smooth dark blue finish over the original grey-green finish.



Wm Maertz

M 34 "square dip" Luftschutz helmet with gold/black Luftschutz decal and satin black finish. The helmet is made of aluminum



L. Hardy

M 34 "square dip" Luftschutz helmet with Luftschutz decal, satin black finish and "salt shaker" style air vents.



A. Barrows

M 34 Luftschutz helmet with decal on side (purpose unknown) and grey-green finish.

In May 1942, the SHD was transferred to police authority. The Luftschutz decals on the front of the beaded M1935, M1935/40 and M1942 helmets were removed or painted over and the police decal and the party shield decal were applied to the sides. On the helmets which were first converted, those being primarily the beaded M1935 and 35/40s, the unbordered police eagle decal was used. On later conversions (more beaded M1935/40s and almost all of the beaded M1942s), the bordered eagle of the fire brigades (Feurwehr) was utilized. This was done, naturally, to show the SHD's new affiliation with the police. It is widely held that the bordered Feurwehr eagle decal was used because the border tended to give better definition to the decal, since the helmet's color was usually quite dark. As a part of this transition, the SHD was also renamed as the Luftschutz Police (Luftschutzpolizei). Most of these decals were applied three millimeters under the air vents as on combat helmets, although tolerances were rather wide in this. It is of interest to note that a sizable number of helmets display decals which were applied behind the air vents. The most likely explanation for this practice is that there was difficulty encountered when trying to apply the decals over the bead. This raised portion would not allow the decal to adhere properly to the surface. Placing the decals behind the vents solved this problem.



Ray Embree

M 35 "beaded," double decal Luftschutzpolizei helmet with unbordered eagle decal and satin dark blue finish. Note decals are positioned behind air vents.



M 35 "beaded" double decal Luftschutzpolizei helmet with normally positioned unbordered eagle decal and satin dark blue finish.

L. Hardy

M 35/40 "beaded" double decal Luftschutzpolizei helmet with unbordered eagle decal and satin dark blue finish. Note reversed decals.

L. Hardy

M 35/40 "beaded," double decal Luftschutzpolizei helmet with unbordered eagle decal and satin dark blue finish.

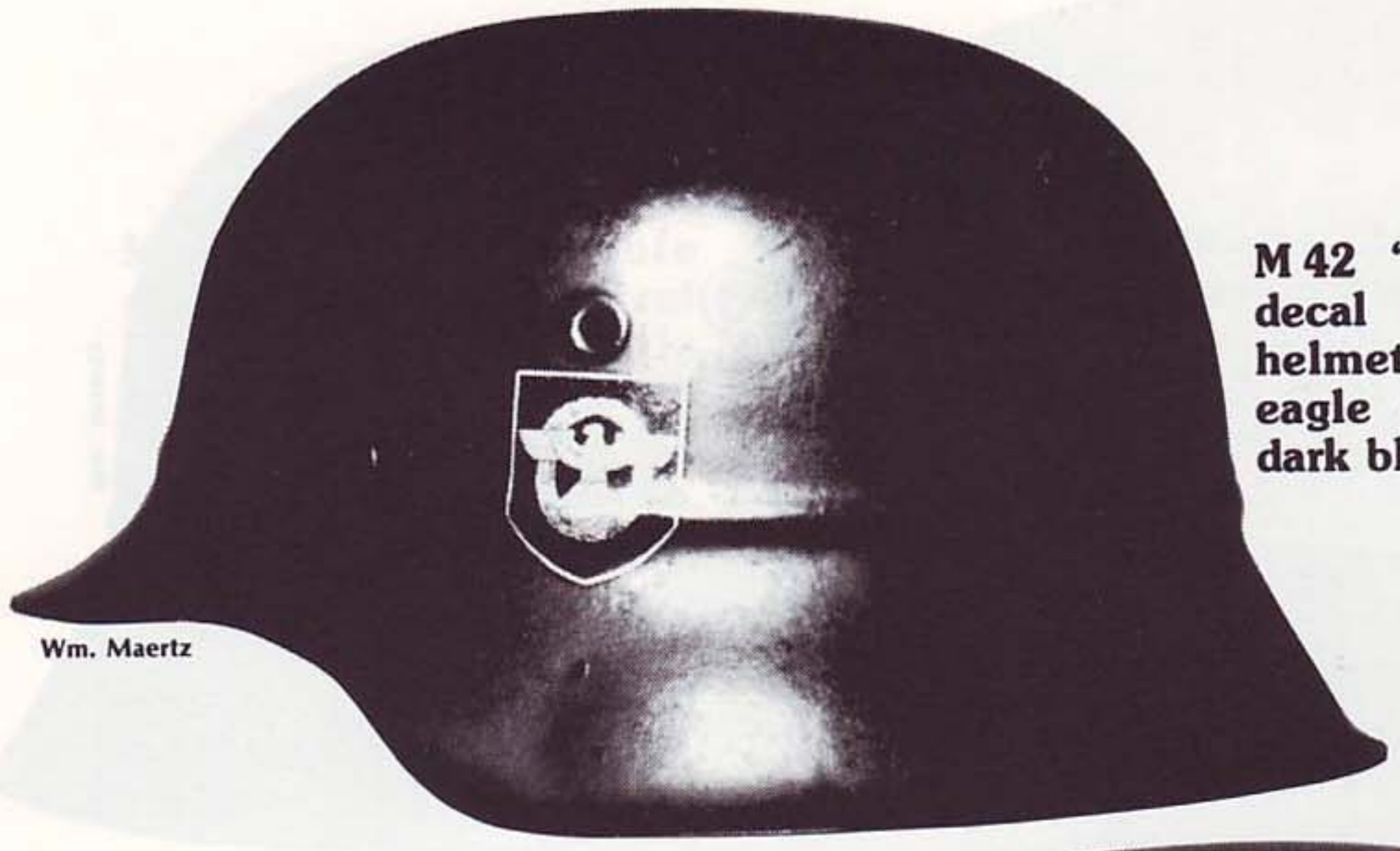


Wm. Maertz

As above, but with bordered decal. Note reversed decals.



J. Coy



Wm. Maertz

M 42 "beaded," double decal Luftschutzpolizei helmet with bordered eagle decal and satin dark blue finish.

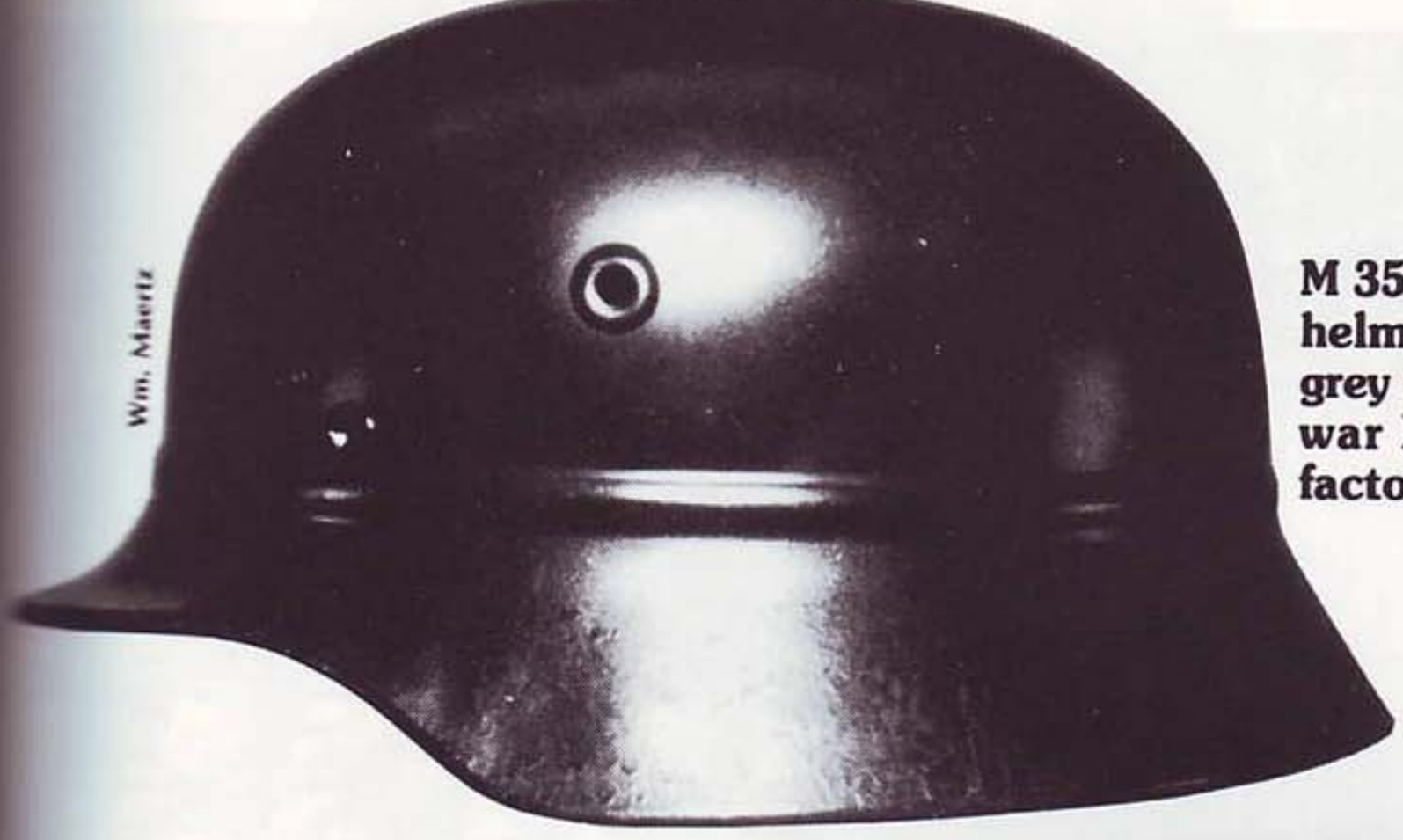
M 35 "beaded," no decal helmet with smooth light green finish. Possibly a late-war Luftschutzpolizei or factory guard helmet.



Wm. Maertz

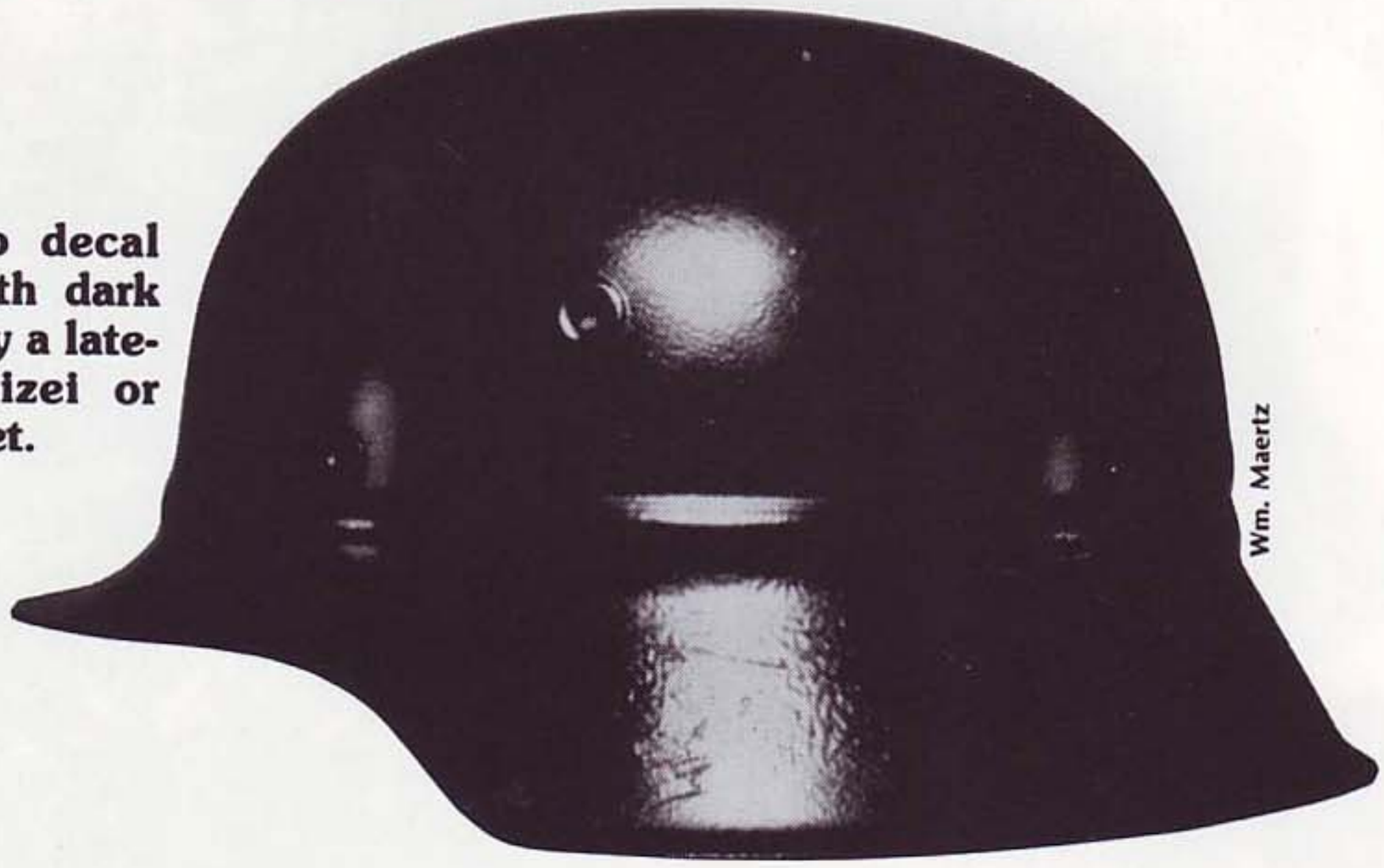


The Hitler Youth members above, attached to the fire fighting service, wear a wide variety of lightweight and beaded helmets with police and Luftschutz decals.



M 35/40 "beaded" no decal helmet with smooth dark grey finish. Possibly a late-war Luftschutzpolizei or factory guard helmet.

M 42 "beaded" no decal helmet with smooth dark blue finish. Possibly a late-war Luftschutzpolizei or factory guard helmet.



As with the civil model Luftschutz helmets and the other beaded combat Luftschutz helmets, a number of these Luftschutzpolizei helmets were "re-issued" in a medium grey smooth finish and a tan-grey satin finish in late 1944. The liner types and materials remained the same as those found in the beaded Luftschutz combat helmets.



Hermann Göring addressing workers at an armament plant in late 1939. Note double factory-related decals on the sides of the Luftschutz helmets.

Illustrated below are but a few of the numerous helmets that existed with company logos or names, which were worn by personnel charged with company security and/or fire fighting duties.



A. Barrows

2-piece Luftschutz helmet with medium grey finish of the "C.P. Goerz" Optical Company, Vienna.



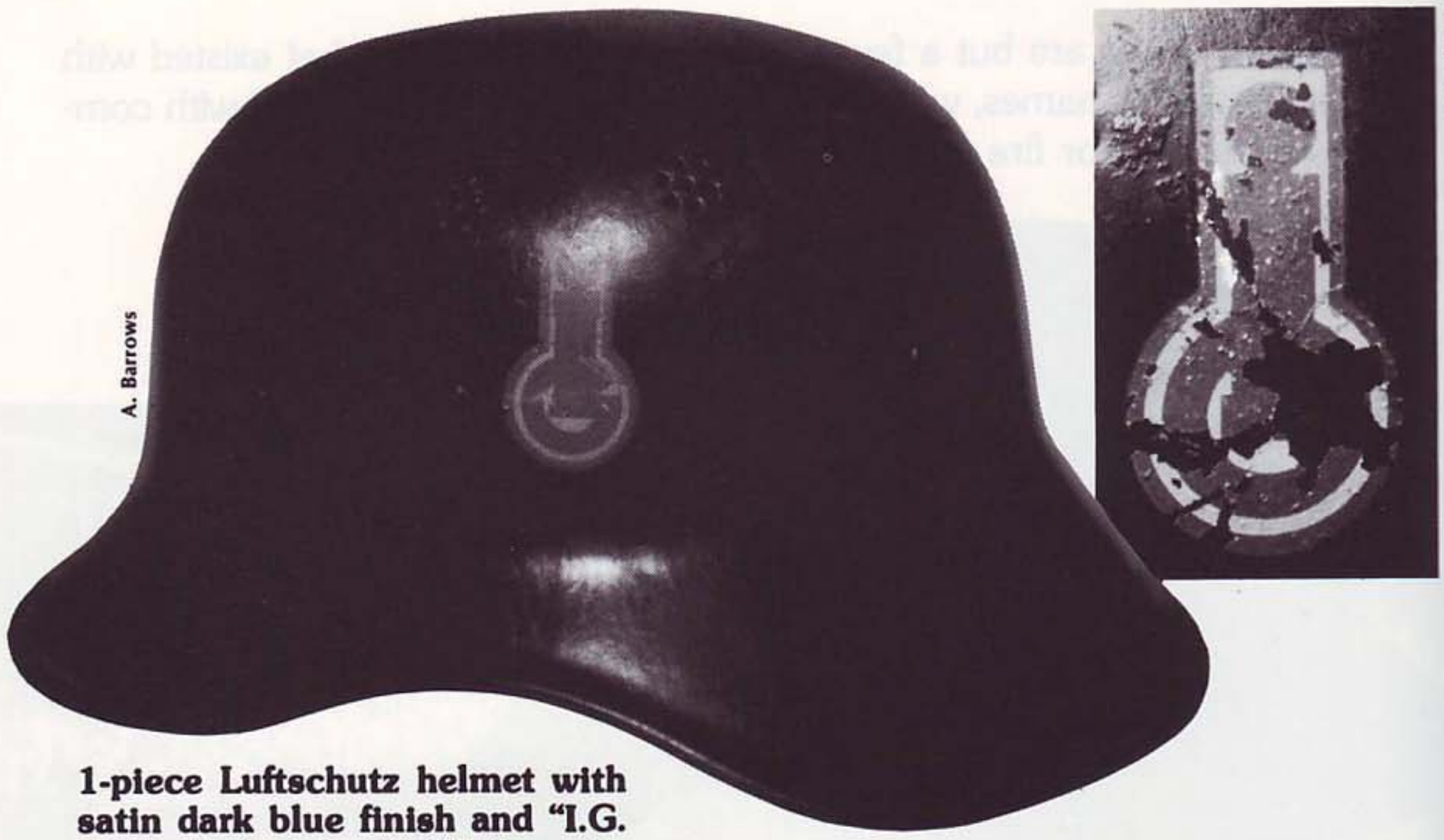
A. Barrows

M 34 with dark blue finish and "Hanomag" company logo and party decal (right side)--made armored vehicles, half-tracks, etc. Located in Hannover.



P. Malone

3-piece Luftschutz helmet with satin dark blue finish and blue/white logo of "I.G. Farbenindustrie A.-G."



A. Barrows

P. Malone

1-piece Luftschutz helmet with satin dark blue finish and "I.G. Farbenindustrie A.-G." logo in green and white.



A. Barrows

3-piece Luftschutz helmet with satin dark blue finish and paper "Junkers Flugzeug u. Motorenwerke A.-G." logo.



A. Barrows

"Junkers" property decal on inside neck shield of a Luftschutz helmet.

I.G. Farbenindustrie logo in blue and white.



A. Barrows

M 34 fire brigade helmet with satin black finish and "WLS MAGGI" stencilled logo. MAGGI was a meat and preserve company which made rations for the armed forces--still in business.

Note: WLS stands for Werkluftschutz.



A. Barrows

M 34 style helmet with medium grey finish and "PUCH" logo, an Austrian factory that produced vehicles and motorcycles--still in business.



D. Deeter

M 34 helmet with satin dark blue finish and logo of "Schoberg (Pfaff) Augsburg Windenfabrik," maker of winches.



A. Barrows

1-piece Luftschutz helmet with satin dark blue finish and logo of "Schoberg (Pfaff) Augsburg Windenfabrik."



A. Barrows



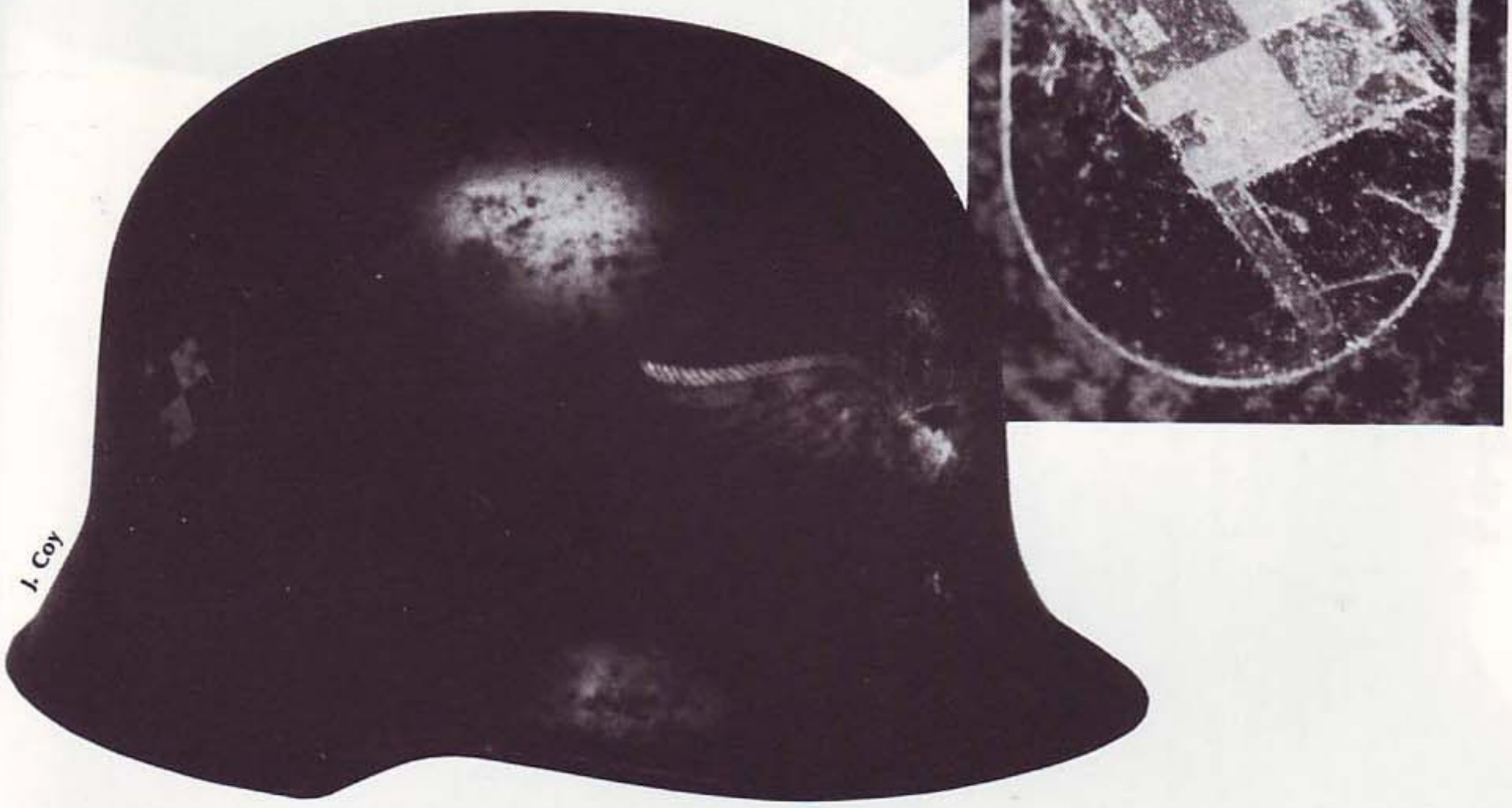
A. Barrows

M 34 steel factory police helmet with satin black finish and decal of "Steyr" Firearms Company (also made vehicle parts).



A. Barrows

M 34 helmet with a satin medium grey-green finish and the logo of "Telefunken" GmbH, Berlin.



J. Coy

M 34 Luftschutz helmet with satin dark blue finish and the red/white/black decal, denoting the city of Würzburg.



A. Barrows

M 34 style helmet with screen vents, satin medium grey finish, and unknown stencilled logo.



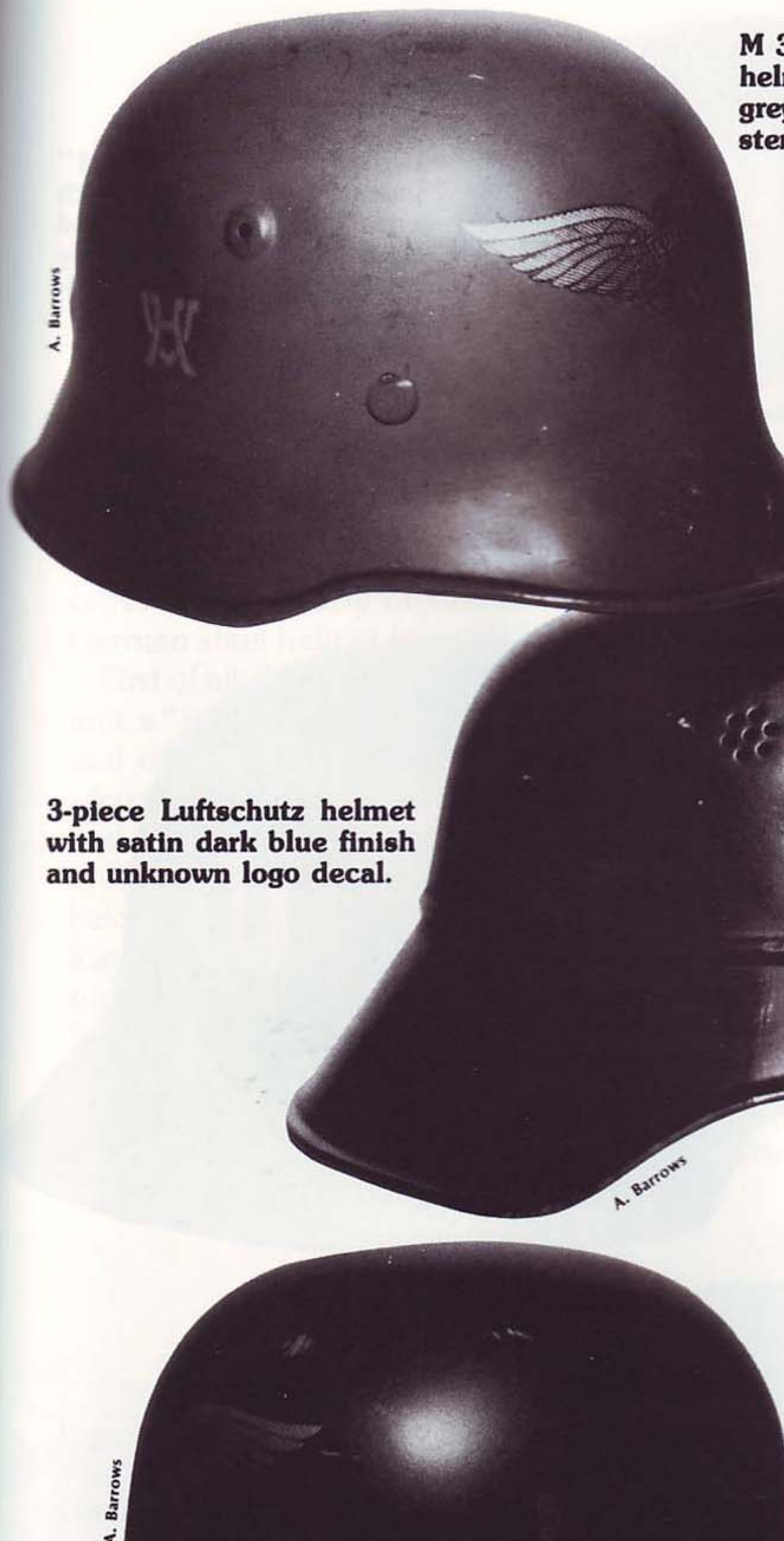
A. Barrows

M 34 style helmet with satin black finish and white stencilled logo of the Volkswagen plant.



A. Barrows

2-piece Luftschutz helmet with satin dark blue finish and unknown stencilled logo.



A. Barrows

M 34 style Luftschutz helmet with satin medium grey finish and unknown stencilled logos.



3-piece Luftschutz helmet with satin dark blue finish and unknown logo decal.

A. Barrows

A. Barrows

1-piece "beaded" Luftschutz helmet (1939) with satin dark blue finish and stencilled logo of "Machinefabrik Augsberg Nürnberg" (maker of machinery, trucks, etc., and still in business).



A. Barrows

1-piece "beaded" Luftschutz helmet with satin dark blue finish and unknown logo (possibly "Mitteldeutsche Fahrrad-fabrik").



A. Barrows

2-piece Luftschutz helmet with satin dark blue finish and unknown stencilled logo.



A. Barrows

M 34 factory police helmet with satin black finish and unknown stencilled logo.

GERMAN STEEL HELMETS USED BY OTHER ORGANIZATIONS

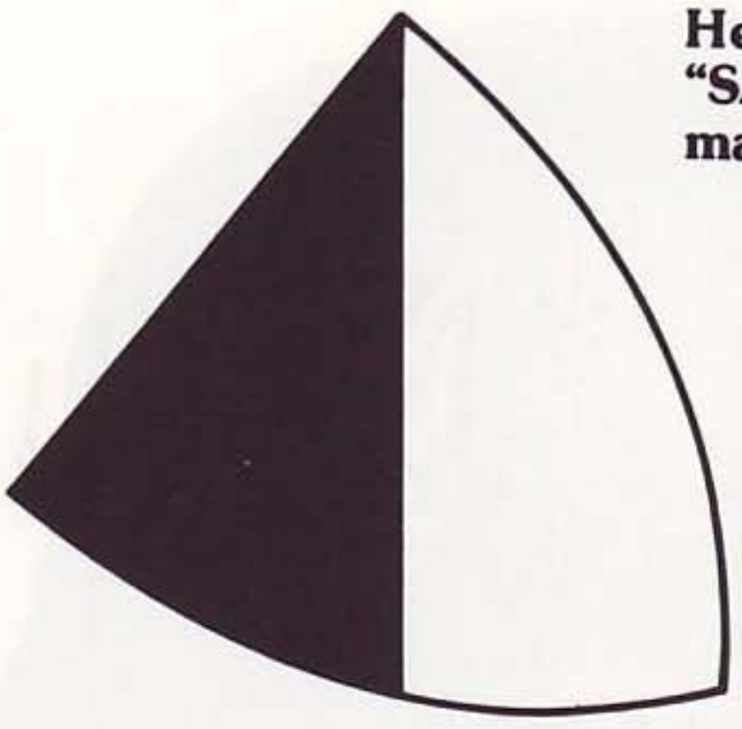
Aside from the Wehrmacht, Police and Waffen-SS, there was a whole series of other party organizations in Germany which wore the standard German steel helmet from 1933 to 1945.

First of all, there were several SA Headquarters units, a "Stabschef Göring" unit, a "Stabschef Röhm" unit, as well as the headquarters of the SA groups and over-groups. All headquarters units wore Model 1916 helmets for security and honor guard duty. This helmet was a chocolate brown color and had a black, mobile swastika on the left side. This swastika measured 3.5 cm on the side. The upper point of the swastika was located one centimeter below the vent lug. The "Hermann Göring" headquarters unit wore the SA insigne on the right side of the helmet and the Prussian colors (black/white) on the left. This occurred because Göring was the Prussian Minister-President. The "Stabschef Röhm" headquarters unit (later headed by Staff Chief Lutze) wore a yellow-colored eagle on a white field on the right side of the helmet until about 1937. On the left side was found the SA insigne on a yellow shield. In addition to German helmets, Austrian helmets of the German pattern were also utilized.



BA Stiftung Preuss. Kulturbesitz

Members of the "SA" in Munich, 9 November 1923.



Helmet insignia of "SA-Stabswache Hermann Göring."



Left side

Right side

Bundesarchiv



"SA-Stabswache Herman Göring," Berlin, 1933.



Austrian M16 chocolate brown helmet with black swastika worn by members of a SA-Stabswache.



M16 Austrian double decal with the insignia of an "SA-Stabswache" (Stabschef Röhm or Lutze?)



Members of an "SA-Stabswache" during the Nürnberg Party Rally, 1935.



Stahlhelm M 18 of an unknown SA-Unit.



W. Bechtel

Bundesarchiv



Members of the Austrian SA in Berlin, 25 June, 1934

A. Barrows



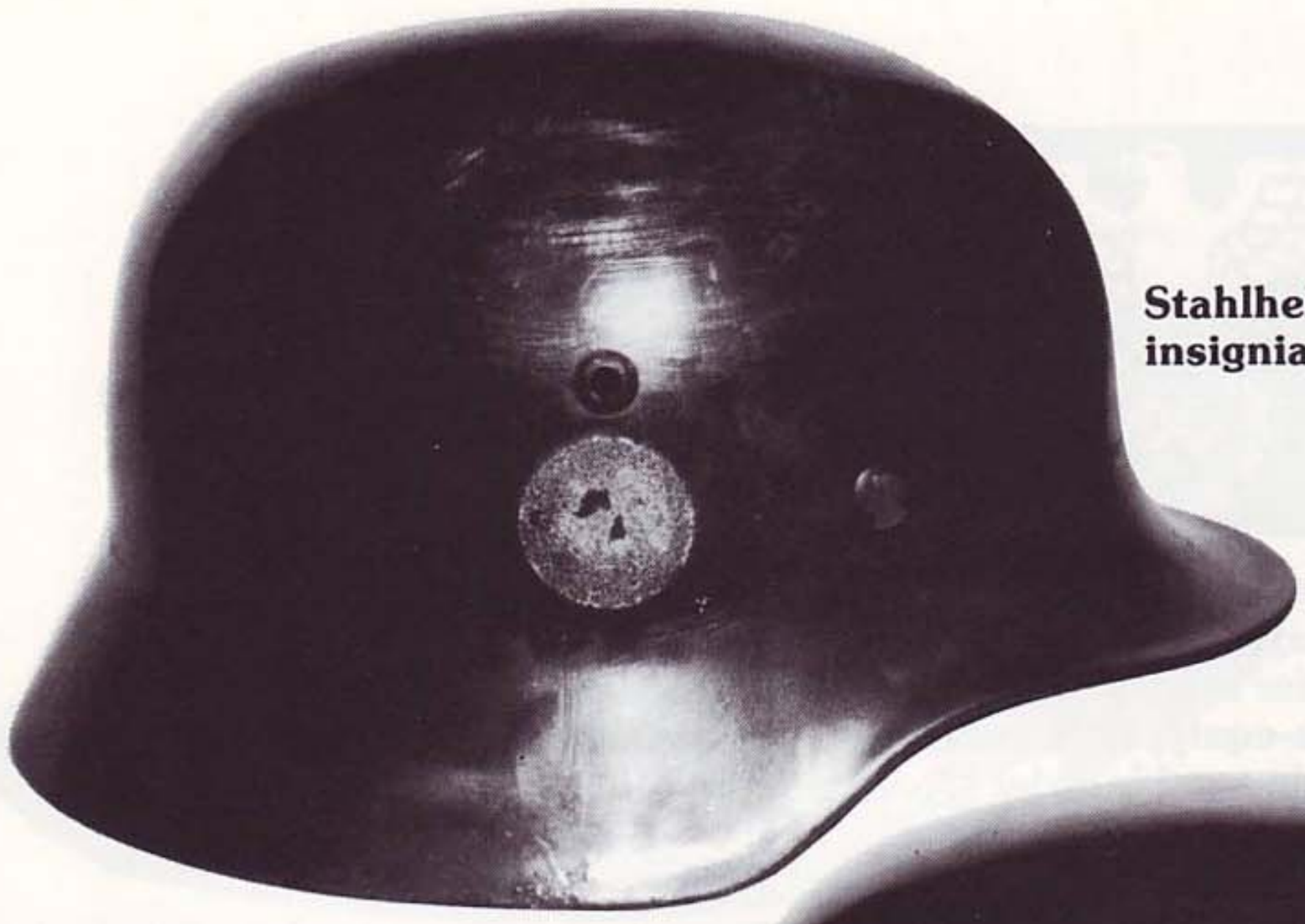


Insignia of the "SA" introduced in early 1939. The above insignia was applied to a medium brown helmet and initially authorized for members of the Motorrad-Meldefahrerstaffeln (motorcycle-equipped messenger detachments of the SA). Ref.: Verordnungsblatt der Obersten SA-Führung, Nr. 7, 25 Mai 1939.

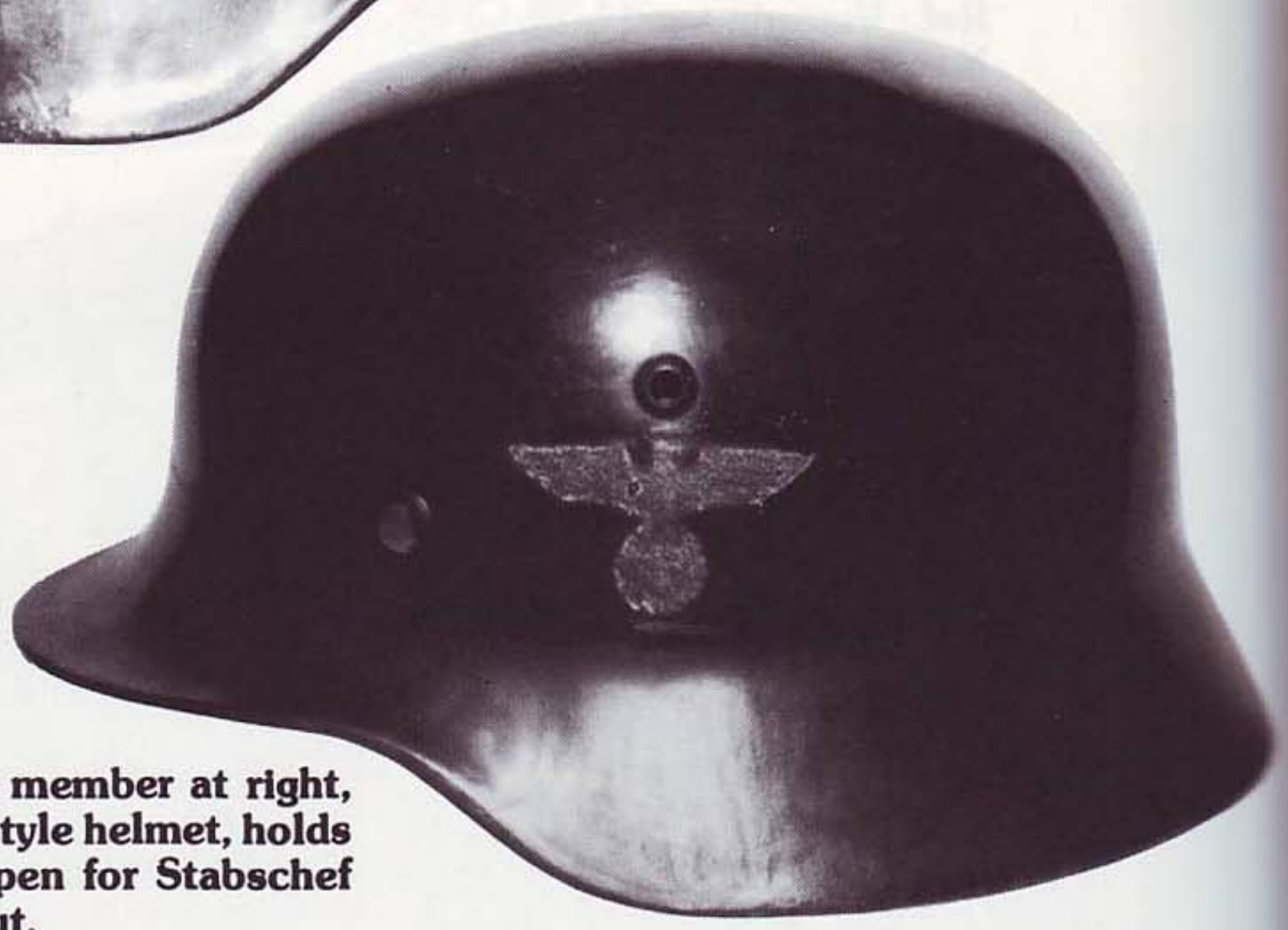
Bundesarchiv



"SA" on parade, Berlin, 1934.



Stahlhelm 35, with the insignia of the "SA."



The Feldherrnhalle member at right, wearing the above style helmet, holds the vehicle door open for Stabschef Lutze as he gets out.





L. Hardy

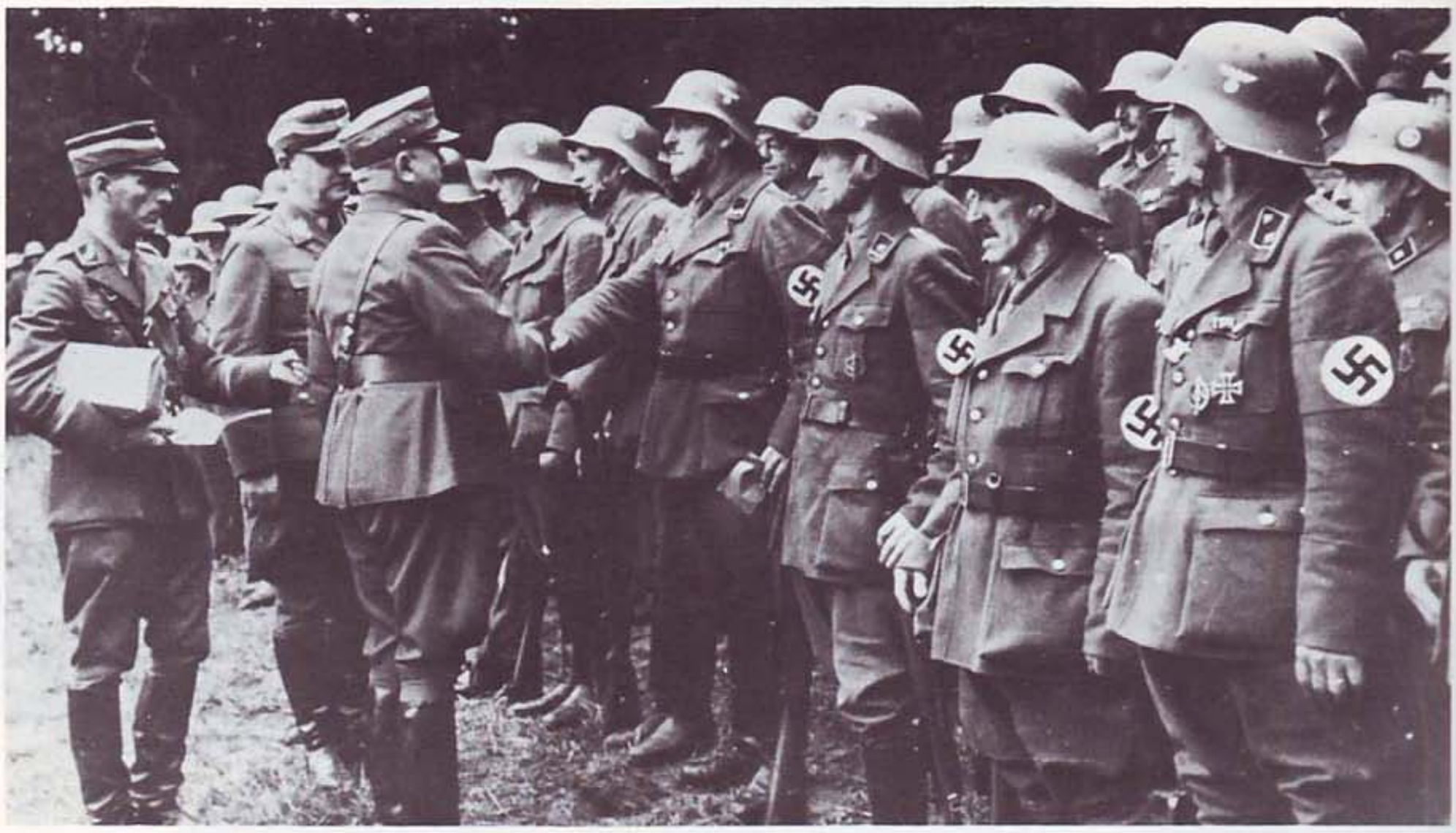
Tannish-brown Luftschutz style helmet with SA decals and 1-piece construction.





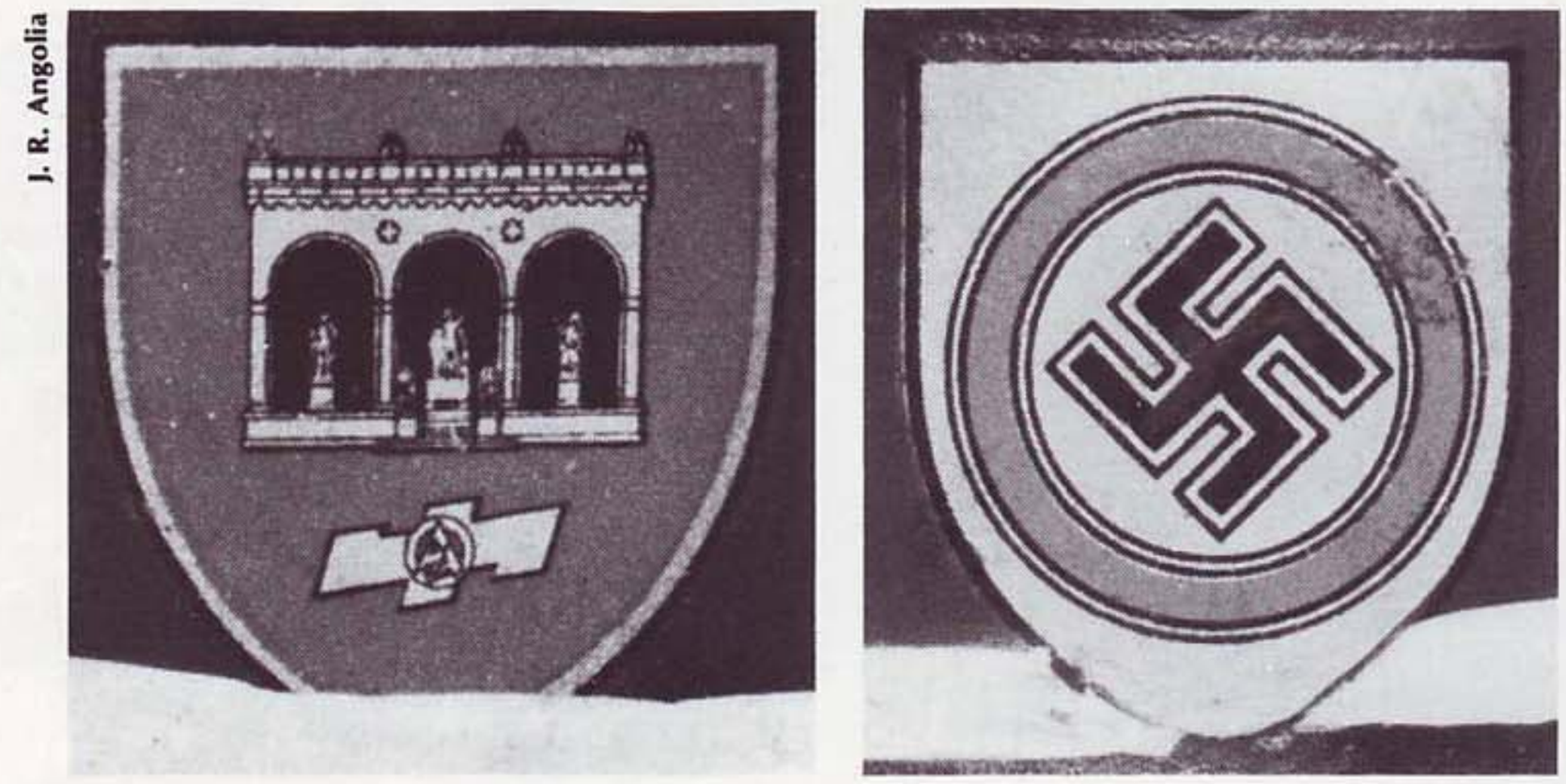
R. Bender

Black Luftschutz style helmet with SA decals. One piece construction.



The War Merit Cross is awarded to elderly SA men, wearing the Luftschutz style helmet illustrated on the previous page, by Stabschef Schepmann (western front, September 1944).

In the early part of 1936, the first barracked SA Standarte was established. It consisted at first of five Sturmbannen drawn up in the following cities: Berlin, Munich-Erding, Stettin, Hattingen and Stuttgart. After the annexation of Austria, a sixth Sturmbann was created in Vienna. This unit received the name SA-Standarte "Feldherrnhalle" and was used to supply honor guards at important party headquarter installations. For this guard duty, the personnel wore a brown-colored Model 1935 helmet. On the left side of the helmet, a transfer with a stylized picture of the Feldherrnhalle monument on a red field was found. On the right side, a swastika shield was affixed. In 1938, this unit was redesignated as an airborne regiment of the Luftwaffe during the Sudeten crisis. During this period of time, the Luftwaffe eagle was worn on the left side of the helmet, but the Feldherrnhalle transfer remained on the right. This Standarte was in existence until 1945.



J. R. Angolia

Insignia of the "SA-Standarte Feldherrnhalle."



Stadnicki

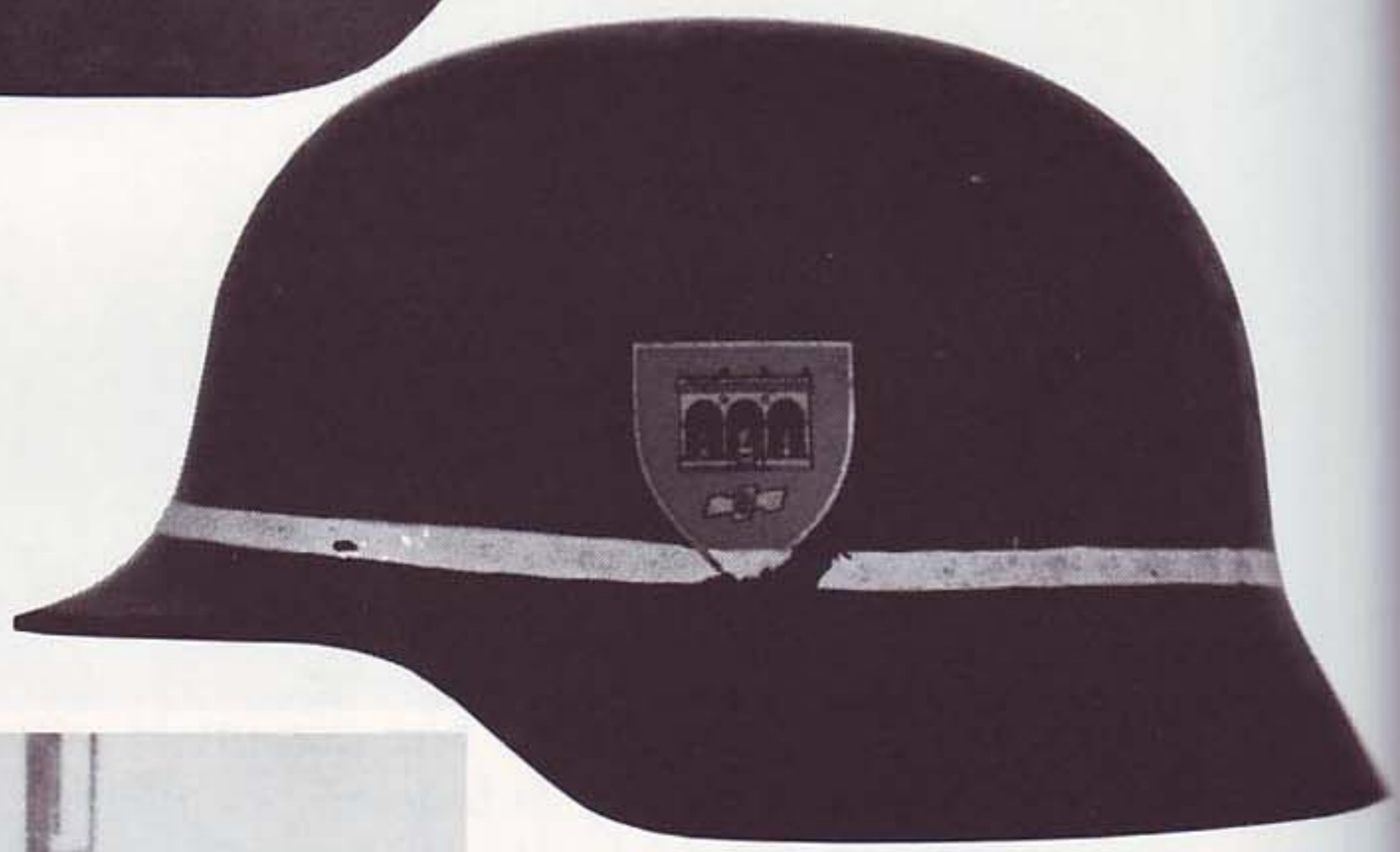


Members of the "SA-Standarte Feldherrnhalle" wearing the SA uniform.



J.R. Angolia

M 35 double decal "SA-Standarte Feldherrnhalle" helmet with satin brown finish and white painted ring (purpose unknown).







T. Goodapple

M42 double decal SA-Feldherrnhalle helmet with smooth, dark brown finish. Note that later issue helmets have reversed decals in comparison to early helmet at far left.

T. Goodapple

M35 double decal SA-Feldherrnhalle helmet (Luftwaffe) with smooth dark brown paint over original Luftwaffe blue-grey finish.

Members of the "SA-Standarte Feldherrnhalle" while part of the "Luftwaffe, 1938/39.

J.R. Angolia

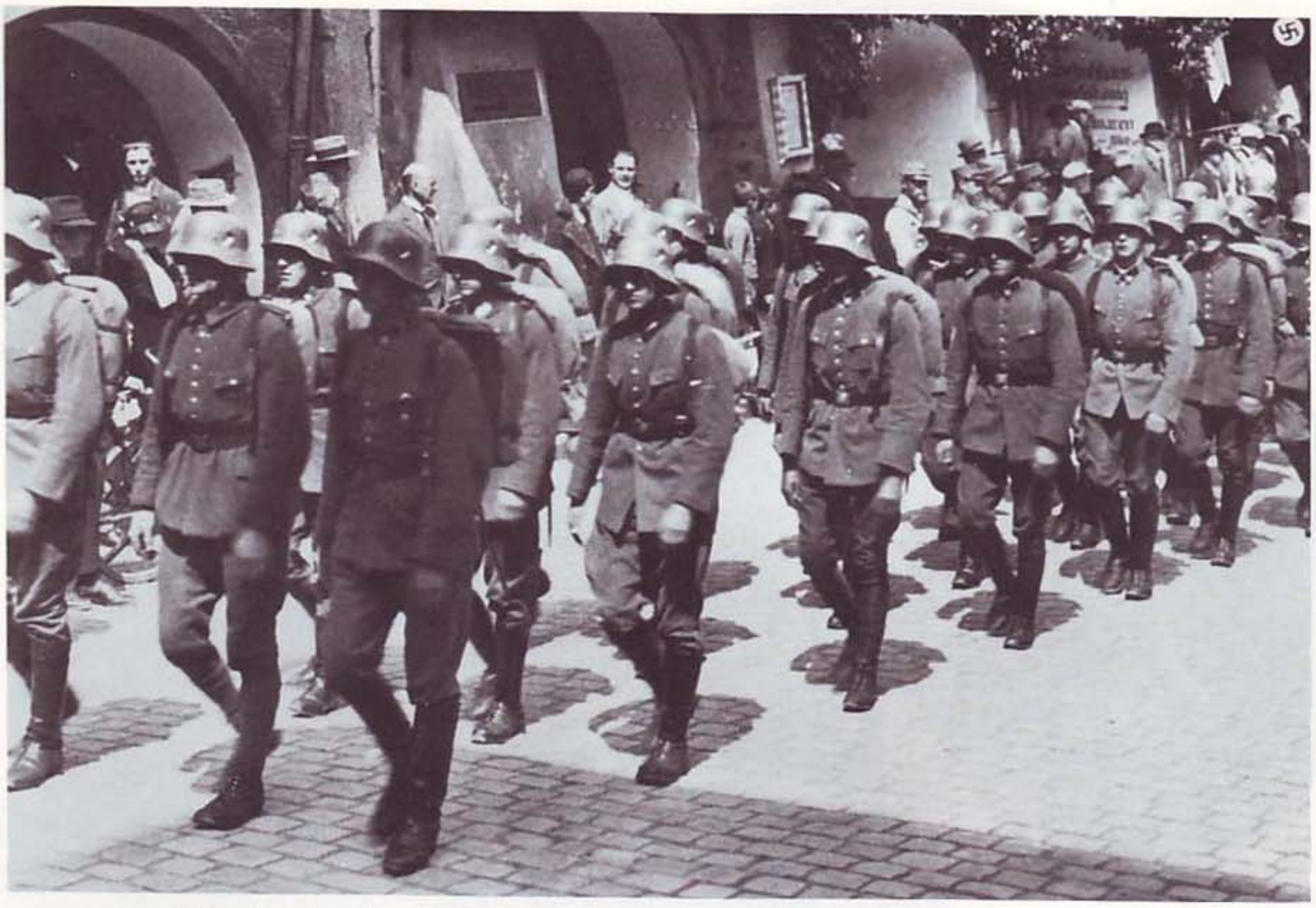


The SS men (right and left) and the SA man (center) all wear the M 18 helmet with large stencilled political eagle on the front (purpose not known).



D.Powers

M 18 helmet worn by members of the JUNGDO (Jung Deutsche Orden), a para-military youth group existing in the mid-1930s. Note white Maltese cross superimposed over the national colors. The helmet color is khaki green.



Members of a Bavarian "Ortsgruppe" of the "Stahlhelm" are wearing the normal German helmet with the following insignia: left side, the colors black/white/red, and on the right side, the Bavarian colors, white/blue. The photos were taken in May, 1933.



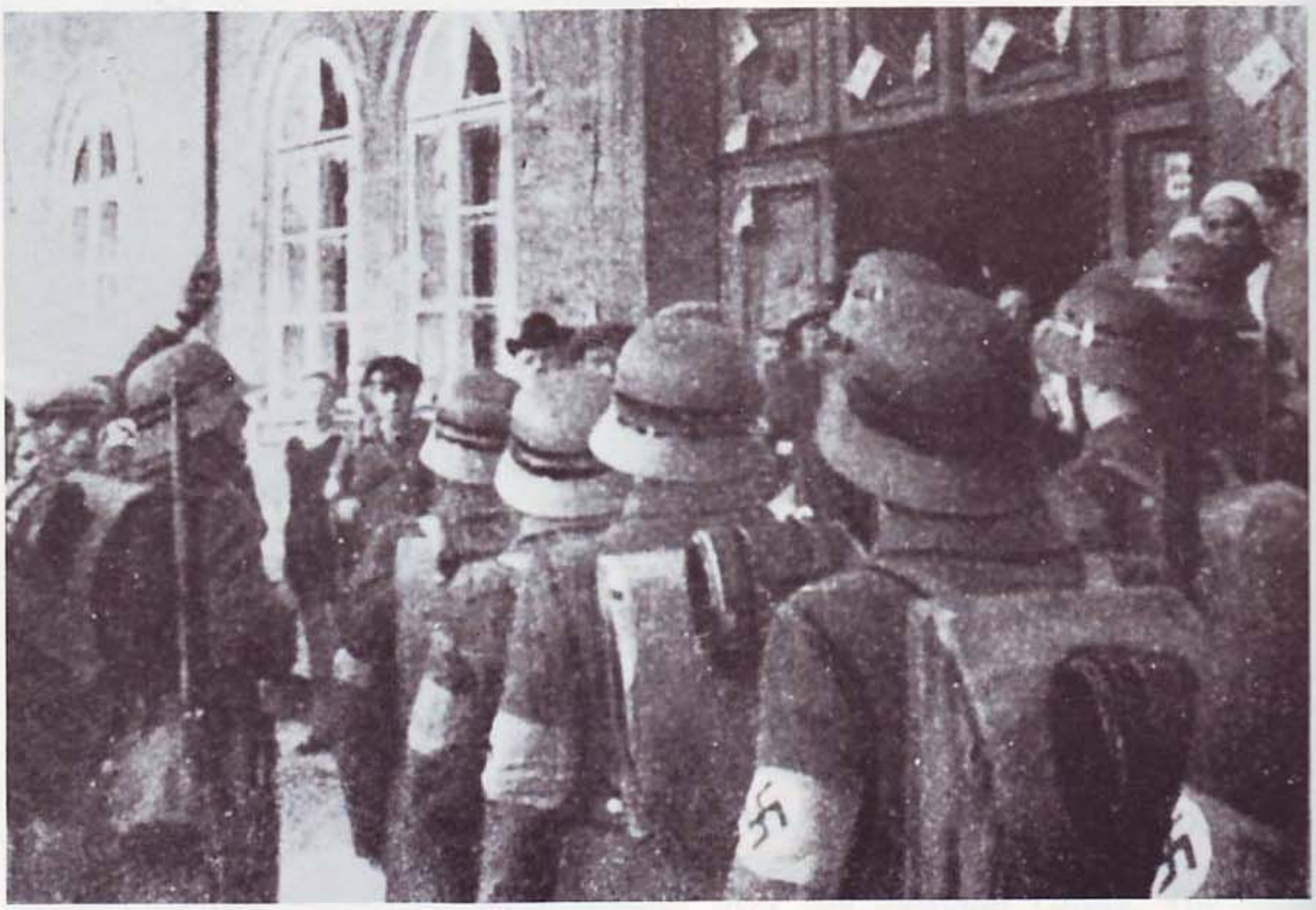


Helmet M 16, with insignia of Baden-Württemberg, details unknown.



A. Barrows

An Austrian helmet with an insignia of "Bayern," details unknown.



Members of the "Sudetendeutsche Freikorps," 1938.

During the war, units of the Reich's Labor Service operated within the framework of the Army and Luftwaffe. As a part of the Luftwaffe, there were entire flak batteries composed of Labor Service personnel. On duty, the normal helmet was worn and these helmets were supplied by the troop sections to which they belonged. In general, these helmets were issued with Army or Luftwaffe insignia, but there were also helmets to which the distinctive Labor Services insigne was applied. More details cannot at this time be cited.

L. Hardy



P. Malone



M42 single decal "reissued" RAD helmet with grey-green finish.





RAD decal applied directly over an Army decal.

This RAD guard wears the standard issue Luftwaffe helmet.

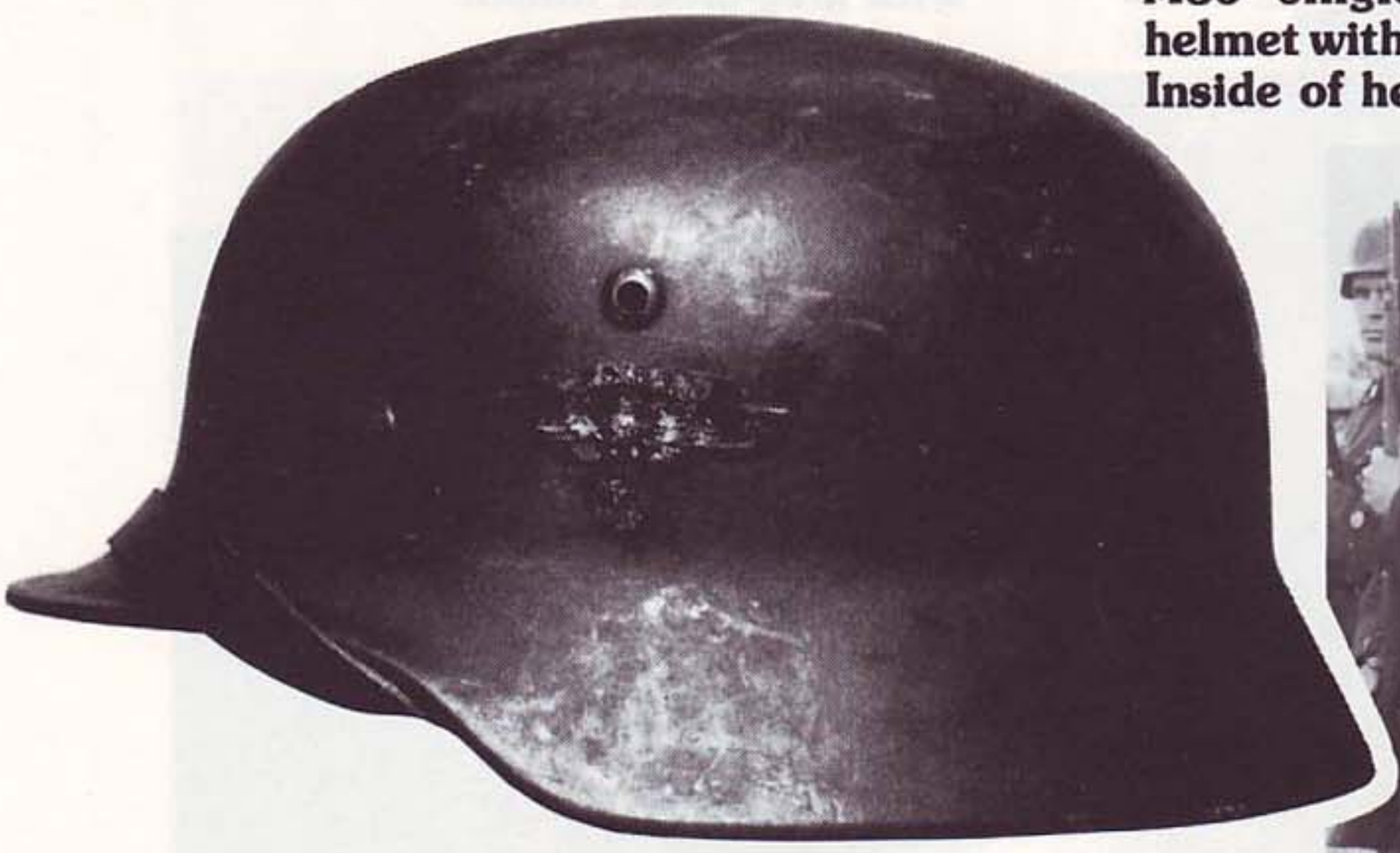
G. Petersen



RAD men, wearing Army helmets, exchange their shovels for rifles as they becomes members of the Wehrmacht.

A so-called "Transport Brigade" was established during the war from the membership of the National Socialist Motor Corps (NSKK). These troops were also equipped with helmets. In most cases, these helmets were Luftwaffe helmets, but some were issued with the NSKK eagle transfer on the side. This transfer was also differently colored, the base color being silver. Further details are not available.

M35 single decal reissued green helmet with orange-gold NSKK decal. Inside of helmet is Luftwaffe blue.

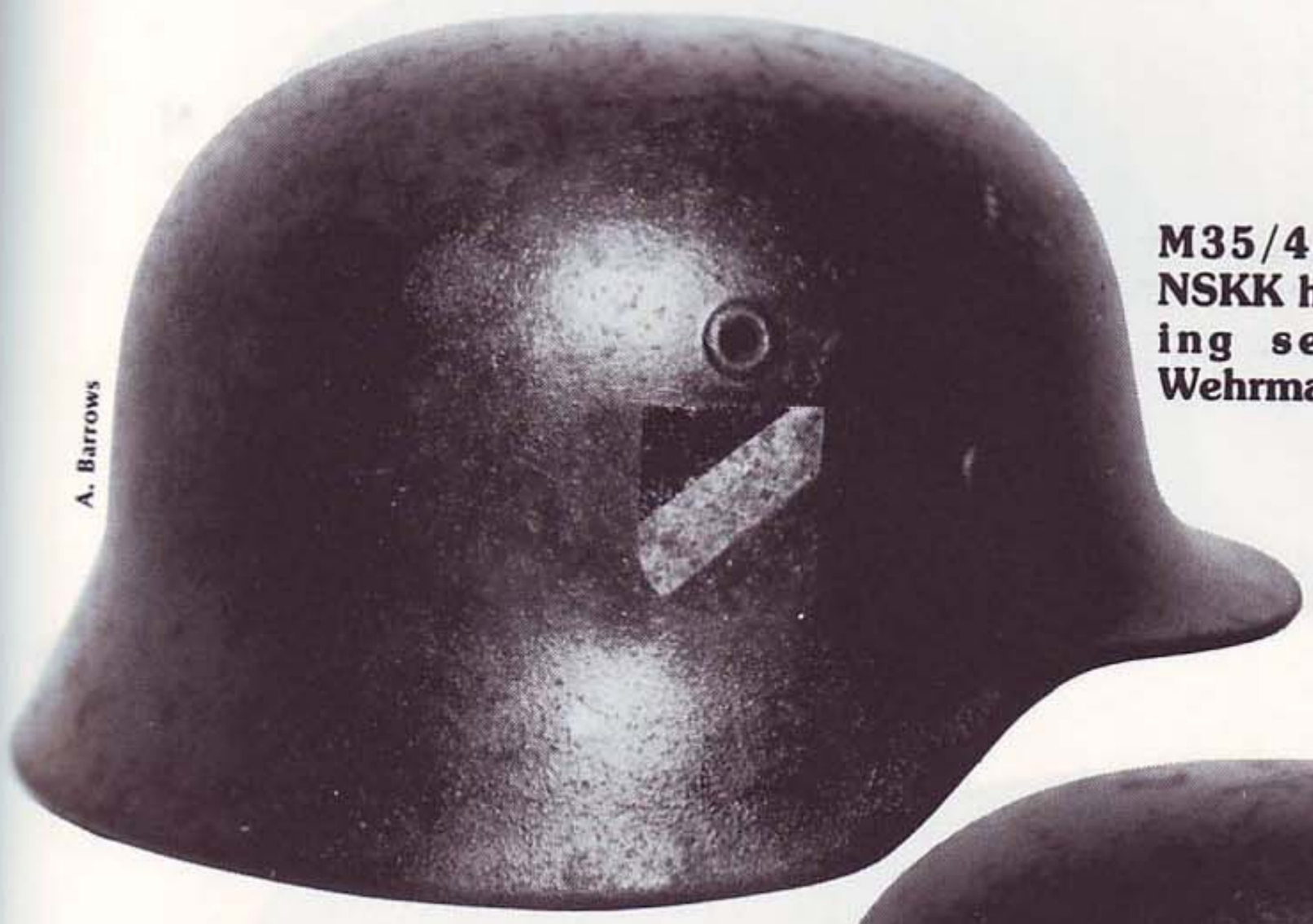








NSKK-Obertruppführer performing wartime duties wearing a Luftwaffe flight blouse with NSKK insignia and a Luftwaffe helmet. Léon Degrelle is in the background.

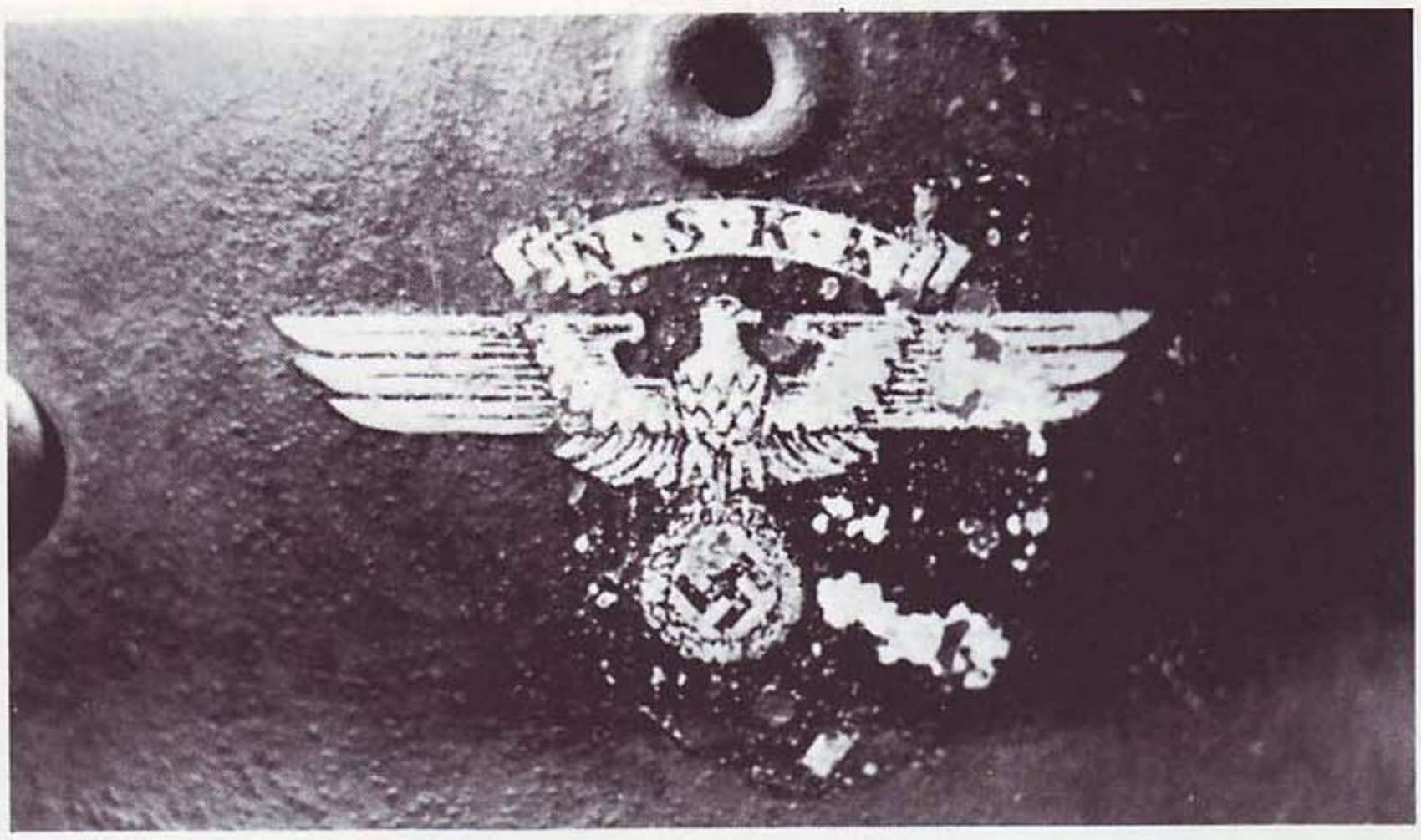


A. Barrows

M35/40 double decal NSKK helmet for wear during service with the Wehrmacht (green finish).



NSKK personnel on duty with the Wehrmacht wear the green helmet with NSKK insignia.



The M 42 single decal NSKK helmet on this page was reissued to foreign NSKK volunteers attached to the Luftwaffe. A silver NSKK eagle has been applied over an Army decal and the finish is blue-grey over the original field grey paint. The hand-painted white shield on the right side of the helmet indicates an unidentified volunteer unit.



J. Coy



M 35/40, with the insignia of the "NSKK" on Airforce blue.



G. Petersen

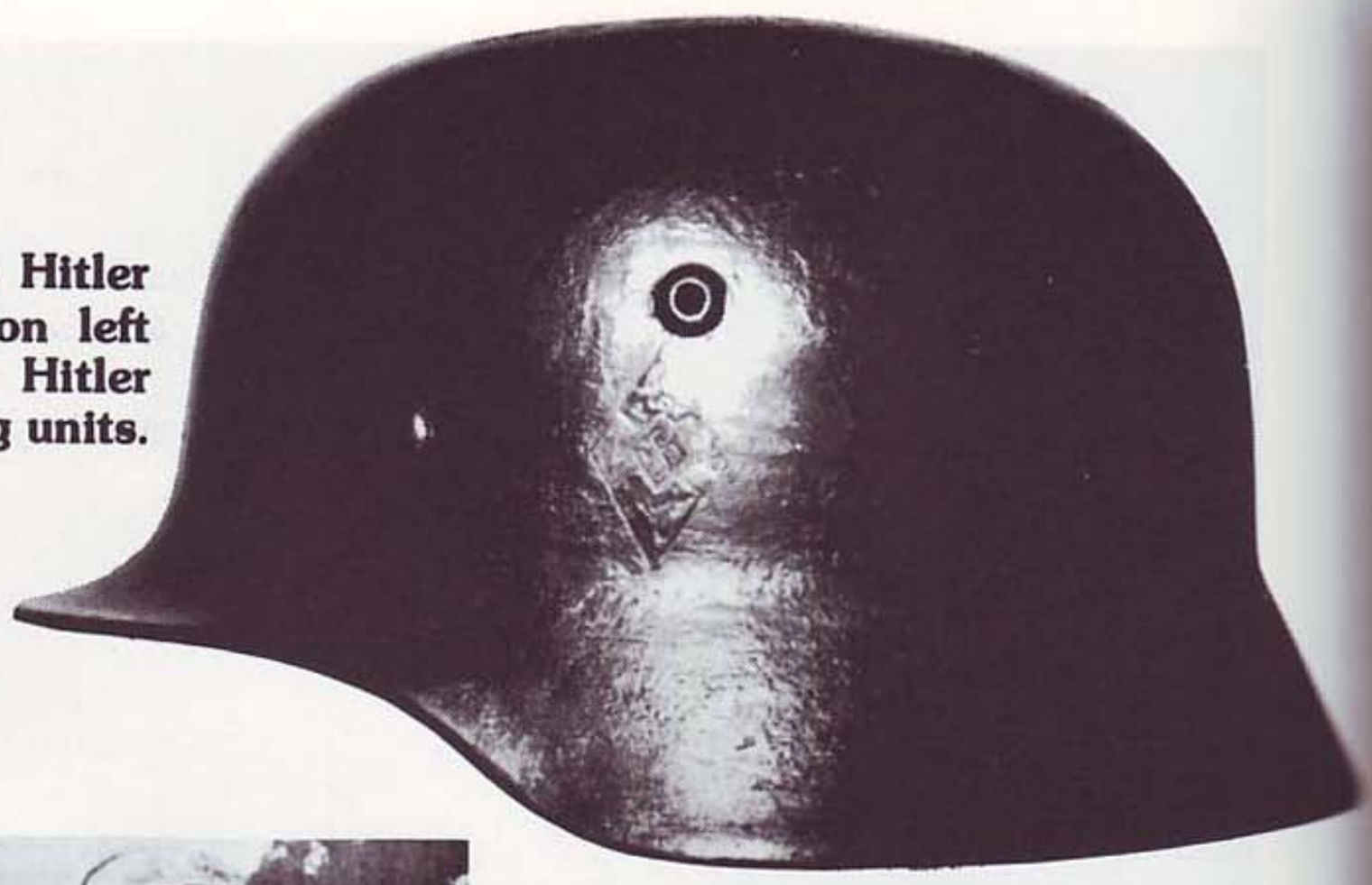
M 35/40 NSKK helmet overpainted in blue for use with the Luftwaffe.



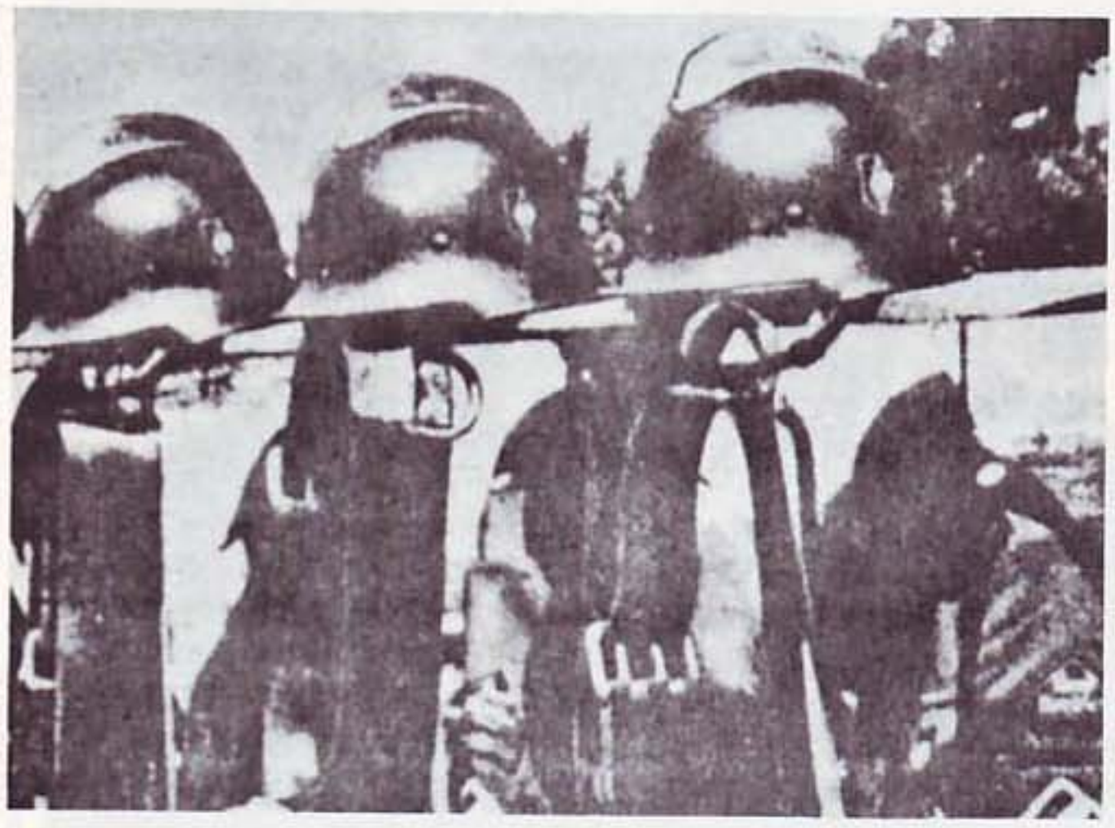
A. Barrows

M 42 NSKK double decal helmet overpainted with a yellowish-tan finish. The right decal (national tri-colors) and NSKK eagle have been painted around.

Black M 35 with Hitler Youth diamond on left side for use by Hitler Youth fire fighting units.



G. Petersen





The photo above shows lightweight Fire Protection Police helmets with the special Hitler Youth decal (right) for use by Hitler Youth fire fighting units (introduced about 1943).

R. Mundhenk





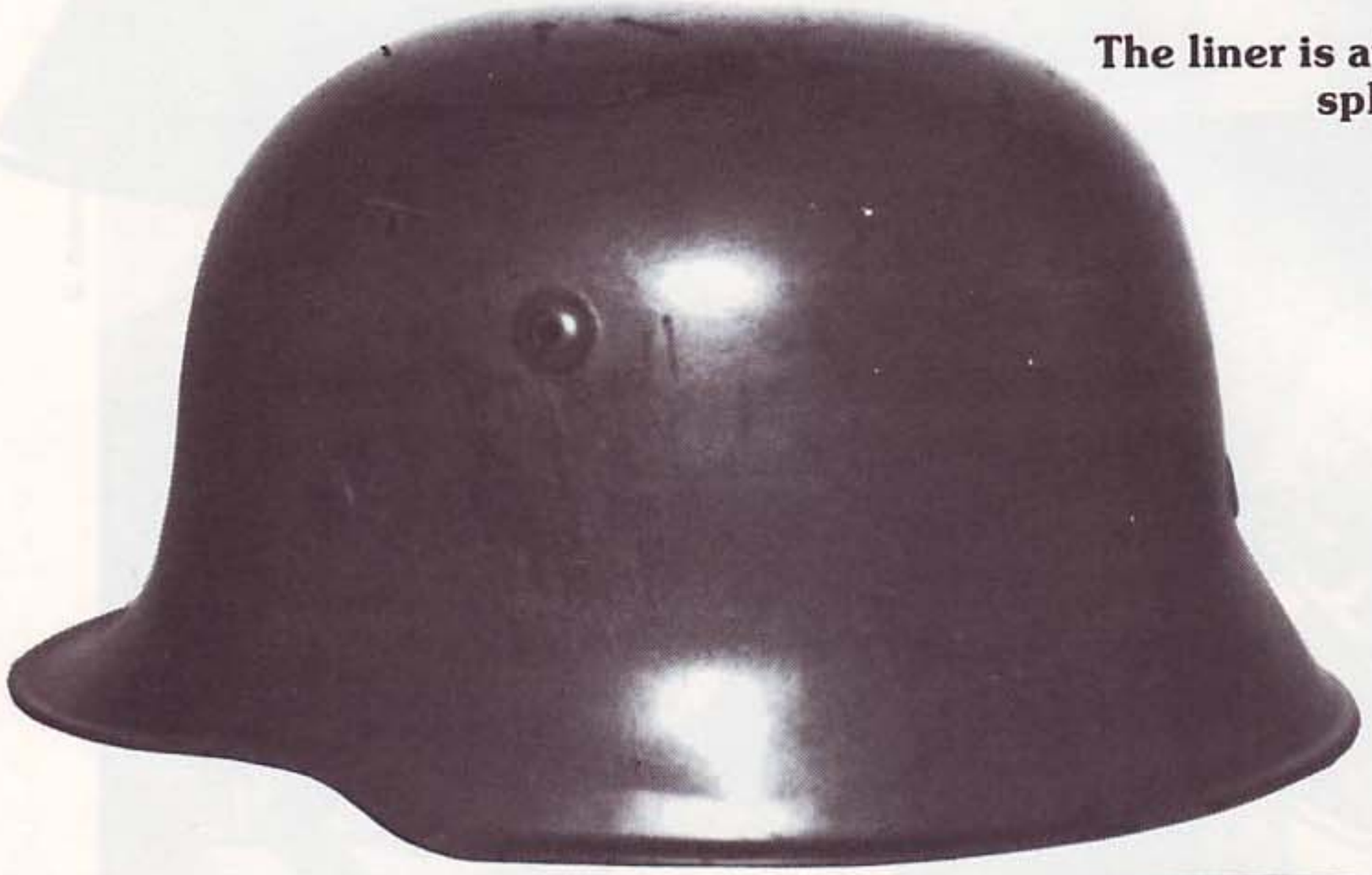
A. Barrows

M 18 double decal Railway Police (Bahnschutz) helmet with medium blue finish.

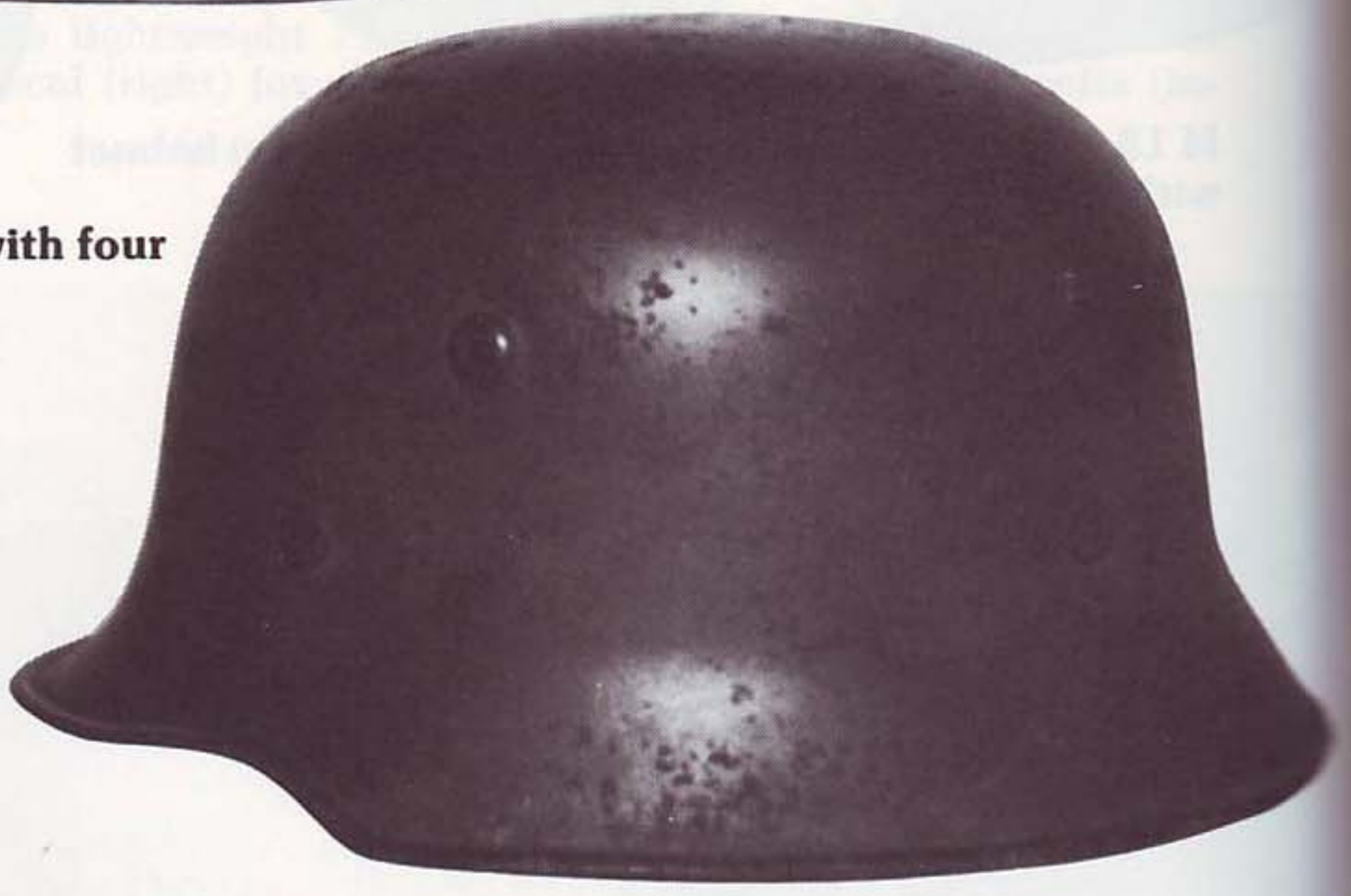


This early photo (circa 1934) of Bahnschutz members shows them all wearing the M 18 helmet with the national shield on the right side and an unidentified shield on the left side.

For disaster duty, the "Technical Emergency Assistance" (TeNo) existed in Germany prior to 1945. During the war, these personnel wore a special protective helmet made of improved steel (Edelstahl), which was also known by the name of "Thale Steel" (Thalestahl) after the city of its manufacture. Liners in these helmets ranged from WW I liners to fire brigade liners to those normally used in military and police helmets, the Model 1931 liner. This same helmet was also occasionally used by military units.



The liner is attached with three split rivets



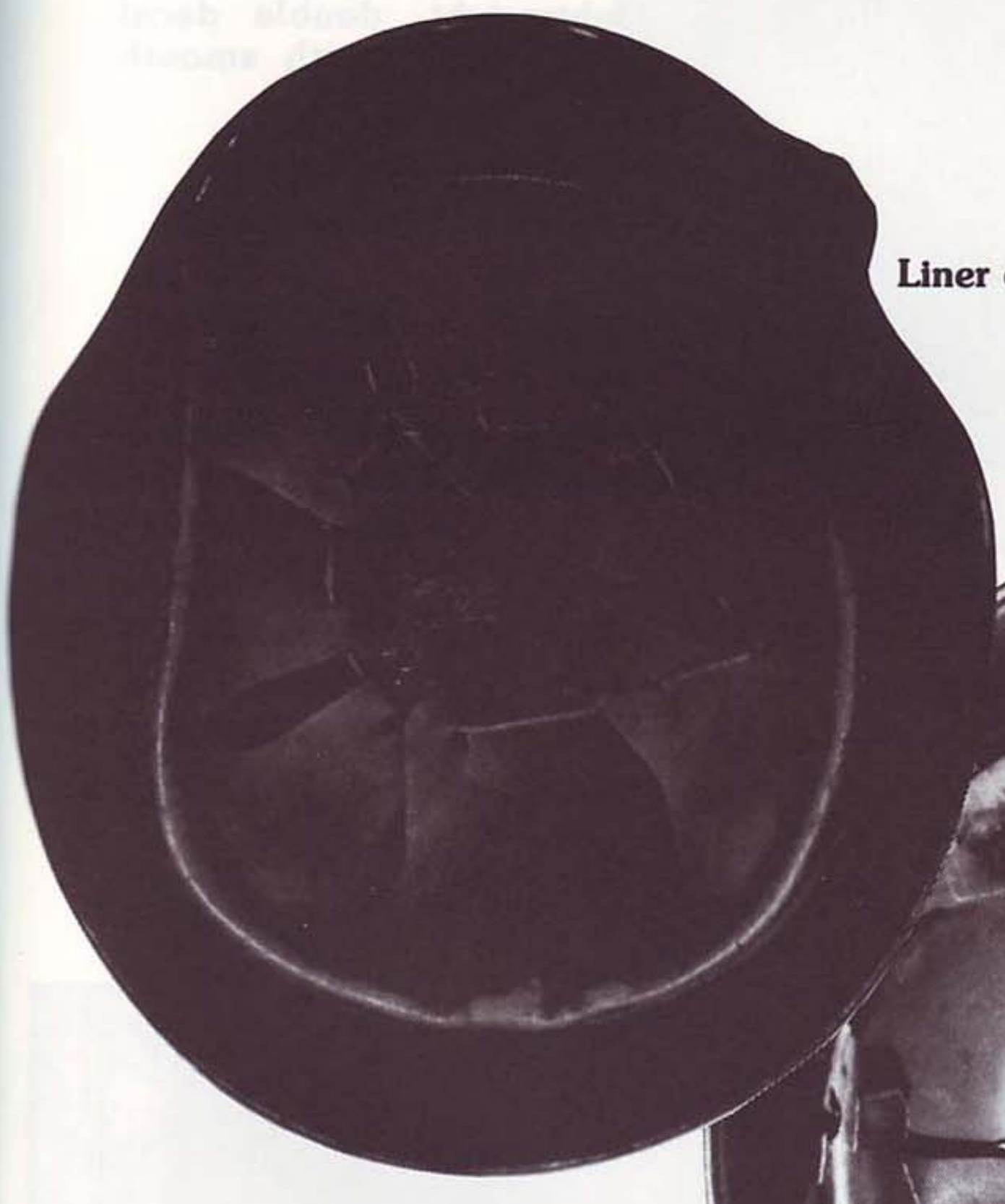
The liner is attached with four split rivets.

Helmet of the "Technische Nothilfe."

NOTE:
The above helmet type was used by numerous organizations to include rural police, field police, the SS/SD, TeNo, Army, Luftschutz, etc. Many different liner systems were used.

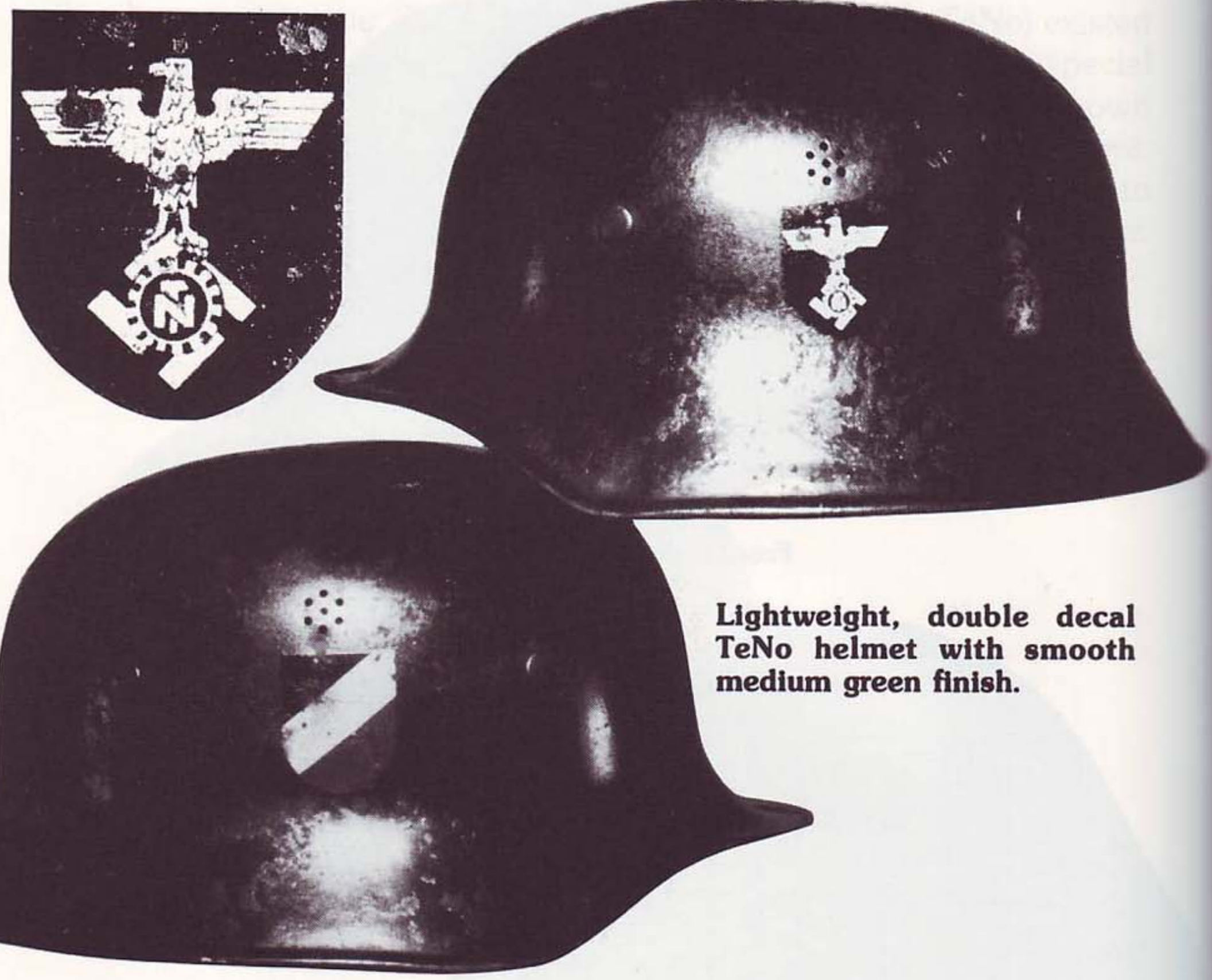


Front side of the TeNo helmet.



Liner of the TeNo helmet.

A different liner of the TeNo helmet.



Wm. Maertz

Lightweight, double decal TeNo helmet with smooth medium green finish.

During the course of the war, there existed in Styria (Steiermark) a defense unit of the Styrian Home Federation. This unit was instituted to protect Styria against partisans. While on duty, these troops wore a brown uniform similar to that of the SA. Headgear consisted of both a steel helmet and a mountain cap.



M 42 with white stencilled insignia of the SA-Wehrmann-schaft der Steiermark.

Further, a unit of "executive troops" under German administration in the Polish General Government was also issued German helmets. These troops were activated in the summer of 1941, but little more can be ascertained about them.

Mention should also be made of the "Freikorps Sauerland." The leadersip of the Gau Sauerland at the end of 1944 drew up a unit in part composed of teachers and workers. Exactly which helmets and uniforms were used can no longer be determined. The helmet shown here is a surplus shell which had originally been manufactured for the Wehrmacht.



J. Schneider

"Beaded" M 42 single decal helmet, with the insignia of the "Freikorps Sauerland," 1944/45.



D. Deeter



M 42 single decal helmet with the green/tan/black "Freikorps Sauerland" decal and a matte grey-green finish. Note that decal is on the right side and on the left side on helmet above.

Some Volksturm formations had their unit designations painted directly onto their helmets. An example of the coding is as follows: 21/43/1 stands for Gau Niederschlesien (see Gau number below), Volksturm-Bataillon 43, 1st Company.

1 Baden
2 Bayreuth
3 Berlin
4 Danzig-Westpreussen
5 Düsseldorf
6 Essen
7 Franken
8 Halle-Merseburg
9 Hamburg
10 Hessen-Nassau
11 Kärnten
12 Köln-Aachen
13 Kurhessen
14 Magdeburg-Anhalt
15 Mainfranken
16 Mark Brandenburg
17 Mecklenburg
18 Moselland
19 München-Oberbayern
20 Niederdonau
21 Niederschlesien
22 Oberdonau
23 Oberschlesien
24 Ost-Hannover
25 Ostpreussen
26 Pommern
27 Sachsen
28 Salzburg
29 Schleswig-Holstein
30 Schwaben
31 Steiermark
32 Sudetenland
33 Süd-Hann.-Braunschweig
34 Thüringen
35 Tirol-Vorarlberg
36 Wartheland
37 Weser-Ems
38 Westfalen-Nord
39 Westfalen-Süd
40 Westmark
41 Wien
42 Württemburg-Hohenzollern
43 Auslandsorganisation



The one-piece, black "gladiator-type" helmet above carries the Volksturm hand-painted designation "08/56" in red (i.e., Gau Halle-Merseburg, Volksturm-Bataillon 56).

Aside from the helmets pictured and described in this book, there are still a great many helmets neither described nor mentioned because their very existence cannot be verified. This is largely due to the fact that much archival material is missing today, a direct result of wartime destruction.

HELMETS OF THE GERMAN RED CROSS

German Red Cross (Deutsches Rotes Kreuz or DRK) personnel who were involved in hazardous duty (search and rescue operations, sanitation in bomb-damaged areas, first aid, etc.) were issued a variety of steel helmets, although the majority of these seem to fall into two categories: M1934 civil helmets and three-piece Luftschutz helmets. These helmets were painted in DRK grey (a smooth, light grey color), although some helmets toward the close of World War II were painted in a darker shade of grey. The DRK decal which was worn on the helmet's left side consisted of a black eagle with down-folded wings perched upon a red cross. A white, mobile swastika was found on the eagle's breast and the entire design was positioned on a white shield with pointed bottom.

Late in the war, DRK decals were dispensed with altogether and thus some M1934 helmets will be seen with one of the two shades of grey, but totally lacking insignia of any sort. It should be noted that the vast majority of DRK helmets came equipped with only a single decal, but a very small percentage were issued with double decals, the right side being the national color shield.

The liners which were used in these helmets were the standard types, although those used in the M1934 helmets generally lacked the crash pad at the top of the inside of the crown.

It is not unusual to see a DRK helmet which shows traces of blue-black paint beneath the DRK grey, bearing witness to its Luftschutz ancestry.



J. Bandy

Lightweight, medium grey Red Cross helmet with single decal (pointed shield).



A. Barrows

M 34 style Red Cross, double decal helmet with light green finish. Note national tri-color right decal.



M 34 style Red Cross, double decal helmet with dark grey finish. Note party decal on right side.

G. Petersen



A lightweight, grey helmet is worn by the Red Cross member at left during rescue efforts after a bombing raid.

Note that this M 34 style, single decal Red Cross helmet utilizes the "Y"-shaped chinstrap system. The finish is medium grey.



PROTECTIVE FLIGHT HELMETS

The Steel Flight Helmet — Pattern SSK 90

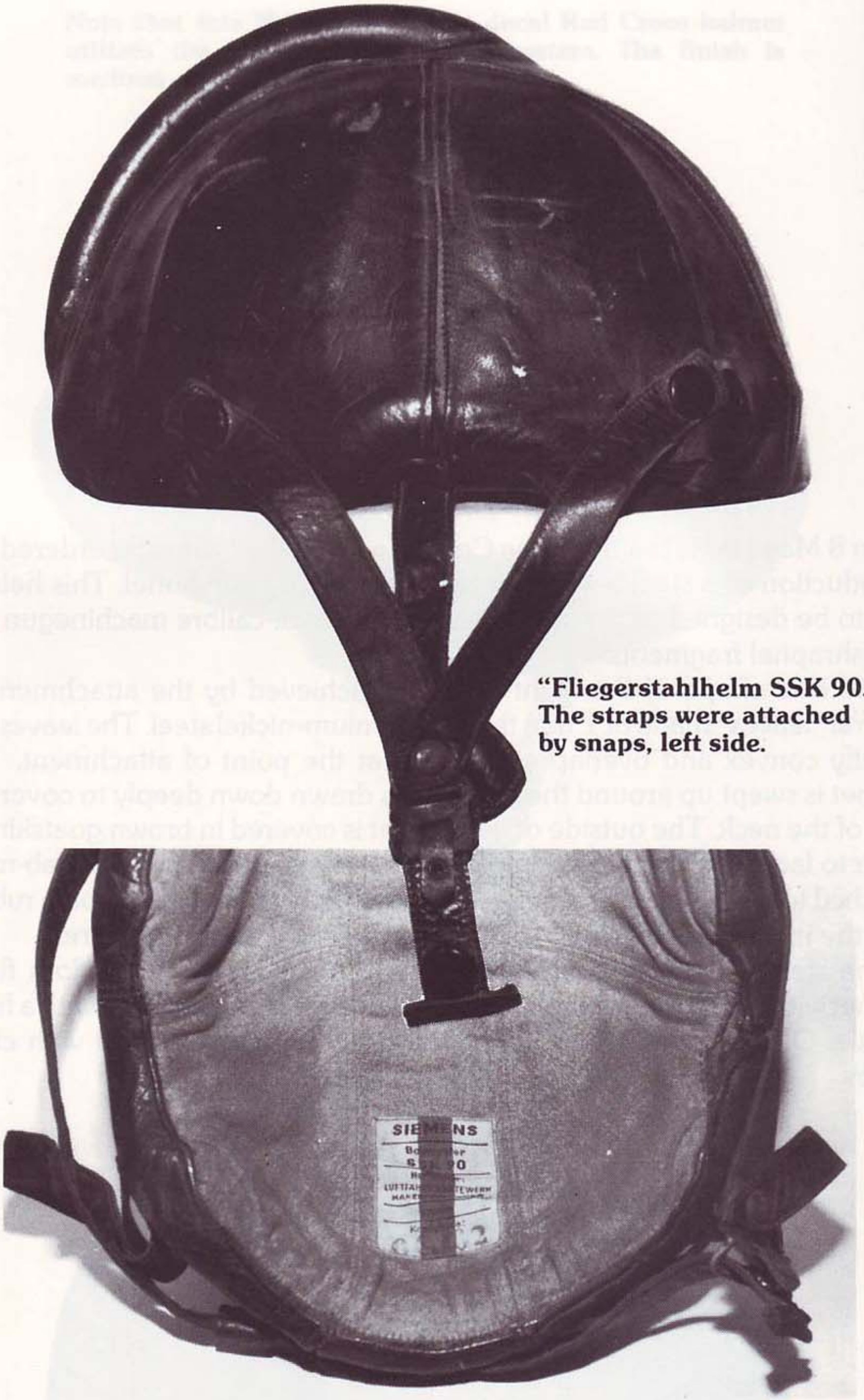
On 8 May 1941, the Supreme Commander of the Luftwaffe ordered the introduction of a steel helmet for the use of flying personnel. This helmet was to be designed to protect them against small-calibre machinegun fire and shrapnel fragments.

The oval shape of the flight helmet is achieved by the attachment of several "leaves" made of 1 mm thick, chromium-nickel steel. The leaves are slightly convex and overlap each other at the point of attachment. The helmet is swept up around the ears and is drawn down deeply to cover the rear of the neck. The outside of the helmet is covered in brown goatskin. In order to facilitate rapidity in putting on and taking off the helmet, a grab-roll is attached to the front of the helmet. The inner padding is made of foam rubber and the inside of the helmet is lined with a brown cotton mixture.

The steel flight helmet was designed to be worn over the cloth flight helmet with radio gear. It was equipped with a snap-on chinstrap with a fixed buckle. Of the helmets first issued, only 50% came equipped with chin-straps.



"Fliegerstahlhelm SSK 90," right side.

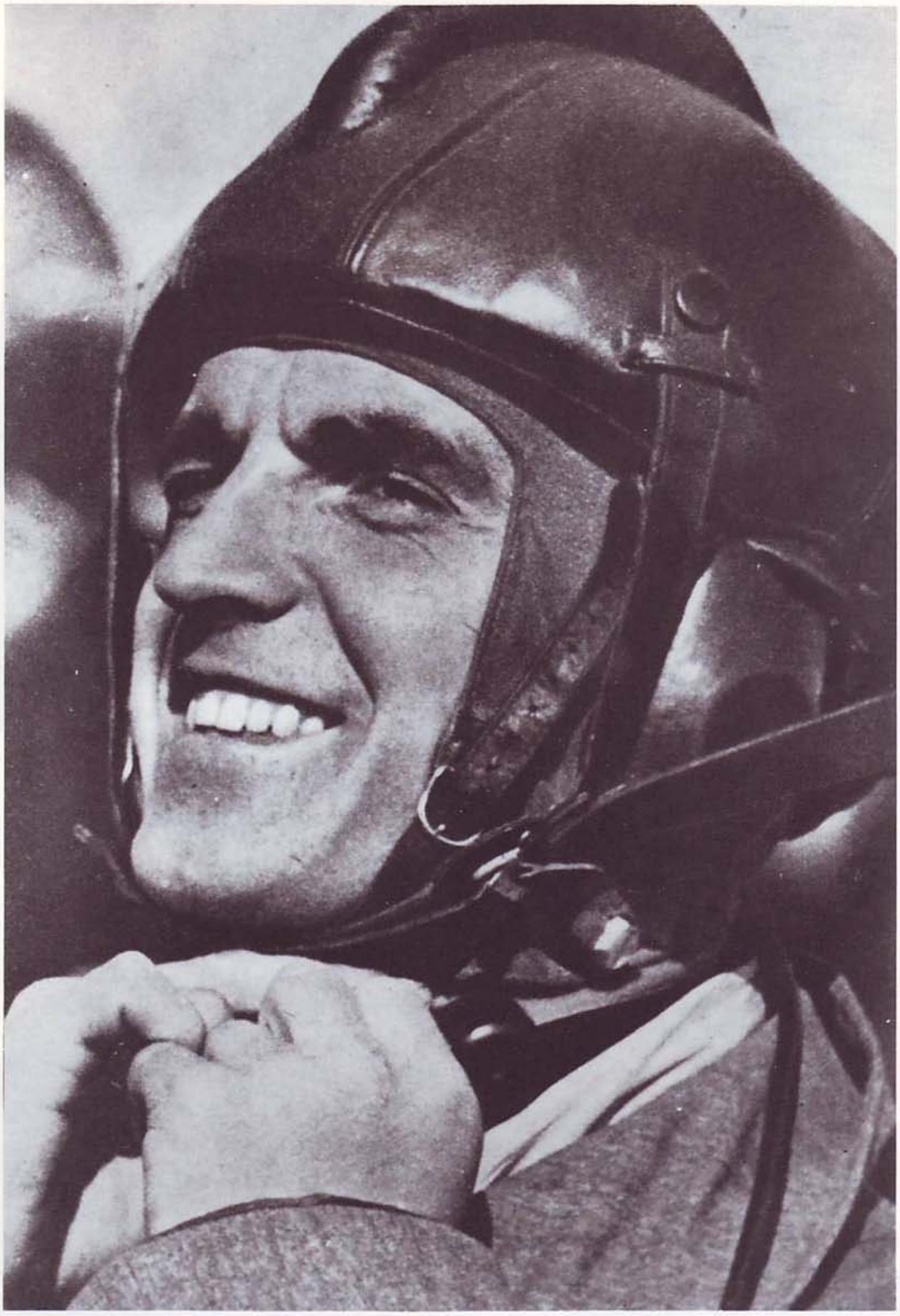


"Fliegerstahlhelm SSK 90." The straps were attached by snaps, left side.

"Fliegerstahlhelm SSK 90," inner view.

The weight of the steel helmet was about the same as the M 35 steel helmet, approximately 1900 grams.

This helmet was issued through the normal supply channel. The deliveries, although only partial, were begun immediately. The new helmet was described in Luftwaffe service regulation 422, section A, supplement 1.



The SSK 90 in wear during testing.

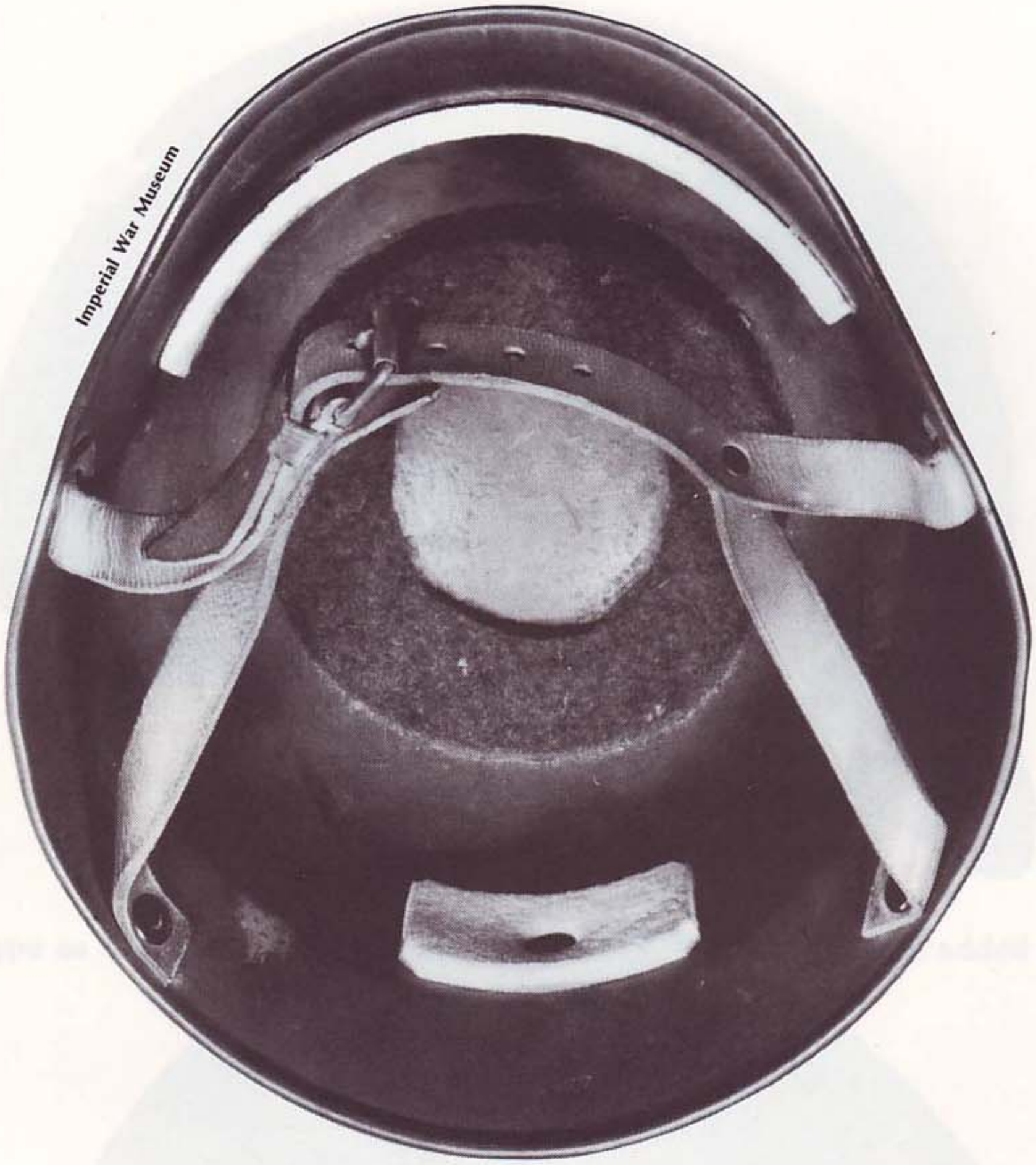
A report in the "Besondere Luftwaffenbestimmungen," dated 26 May 1941, indicated that the delivered "Fliegersturzhelme" were unacceptable for service at the front and were returned to the Luftwaffe Clothing Office in Berlin. Even the SSK 90 helmet did not prove itself since it was not worn by flight personnel. Instead, the normal M 35 helmet was worn, but its sides had been reworked by technicians. An outward bulge was pressed into each side so that headphones could be worn.



Imperial War Museum

Imperial War Museum

M 35 helmet, modified for German aircrews from KG53 during the "Battle of Britain." (Red and white handpainted insignia.)



Imperial War Museum

The modified liner of a modified helmet 35, for German aircrews during the "Battle of Britain."



Bundesarchiv

The standard M35 helmet is worn by these aircrew members in October 1940, which was quite common during the war years.

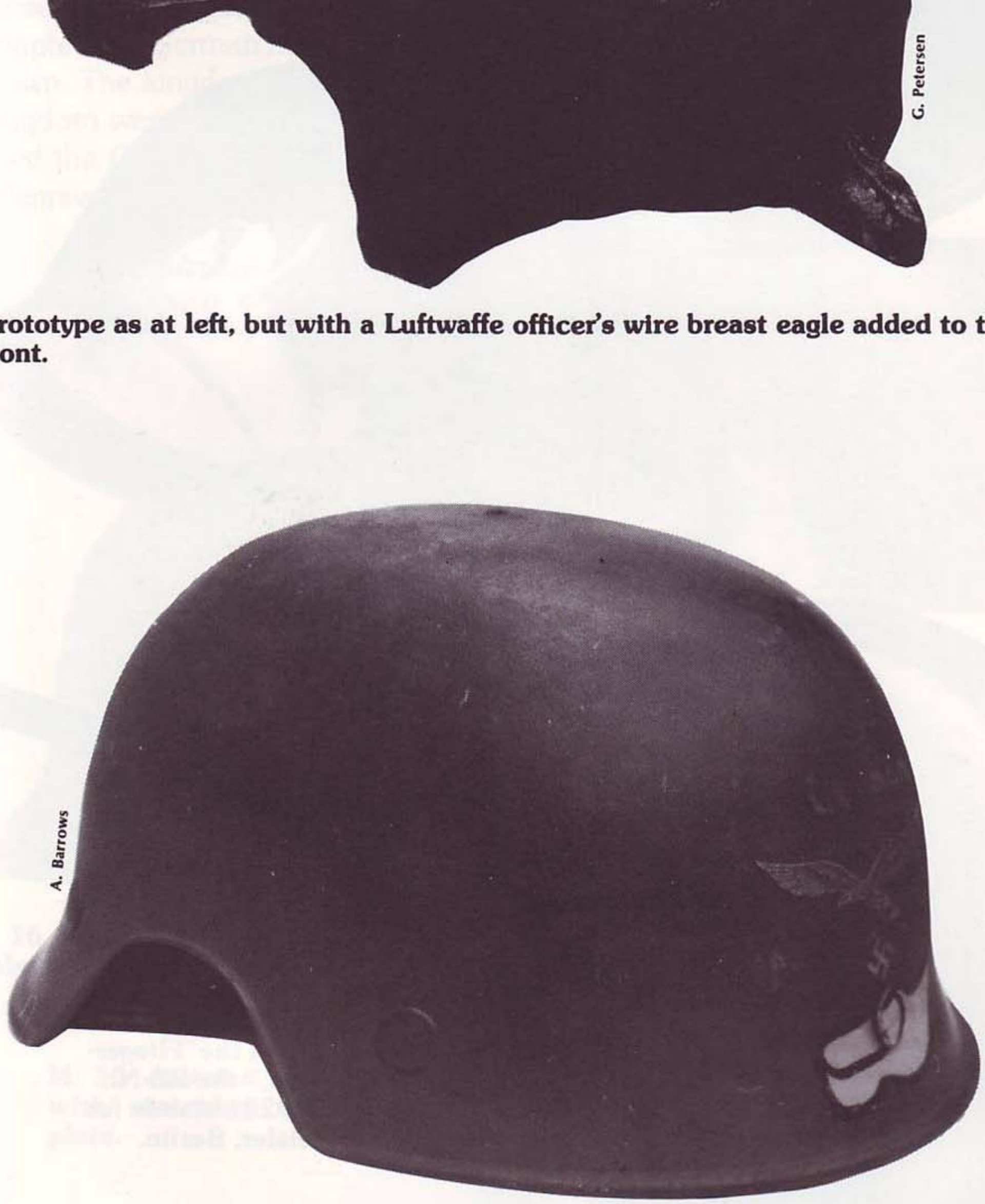


Prototype of a "Fliegerstahlhelm."



G. Petersen

Prototype as at left, but with a Luftwaffe officer's wire breast eagle added to the front.



A. Barrows

A German "Fliegerstahlhelm" with ZG 26 "Horst Wessel" squadron emblem (Dutch shoe).



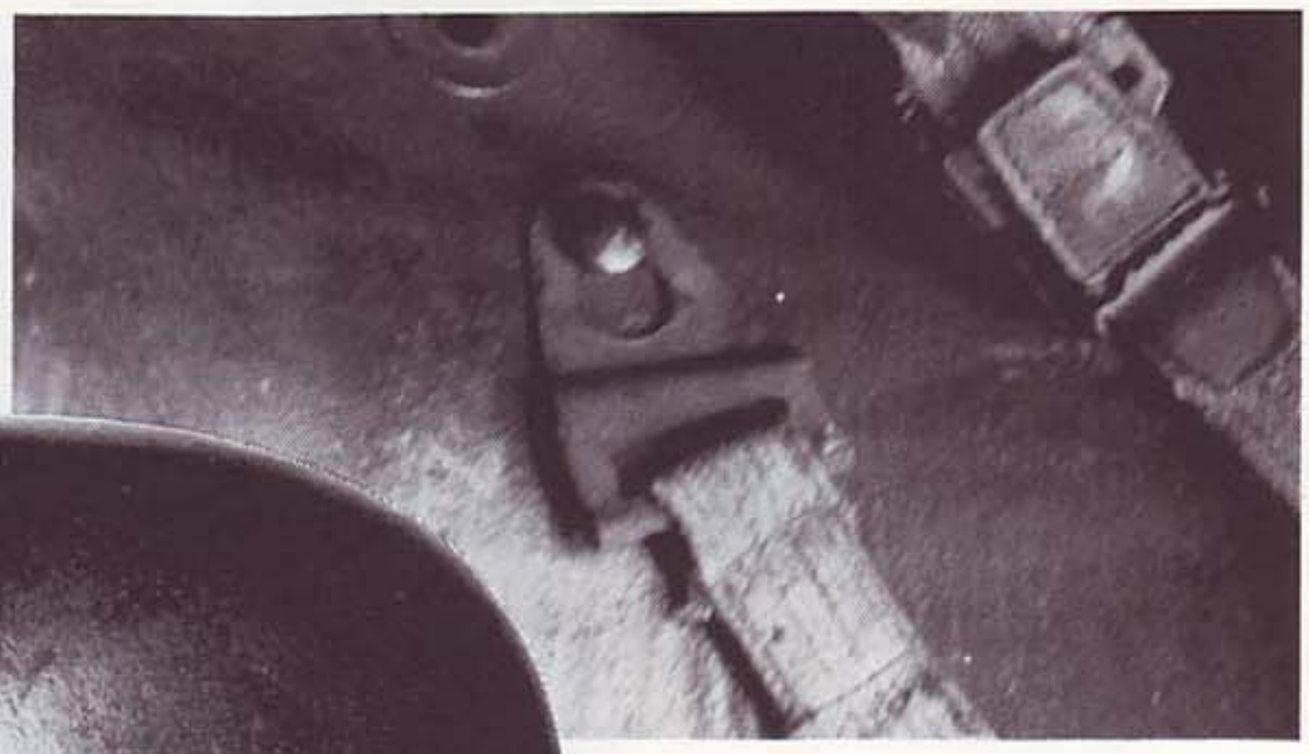
A. Mollo

German "Fliegerstahlhelm." Further details unknown.

The liner of the "Fliegerstahlhelm," the RB-Nr. 0/0250/0201 stands for Karl Heisler, Berlin.

THE GERMAN STEEL HELMET IN OTHER COUNTRIES

During World War One, a total of 486,000 German helmets were issued to Austria-Hungary. The first 15,000 helmets were ordered in November of 1916 and the balance of the helmets were delivered in installments of 20,000 to the supply office stationed in Laibach. Most of the German helmets were sent to the Austrian 5th Army which was involved in fighting on the Isonzo front. After the war, these helmets were literally strewn over the former monarchy and were used in part by the various newly-founded states that arose from the dismembered Austro-Hungarian Empire. Czechoslovakia adapted the German helmet by applying a French-style comb to the top of the crown. The kingdom of Jugoslavia also used the helmet, but the crest of the kingdom was affixed to the front. The new Federal Republic of Austria also used the German helmet, as did the later-established Austrian Home Guard (Heimwehr) units, which applied their own insignia.



Austrian chin strap attachment.



M 16 Austrian helmet.

M 16 Austrian helmet with matching frontal plate.

J. Bandy



M 16 Austrian helmet with a visor.



A prototype of an Austrian helmet for intended use after WWI. "K" stands for "Kaiser Karl."



M 16 Austrian helmet with the insignia of an Austrian home guard unit in Vienna.



M 16 Austrian helmet with the insignia of an Austrian home guard unit.



M 16 Austrian helmet with the insignia of an Austrian home guard unit.



M 17 Hungarian helmet with the insignia of the Austrian Gymnastic Club in a home guard area.



M 16 Austrian helmet with the insignia of an Austrian home guard unit. The center stripe is green.



Austrian officers being inspected by "Kaiser Karl," 9 August 1918.



Austrian soldiers of the Vienna Guard Battalion wear their special helmet with German Army decals already added, just three days after the Anschluss.



Austrian mountain troops wore a sprig of pine needles attached to their helmets on special occasions.



Austrian helmet of the "Gardebataillon" in full dress.



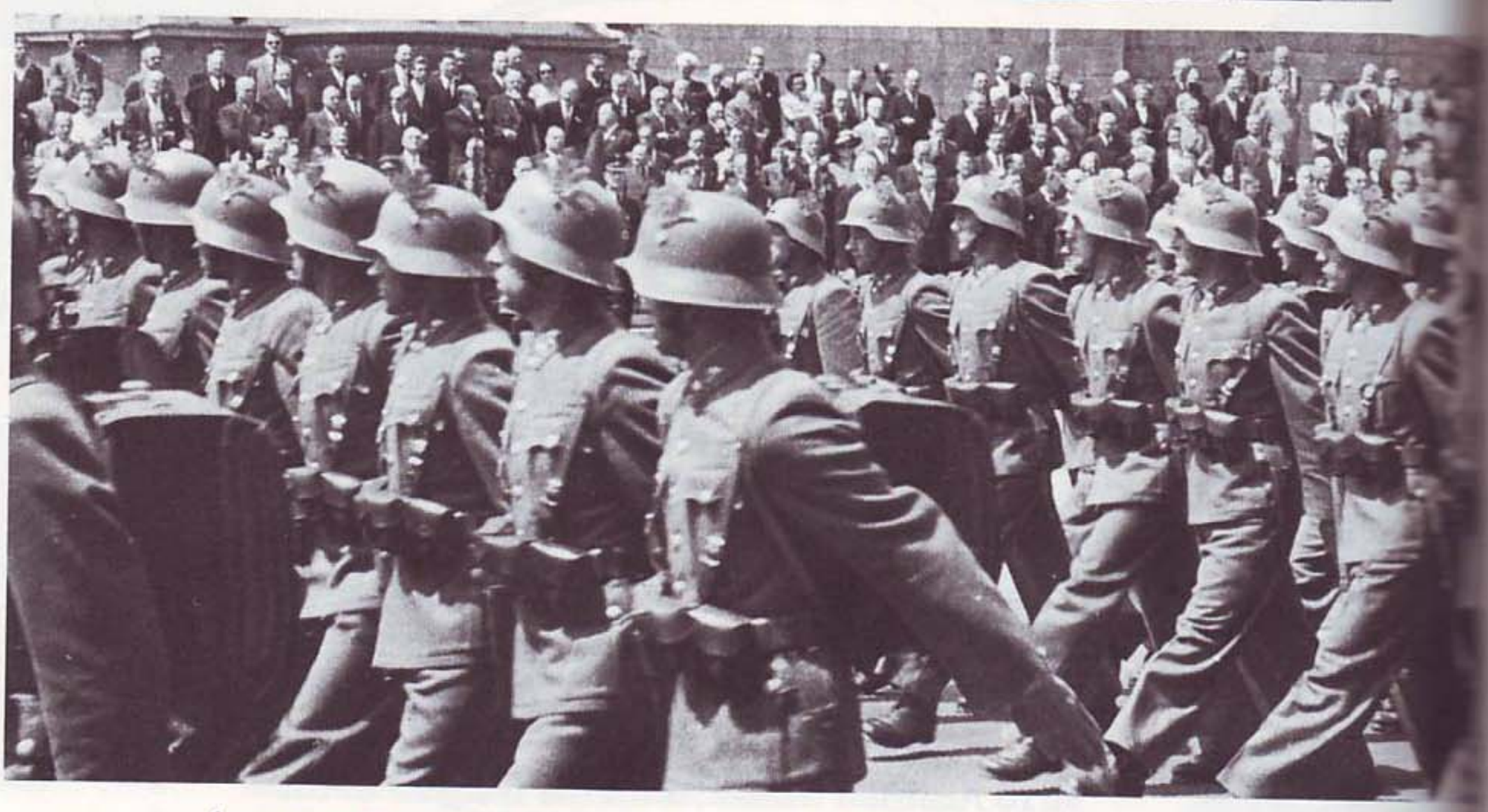
M 16 Austrian helmet, with the insignia of the Austrian "Gardebataillon," 1935-38.



M 16 Austrian helmet with brass insignia of the Austrian rural police.



Austrian Federal Police in Vienna.



Austrian Rural Police ("Gendarmerie") in Vienna, 1951.



M 16 Austrian, double decal helmet of the Austrian rural police with the insignia of German police.

M 35, with the insignia of the Austrian rural police.

D. Dahl

With the reinstitution of the Austrian police after the war, old Wehrmacht stockpiles were drawn upon to reequip these personnel. For this reason, the "B-Gendarmerie," the precursor of the Federal Army, wore German helmets between 1951 and 1955. The Federal Gendarmerie and the Federal Police also wore German helmets in the 1960's. The Federal Police in Vienna wore helmets painted dark green and on parade, an oakleaf cluster was attached to the left air vent. These helmets were mustered out of service between 1960 and 1962. The Federal Gendarmerie used the helmets between 1950 and 1963, but the color was "gendarmerie grey." On festive occasions, the oakleaf cluster was also worn. The leaves of this device was made of waxed paper and were cut and colored to simulate oak leaves.



J. Bandy

Austrian Berndorfer, standard shell, the first steel helmet produced in Austria by the firm, Krupp Berndorfer Metalwarenfabrik. It was issued to Austrian troops in limited numbers.



Austrian Berndorfer W.W. I helmet with additional rivet for Austrian M16 chin strap.

Austrian Berndorfer helmet with frontal plate.



A Berndorfer and a normal Austrian helmet with the insignia of Yugoslavia, prior to WWII.

Besides Austria-Hungary, Bulgaria also received a shipment of helmets from Germany. Their shipment totalled 170,000 and these same helmets were used into the 1930's. A white/green/red Bulgarian national color shield was located on the right side.



Bulgarian soldiers wearing the M 16 helmet.

The Ottoman Empire was to receive 5,400 helmets, but these were never delivered. Instead, these helmets were used by the German Free Corps units. This helmet lacked a visor.



M 18 Turkish helmet.



Full visor variant of the German-made M 18 Turkish helmet.

During the First World War, the Prussian 27th Jäger Battalion was established by the Prussian War Ministry. This unit was composed of Finnish nationals and was equipped with German material, including Model 1916 and 1918 helmets. These troops formed the nucleus of the Finnish Army after the founding of the Finnish government. These helmets were used until 1950 and were then mustered out of service. In 1940 and 1941, Finland purchased Model 35 helmets from Germany and these are still used to a certain extent today. During the Winter War against the Soviet Union in 1939-40, the troops of the 4th Squadron of the Uusimaa Dragoon Regiment and the 4th Light Section wore a white death's head painted on the front of their helmets. This was not an official insigne since the Finnish Army wore no emblems on their helmets.



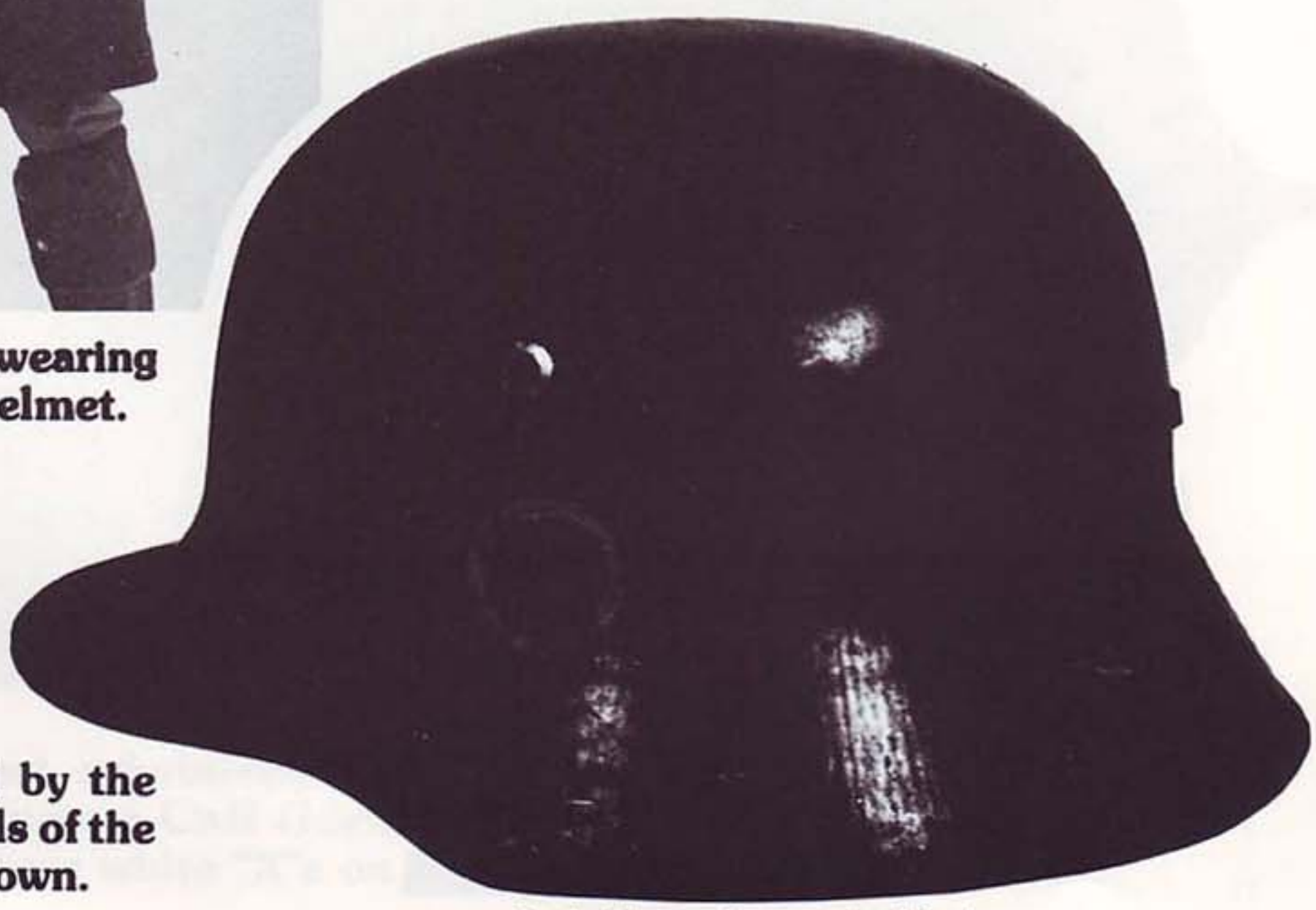
Two Finnish soldiers with German helmets M 35.



M 16 Austrian helmet relined and reissued to Finnish troops. Note extra holes and rivets for new liner arrangement.



A Finnish soldier wearing an Austrian M 16 helmet.

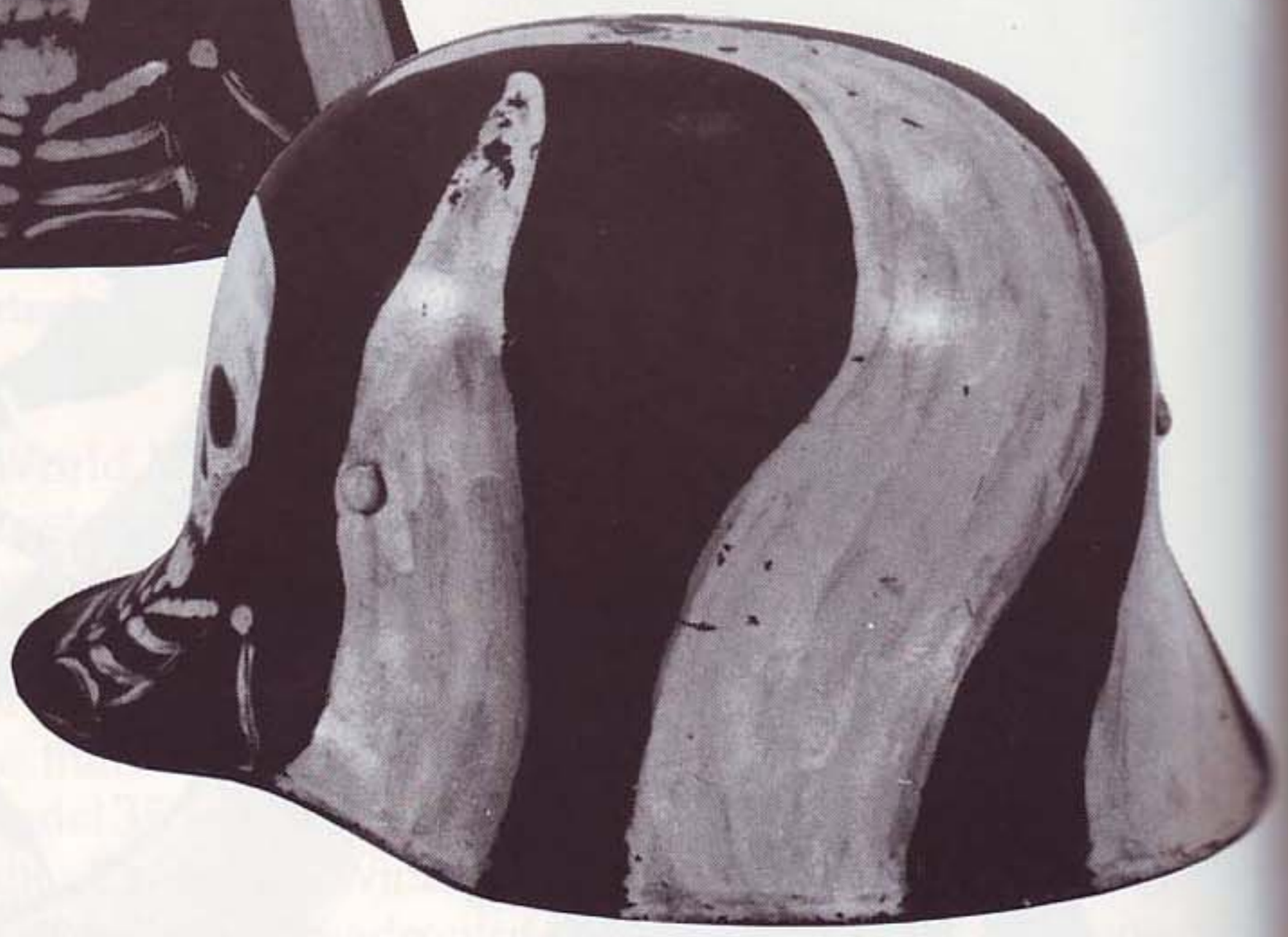


M 16 helmet, used by the Finnish army. Details of the red circle are unknown.

Cavalry Museum Lapeenranta, Finland



M 16 Austrian helmet used by the Finnish Army during the Winter War, 1939/40.



Cavalry Museum Lapeenranta, Finland



D. Powers

M35/40 with insignia of the 4th Kevyt Osasto.



Cavalry Museum Lapeenranta, Finland

A German helmet with a helmet cover used by the Finnish Army after World War II until 1970.

At the end of World War I, about 150,000 German soldiers marched across Dutch soil on their way back to Germany. Upon their entry into the Netherlands, they were required to surrender all of their military equipment, as the Netherlands had remained a neutral nation during the conflict. The steel helmets and all other gear were immediately given over to the Volunteer Civil Guard (Vrijwillige Burgerwachten).



M 16 helmet, refurbished and repainted dark green for use by the Volunteer Civil Guard of Amsterdam. The shield is red with three white "X"s on a black vertical stripe.



Leger-en Wappenmuseum
"General Hoefer"

M 16 helmet with yellow/green crest worn by members of the Volunteer Civil Guard of the Haag from 1919 to 1938. Civil Guard units were in Haarlem, the Haag, Amsterdam and Rotterdam.



A. Barrows

German M 16 used by WWI Flemish collaborators. The helmet was repainted earth-brown with a black rampant Flemish lion on the front.



P. Struye

M 35/40 with the insignia of the Flemish National Socialist Youth Union, 1942-1944.



M 35 with the insignia of the formation AGRA (Amis due Grand Reich Allemand) in Wallonie, 1940-1944.

From 1940 on, SS units were drawn up in those western European countries which were occupied by German forces. These troops were assembled under the designation "Germanic-SS" (Germanisches-SS). The uniforms of these troops were generally similar to those used by the Allgemeine-SS in Germany, although there were important differences in the insignia which were used on the uniform. In Denmark, the Schalburg Corps used a black Model 35 helmet for guard duty. These helmets had a white sun-wheel swastika (Sonnenrad) on the right side. In Flanders, the "National Socialist Youth of Flanders" (National-Socialistische Jugend Flanderns) wore, on the left side of the German helmet, an emblem consisting of a white seagull

A Schalburg Corps guard on duty.



M 35/40 with the insignia of the Schalburg Corps, Denmark, 1940-1945.



Belgian Army Museum



Dutch NSKK volunteers wearing German helmets with the "Wolf Hook" as insignia. The men in black are wearing the uniform of the Dutch "Weer Afdeelingen" (Defense Sections, actually the Storm Troopers of the N.S.B.).



Pierre Pose

German M 35/40 with insignia of either the Dutch Landwacht or Landstorm (silver rampant lion and flaming bomb on black background).



within a white circle. The seagull represented "storm" and symbolized the old Flemish battle cry, "Vliegt de Blauwvoet — Storm op Zee!" (The seagull is flying — storm on the sea!).



M 35/40 double decal "Weer Afdeelingen" helmet (Storm Troopers of the Dutch N.S.B.) with rough textured grey-green finish.



Flemish volunteers in the NSKK.



Dutch volunteers in the German Labor Service.

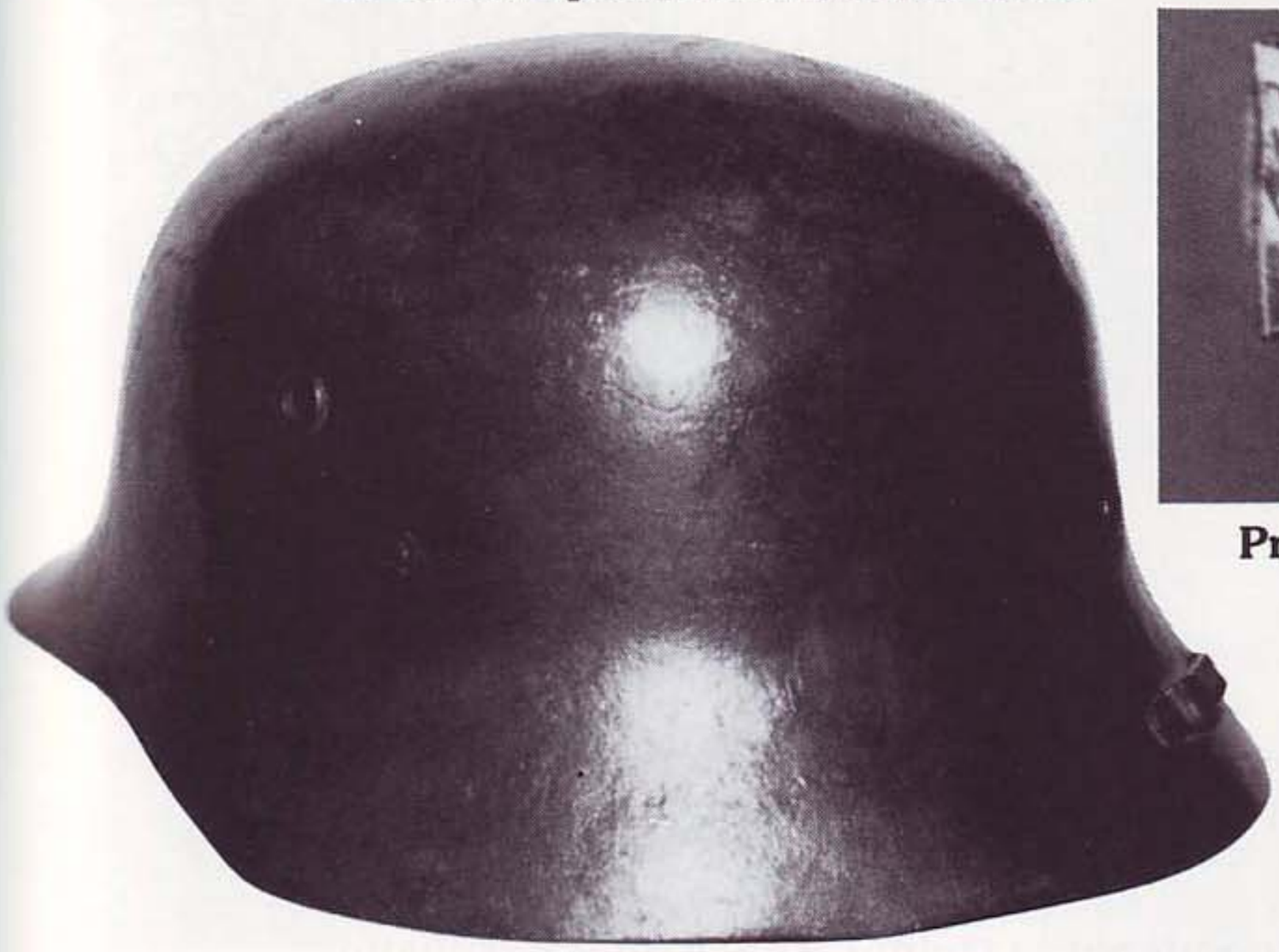


The M 17 Hungarian helmet, produced by Krupp Berndorfer Metalwarenfabrik after they ceased manufacturing the "Berndorfer" helmet. This helmet closely resembles the Austrian M 16 except for the placement and smaller size of the exterior rivets.

Hungary developed its own steel helmet production with the help of the Eisen- und Hüttenwerke AG in Thale. The Hungarian facility produced its version of the M1935 under its own directorship. This helmet was different from the German model in several ways: the helmet had an additional hanging loop on the rear of the apron, the liner configuration differs from the German pattern and the two front holes for the attachment of the liner-retaining rivets are set further to the rear.

NOTE:

In 1935 a representative from the Institute of War Technique (Haditechnikai Intézet) was sent to Thale to study the positive M 35 test results. Being impressed, he returned to Hungary with a German technician and immediately put their own version of the M 35 into production in late 1935.



M 35 Hungarian helmet.



Proof mark of the Hungarian helmet found in the neck-guard.

Reissued M 17 Hungarian helmet, worn by members of the Austrian Army after the Anschluss in 1938 (unification with Germany).



A. Barrows



Dan Stover



M 16 style helmet of the Irish Army.

The shell of the helmet, painted dark green, was forged in England by Vickers Ltd. On the inside rim, at center of the rear, was a die stamped inscription, "V Ltd H 8696." Each helmet had its own serial number and the fittings of the helmet were completed in Dublin. The leather headband, which was stamped "T. Smith a.Son, Dublin 1927 S," was

secured to the shell by three bolts, and held in place by a steel washer (two on the front on each side of the badge[1] and one in the rear). The other rivets were to hold the chin straps.

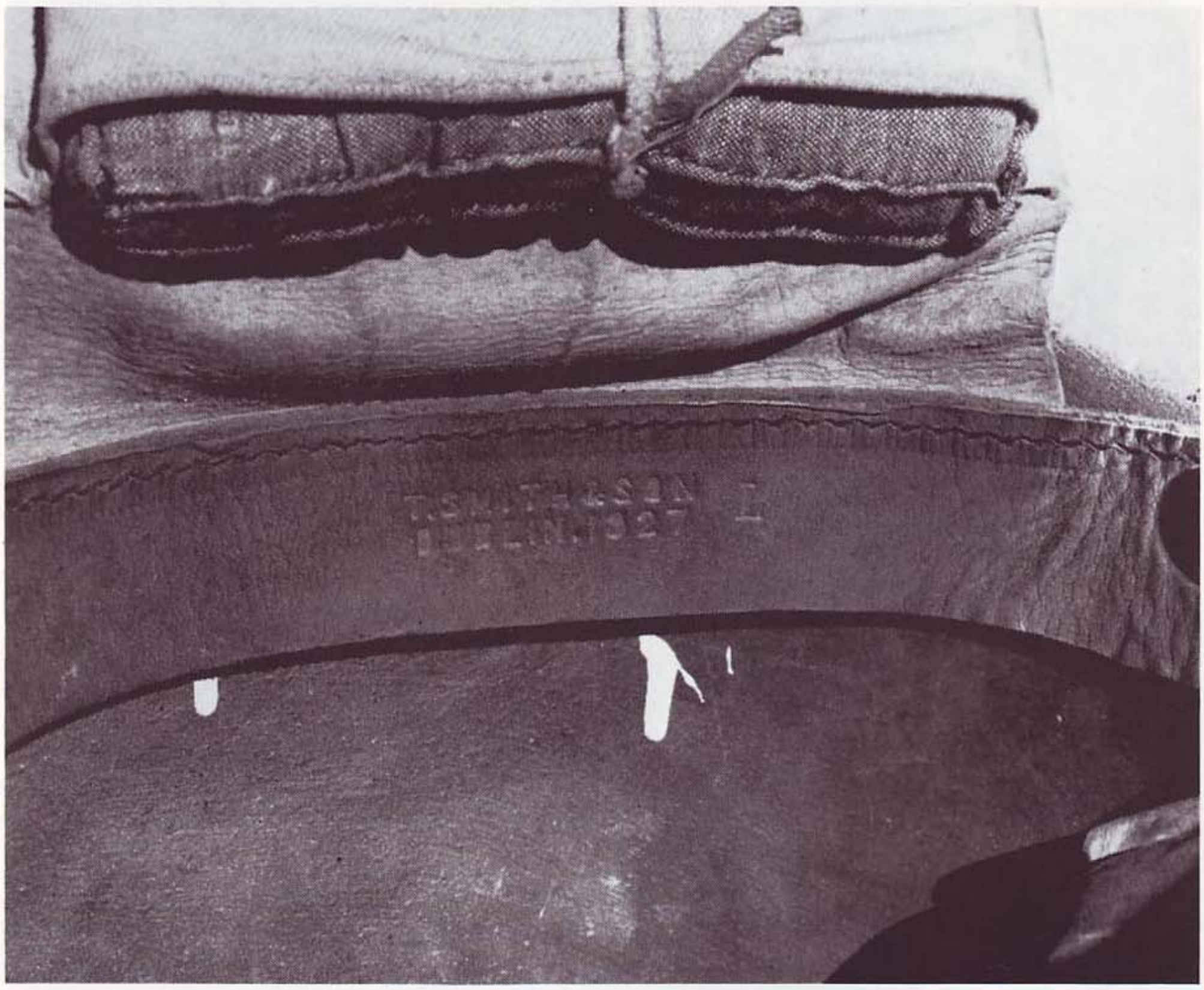
The drawing on the opposite page and the description of the helmet were taken from a report made by Mr. John M. Hudson and F. Glenn Thomson, Dublin, Ireland.



Dan Slover

NOTE:
The white color of this helmet indicates it was used by civil forces like fire brigades, etc.

Officer's army badge was painted black and inserted into the two metal loops which were welded to the front of the helmet.



Dan Slover

Liner of the Irish Army helmet.

Model 1916 and M1918 steel helmets were also used in Afghanistan, Mexico, Poland, Hungary, Latvia and Lithuania. During the Second World War, a frontline unit of the Red Army was equipped with former German M 16/18 helmets which probably originated from Latvian or Lithuanian stockpiles. A red hammer and sickle was painted on the front.

Steel helmets of the 1935 pattern were used before the war in China, during the war in Croatia and Spain and after the war in Norway and Austria. The German helmets used by the Norwegian Army were left behind by the departing German troops after the capitulation on 8 May 1945. These helmets were repainted and redecalled and were then given to the Norwegian Air Force and Home Guard units.

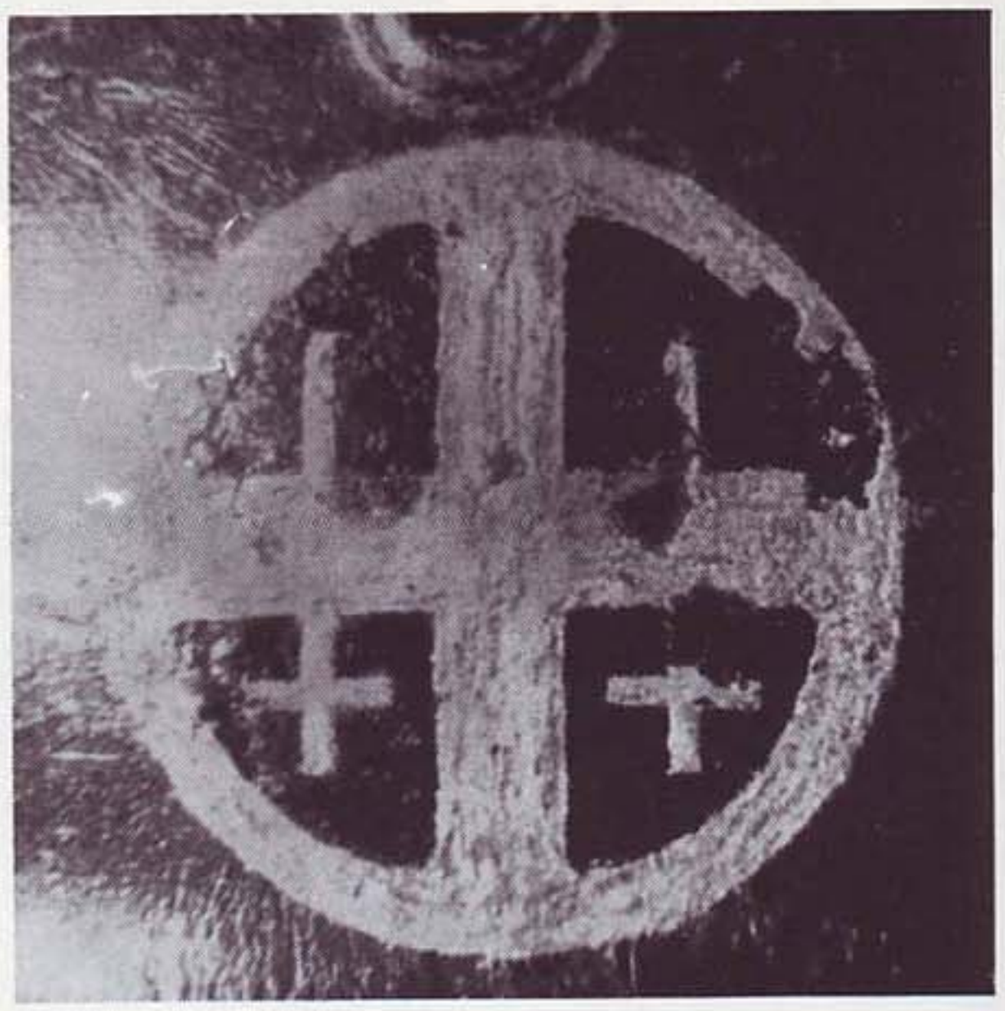
Right side



Members of Vidkun Quisling's personal bodyguard wore a dark blue M 35 helmet with his monogram on one side and the N.S. eagle and sun cross emblem on the other.



Left side



D. Powers

Insignia of the Norwegian NS Hird Factory Guard and NS Hird Security Unit, as worn on their steel helmets.

H. P. Taylor



A member of Quisling's "Førergarden" standing guard, Norway, 1942-45. The helmet is blue with white insignia.

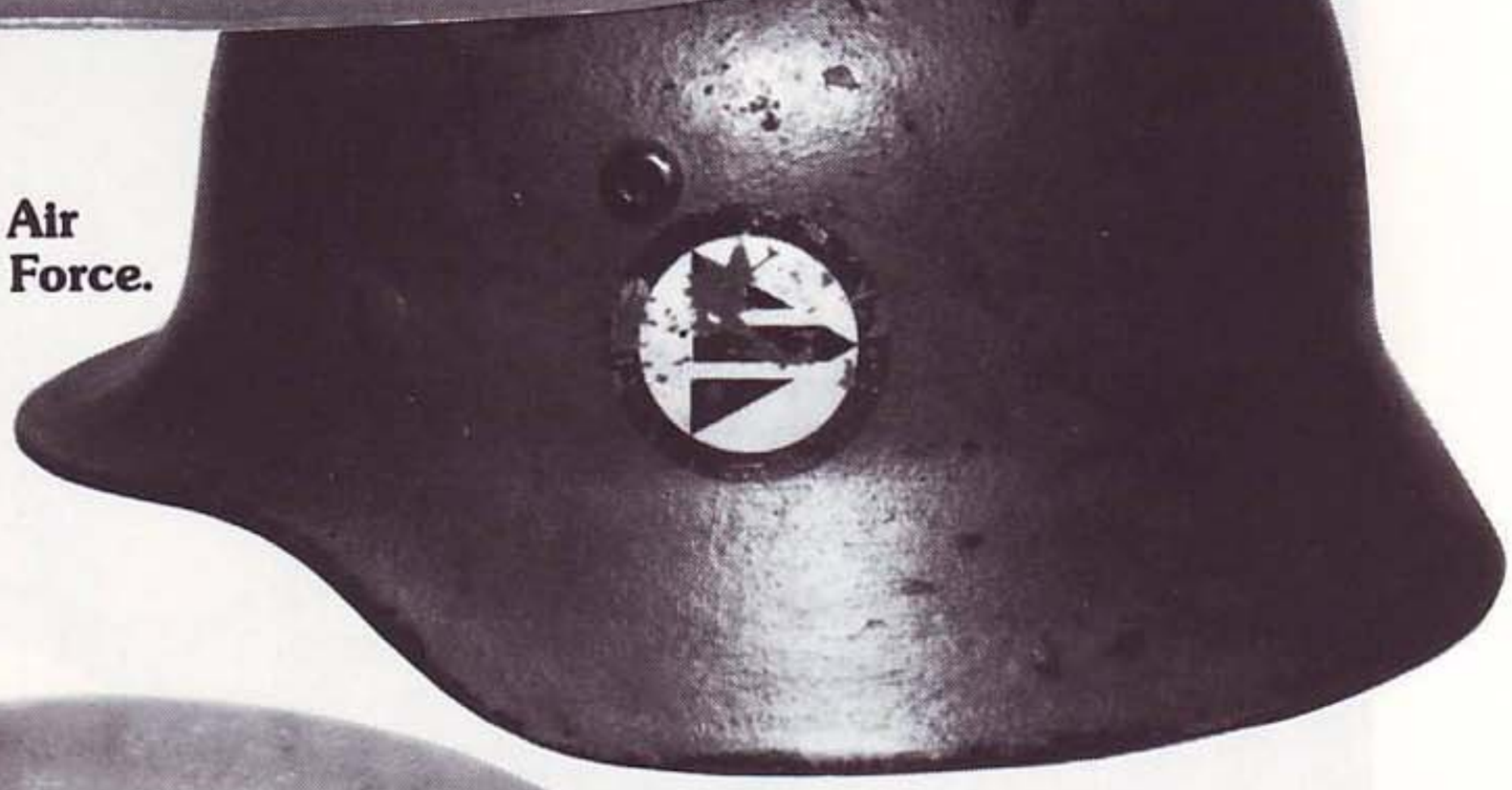
German helmets used after 1945 by Norwegian military forces.

Home Guard.

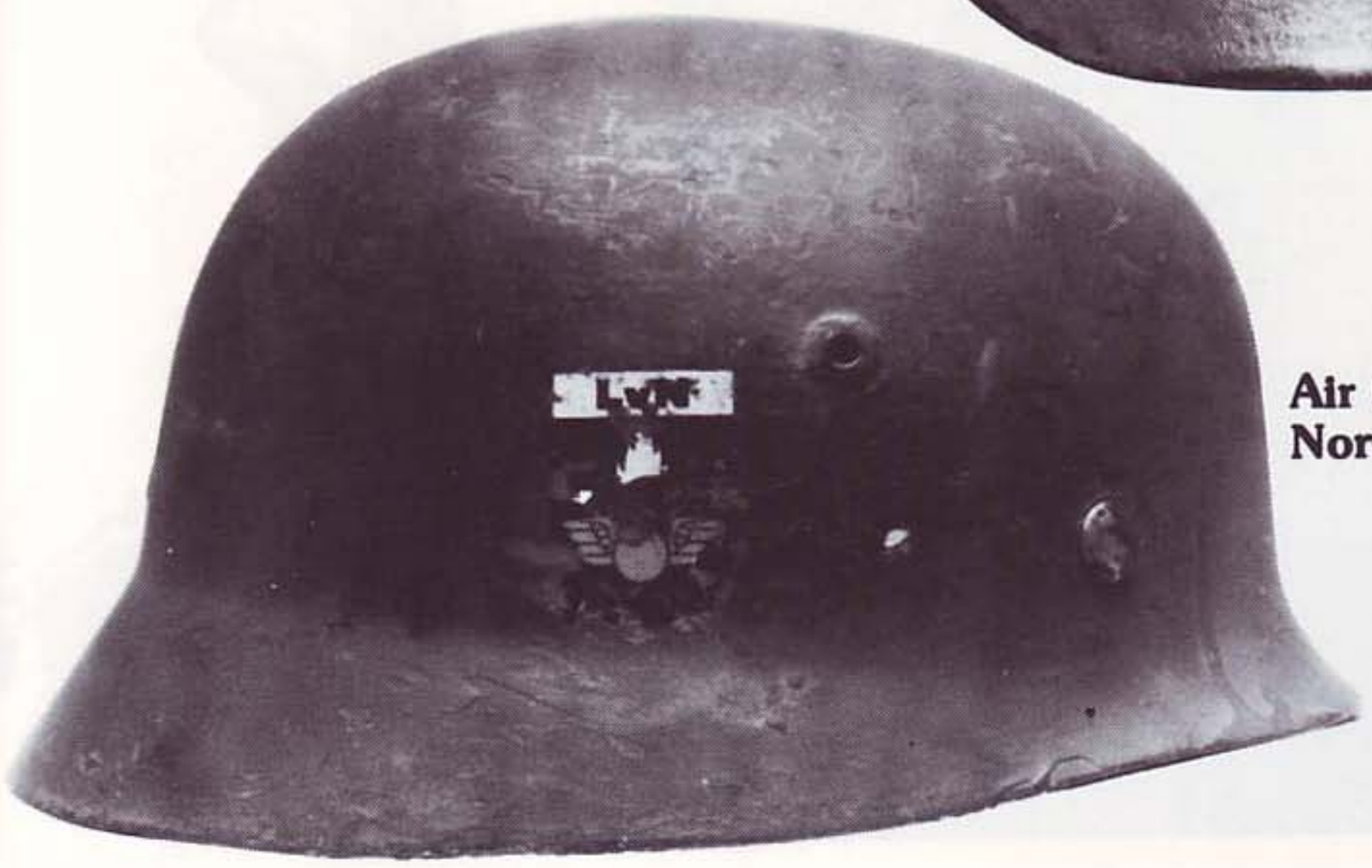




Unofficial Norwegian flag on a M 42 helmet.



Air Force.



Air Guard, Norway.

M 35 helmet with the insignia of the "Einsatzstaffel der Deutschen Mannschaft" in Croatia, 1941-1945.

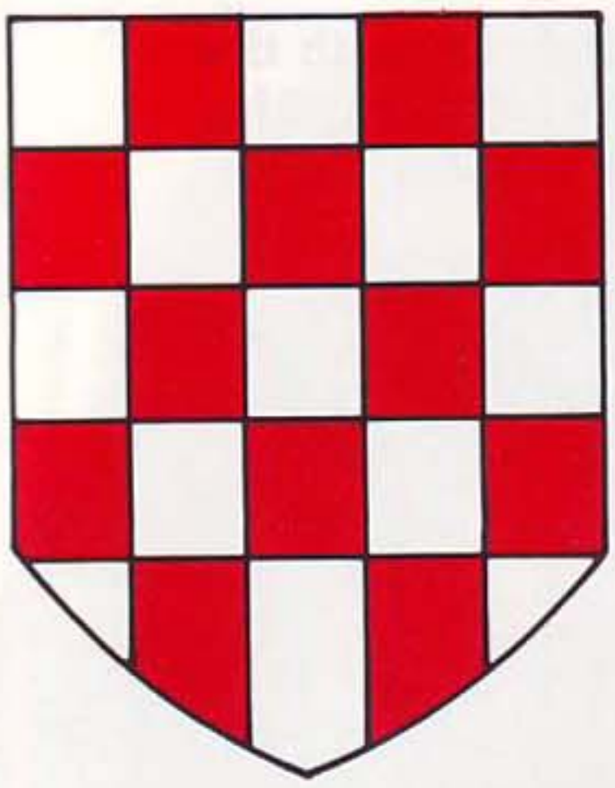




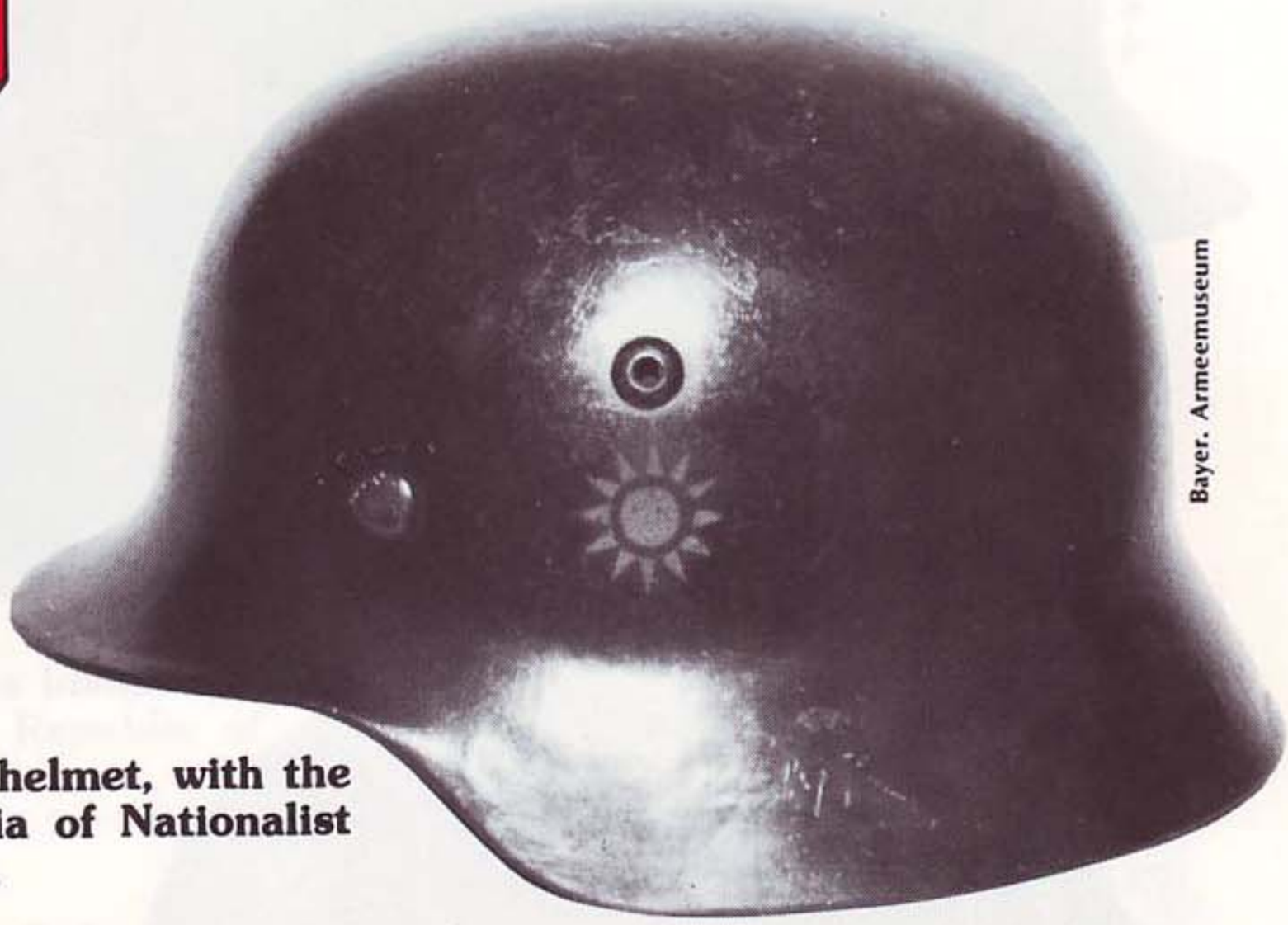
"Deutsche Mannschaft in Kroatien," 1941/45.

G. Petersen





Red and white checkerboard helmet decal as worn by the Deutsche Mannschaft and members of the Croat Legion (35mm wide, 42mm high).



Bayer. Armeemuseum

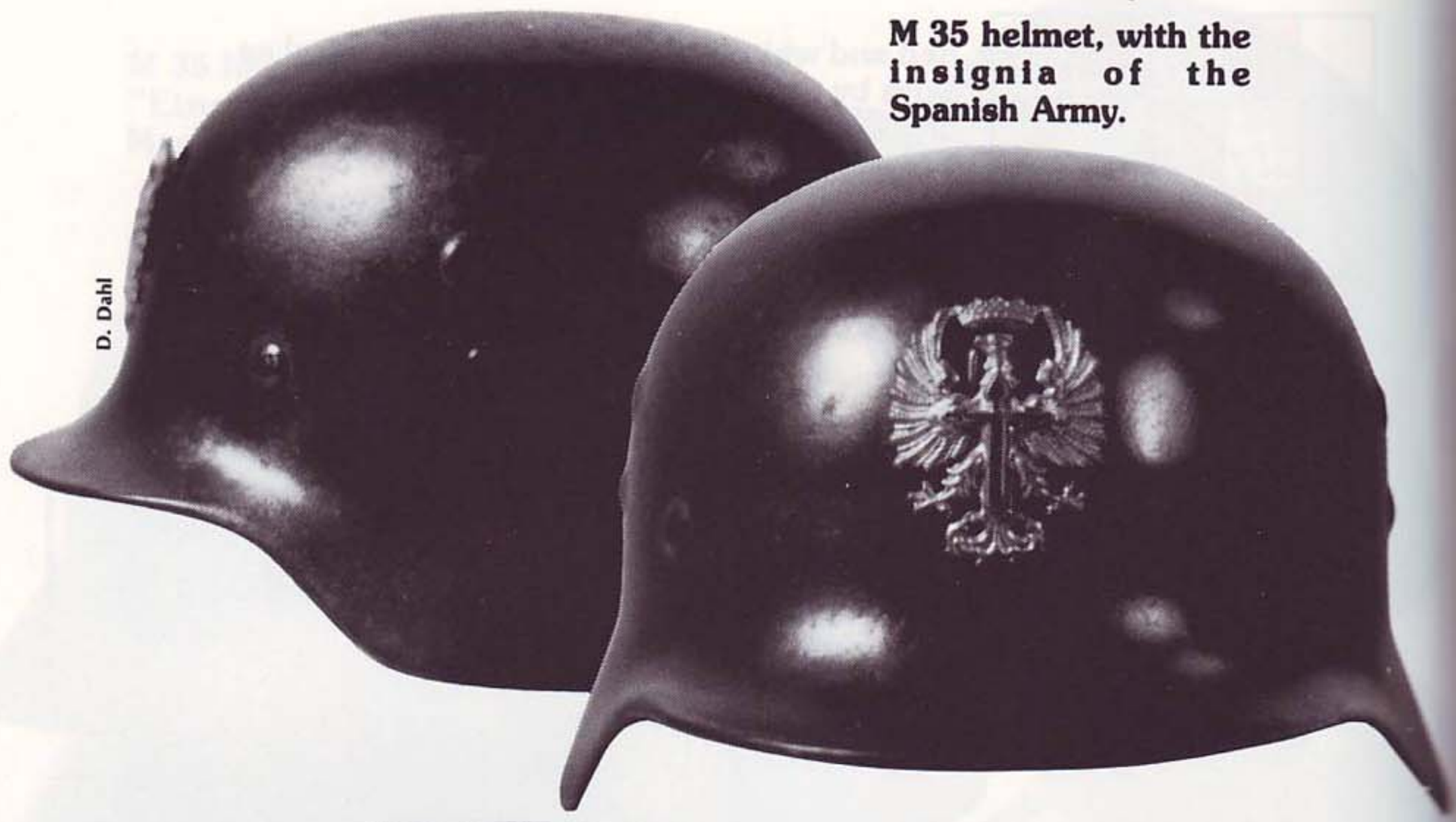
M 35 helmet, with the insignia of Nationalist China.



D. Powers

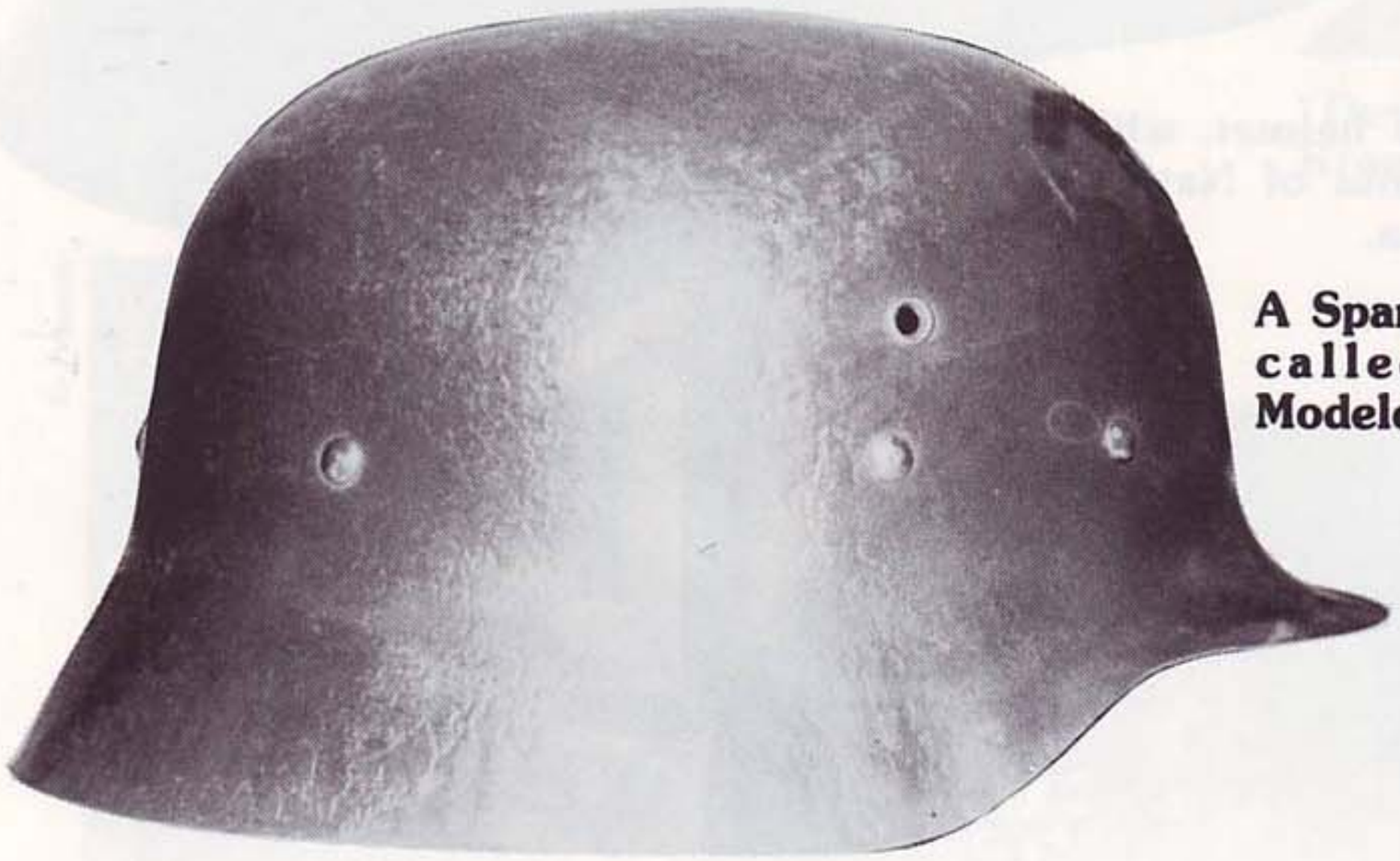
German WWI style Chinese helmet with double stencilled white Chinese stars.

Croatian officer candidates wearing German helmets with the red/white checkered shields, June 1944.



D. Dahl

M 35 helmet, with the insignia of the Spanish Army.

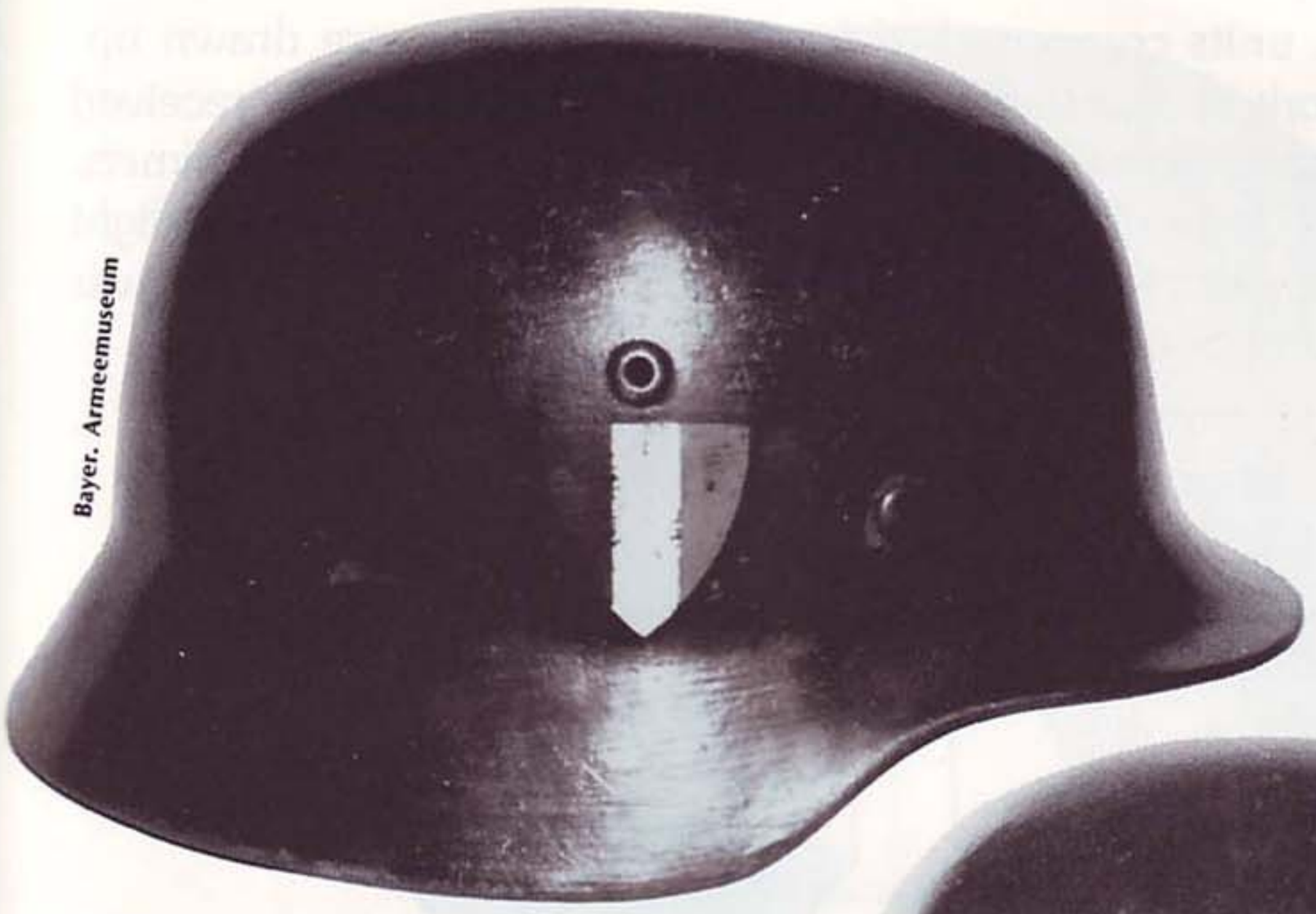


A Spanish-made helmet called the "Casco Modelo Z" (1942).

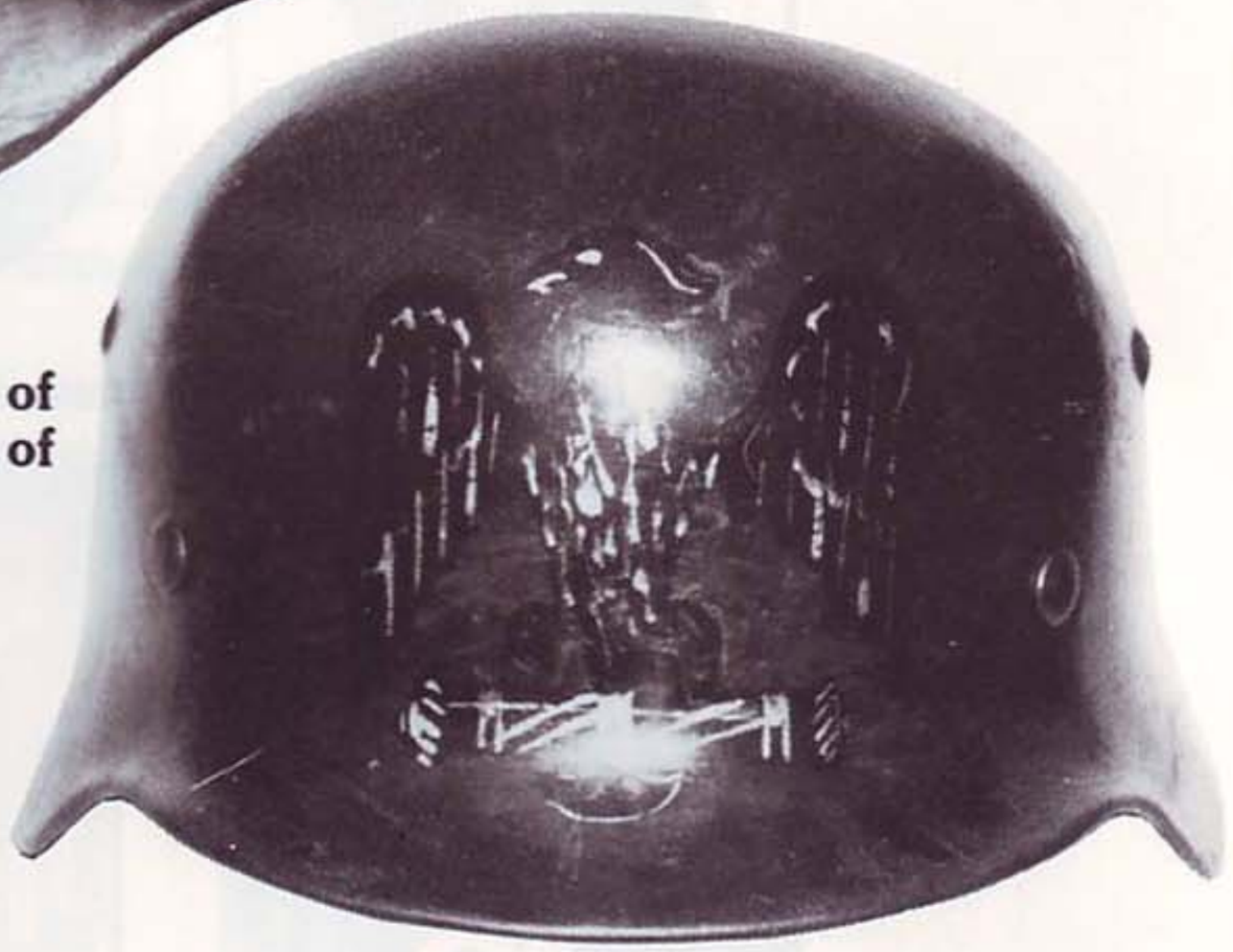


D. Powers

M 16 helmet, worn by Mexican cadets and the regular military for a short period of time, with a black over green finish, stencilled inside "Chapultepec, 1923, Mexico D.F. Mexico," and a brass Mexican coat of arms mounted on the front.



Bayer. Armeemuseum



M 35 helmet, with the insignia of the Socialist Fascist Republic of Italy, 1943-1945.



D.Powers

M 33 Italian helmet, with the same insignia.

During the war, units composed of foreign volunteers were drawn up within the framework of the Waffen-SS and the Army. These units received permission in part to wear their national symbols and insignia on their helmets. Thus, the volunteer legion "Nederland" wore the colors orange/white/light blue in place of the swastika shield. This color pattern dates back to the war between Holland and Spain.



Orange/ white/ light blue

Helmet insignia of the Volunteer Legion "Nederland."



J. Bandy

Red/yellow/ red

Helmet insignia of the 250. Infanteriedivision, the so-called "Blue Division" consisting of Spanish volunteers.

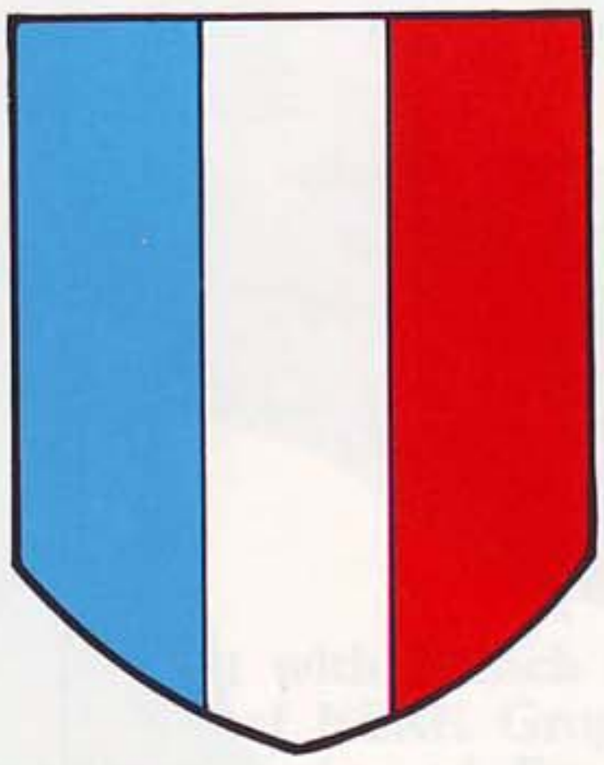




M 35 helmet, with insignia of the "Blue Division."

J. Bandy





Blue/white/red

Helmet insignia of the "Infanterieregiment 638," the "French Legion," consisting of French volunteers.

Green/white/red





Black/white/red

Helmet insignia of the "Infanterieregiment 950," the "Indian Legion."

Soldiers of the 250.ID, the "Blue Division."



Soldiers of the IR 638, the "French Legion."



M 42 helmet, with the insignia of a German "Ostbataillon," Western Front, 1944.



G. Petersen

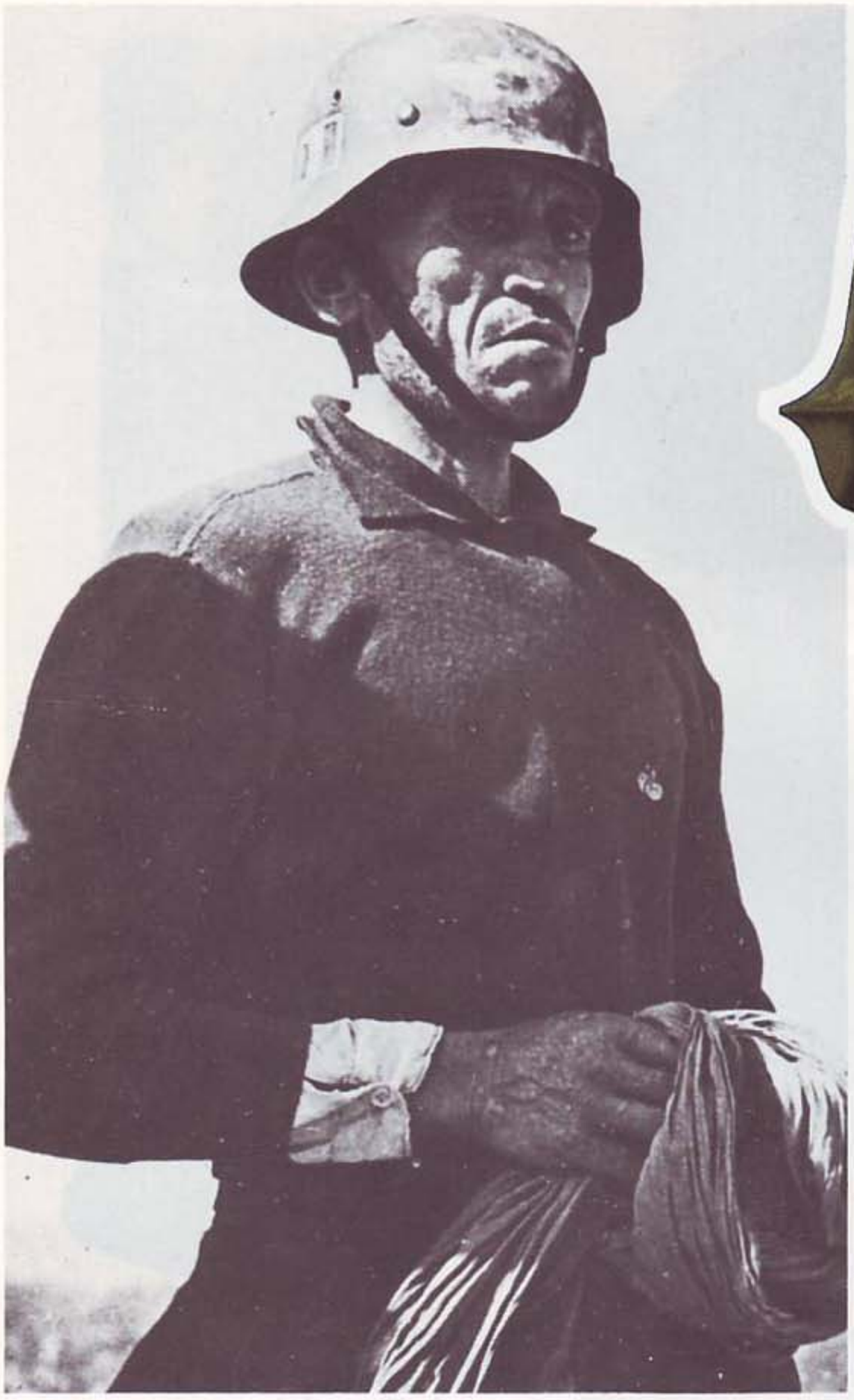
M 35/40 double decal Luftwaffe helmet with French tri-color decal, worn by French members of NSKK Gruppe Luftwaffe (which included seven companies of French volunteers).

An M 42, field grey Waffen-SS helmet discovered near Myslenice, south of Kracow, Poland, has the SS runes on the right side and a dark blue shield decal with gold rampant lion and three ducal crowns on the left side of the helmet. This is possibly an unofficial helmet for the 14. Waffen-Grenadier-Division der SS (Galizische Nr. 1).



The Galician shield.

G. Petersen





D. Powers

M 35 used by the Egyptian "Guard of the Presidency," which is medium green with refitted British type liner (crown mounted with screw/nut) and Austrian M 16 type chinstrap. Note rank chevrons on side. A relic from the 1967 War.

Arabian volunteers in German uniform, Africa, 1943.

A. Mollo





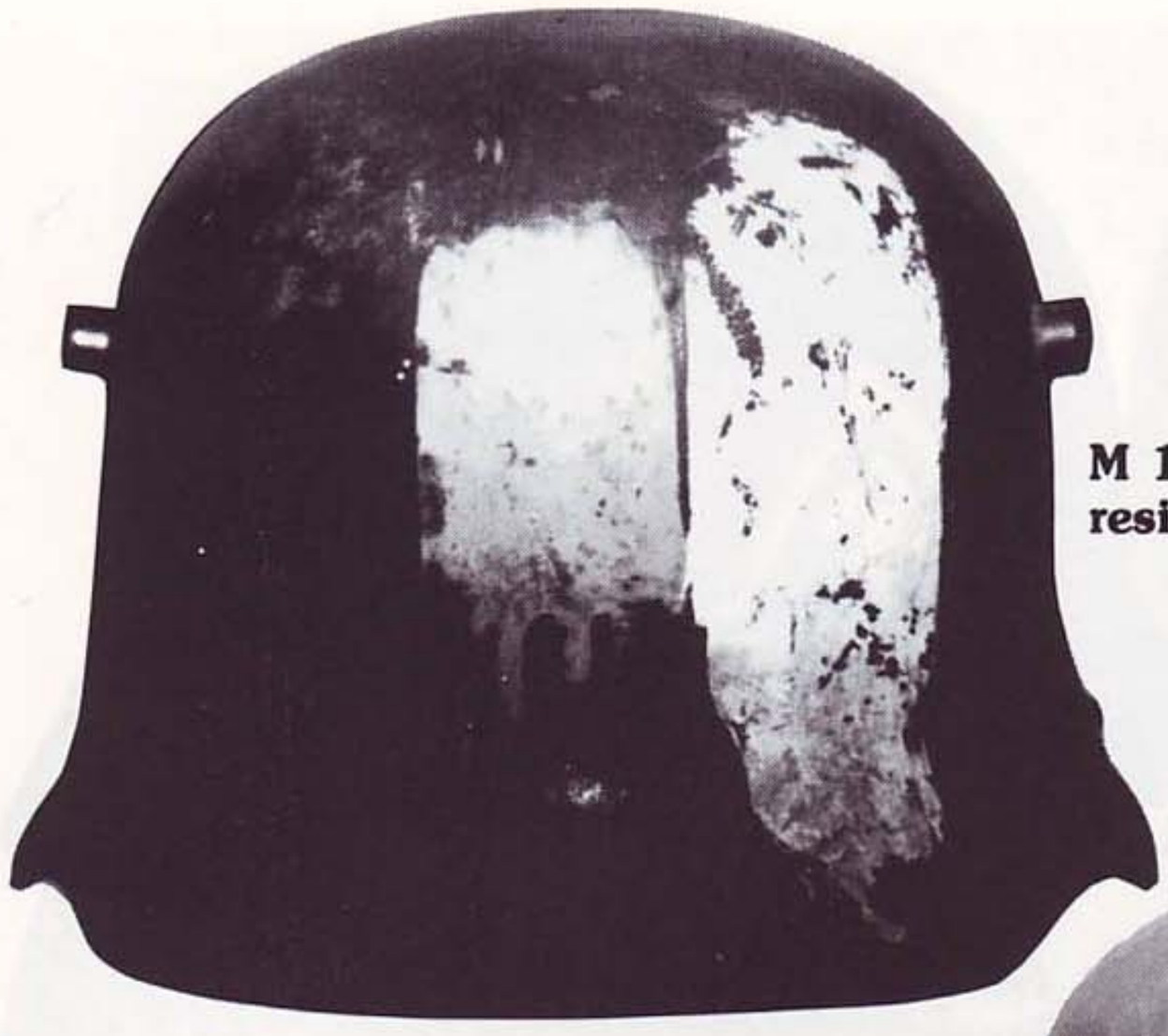


M 35 helmet, with the insignia of a German "Ostbataillon," Eastern Front, 1943/44.

Soldier of a German "Ostbataillon," 1944, Eastern Front.



The Ukrainian volunteer, taking the oath of allegiance to Hitler, carries a white, stylized trident on the right side of his helmet.



M 16 helmet, used by Czech resistance groups 1943/45.



M 35 helmet, used by Czech resistance groups, 1943/45.



M 42 helmet, used by Polish resistance groups, 1943/45.



M 42 helmet, used by the Danish resistance group "Holger Danske," 1943/45.

During the Warsaw Uprising of August 1944, Polish insurgents wore German helmets with a number of personalized symbols added, i.e., (right) the emblem of the "Grupy Szturmowe" (Attack Groups).



M 32 Czech helmet with the insignia of the Army.



A Czech helmet used in a "Heeresbekleidungsamt," which means Army Clothing Depot.



D. Powers

M 26 French reissued helmet, with the insignia of the Army.



A. Barrows

Russian M 40 helmet reissued to the Luftschutz der NSDAP. Tan with a stencilled silver political eagle.

French helmet used by members of the Luftschutz der NSDAP on air raid duty.

THE DEVELOPMENT OF NEW GERMAN HELMETS DURING THE SECOND WORLD WAR

After the end of the campaign in Poland, Professor A. Fry and Dr. H. Hänsel of the Reich's Institute for Defense Technology and Materials Research began to test the effectiveness of steel helmets within the framework of a commission from the Iron and Steel Specialty Division of the Reich's Research Council.

In October, 1939, Prof. Fry returned from a trip to Poland with a group of various helmet models (Polish, French and English). At the institute, the helmets were shot at with a small calibre rifle of 5.6 mm (.22 cal.) and the results were compared. All of the helmets were pierced, but the British helmet was penetrated through both walls. The German helmets tested showed better results, although the M35 helmet was also penetrated, but only at the concave surface where the crown of the helmet flared outward to become the visor and apron. On the basis of these results, the two men began the design of new helmet models. Those designs produced by Dr. Hänsel proved to be the best. Prototypes were made at the Völklingen Stahlwerke and were subsequently ballistically tested at the institute. Those designs of Dr. Hänsel proved to be more effective.

The results of this research were forwarded in 1942 to the Army Weapons Office (Prüf 2 I c) by Dr. Hänsel. The question of the introduction of a new helmet was under consideration in that office in spite of the fact that Hitler had already forbidden the further development of a new steel helmet. The reason for this research was to be found in a memorandum from the Army Medical Inspectorate which pointed to an increasing number of head wounds despite the use of the steel helmet. Bypassing the Ministry of Armaments, General of Artillery Leeb (also Chief of the Weapons Office) undertook the development of a new helmet pattern in collaboration with a Colonel Kittel.

Out of these limited tests, four prototypes resulted: "A," a slightly modified M35 helmet; "B"; "B/II"; and "C." Following the ballistic and troop testing, the two "B" variants proved to be superior. The results were compiled in a memorandum and in the autumn of 1944 they were presented to the Führer's Headquarters.In spite of the favorable results

of these helmets and their economization of both materials and labor time, the introduction of the helmet was rejected, evidently because the existing helmet was to remain the symbol of the "Greater German Freedom Struggle."

The following two sections are translations of original documents pertaining to the testing and proposed introduction of the prototype helmets mentioned above. The first is a memorandum written by Doctor of Engineering Haidlen, a colonel and section chief of Weapons Inspection Office 2 I c.

Thoughts on a New Steel Helmet

-issued by Weapons Inspection Office, Pruf 2 I c.

I. Shortcomings of the German Steel Helmet

A group of serious shortcomings plague the current German steel helmet:

a) It has unfavorable ballistic properties because of its very steep side walls (almost 90° to the horizontal). This allows bullets and fragments to readily penetrate, whereas with a more sloping surface this could be avoided. Furthermore, the transition from the vertical sides to the sloping apron forms a weak point which can be penetrated by a relatively light impact. Ballistic tests have proven this to be true. On the other hand, many of the foreign helmets which were tested showed superior results as compared to our own helmet.

One must consider the inconvenience due to the weightiness of the helmet that our soldiers have had to endure. All in all, there must be a more protective and efficient helmet that could be produced.

b) The visor of the Model 35 interferes with the use of optical apparata (telescopic sights, directional and ranging devices, etc.). The soldier must push the helmet toward the rear of the head in order to keep the visor out of the way. In off-hand shooting, the visor can upset the aiming process.

The neck apron of the helmet is inconvenient when the soldier is in a prone position because even the smallest knapsack pushes the helmet forward and over the eyes of the wearer.

c) The greatest disadvantage of the German steel helmet is that the apron causes such a rumbling sound in the wearer's ears during high wind conditions and in vehicle slipstreams that the troops avoid wearing the helmet. This sound is not only a hardship to the soldier, but it may also cause difficulty in understanding commands and radio transmissions. Furthermore, this noise can also hinder the identification of aircraft by their engine sound. It may also cause reconnaissance parties and sentries to misinterpret suspicious sounds. Unusual motor noises may not be noticed by drivers who are wearing the helmet.

II. The Development of New Helmet Designs

New helmet designs which can solve the above-mentioned shortcomings were developed after long research by the Reich's Chemical and Technical Institute (leader: Professor of Engineering Fry; consulting

expert: Dr. Hänsel). The comments of the institute were included in paragraph I above.

A prototype Model A was rejected by the Army High Command and also by the Weapons Inspection Office because its sides presented too steep an angle of incidence. Model C. was also rejected after a short test at the Döberitz Infantry School because its visor and neck apron were still an inconvenience to the wearer.

The Model B developed by Dr. Hänsel seemed to solve all of the problems inherent in the Model 35 helmet. It is readily recognizable through its simple shape, marked by a very flat angle of inclination which is a maximum of 55° on the front and 60° on the sides and rear.

All of the problems were solved through the shallow curvature and by the elimiation of a special visor and neck apron. Model B has a considerably smaller surface area than the old helmet. If the wall thickness of the Model B is held the same as that of the M35, the weight of the prototype is approximately 0.2 kilograms less. If the weights were made equal, the Model B's wall thickness could be increased from 1.2 mm to 1.6 mm, thus increasing the ballistic resistance of the helmet even further.

An alternate model was designed by Dr. Hänsel and was called the Model B/II. It has additional ear and neck protection, but it retains the same angle of inclination as the Model B. It differs by having a 2 cm long side and rear apron which extends downward and outward on the same angle as the upper portion of the helmet. Both models (B and B/II) were selected for on-going testing by the Weapons Inspection Office.

To this end, the Eisen- und Hüttenwerk Thale was given the contract to fabricate fifty of the Model B helmets and the same number of B/II helmets. This company which was well experienced in helmet manufacture also produced its own experimental helmet.

The proposed Model "Thale" is distinctive because of its very simple shape which differentiates it from the Model B. Its length and width are diminished so that the helmet does not tend to take on a very broad appearance. This fact means that it can be used by tank commanders, paratroopers and naval communication personnel. The helmet is shaped like a shallow dome, whereas the Model B is more conical, extending up to 80 mm more in height. The Thale helmet has a shallow angle of inclination; that is, 58° in front and up to 68° at the sides and rear. This helmet has a small rim which is an artifact of the cutting process which took place after the one-step stamping. The formation of Model B's lower section requires several manufacturing steps. The small rim of the Thale helmet also hinders deformation of the steel during tempering. There is a small uplift in the rim of the helmet above the eyes of the wearer. This uplift is approximately 5 mm high and was included for aesthetic and functional reasons. As is also true in the case of the Model B prototype, the Thale helmet has no visor or apron.

III. Testing of New Helmet Prototypes

a) Troop Research

The Models B and B/II were tested for their functionality at the Döberitz Infantry School. At the close of these trials, the proposed helmets had been compared with the Model 35 helmet during the use of the following pieces of equipment: 8 cm mortar, bazooka (nicknamed the "stovepipe"), 2 cm antitank rifle, 2 cm antiaircraft gun, M43 "Püppchen" rocket launcher, 5 cm antitank gun, machine pistol 44, Karabiner 98k and Karabiner 43 (all with telescopic sights), machinegun sighting devices, stereo telescope, range-measuring devices, Model 42 knapsack, and the "Dora" field telephone.

These tests indicate the following about the B and B/II prototypes:

1. Because of their differently-shaped visors, there was no interference in operating any weapon, even with telescopic sights.
2. There is little impingement by the helmet on the neck of the wearer. This is particularly true in the case of the Model B/II which has a shorter apron.
3. Acoustic qualities are improved. This means that the distracting rushing sounds have been eliminated, making it easier to hear reports and commands and to determine the direction of the origin of a noise.
4. The helmet was easily worn by the soldiers.

Comparative Measurement Table for Steel Helmets

	B	B/II	"Thale"	M35
Total Length (mm)	286	286	266	286
Total Width (mm)	254	277	231	241
Total Height (mm)	126	146	132	155
Weight without the Liner (kg)	1.20*	1.10	1.20*	1.09

**at a 1.6 mm shell thickness*

Concerning the matter of camouflage, it was established that the new helmet models were well-suited to concealment because of their molehill shape. The newly-developed shapes of these helmets makes a mottled camouflage cover superfluous. The unfavorable shadow which highlights the face of the wearer (of the M35 helmet) and makes it a clear target is diminished in the Models B and B/II.

It has been comprehensively shown that the troop testing of the Model B and B/II prototypes was very successful. The Thale helmet was not tested at the Döbertiz Infantry School because it was so similar to the B helmet that it was thought to be unnecessary.

It is therefore necessary to test the three new helmet patterns with branches of the service other than the infantry. It should be done on a larger scale, as well. The new Liner System 44 is to be tested in conjunction with the helmets. Tests are to be carried out initially by the "Grossdeutschland" replacement brigade and completed by a cavalry regiment.

b) Ballistic Testing

The first ballistic tests were carried out upon a section of sheet metal held at the same angle of incidence as that of the Models B and B/II. These tests were carried out by the Reich's Chemical and Technical Institute. These test firings indicated that if the new helmets were hit by sintered iron bullets (9 mm Parabellum) with an impact momentum of between 19 and 21 kilogram meters, the shell wall would not be penetrated. However, a Model 35 helmet hit on its steep side by the same bullet with a momentum of only 10 to 12 kg·m would be penetrated. This means that the B and B/II prototypes exhibit a 60% greater ballistic resistance when compared with the current helmet of the identical shell thickness. The institute calculates that if the Model B's shell thickness were increased to 1.6 mm, its ballistic resistance would be raised by over 100% in comparison with the current helmet. The results of testing the Thale helmet are not quite as favorable as the B or B/II helmets, doubtless due to its somewhat steeper angle of incidence.

c) The Position of the Medical Inspectorate

Two medical questions were to be clarified:

1. Is the soldier's head sufficiently protected by the shape of the new helmet or does the skull require further protection?

On this point, the inspectorate made the following statement: 'The area which is protected by the B prototype encompasses the entire cranium with the exception of the lower neck region. In the Model B/II, the increased protection of the neck appears to be of little importance. On the other hand, the protection offered opposite the ears of the wearer is highly desirable. The removal of the temple and neck protection is only justifiable if the shell thickness can be increased to 1.6 mm in order to improve ballistic resistance and if the smaller helmet is shown to be less of an encumbrance to the soldier. From a strictly military viewpoint, the decision as to which helmet, B or B/II, should be chosen cannot be made by this office.'

2. In spite of the fact that the helmet may be able to withstand penetration by projectiles with high momentum, will the sheer impact cause concussions, skull fractures or spinal column damage?

The Sanitation, Experimentation and Training Section of the Luftwaffe, under the direction of the staff surgeon, Dr. J. Schneider, investigated the fracture-resistance of the human skull (while protected by a steel helmet) through experimentation on cadaver heads. It was demonstrated that the Model B with 1.6 mm walls could not produce secondary injuries after impact. Furthermore, they stated that the resistance to bone-shearing of the human skull was, in any case, quite high. For these reasons, skull fractures and spinal column injuries were not to be expected. Objections to the proposed helmets on the basis of too great a ballistic integrity are completely groundless.

IV. Production Prerequisites

While the M35 helmet requires at least four stamping steps even with the latest technology, the proposed helmets because of their simplified shape will require only three stamping steps. Therefore, one stamping unit in a plant will be unnecessary. The intermediate heat-treatments between the first two forming and between the second and third (trimming) steps should probably not be abandoned.

Because of the sloping configuration of the new helmets, several different head sizes can be accommodated by a single helmet. This also will generate a lesser number of fabricating steps.

The saving in labor time can be expressed in these terms: With a monthly production of 500,000 helmets, 23,500 man-hours can be saved.

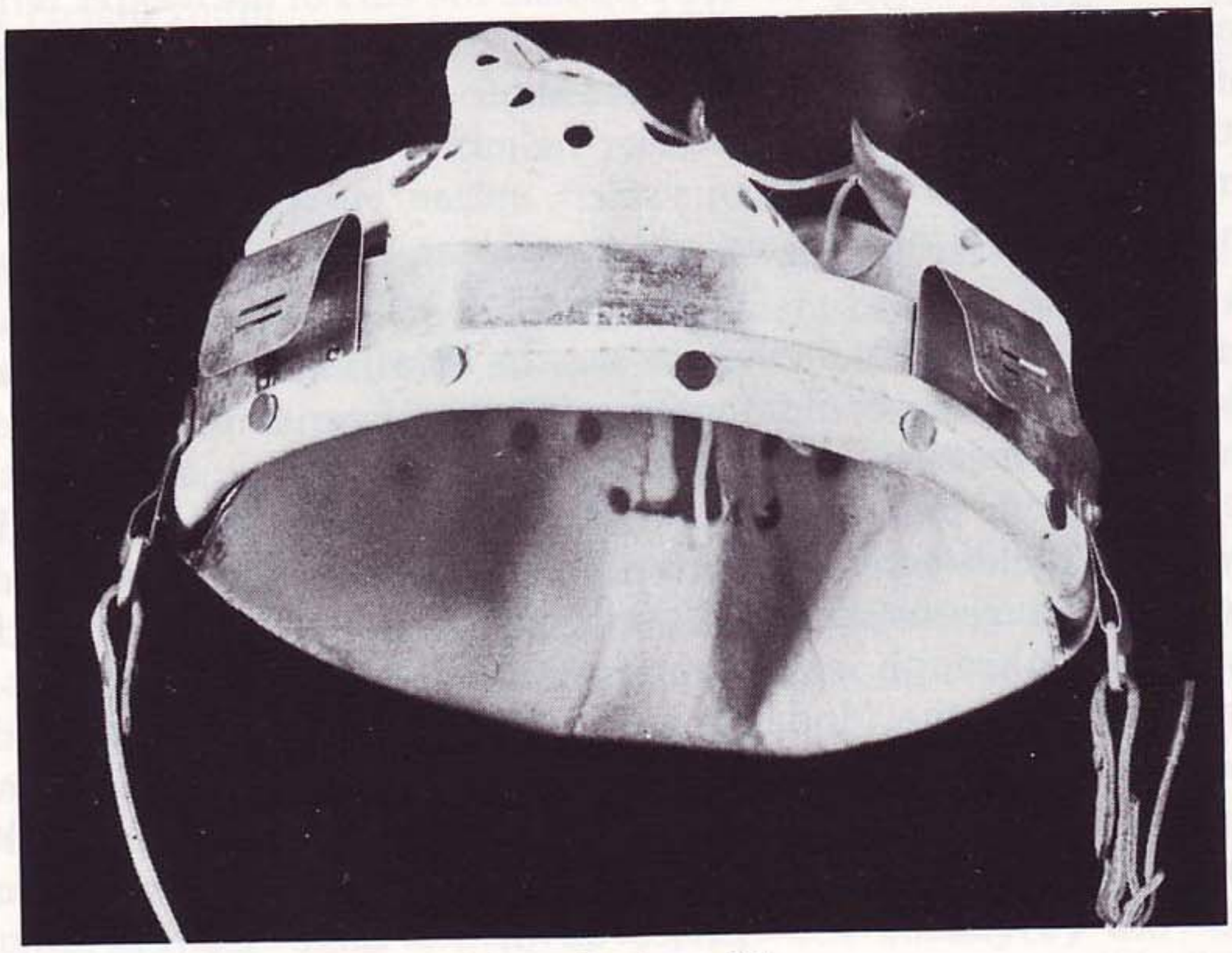
The conversion of production from the old Model 35 helmet to the new one (which is to be called the Model 45) can be carried out by retooling the replacement stamping and cutting presses which will take the place of their worn-out predecessors. A halt to production does not therefore need to take place in order to retool for the new helmet.

V. Liner System

The question of whether a new liner system should be implemented is of secondary importance compared to whether a new helmet should be introduced.

The new Model 44 liner which was being developed for the Model 35 helmet performed very well in the field tests. This liner will also fit inside the Model B, B/II and Thale helmets. In order to determine whether this liner is sturdy enough to endure impact upon any of the new helmets, tests on helmeted cadaver heads must be carried out. If these tests do not produce favorable results, then the liner must be reinforced.

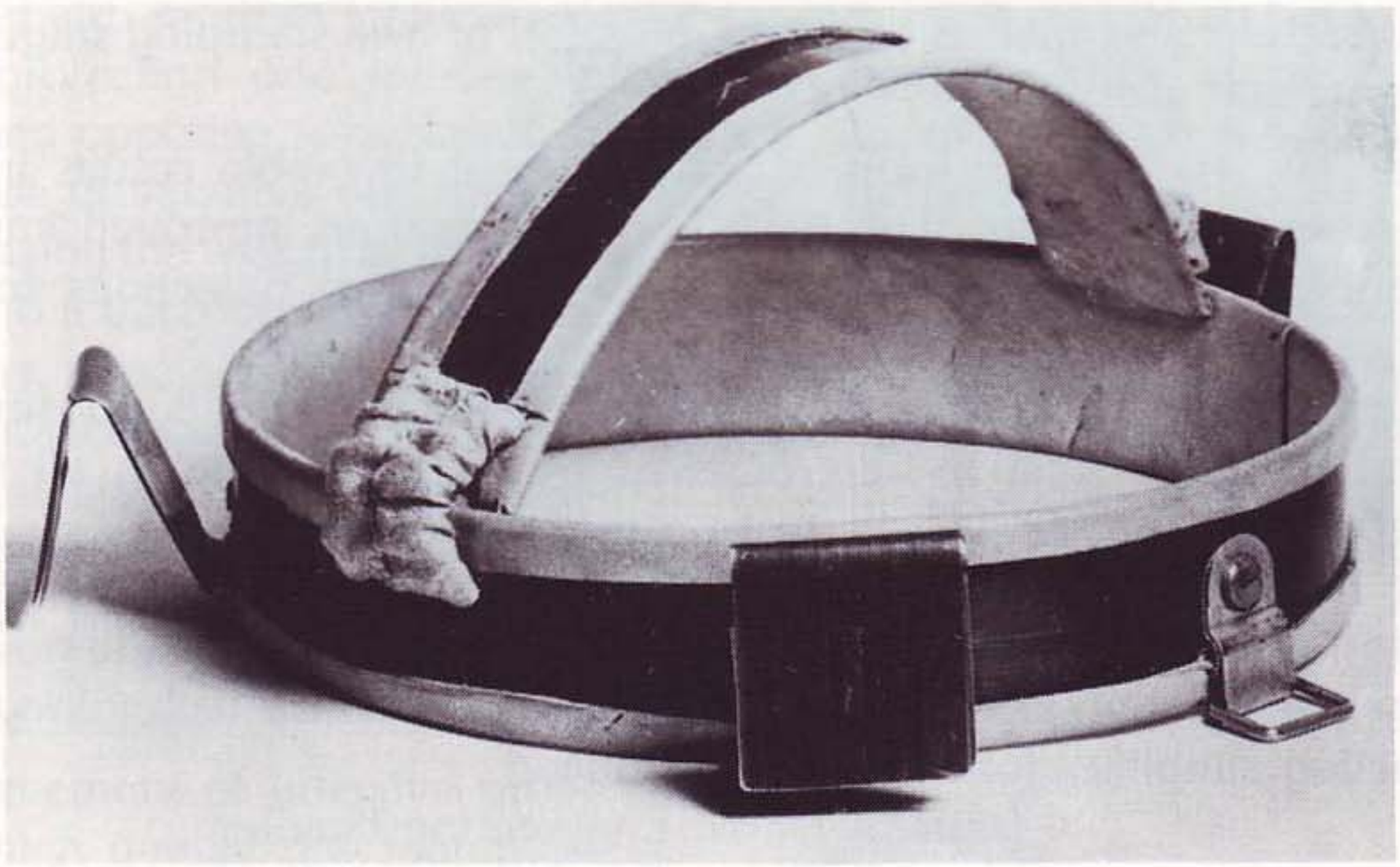
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Liner System 44.

Further, Dr. Hänsel proposed another liner which is easily recognizable because of its spring strap which lies sagittally on top of the head. This liner must also be tested on cadaver heads to find out if it is sufficiently functional and strong.

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Liner System "Dr. Hänsel."

VI. Differentiation from Enemy Steel Helmets

The possibility that the new helmet might be confused with the helmets of enemy soldiers does not appear to be great, particularly since the upper portion of the current M35 helmet very nearly resembles the Russian and American helmets. The Model B and Thale helmets somewhat resemble the Czechoslovakian helmet, but because of their wider flare, confusion should not result.

The shape of the helmet for purposes of recognition is not really a major consideration since helmets are often equipped with a mottled camouflage cover which tends to hide the outline of the helmet.

VII. Summary

The three new helmet patterns, Models B an B/II from the Reich's Chemical and Technical Institute, and the "Thale" prototype, remedy the drawbacks of the current German helmet in the following areas:

1. Ballistic resistance is increased through a shallow angle of incidence and the removal of the shallow furrow at the point where the dome of the helmet meets the apron.

2. a) Ballistic resistance may be further increased by thickening the shell walls, thus making the weight of the pattern B or "Thale" helmet the same as the M35 helmet, or

b) the other alternative is to retain the previous 1.2 mm shell thickness and in doing so to decrease the weight of the helmet and the quantity of materials needed to produce it.

3. The new helmets allow the greatest freedom of movement of the head, permitting the operation of all weapons and equipment, even optics.

4. Vision is improved by the deletion of the visor.
5. The wearer's hearing is improved. The distracting rushing sound is eliminated by the removal of the acoustically unfavorable side and neck apron.
6. Production is simplified by the elimination of one stamping stage and of two helmet sizes.

The new steel helmet form has shown most favorable results in the small-scale troop testing. The ballistic tests reveal an improved impact-resistance. The Medical Inspectorate has posed no objections to the new helmet.

Which of the three models, B, B/II or "Thale," is to be finally chosen will depend upon the final results of a large-scale field trial on all three helmets and a further ballistic test on the "Thale" prototype.

The marked shortcomings of the M35 helmet in comparison to the superiority of the new patterns demand that a decision be made now if a new helmet which takes advantage of our new weapons technology and production simplification is to be introduced.

(signed) Dr. of Engineering Haidlen
Colonel and Section Chief of Weapons
Inspection Office 2

The second document which follows was prepared by Professor Fry and Dr. Hänsel under the auspices of the Reich's Institute for Defense Technology and Materials Research in Berlin. This report offers a rationale for the introduction of a new helmet and also states the results of various tests that were carried out on the prototypes. This material was uncovered only several years ago and it, too, provides some excellent information about an area of interest to military historians and collectors alike.

Institute for Defense Technology
and Materials Research

Steel Helmet Memorandum
Outline No. 1
Berlin, 23 August 1944

DEVELOPMENT OF NEW STEEL HELMETS

Since the introduction of the steel helmet in the First World War, the developmental work on its design has never come to a standstill. It is particularly noteworthy that various new helmet prototypes have been proposed since the introduction of the current German helmet, particularly since both the USA and Britain have also chosen to introduce new helmets in the middle of the war. This situation brings us to a re-evaluation of the sufficiency of our current German helmet in terms of the demands of modern warfare. According to the previous report* (*probably a report from A. Fry and H. Hänsel entitled "Research on Steel Helmets," dated 20 July 1942), the German helmet was inferior in several respects to various foreign helmet models.

The requirements for the efficient service of a helmet may be expressed in the following short formula, "The maximum protection with the minimum inconvenience to the fighter."

By its very nature, the same helmet that provides protection for the soldier also more or less inconveniences him by its weight and size. Effective protection and minimal hindrance are properties which in part demand opposing construction parameters. Effective protection necessitates the use of valuable raw materials and an increased shell thickness, thus increasing the weight of the helmet. Minimal hindrance, however, revolves around a decreased weight. The average soldier can only be expected to endure a weight of 1.5 kg and this weight has indeed been set as the upper acceptable limit. The helmet's materials must be able to provide a defense against both direct and indirect shots. However, the helmet must also be able to provide some limited protection against the effects of heavier weapons.

The several restrictions on protective and hindrance criteria are:

Achievement of effective protection through:

1. high quality raw materials
2. maximum possible shell thickness
3. favorable shape which offers a small angle of incidence to a bullet
4. very small concussive force on the skull after the impact of a bullet or shrapnel fragment
5. sufficient space between the head and the inside of the shell wall so that dents caused by impact do not injure the head
6. suitable shape for effective camouflage.

Achievement of minimal encumbrance through:

7. the observance of low weight limits
8. unhindered vision
9. ease of hearing (particularly directional hearing), the avoidance of rushing sounds in windy weather caused by the shape of the helmet, and the diminishing of resonance from explosions
10. total freedom of movement in all positions during the use of weapons and equipment
11. presentation of the smallest possible target surface so that bullets and fragments miss the helmet entirely.
12. efficient ventilation.

Throughout all of these requirements, easy fabriction and aesthetically pleasing shape are important.

An equalization between the greatest protection and the least encumbrance can only be achieved by suitable raw materials and effective exterior design. The major difficulty, however, seems to be in the area of the shape-stamping process rather than that of the raw materials.

The ultimate material for use in the helmet is a steel of great durability and strength. Research with aluminum alloys and synthetic fibres by the metallurgical group of the Institute for Military Technology and

Materials has shown that up to this point there is no material superior to steel. At present, the only feasible material for helmets is a silicon-manganese steel alloy like that currently used in our helmets and those of several other foreign countries. A small addition of titanium or zirconium would increase the ease of deep-stamping the helmet shell. A further improvement could be achieved by the use of a suitable warm-bath tempering process. This would moderate the ballistic resistance of the helmet by allowing slight deformation of the helmet's walls after impact. If an equally strong but more brittle steel were employed, it would be prone to fracturing. This fracturing might send small, secondary fragments into the skull of the wearer, whereas slight inward deformation might only cause a concussion.

The possibility that a more protective helmet can be manufactured by utilizing the improved qualities of raw materials is at the moment exhausted if no new knowledge about the relationship between the metal's crystal structure and its ballistic properties is attained. Further protection for the soldier is only achievable through a more effective design of the helmet. Our major premise in this development is: Improvement of the helmet's ballistic integrity through the implementation of a shallow angle of incidence.

It is known that resistance to penetration can be increased by a diminuition of the angle of incidence. This angle is of course very much dependent upon the trajectory of the projectile, although the majority will travel horizontally (for example, direct shots and explosives that burst close to the ground). The soldier normally keeps the axis of his head perpendicular to the ground (standing, sitting, kneeling, or lying prone) so that he is able to observe. If he is taking cover face-down, then his head's axis is horizontal. Nevertheless, both of these frequent cases provide a parallel or perpendicular relationship to most incoming projectiles. The shape of the helmet must therefore provide the maximum deflection possible, based on the supposition of the projectile's horizontality.

In order to test the effectiveness of the current German helmet, it was compared ballistically with other modern, foreign helmets (refer to Table 1). These ballistic tests showed that the various helmet models produced roughly the same results under similar ballistic conditions.

Table 1

Bullet type	Calibre	Helmet Axis	Trajectory	Impact Force
Lead	5.6 mm	perpendicular	horizontal	17 kg·m
Steel-jacketed lead	7.63 mm	perpendicular	horizontal	50 kg·m
Sintered iron	9 mm	perpendicular	horizontal	10-20 kg·m

The results indicate that all modern helmets withstood the impact of a lead bullet with an impact energy of 17 kg·m. An example of this is the Polish helmet in figure 1, shots numbered 1 and 2. Only the German helmets displayed tearing because they were hit at the point of transition between the visor and the front of the crown (refer to figure 2, shots 8 and 9). When the

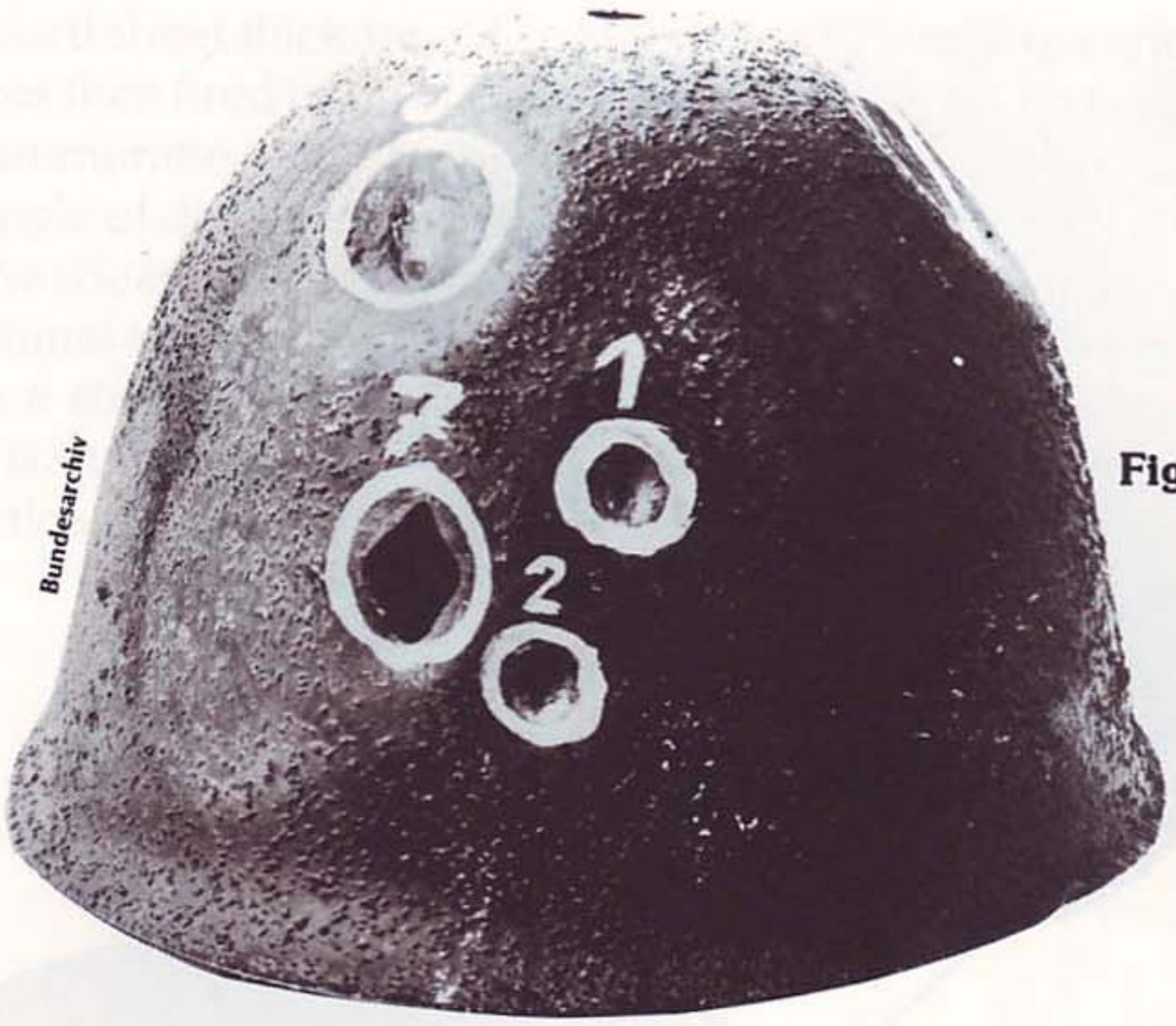


Figure 1

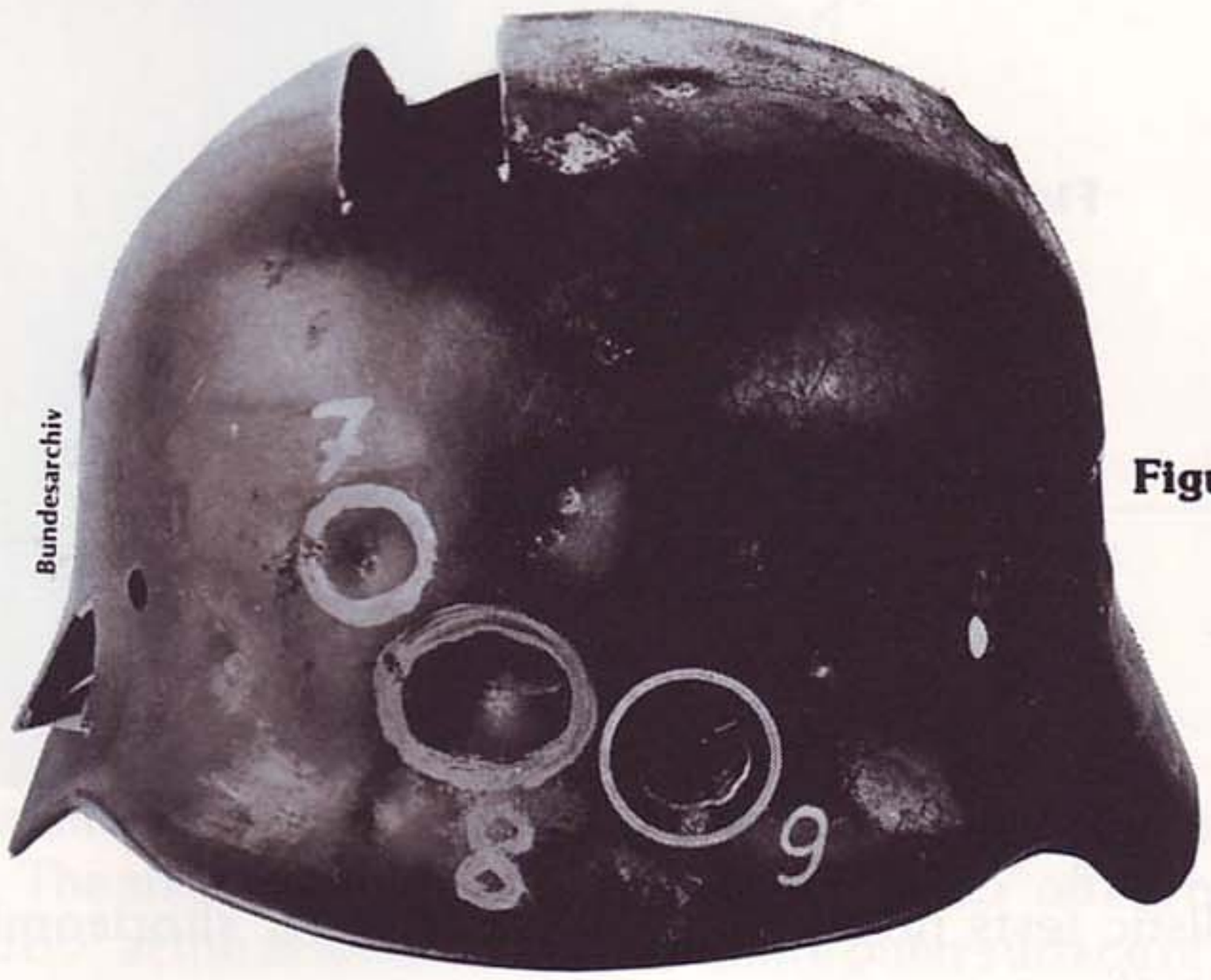


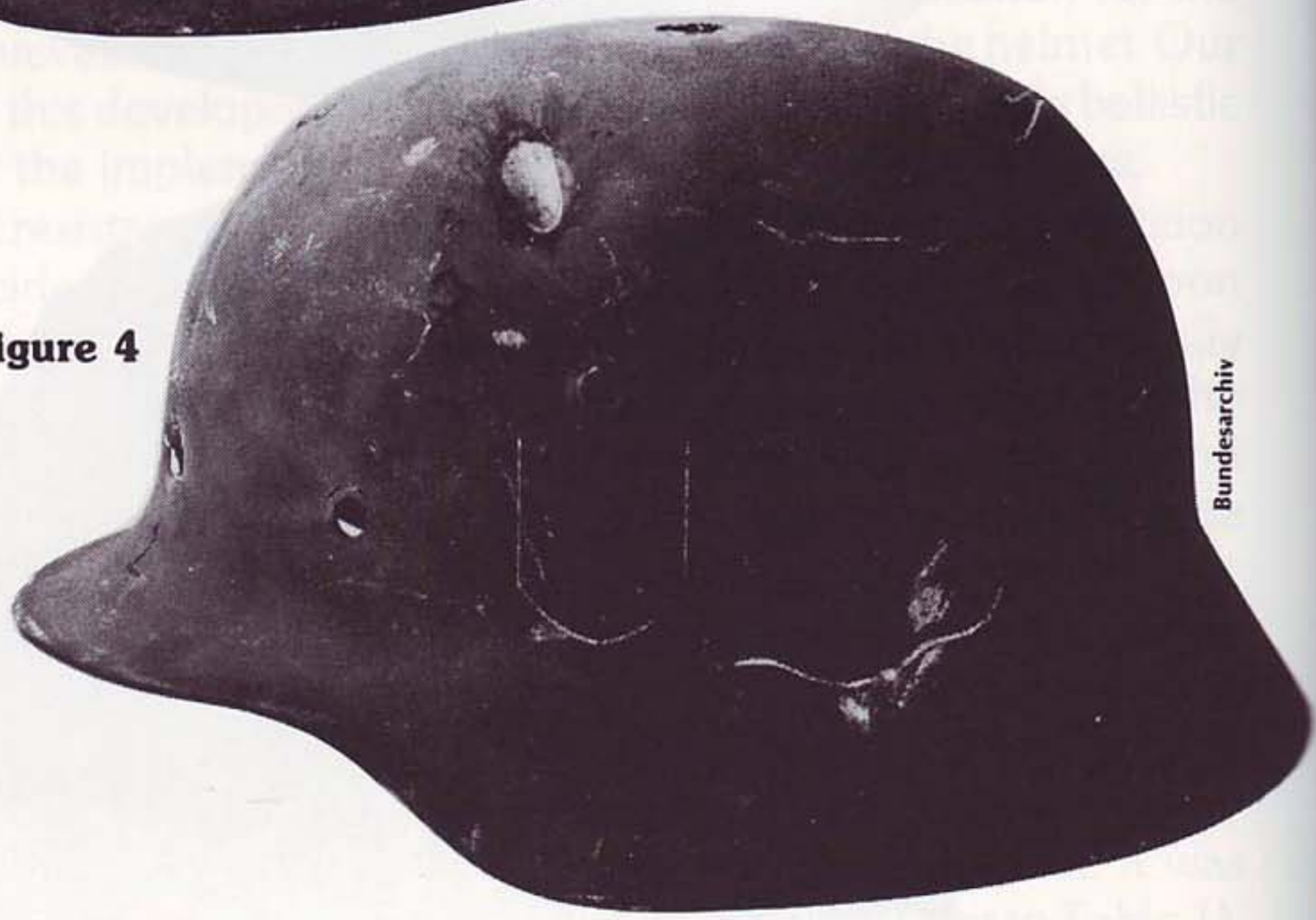
Figure 2

helmets were hit with a steel-jacketed, lead core bullet with a 50 kg·m impact energy, they were only unpenetrated if they possessed a shallow angle of inclination (see figure 1, shot 3; figure 3 and 4, shots 5 and 7). Even though most of the German helmet is steeper around the sides than the other helmets that were tested, it offered only slightly less protection. If the point of impact fell at the area of transition between the apron and crown, large holes and tears were prone to form (see examples in figures 3 and 4, shot 6). Similar results were obtained with sintered iron bullets. From these findings, it is quite clear that the concave curvatures on the outer surface of the German helmet are the major weak points. Such weakness at the concave zones is understandable because the steel has already been deformed there during the stamping process and thus further elasticity to the point of penetration can result when a projectile impacts in this region.



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Figure 3



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Figure 4

The ballistic tests pointed out two very clear shortcomings of our current helmet:

1. Insufficient deflection is caused by the too-steep front, side and rear walls of the helmet's crown.
2. Unfavorable properties exist at the concave transitional areas between the crown and the visor and apron.

Both of these factors severely impair the helmet's ability to protect the wearer. A new helmet must be patterned in such a way that it provides the maximum of deflection and has only smooth, convex outer surfaces. Since a helmet with too shallow an angle of incidence would extend quite far outward and thus inconvenience the wearer, the possibility for maximum protection is somewhat limited. Research must determine the optimal degree of steepness of the sides, the shell thickness and the type of material to be used if ballistic integrity is to be maximized. Figure 5 shows such a ballistic curve. The manganese-silicon steel alloy (of the type currently used)

in the standard sheet thickness of 1.3 mm was tempered to various strength values. It was then fired upon at various angles with 7.63 mm steel-jacketed, lead core ammunition with an impact energy of 50 kg·m. In each case, the resulting angle of deflection was also measured, even if the bullet managed to pierce the sheet. Figure 5 shows these relationships. The graph indicates that the optimal angle of incidence lies between 50° and 70°. The steel sheet must have a strength of between 150 and 180 kg/mm². This degree of toughness is a simple matter to achieve. Any values outside these two ranges are impractical in terms of size and/or ballistic resistance.

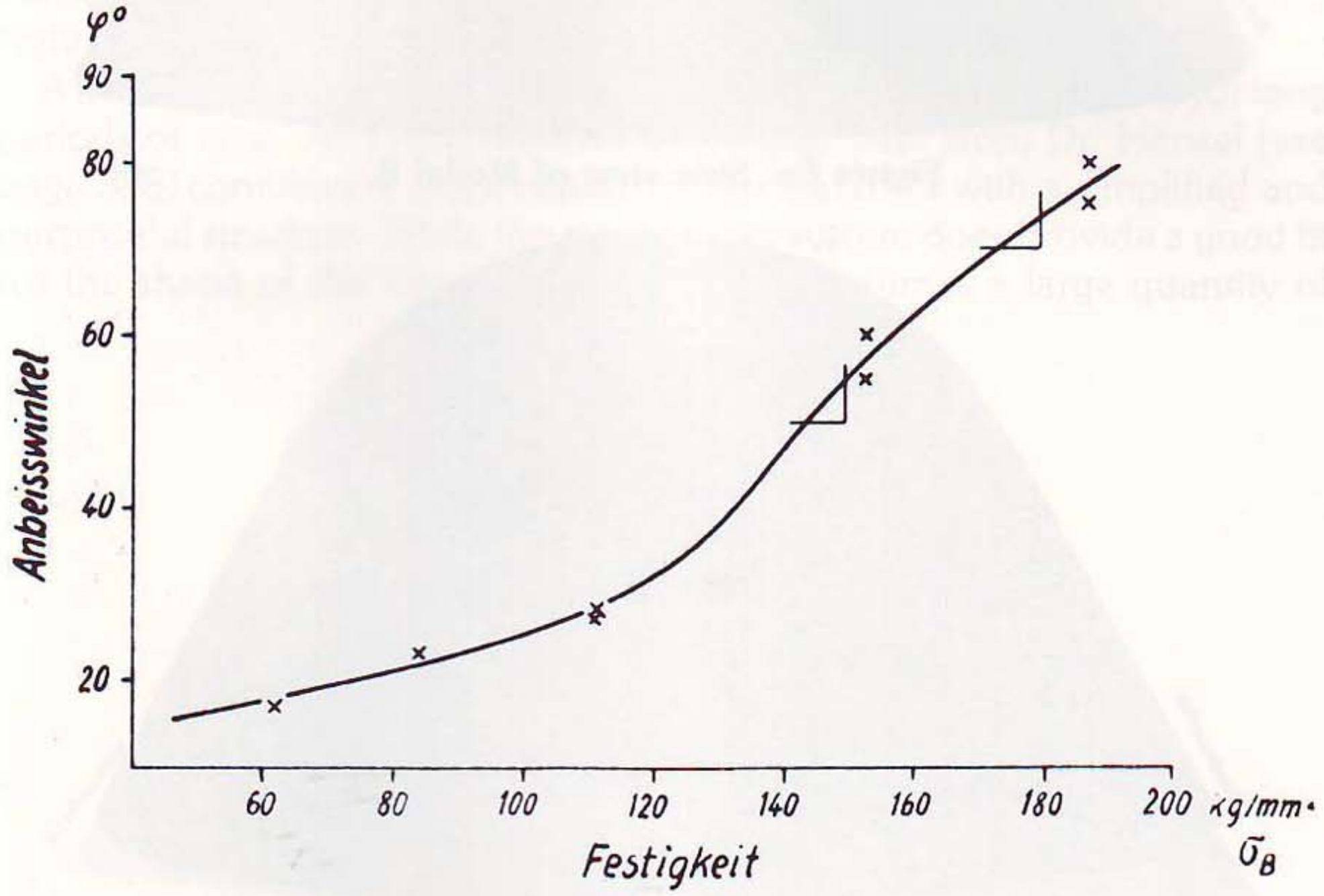


Figure 5

With all this information in mind, the new Model B prototype was developed (see figure 6). The angles of inclination of this helmet are 55° off the horizontal in the front and 60° at the sides and rear. The entire outer surface of the helmet is convex. The sloping nature of the sides, front and rear which terminates in the domed vertex of the helmet is superior to the current M35 helmet. A shot fired horizontally which hits any part of the crown impacts with a very small angle of incidence. The smooth, compact configuration of the helmet presents a minimal target and poses only the smallest encumbrance to the soldier while operating both weapons and equipment. The helmet is also easy to camouflage. The objection that this new helmet may be easily confused with enemy helmets (for instance, the British helmet) must be rejected since this could only occur as a result of either poor visual recognition or because of great distance. In such cases, there is no guarantee that a Model 35 helmet could be distinguished from Russian or American helmets. The new Model B prototype has a weight of approximately 900 to 920 grams, as opposed to the 1130 grams of the Model 35 helmet of the same head size. If the helmet weights were made equal, the Model B's shell thickness could be

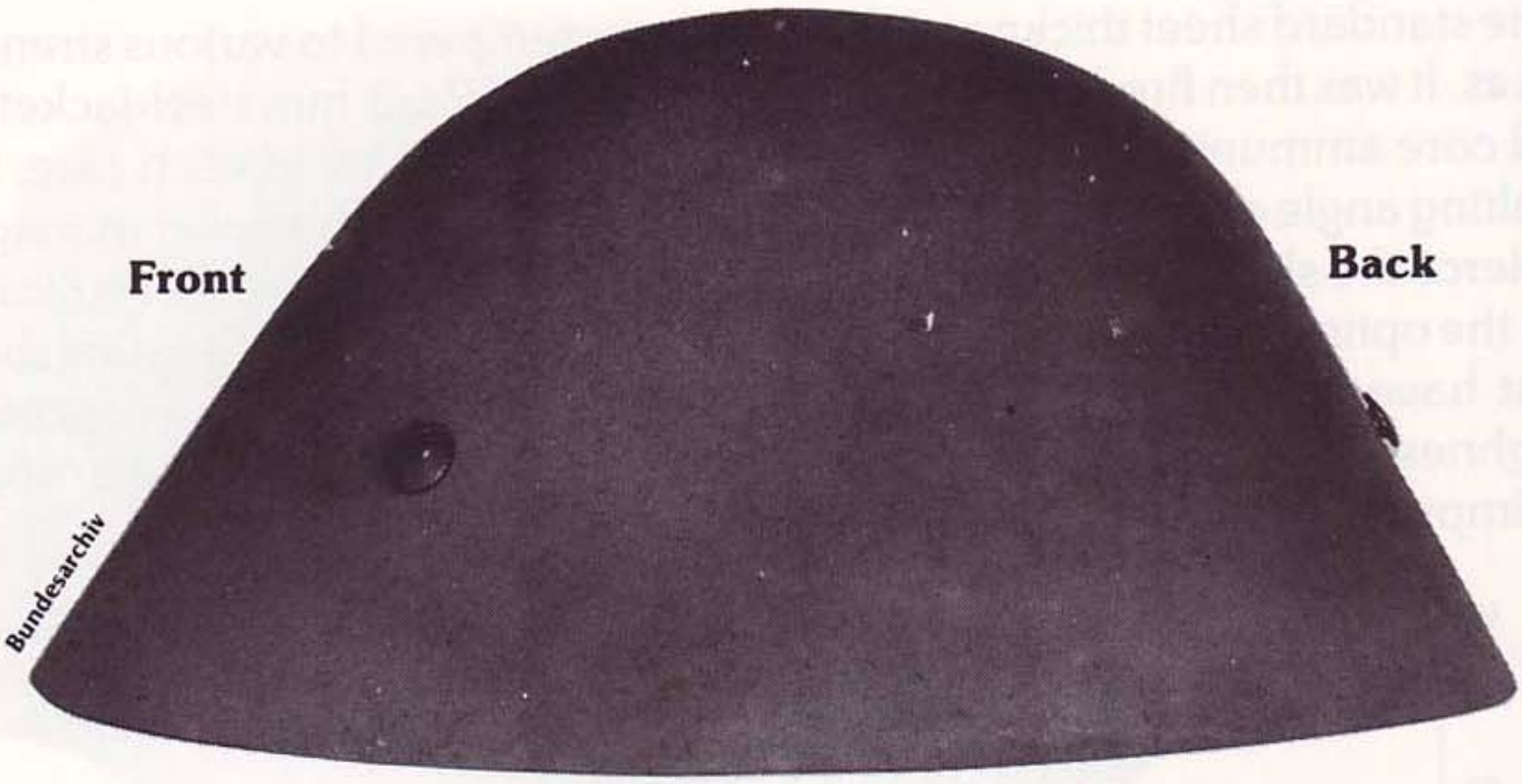


Figure 6a: Side view of Model B.

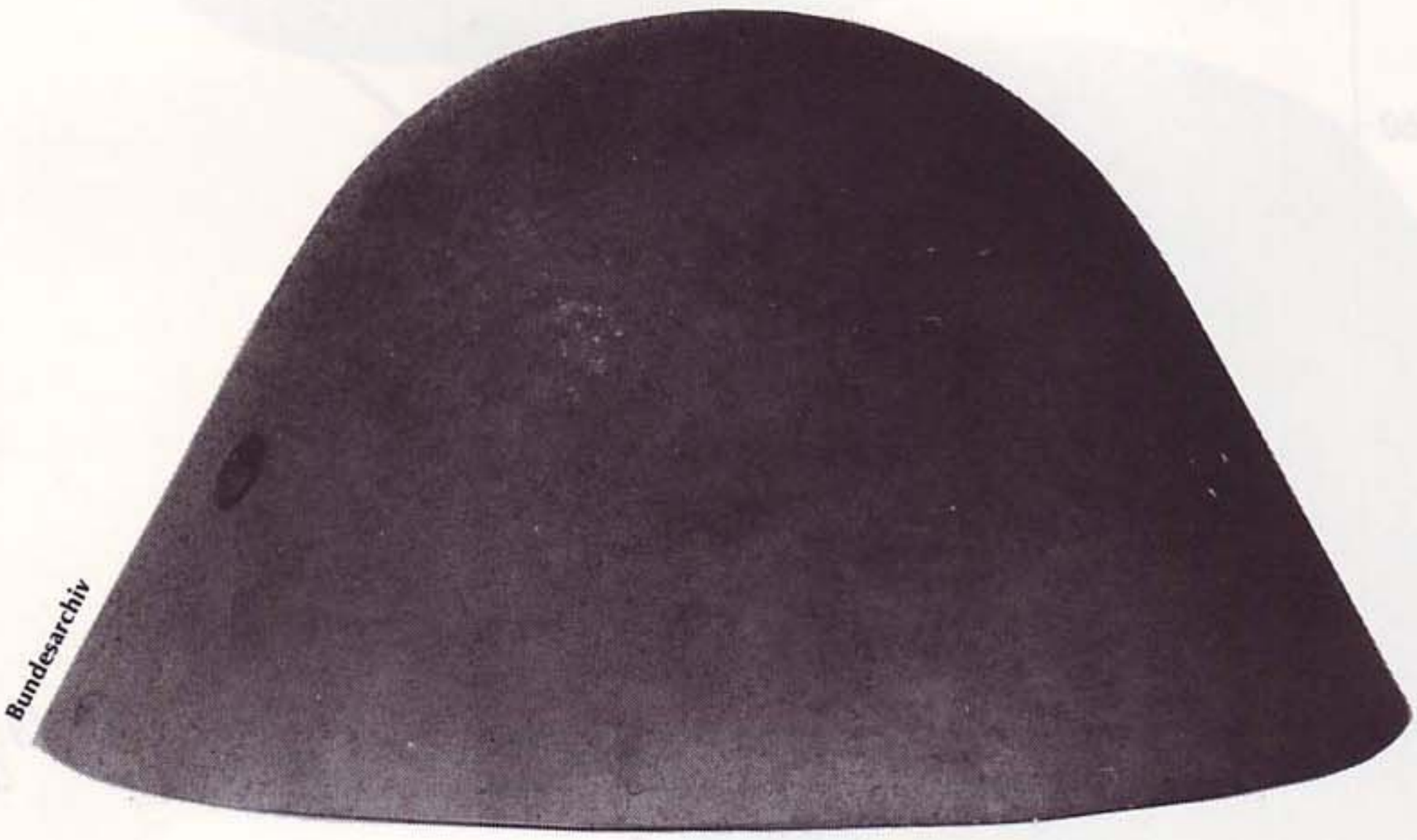


Figure 6b: Front view of Model B.

increased to 1.6 mm, instead of the 1.2 to 1.3 mm of the M35 helmet. The demands for an aesthetically effective helmet are satisfied through its purposeful, clean lines. The manufacture of the new helmet necessitates no greater expenditure than the Model 35. In all probability, the new helmet will save one or two manufacturing steps and one heat-treating step. The helmet will also conserve on raw materials if the 1.2 to 1.3 shell thickness is maintained. This is a possibility because the new helmet has a smaller circumference than its predecessor. Furthermore, the prototype has only three sizes: small, normal and large. The liner/system is also easier to manufacture.

The Model B helmet represents the most effective solution to all problems since the special ear and neck aprons have been removed. This eliminates encumbrances for the wearer and also puts an end to the distracting rustling sound in windy weather.

The Medical Inspectorate could not come to a decision regarding the possible advantage of side and rear aprons on the helmet, nor could it decide upon the usefulness of a thicker shell wall. In order to provide a

further option, another prototype called B/II was developed (see figure 7). It is notably different from the Model B in that it has a downwardly-extending apron on the sides and rear. This apron retains the same angle of inclination as the upper portion of the helmet. The B/II has a shell thickness between 1.3 and 1.4 mm, thus giving it the same weight as the M35 helmet. The demand for an expanded neck apron led to the development of a further prototype, the Model C (see figure 8). In this helmet, the angle of incidence was increased, although still within permissible limits. Too great a width at the sides was avoided as was too much extension at the front and rear. Since Models B and B/II showed less inconvenience for the wearer in later field testing, Model C was withdrawn from further consideration.

A liner was required which could be worn comfortably in combat for long periods of time. An independently-developed liner from Dr. Hänsel (see page 388) combines a conservation of raw materials with a simplified and purposeful structure. While the current liner system does provide a good fit for the shape of the wearer's head, it also consumes a large quantity of

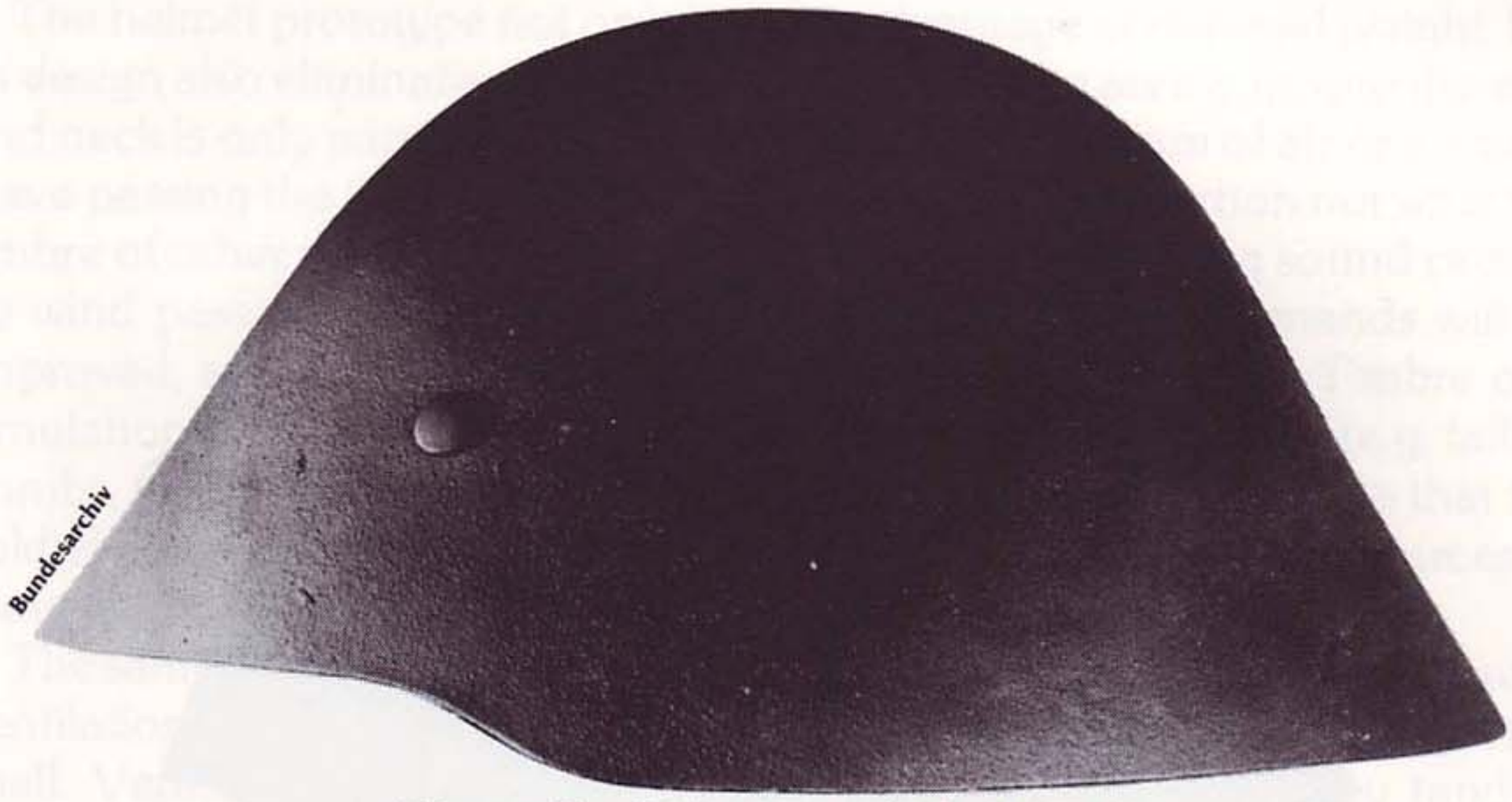

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Figure 7a: Side view of Model B/II.

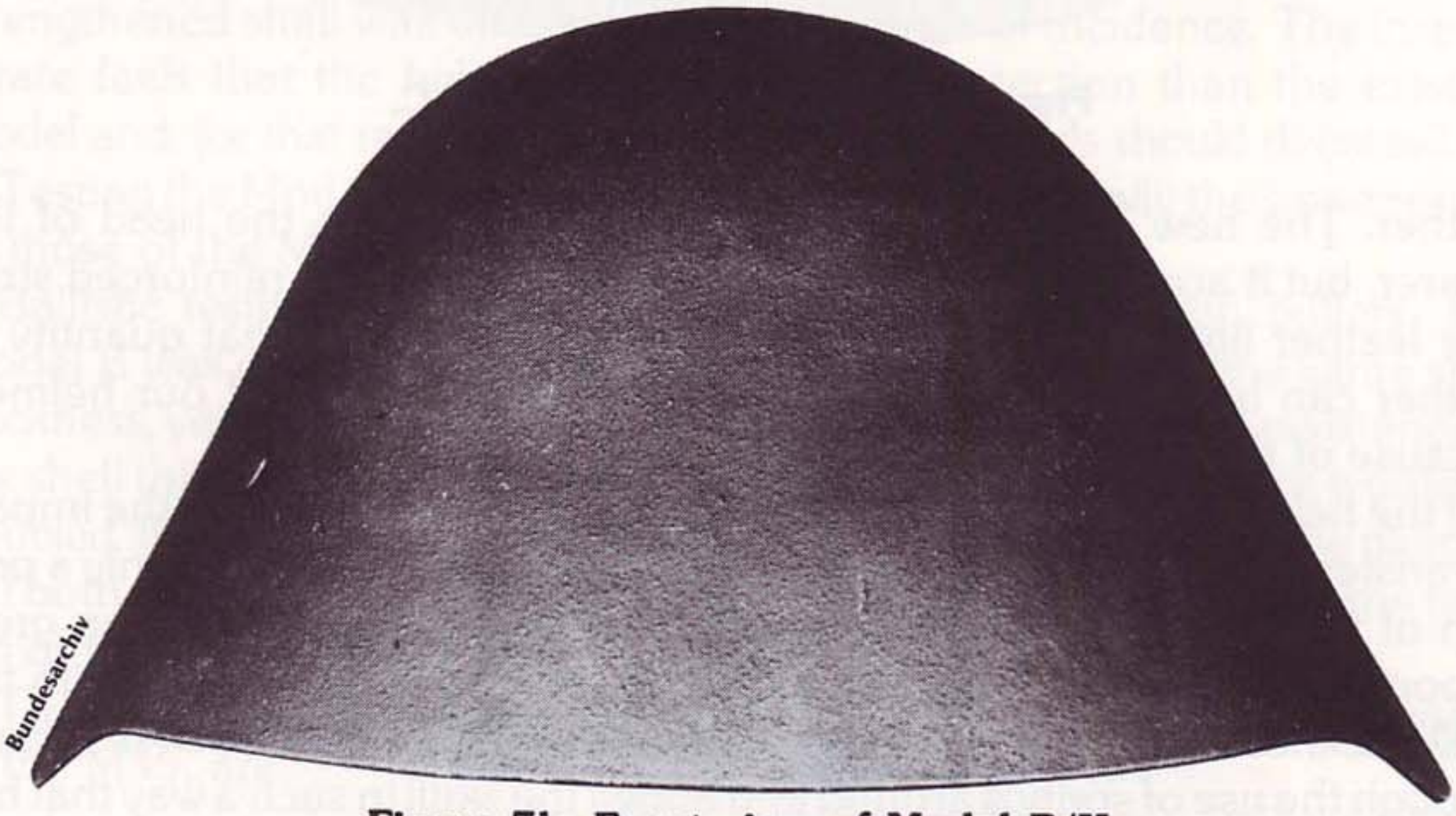

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Figure 7b: Front view of Model B/II.

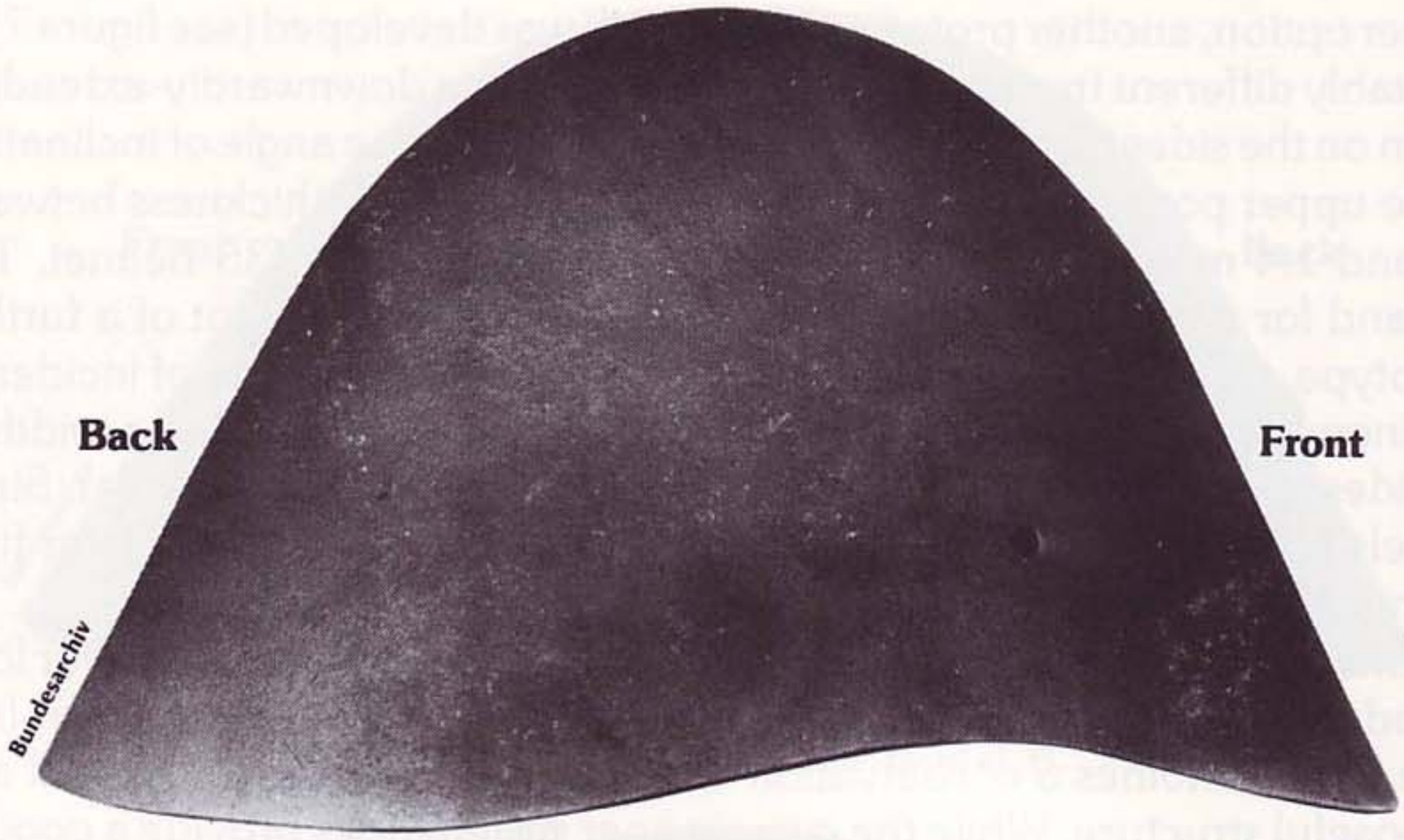


Figure 8a: Side view of Model C.

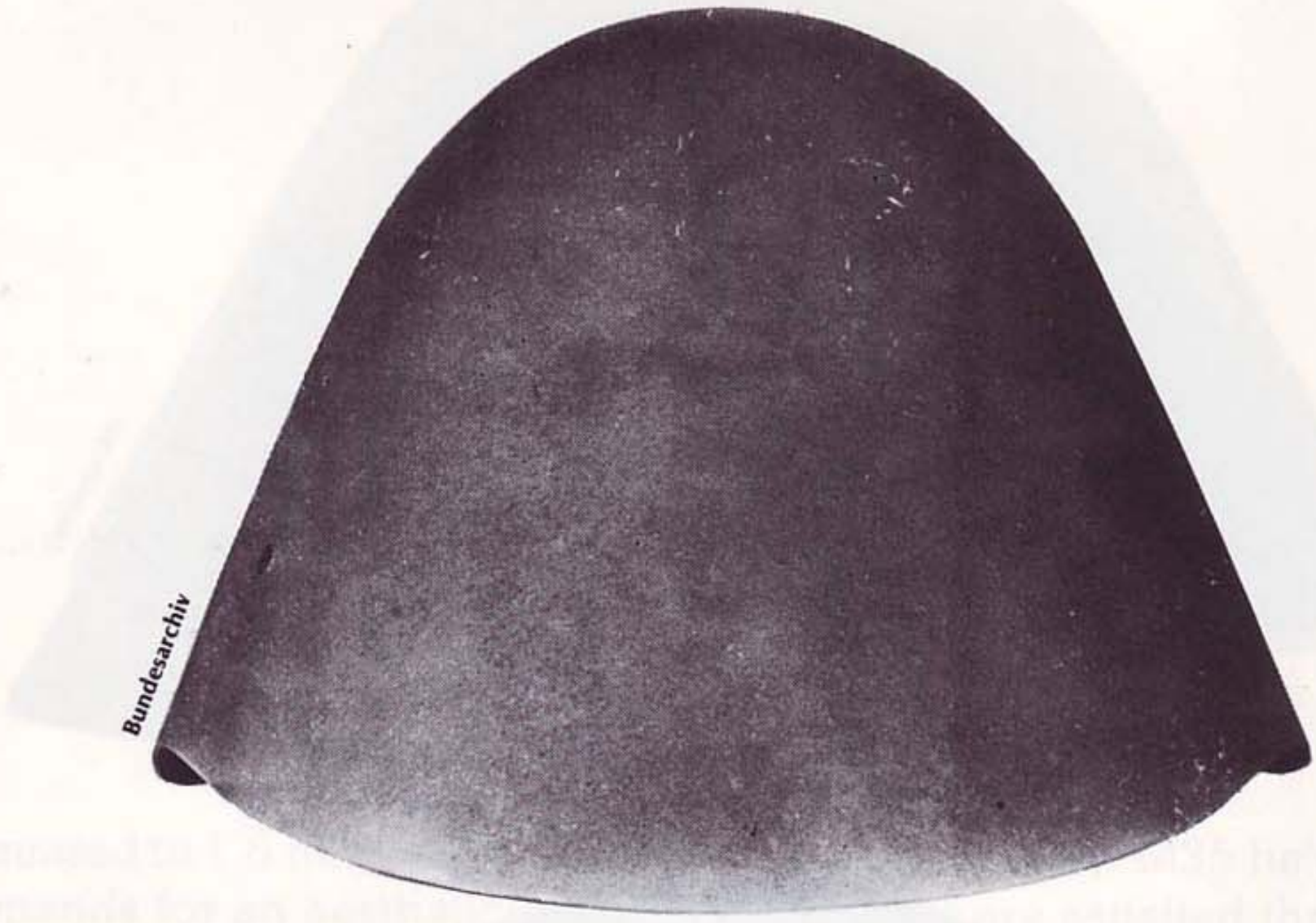


Figure 8b: Front view of Model C.

leather. The new liner prototype also conforms well to the head of the wearer, but it accomplishes this through the use of a steel-reinforced strip. The leather lining has been dispensed with and thus a great quantity of leather can be conserved. This new liner will fit into any of our helmets because of the steel attachment clips.

If the helmet is hit by a projectile that does not pierce the shell, the impact is transferred to the skull of the wearer. Sloping shots will impart only a portion of the shock to the head. The amount of this impact takes on great importance because the ballistic integrity of the helmet increases with the shell thickness. The new liner system provides an improved shock-resistance through the use of springs around and above the skull in such a way that hits from any direction are dampened, thus minimizing possible head wounds.

The notable characteristics of the new liner system are:

1. conservation of raw matrials, particularly leather
2. self-adjustment to the shape of the wearer's skull
3. shock-dampening after impact by bullets, fragments, etc.

The testing of the Model B helmet at the Döberitz Infantry School showed totally satisfactory results. It was shown that soldiers wearing this helmet could operate the following equipment without difficulty: mortars, antitank guns, small arms both with and without telescopic sights, stereoscopic telescopes, rangefinders, other targeting and ranging devices, field telephones and radios. If the soldier assumes a prone position, the rear of the helmet does not contact the nape of the neck and therefore cannot be pushed over the wearer's eyes, as is the case with the M35. The rear of the helmet encloses the nape of the neck and provides excellent protection without hampering hearing. The arrangement of the front of the helmet acts and appears somewhat like a visor. It protects the front of the head well, due to its smooth angularity although it does slightly impair vision upward.

The helmet prototype not only has the advantage of reduced weight, but its design also eliminates sound distortion. Since the area opposite the ears and neck is only partially covered by the helmet, a stream of air or a sound wave passing the helmet cannot form an additional distortion nor alter the timbre of other rumbling sounds, as for example the rustling sound caused by wind passing the M35 helmet. The intelligibility of commands will be improved, as will the ability to sense the direction of sounds. Timbre or a simulation of rustling noises of which the soldier must be aware (e.g. falling bombs, flying bullets, aircraft, etc.) do not occur in the Model B so that the soldier's hearing is not misled and thus he can avoid possible sources of danger.

The sanitary requirements of the Army Medical Inspectorate for adequate ventilation are met by the Model B because of the shape of the interior of the shell. Ventilation holes are unnecessary and, in any case, they tend to weaken the helmet. The crucial portions of the skull are protected by the strengthened shell wall and by the shallow angle of incidence. The inspectorate feels that the helmet provides better protection than the existing model and, for that reason, the number of head wounds should decrease.

Testing the Model B/II in field trials produced essentially the same results as those of the Model B.

Ballistic testing was carried out with 9 mm sintered iron bullets. The Model B was compared to the Model 35; both helmets had the same shell thickness, yet the Model B demonstrated a 60% higher ballistic resistance. If the shell thickness were to be increased to 1.6 mm, the resistance would be doubled. If steel-jacketed, lead bullets are fired, the M35 helmet will be pierced, but both the B and B/II will exhibit only deep, inward bulging and some tearing of the metal, but no penetration (see figure 9).

The primary characteristics of both the B and B/II prototypes, as opposed to the M35, are:

1. Improved protection through:

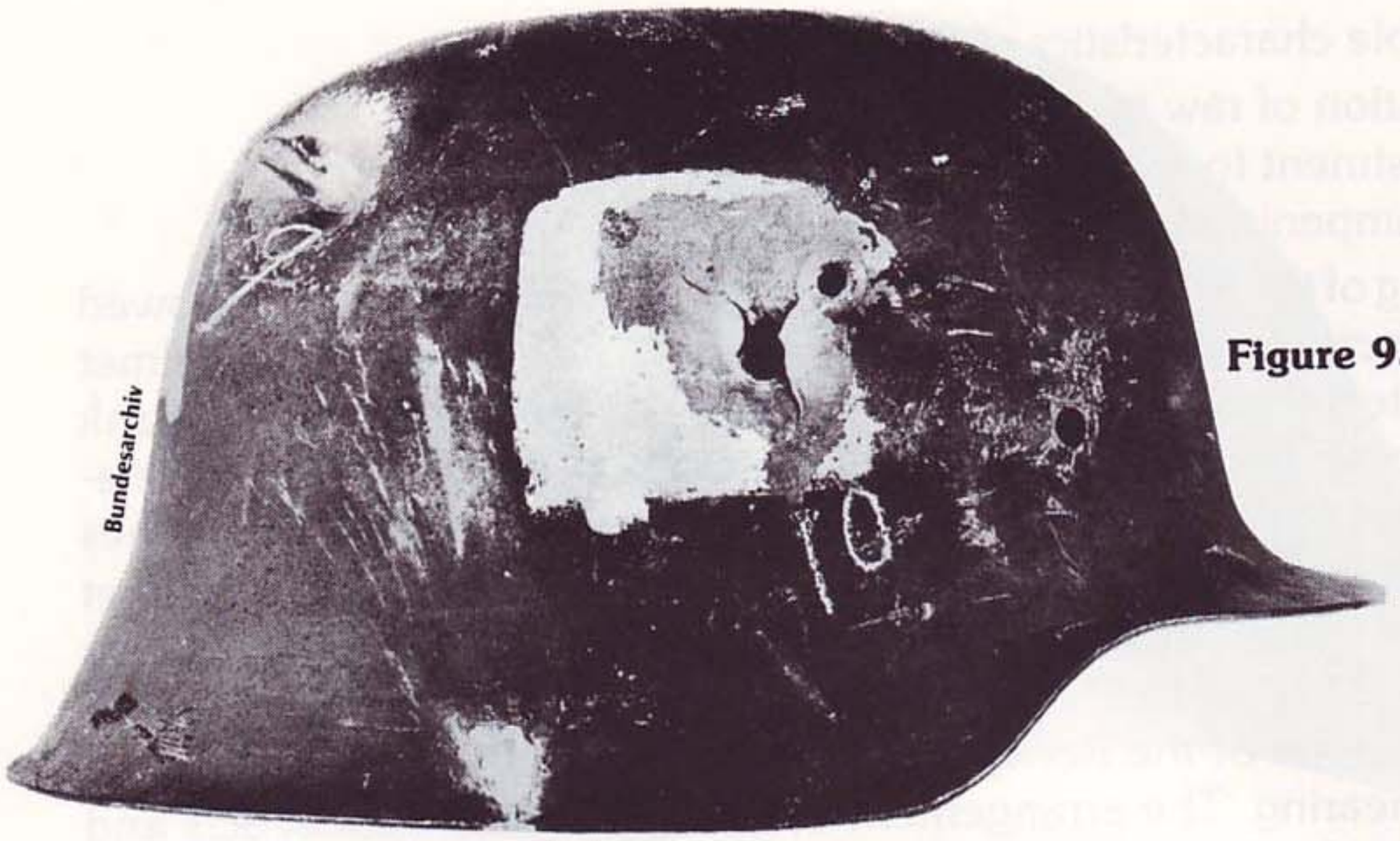


Figure 9a

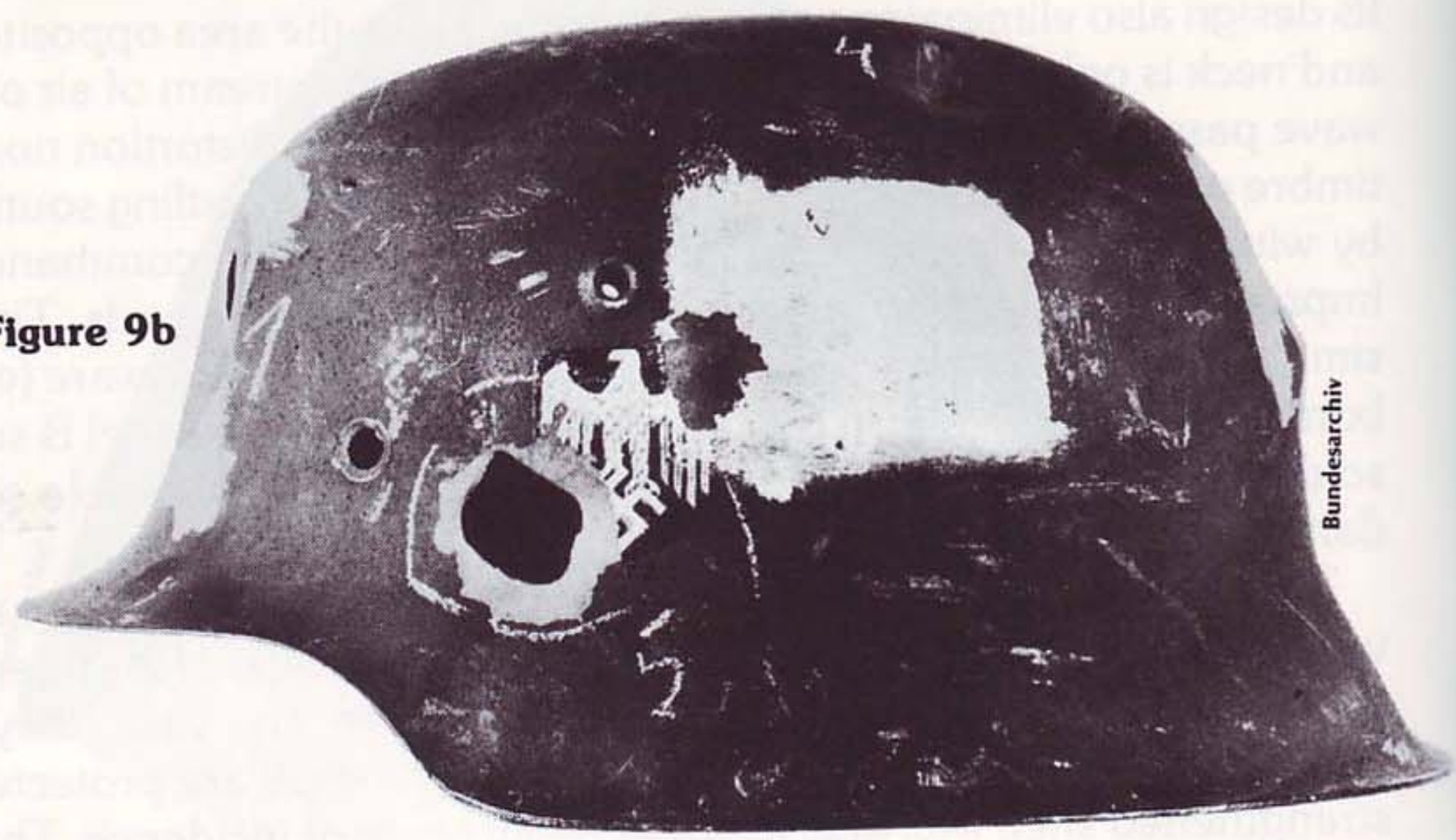
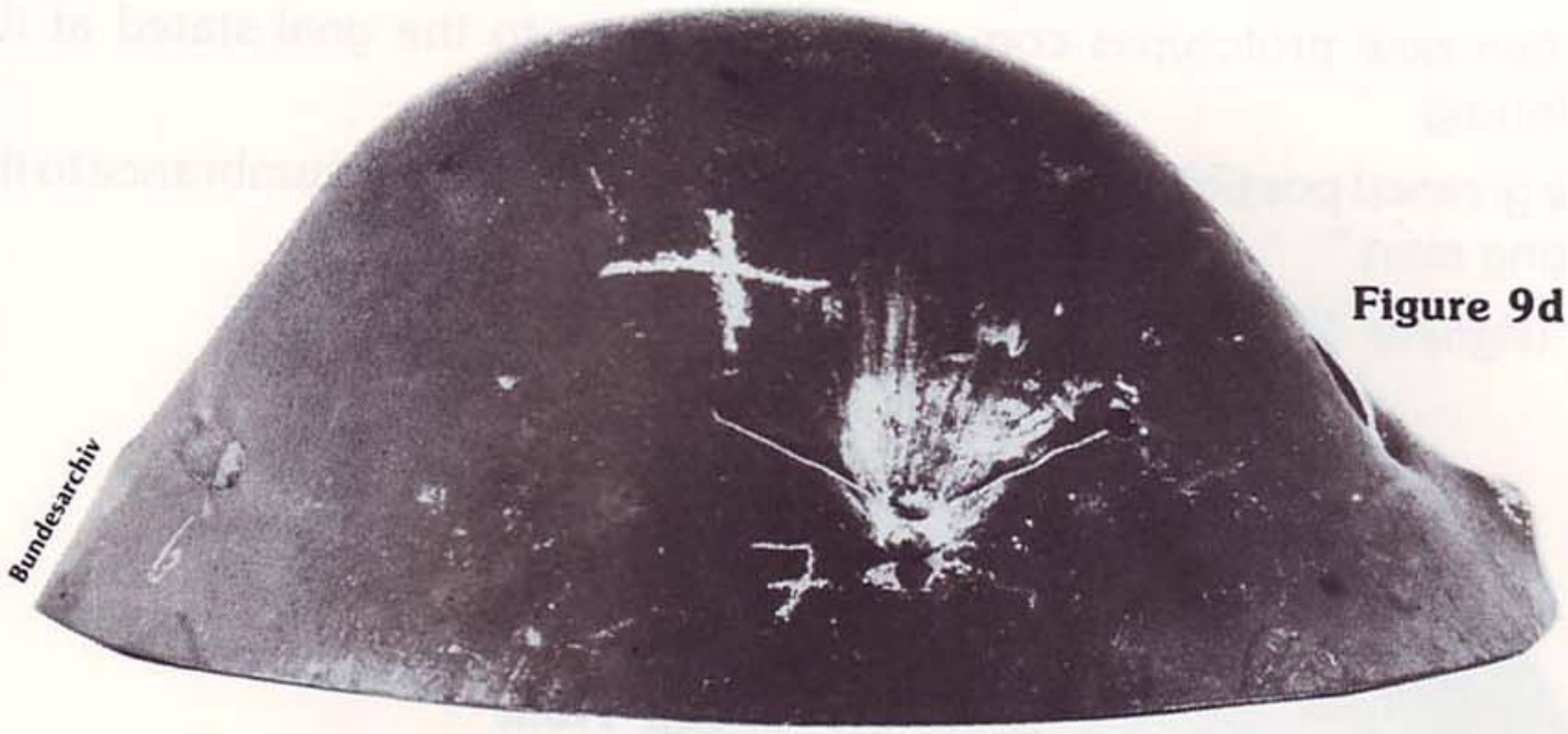


Figure 9b



Figure 9c



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Figure 9d

a) a small angle of incidence (frontal angle — 55°, side and rear angles — 60°) from all horizontal angles of fire
b) elimination of concavities on the helmet's outer surface
c) increasing the shell thickness from its present 1.2 to 1.3 mm up to 1.6 mm
d) diminishing head injuries from ricocheting bullets and shrapnel through increased deflection and by improved shock-dampening in the liner system.

2. Conscious renunciation of protection for the neck and ears. Protection of these areas entails encumbrance for the wearer, although the design of the Model B does provide even greater protection for the remaining parts of the skull and upper head.

3. Less inconvenience through:
   a) freedom around the neck
   b) better vision, even angularly upward
   c) facilitated use of weapons, optical and similar devices through improved visor structure
   d) elimination of sound distortion by improved helmet design, improved directional hearing, and easier use of communication equipment through the functional design of the side walls.
   e) easy camouflaging ability
   f) reduction of overall weight by 20% (200 to 250 grams) with a continuation of the same wall thickness
   g) effective ventilation without the use of special devices.

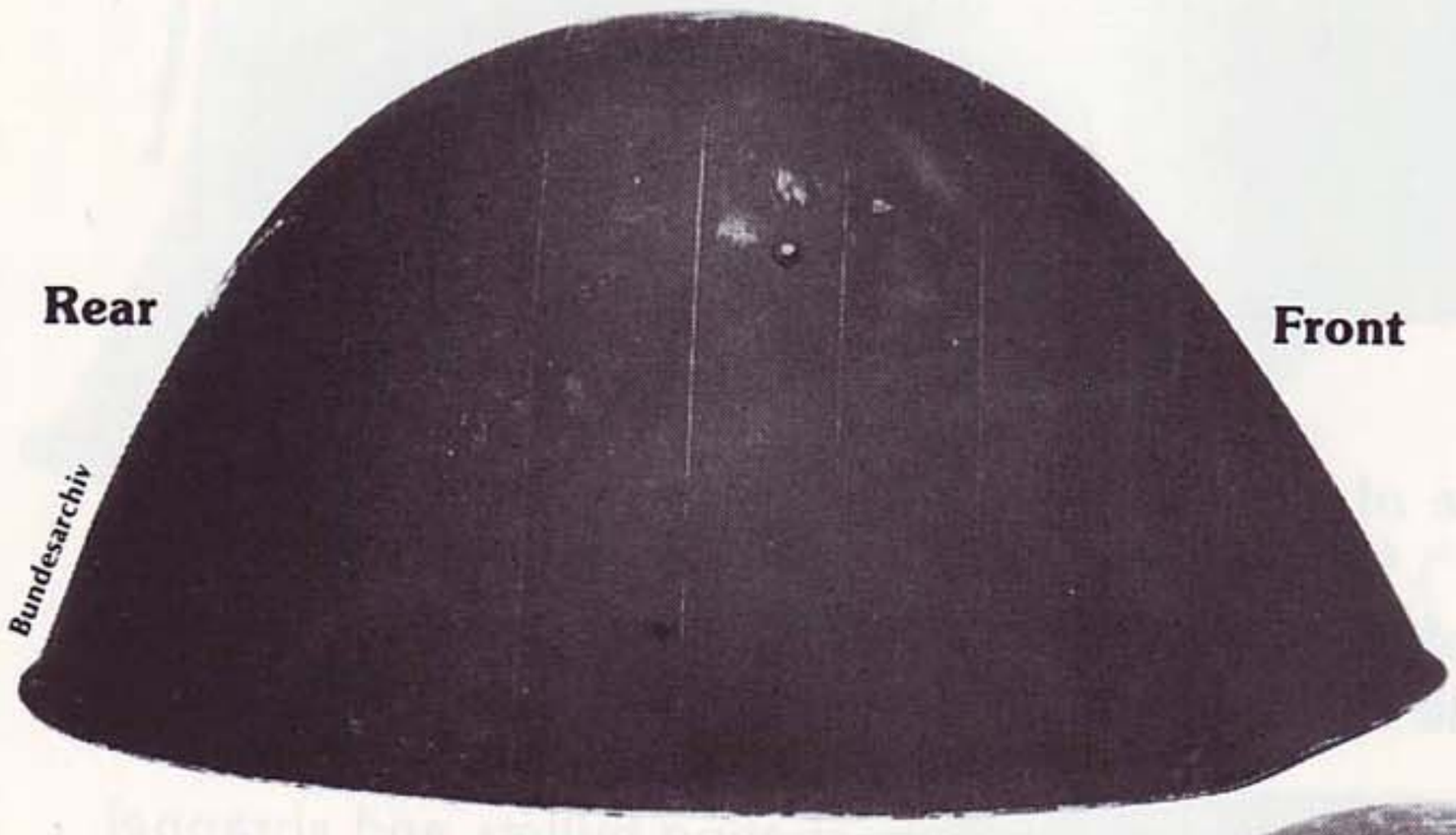
4. Simplified manufacture which will probably reduce fabrication steps, intermediate tempering, and the amount of raw materials.

Both Models B and B/II will be proposed for the conclusive troop trials. It will be ascertained by these tests whether the heavier, but less protective Model B or the lighter, but more protective Model B/II will be put forth as the replacement for the Model 35 helmet. It has been determined that the prototype must provide at least a 60% greater protection factor than the M35 and that it must also provide less encumbrance to the wearer. With this,

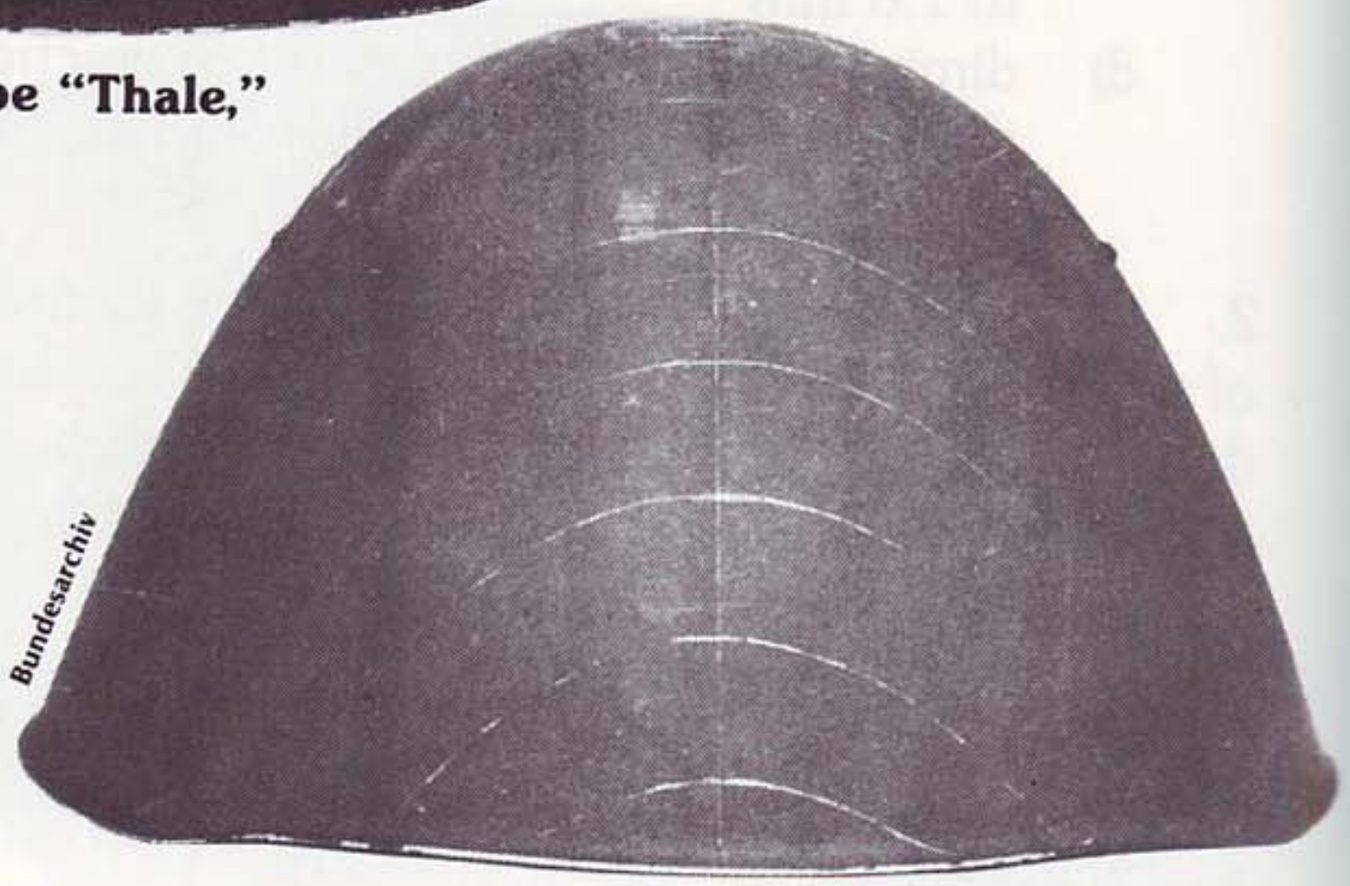
the two new prototypes come one step closer to the goal stated at the beginning:

"The greatest possible protection with the least possible encumbrance to the fighting man."

(signed) Fry (signed) Hänsel



Helmet prototype "Thale," side view.



Helmet prototype "Thale," front view.



The East German Army adopted the W.W. II tested, Model B/II. The Berlin honor guard at left wears the current model helmet.

HELMET-RELATED PATENTS

The following are a series of notable patents which all pertained to various areas within the realm of steel helmet technology. The nineteen patents are interesting because of several reasons. First of all, many of them will be quite familiar to those individuals with a knowledge of the design of German steel helmet. Secondly, a portion will appear to be valid designs which "never got off the drawing board." Finally, there are several which may appear to be almost comical at first glance, a condition which does change with later inspection except for one very notable example.

The translator has endeavored in this section to give a brief synopsis of the content of each patent document, rather than faithfully translating each line. As a rule, these documents tend to be painfully redundant and quite frankly tiresome. It is for this reason that the translator has tried to be mercifully brief in his description of each patent, while still retaining the salient information. The original patent diagrams have been included for each of these inventions.

Patent No. 303460 Class 41c Group 1

A patent was issued to Friedrich Schwerd of Hannover on 18 January 1916 for his design of a helmet liner system. This liner was designed for steel helmets, but could be used in other types of helmets as well. Schwerd felt that since the steel helmet and its armored frontal plate were designed to protect the wearer against hostile small arms fire from certain directions, the design of the liner was particularly important. He also felt that each liner must be able to conform well to the wearer's head in light of the fact that only a few shell sizes were being manufactured.

The liner was designed in such a way that the helmet rested on the wearer's head by means of three

Fig. 1

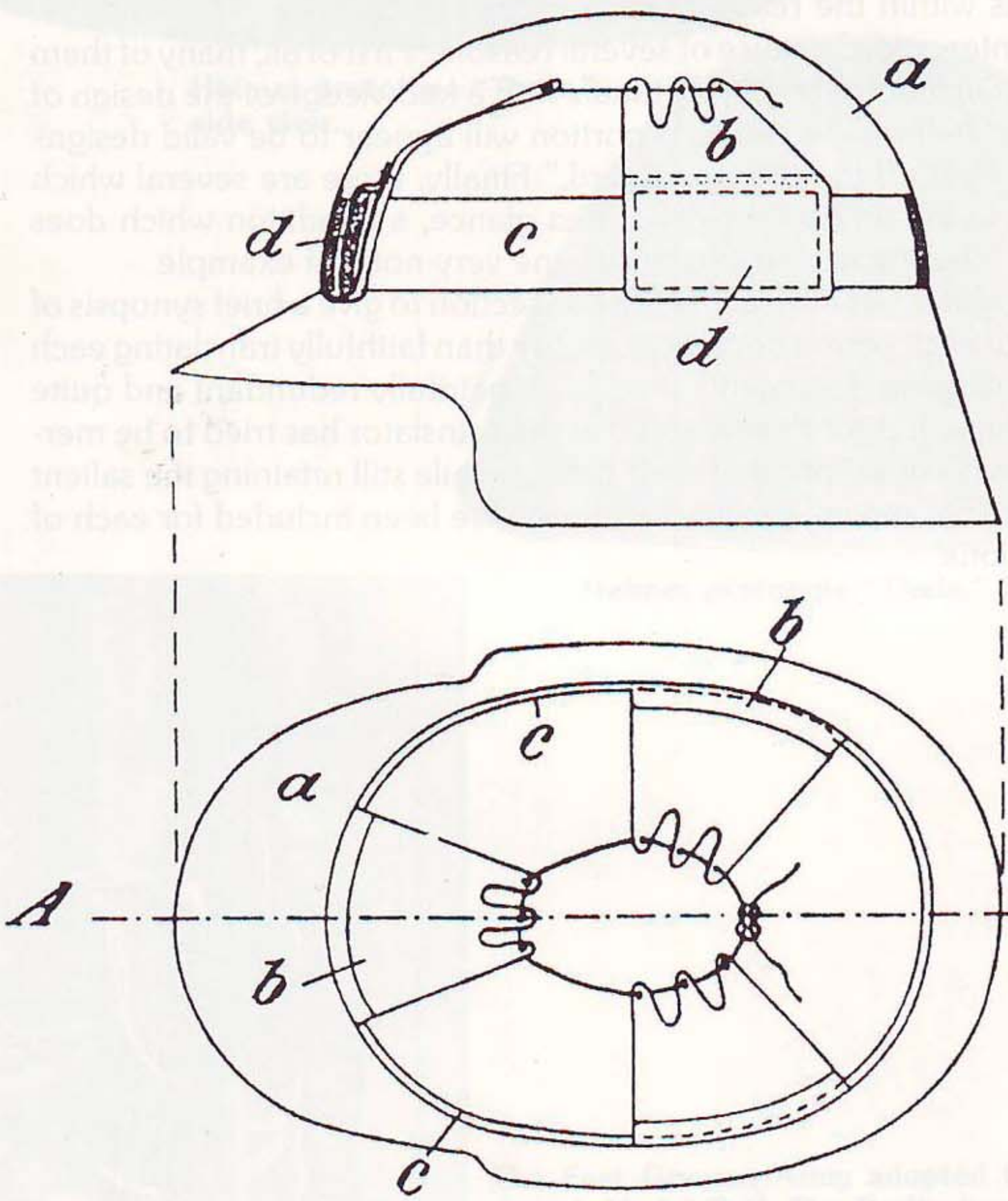


Fig. 2

cushioned pads. Air spaces were provided at the top of the head and between the liner pads. Pockets for cushioning material were located behind each pad. The pads were adjustable by means of a drawstring which passed through holes in the ends of the liner tabs. The pads were arranged so that the front member rested on the skull above and behind the ears. Each of the pads was attached to an iron band which in turn fit into, and was attached to, the helmet.

The diagram at left shows the helmet and liner in a longitudinal section (figure 1) and as seen from beneath (figure 2).

Patent No. 303876 (Class 72g Group 2

On 28 January 1916, Professor Friedrich Schwerd was issued another patent by the Reich's Patent Office. This patent protected his design of what has come to be called the armored frontal plate for the helmet. In the document, this device is referred to as the "helmet shield plate for steel helmets."

The purpose of this removable plate was to protect the wearer from hostile rifle fire and shrapnel. The wearer's head would be protected both on the front and sides.

In order to make the plate readily removable, Schwerd proposed a "bayonet-like" attachment system. Slots in the plate were designed to accept the ventilation lugs on the sides of the helmet. A strap was provided which would pass behind the helmet in order to secure the plate in position.

Fig. 1

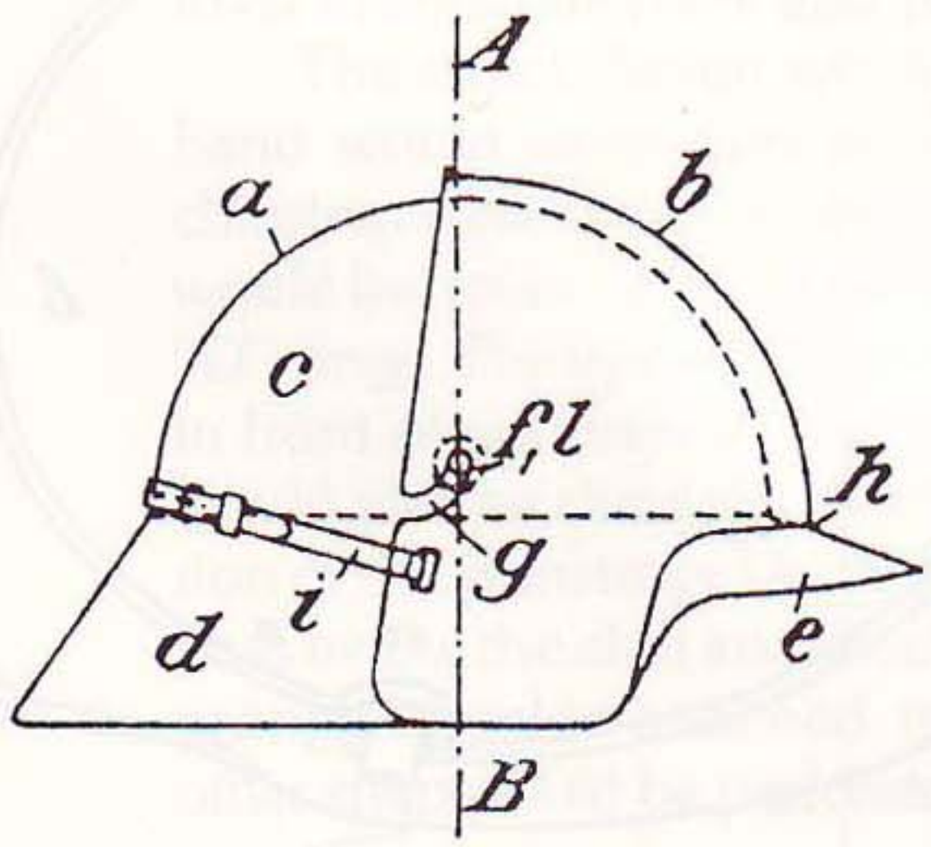
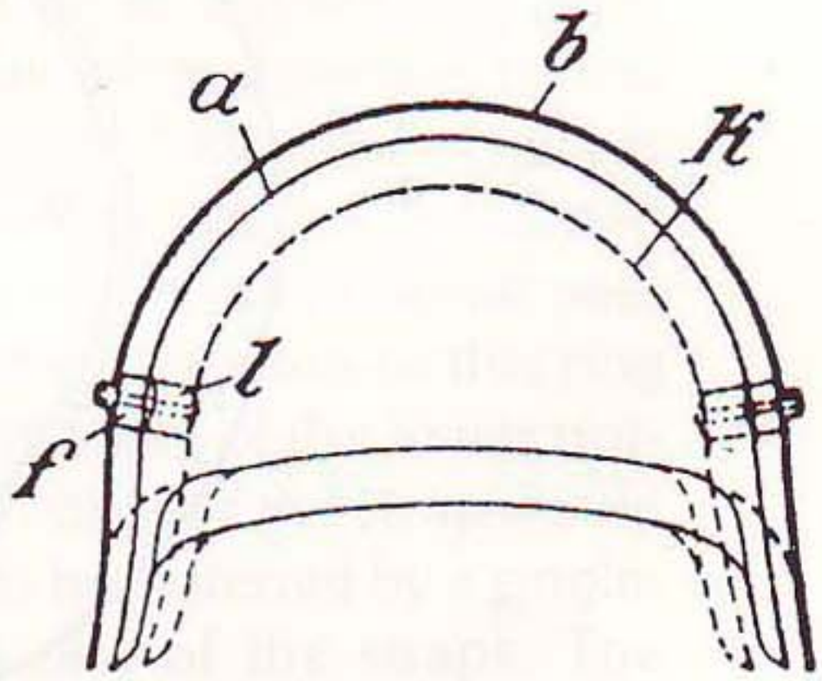


Fig. 2



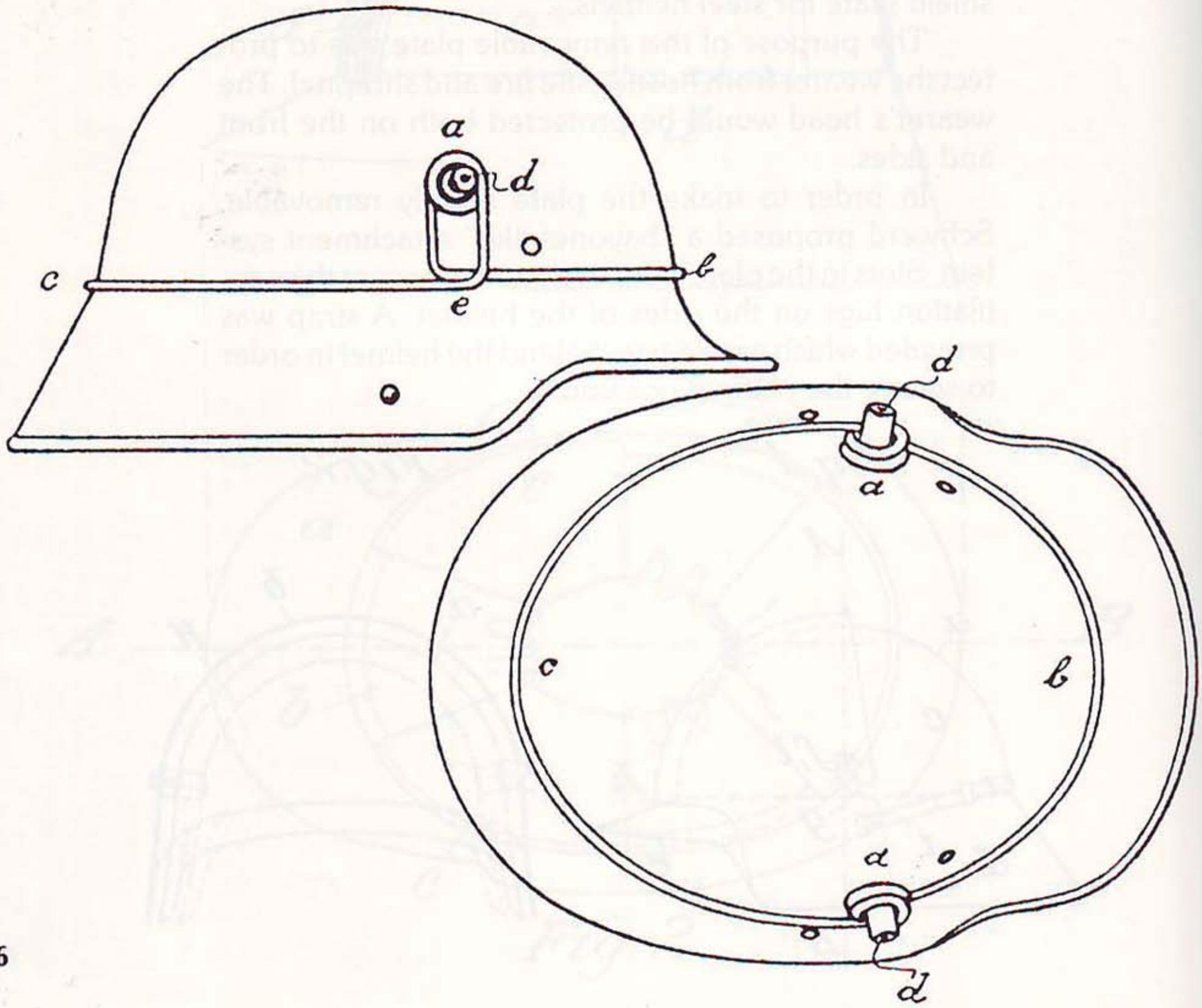
The ventilation lugs would have to be designed in such a way that a single-sized plate would fit on to helmets of various sizes. These lugs were to be longitudinally bored, so that they would serve not only as supports for the plate, but also as ventilation openings for air exchange within the helmet.

Patent No. 486752

Class 72g Group 2 L101095 XI/72g

An engineer, Hans Heinrich Knoke of Hamburg, was issued a patent for his helmet camouflaging apparatus on 21 December 1926. The device as titled "Apparatus for the attachment of camouflage materials to steel helmets."

The purpose of this device was to provide a means of rapidly attaching camouflage materials to the helmet. Up until this time, materials like grass, heather, branches, etc. had to be held in place by cloth or rubber straps, wire, or similar methods. There was, however, no uniform means of accomplishing this.



The diagram shows the clamp which was to be used to hold the camouflaging material in place. The clamp was made of spring steel wire which conformed to the helmet's shape. Coils of this wire were to pass around the ventilation lugs, thus giving the arrangement the necessary tension. The curved portions in front and rear serve to secure the camouflaging materials against the helmet. The angularities at point *e* on the diagram are present to maintain the proper positioning of the spring loop against the helmet.

A further proposal to improve upon the device's ability to hold materials of various thicknesses was to attach three or four individual spring clips to the front and rear loops.

The design of the device also allows rapid changing of the camouflaging materials to better suit the existing conditions in the field.

Patent No. 1304060 Group 72g Class 2

On 28 April 1933, Fritz Becker of Marsiliusstrasse 4-6, Berlin Ost 27 was granted a patent for his design of a chinstrap system which was to be used on "Helmet-type headgear."

The rationale for his design was that existing types of chinstraps did not fully secure the helmet to the head of the wearer. It as for this reason that Becker designed a "Y"-shaped chinstrap system that had upper branches which passed in front of and behind each ear. This design was to better maintain the helmet's proper position during running, jumping, and while the wearer lay prone.

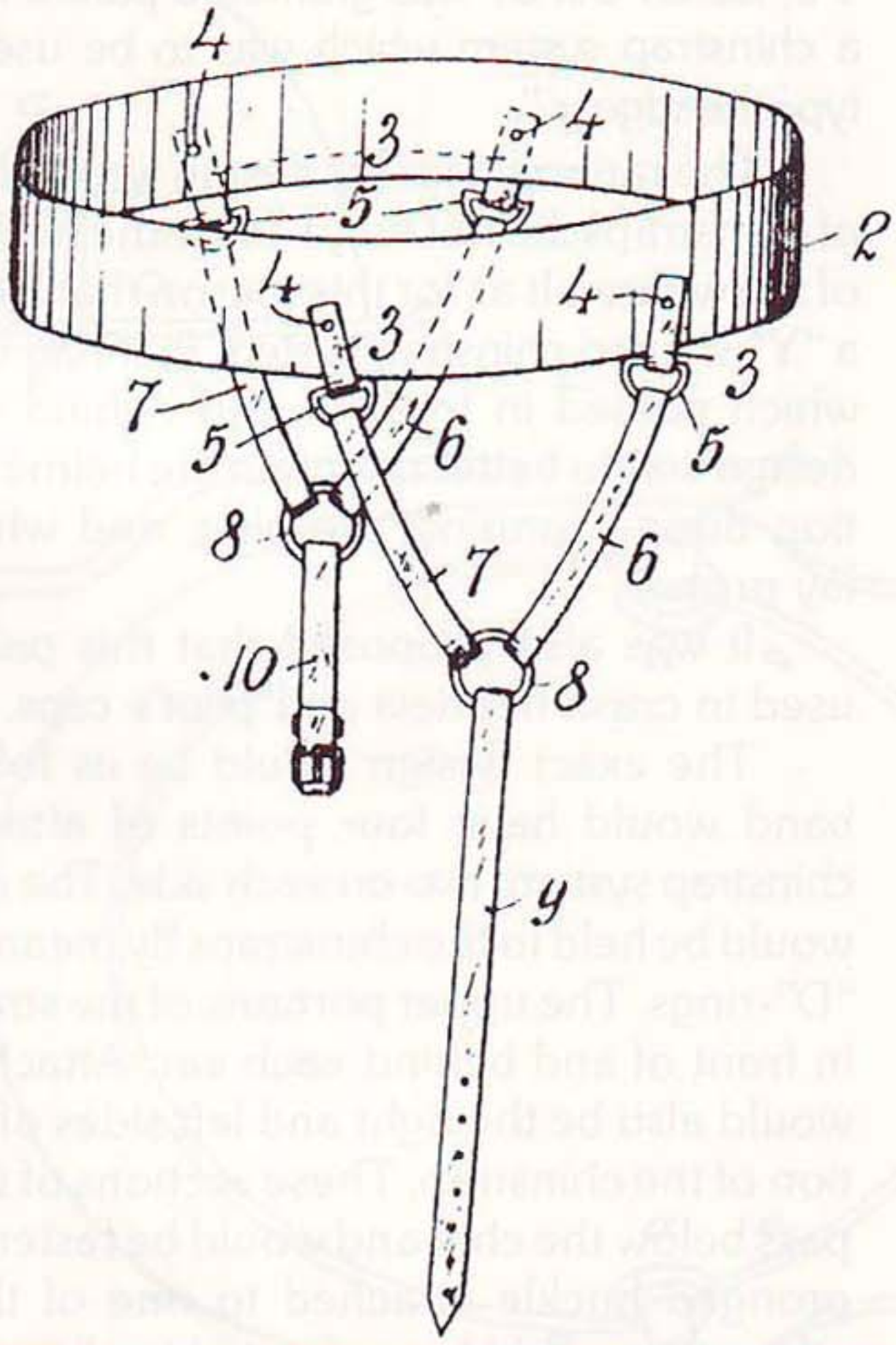
It was also proposed that this pattern might be used in crash helmets and pilot's caps.

The exact design would be as follows: the liner band would have four points of attachment to the chinstrap system, two on each side. The attaching points would be held to the chinstraps by means of articulated "D"-rings. The upper portions of the straps would pass in front of and behind each ear. Attached to this ring would also be the right and left sides of the lower portion of the chinstrap. These sections of the strap would pass below the chin and would be fastened by a single-pronged buckle attached to one of the straps. The other strap would be perforated to allow for adjustment.

Fig. 1



Fig. 2



Patent No. B383326 Group 72g Class 2

A rather interesting pair of helmets were patented by Mssrs. Bath and Wagawa of Dresden on 21 April 1936. These metal helmets were specifically designed to be used by air defense personnel. These prototypes were intended to protect the wearer against shrapnel and bomb fragments. The visor of the standard helmet was modified to permit the easier use of gas masks and field glasses. The field of vision was also greatly expanded.

The first diagram represents the helmet which was in use at that time. The diagrams which follow demonstrate the two patented variants. The first variant has the same shape as the standard helmet, but the visor has been totally removed. The second helmet shows only a small remnant of the visor and a modified neck

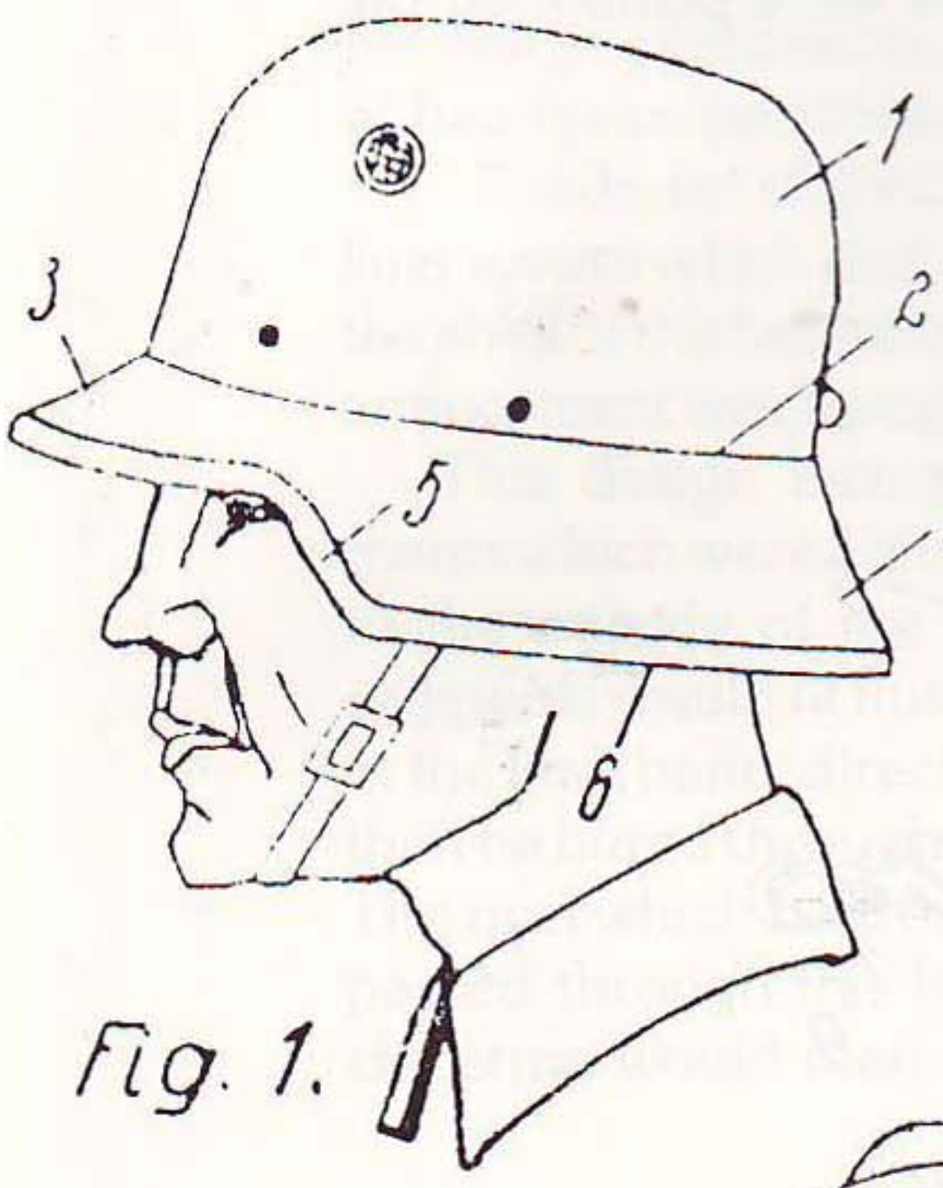


Fig. 1.

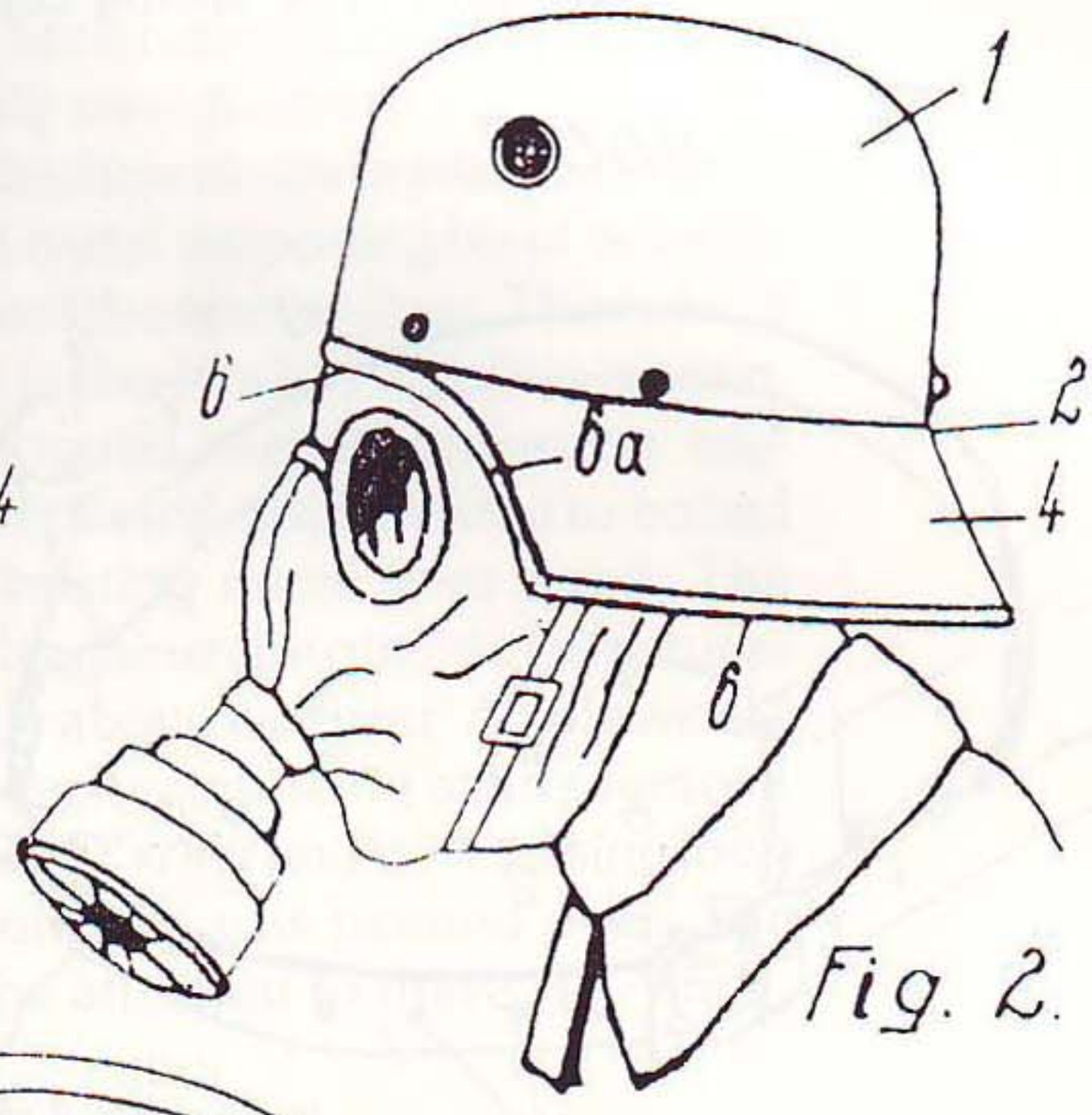


Fig. 2.

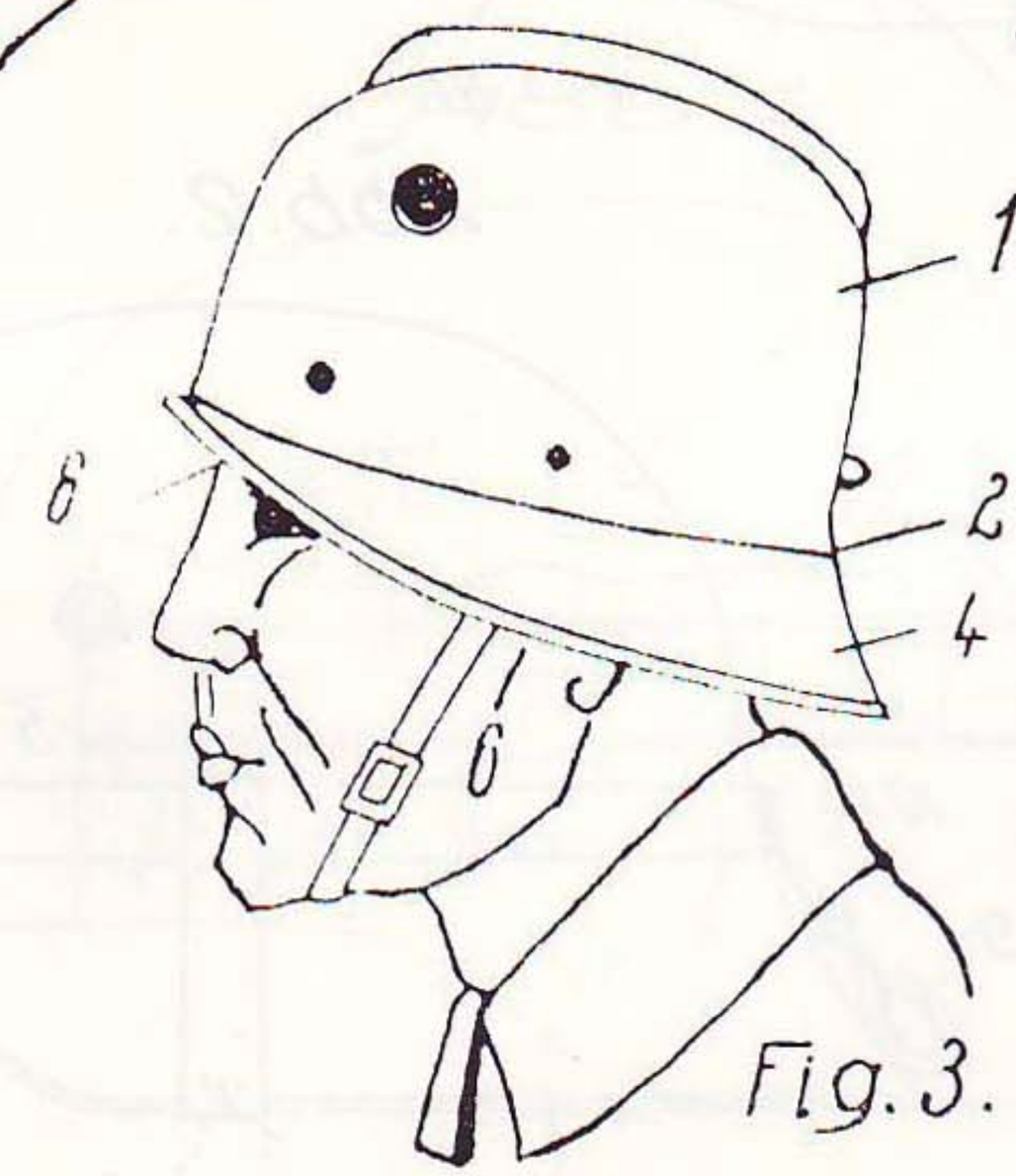


Fig. 3.

apron. This helmet also has a protective comb which runs sagitally along the top of the crown.

It was further proposed that these helmets might be used not only by civilians, but also by command personnel of the Army and Luftwaffe.

Patent No. 1419701 Group 72g Class 2

Josef Welte of Aschaffenburg am Main was issued a patent for a suspension device which would attach the helmet to the backpack or belt without the use of its chinstrap. The patent document is dated 23 July 1937.

The hanging device was composed of a leather strap which ran around the base of the helmet's crown, a single-pronged buckle, two metal spring clips, and a "carbine hook." The spring clips were positioned on

Abb. 1.

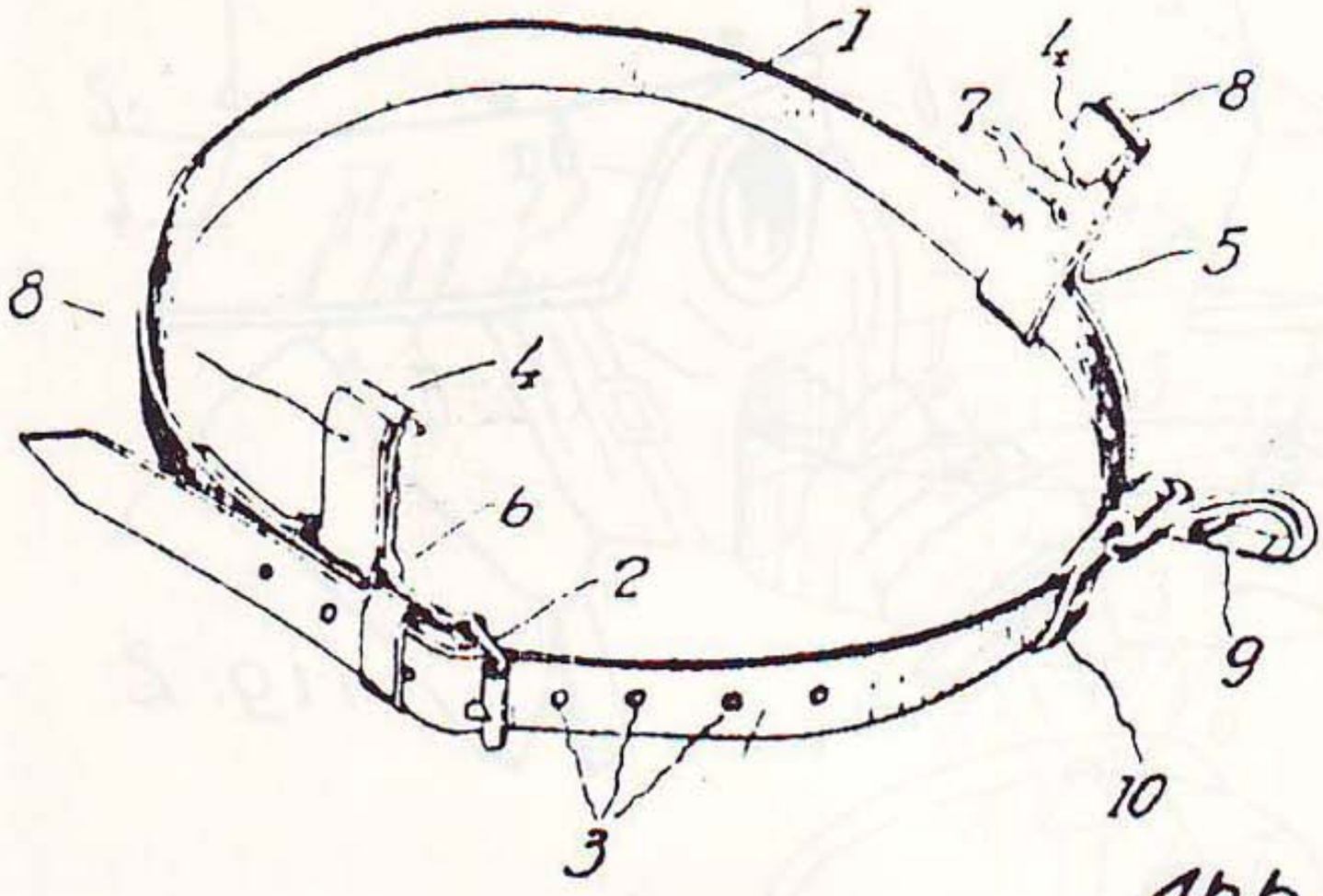
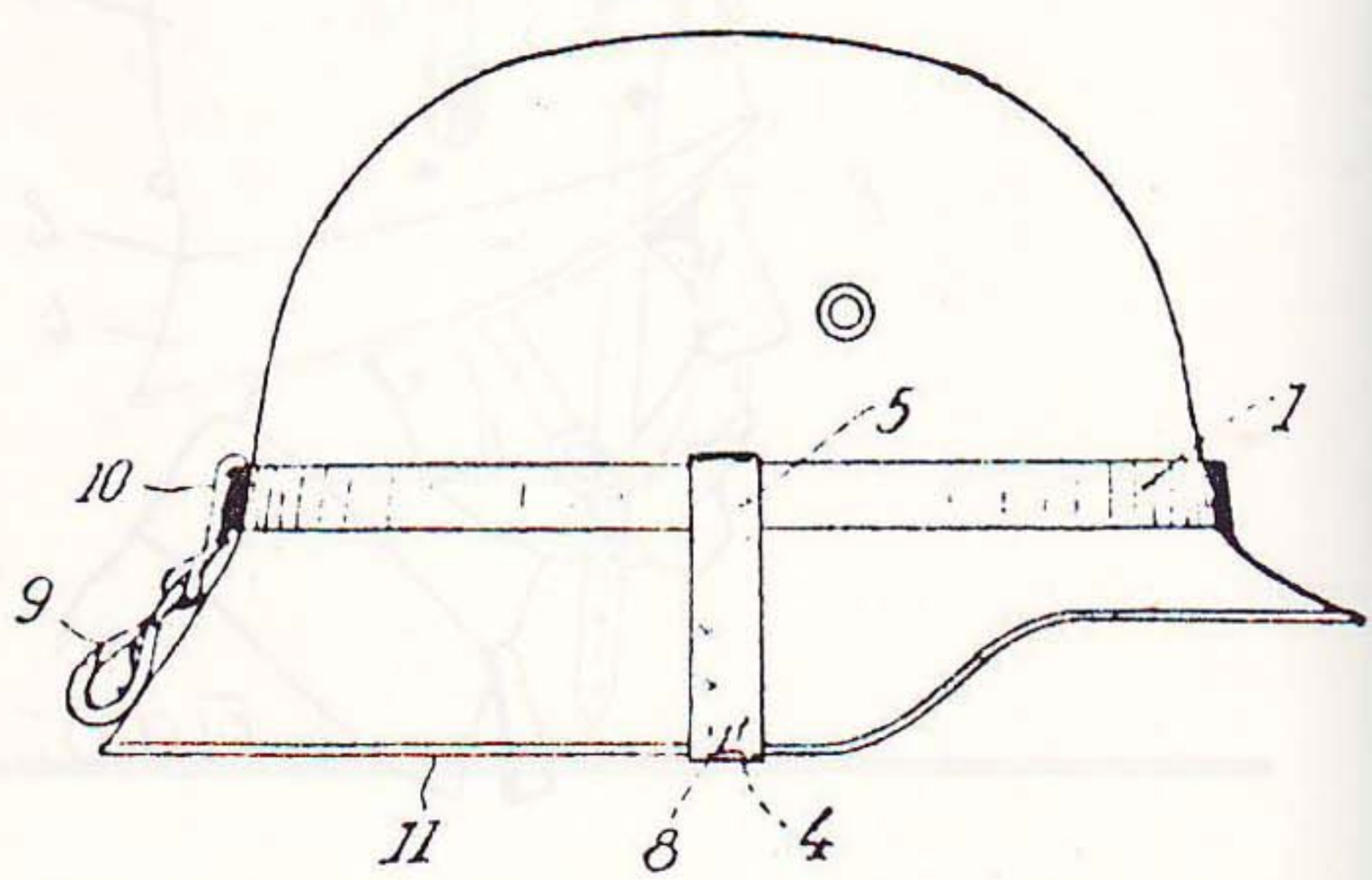


Abb. 2.



each side of the helmet and held the strap in the desired location by hooking the clips under the rim of the helmet. The carbine hook was located at the rear of the helmet and was used to attach the entire assembly to a loop on a belt or backpack. The single-pronged buckle allowed adjustment to various sizes of helmets.

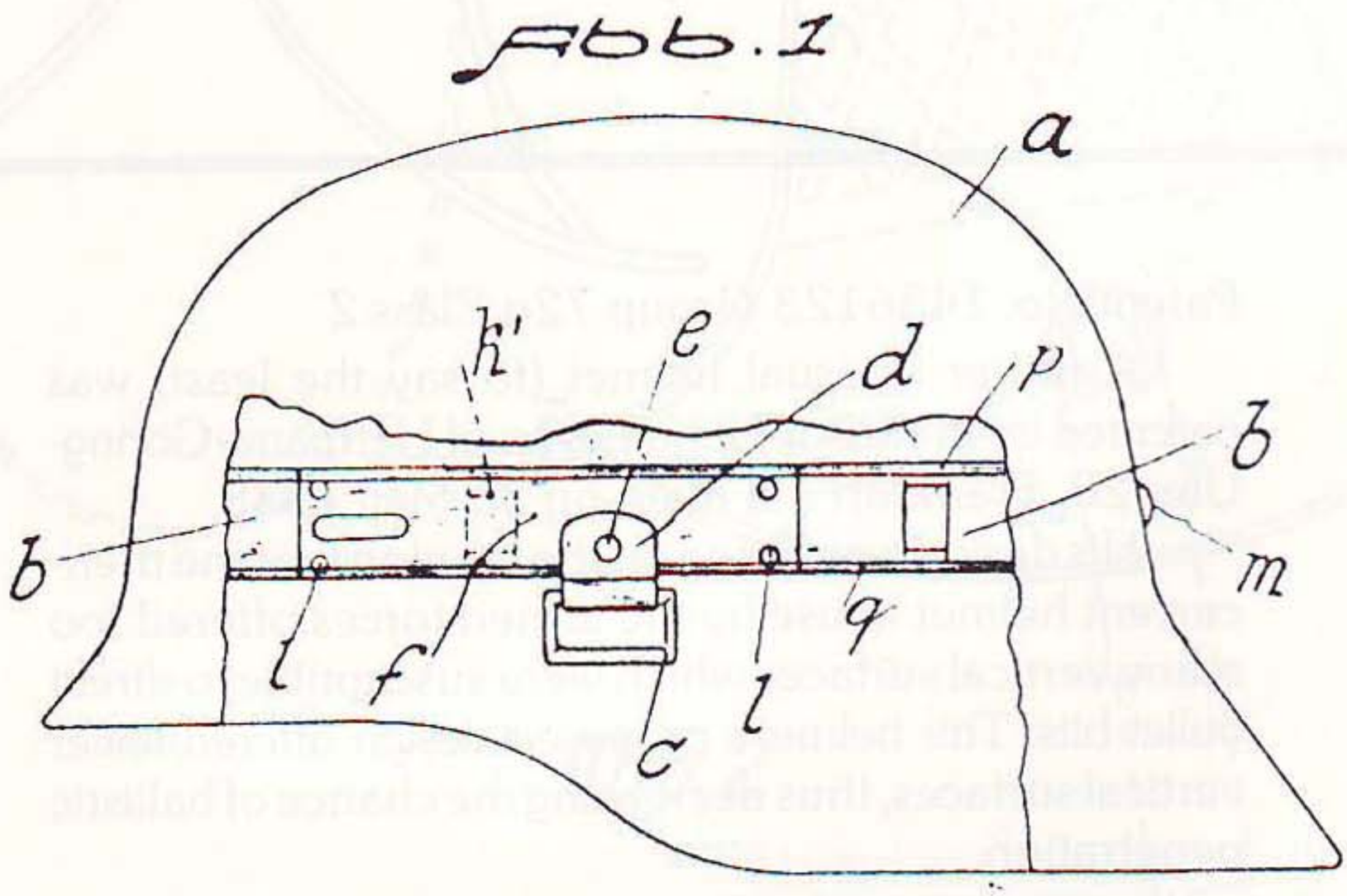
This arrangement was designed in such a way that the helmet would no longer need to be suspended by its chinstrap when not in use. This practice caused the weakening of both the chinstrap and the liner band.

Patent No. 1435278 Group 72g Class 2

Werner Zahn of Kurfürstendamm 154, Berlin-Halensee was issued a patent on 20 January 1938 for his design of chinstrap attachment loops for the liners of headgear, particularly steel helmets.

The design of the attachment was predicated upon a liner system which had a metal supporting band between the shell of the helmet and the leather liner. This type of arrangement was found in the Model 1931 liner system.

This design incorporated metal reinforcing segments which were either riveted, spot-welded or bolted to the outside of the existing metal liner band. The segments would fit flush against the outside curvatures of the liner band, directly above each ear. A hole would then be bored through each reinforcing band segment. The rivet which held the "D"-ring and its retaining loop passed through this hole and was peened over. The chinstrap would then be attached to these "D"-rings.



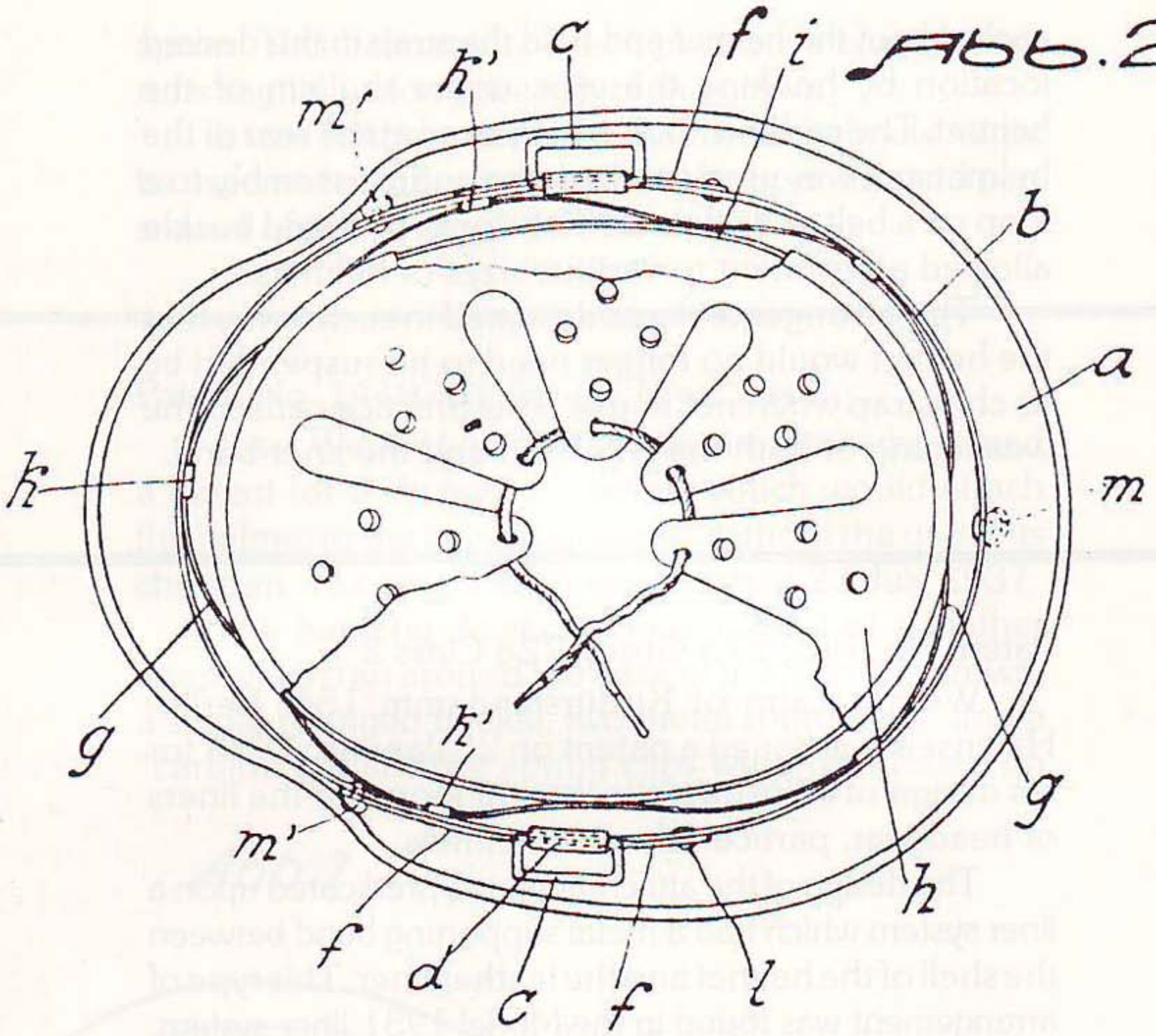
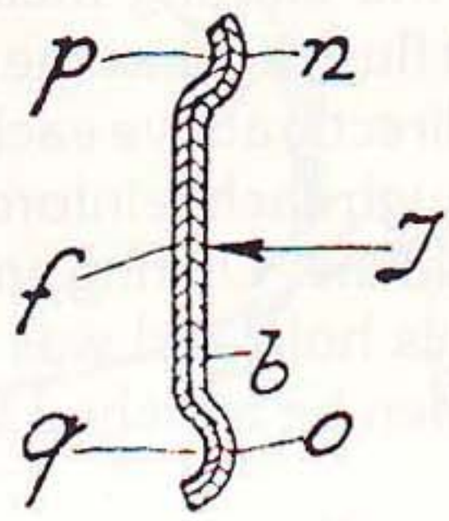


Abb.3



Patent No. 1436123 Group 72g Class 2

A rather unusual helmet (to say the least) was patented by Professor Hugo Leven of Hermann-Göring-Ufer 20, Frankfurt am Main on 25 May 1938.

His design was based on the opinion that the then-current helmet in use by the armed forces offered too many vertical surfaces which were susceptible to direct bullet hits. This helmet's proposed design offered fewer vertical surfaces, thus decreasing the chance of ballistic penetration.

The helmet was to be constructed of four major components: the liner system, a keel-like sagittal channel, and the left and right sides of the helmet. The overall shape of the helmet is somewhat reminiscent of the medieval morion helmet.

The helmet's identical curved sides (see diagram 3) would be clamped together by the sagittal channel (see diagram 4). After being placed into position, this channel would have been crimped to insure the helmet's integrity.

According to the designer, this prototype helmet would provide superior protection for the wearer's head, neck and shoulders, particularly when lying prone. The helmet was to be suitable for soldiers, police officers, fire brigade personnel, and so forth.

The liner assembly was to be constructed of interwoven leather strips, drawn together at the top. This woven effect would insure proper ventilation for the head. The planned chinstrap would have been made rather wide. It was to have been made of leather with rubber accessories for attachment and adjustment.

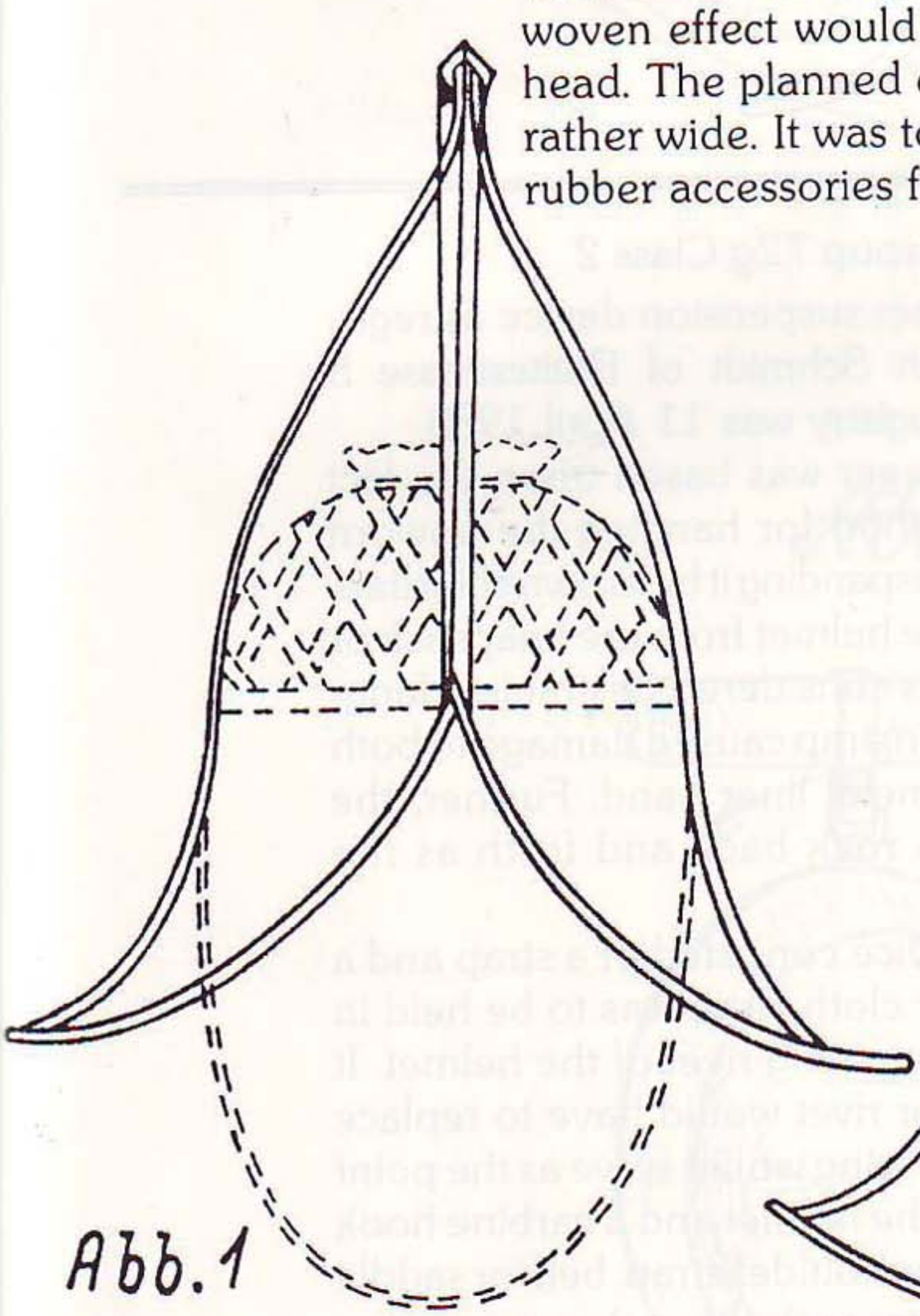


Abb. 1

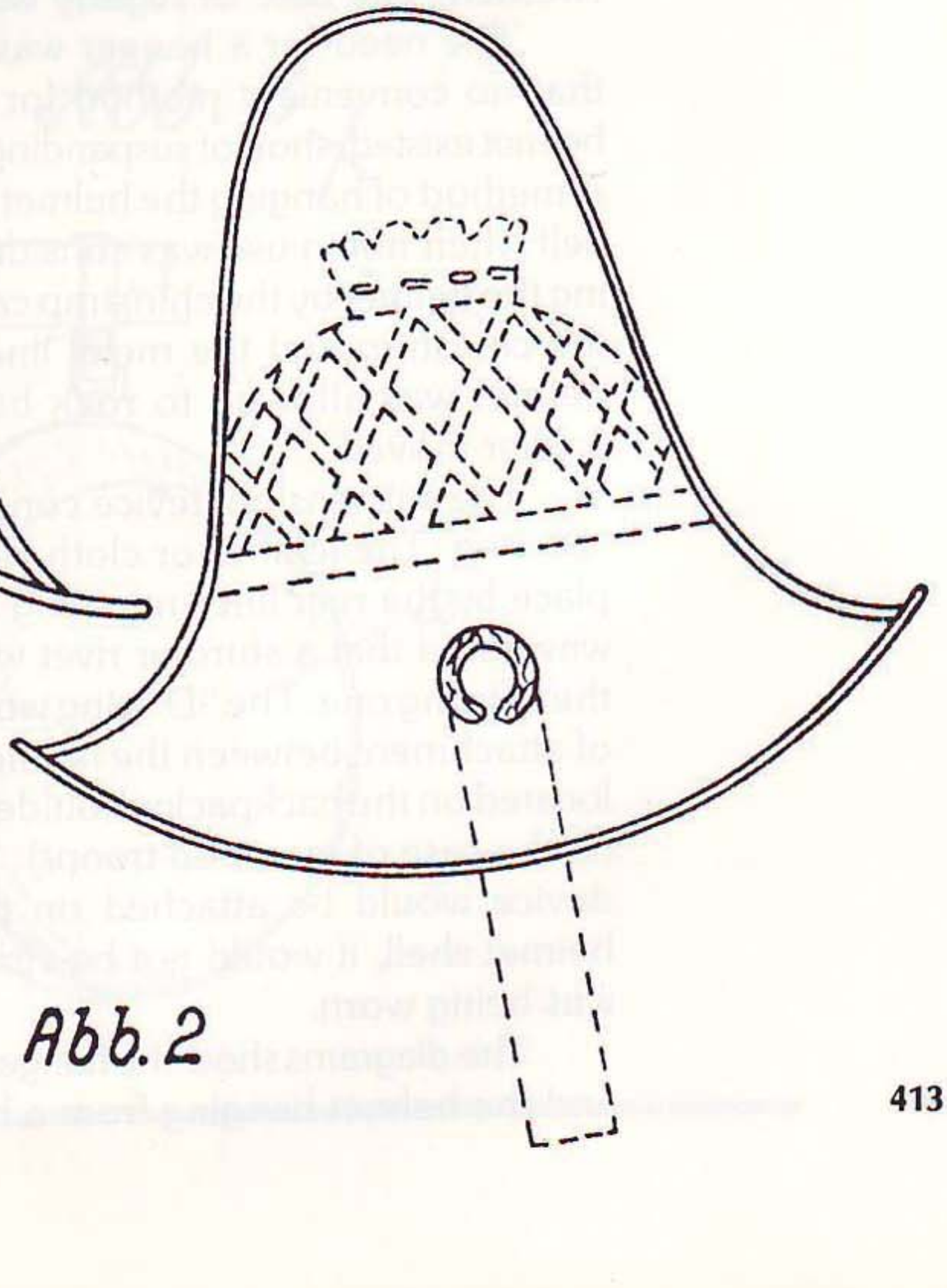


Abb. 2

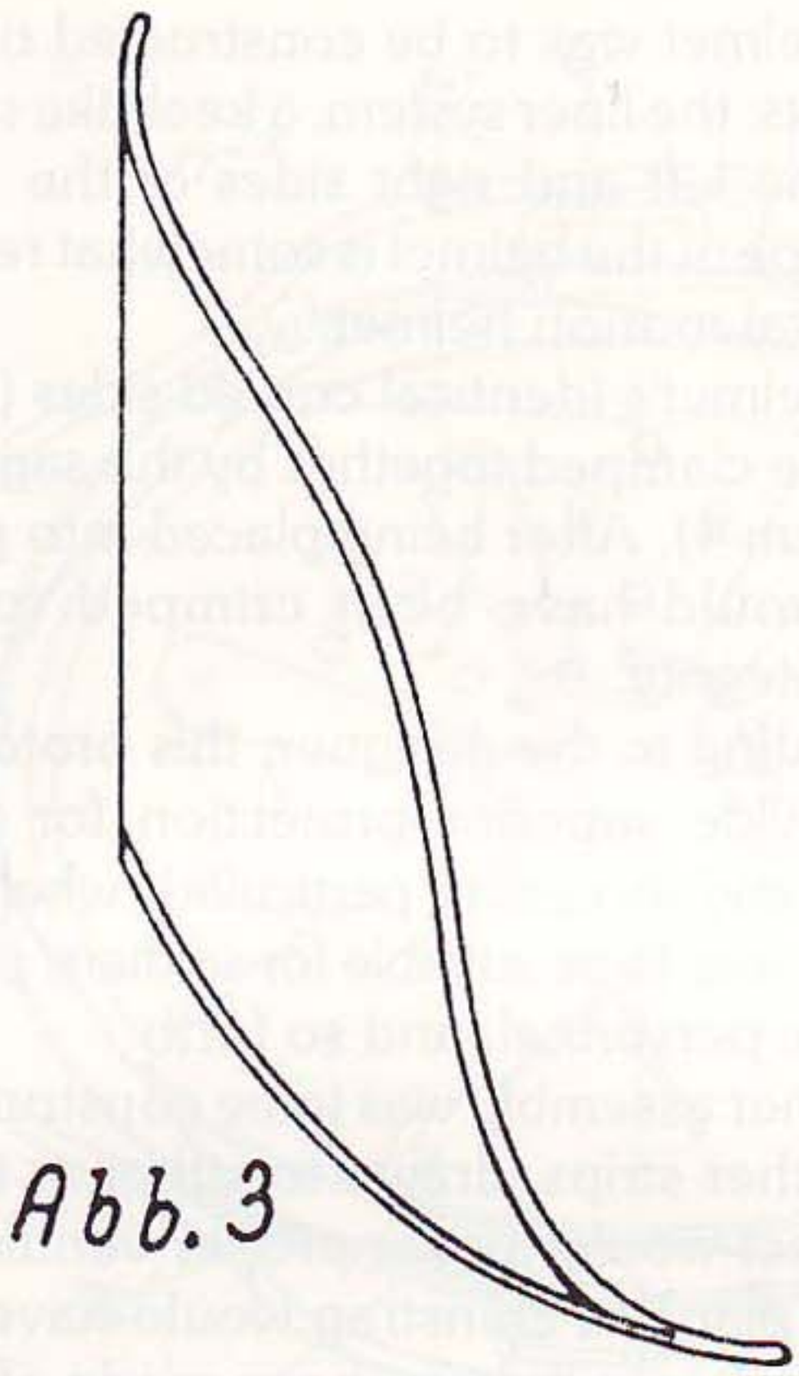


Abb. 3



Abb. 4

Patent No. 1439764 Group 72g Class 2

A patent for a helmet suspension device as registered to Franz Heinrich Schmidt of Breitestrasse 5, Dresden, The date of registry was 11 April 1938.

The need for a hanger was based upon the fact that no convenient method for hanging the unworn helmet existed, short of suspending it by its own chinstrap. A method of hanging the helmet from the knapsack or belt when not in use was considered desirable. Hanging the helmet by the chinstrap caused damage to both the chinstrap and the metal liner band. Further, the helmet was allowed to rock back and forth as the soldier moved.

The suspension device consisted of a strap and a "D"-ring. The leather or cloth strap was to be held in place by the rear liner-retaining rivet of the helmet. It was noted that a sturdier rivet would have to replace the existing one. The "D"-ring would serve as the point of attachment between the helmet and a carbine hook located on the backpack, shoulder strap, belt, or saddle (in the case of mounted troops). Since the suspension device would be attached on the underside of the helmet shell, it would not be visible when the helmet was being worn.

The diagrams show the hanger in position in figure 1 and the helmet hanging from a belt in figure 2.

Abb. 1

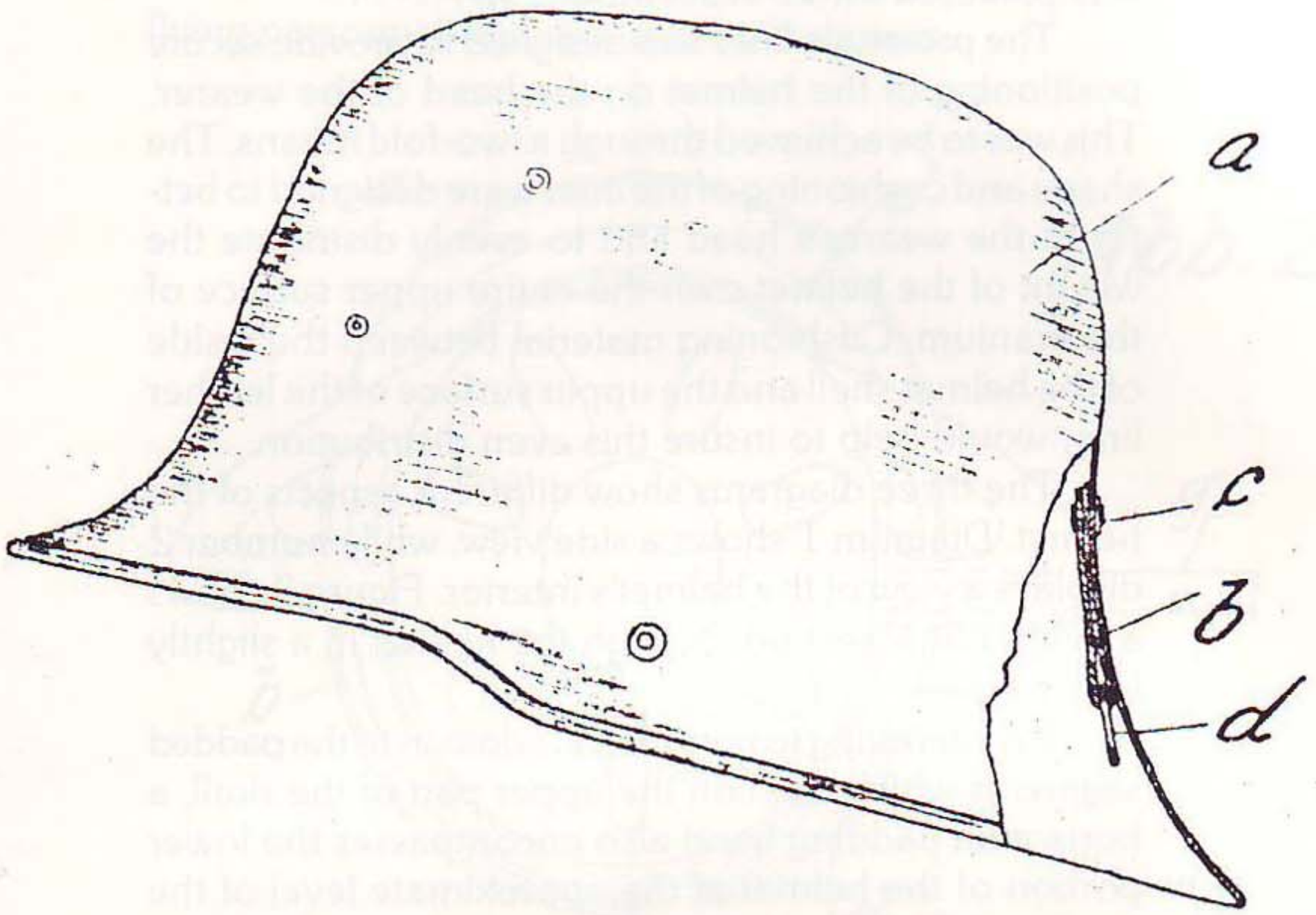
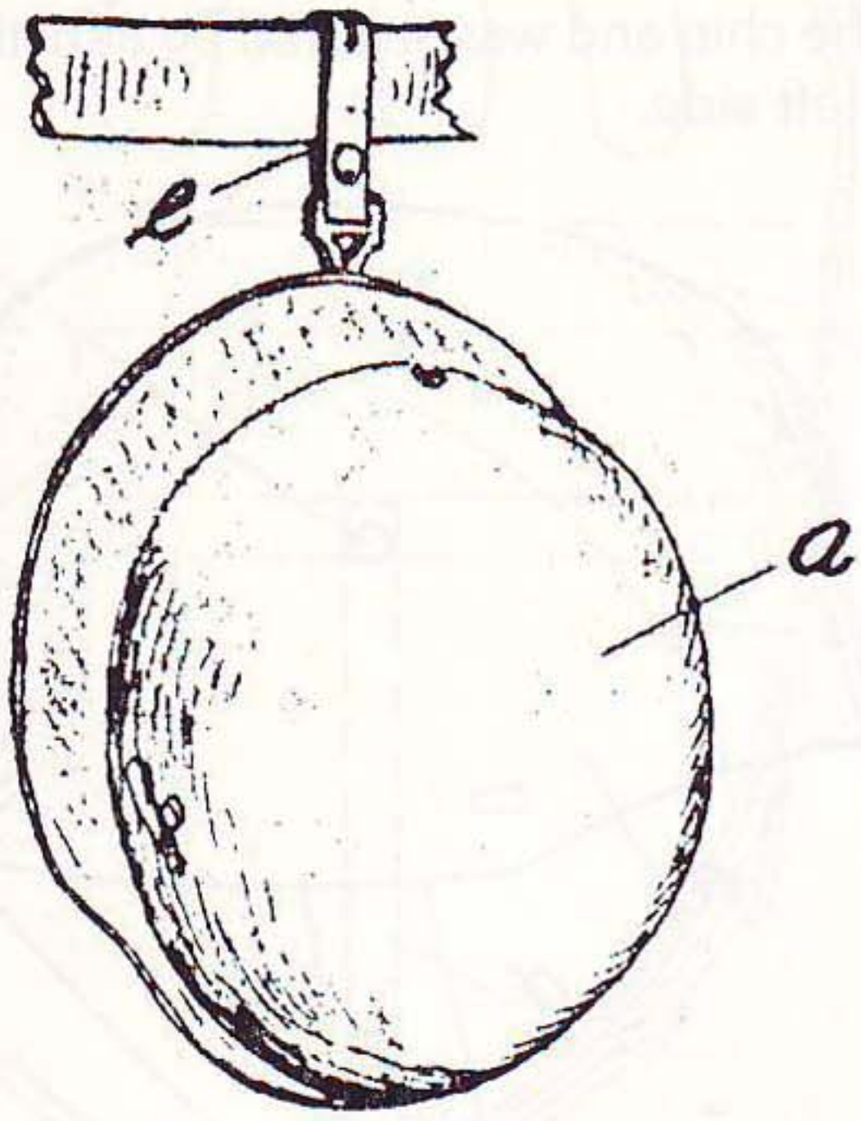


Abb. 2 X



Patent No. 1458595 Group 72g Class 2

Karl Heisler of Magazinstrasse 14, Berlin Ost 27 developed a new design for a helmet liner system which was patented on 12 November 1937.

The prototype liner was designed to provide secure positioning of the helmet on the head of the wearer. This was to be achieved through a two-fold means. The shape and cushioning of the liner were designed to better fit the wearer's head and to evenly distribute the weight of the helmet over the entire upper surface of the cranium. Cushioning material between the inside of the helmet shell and the upper surface of the leather liner would help to insure this even distribution.

The three diagrams show different aspects of the helmet. Diagram 1 shows a side view, while number 2 displays a view of the helmet's interior. Figure 3 shows a longitudinal section through the helmet in a slightly larger scale.

It is interesting to note that, in addition to the padded segments which cushion the upper part of the skull, a horizontal padding band also encompasses the lower portion of the helmet at the approximate level of the forehead. This band was to be riveted into place.

The leather portion of the liner extends downward to serve as a cover for the ears and the back of the head. Cutouts were provided to give clearer access to the ear canals, thus improving hearing. The mainstay of the liner's structural support was a heavy strap which was bolted to the sides of the helmet. This strap passed under the chin and was secured by a friction-type buckle on the left side.

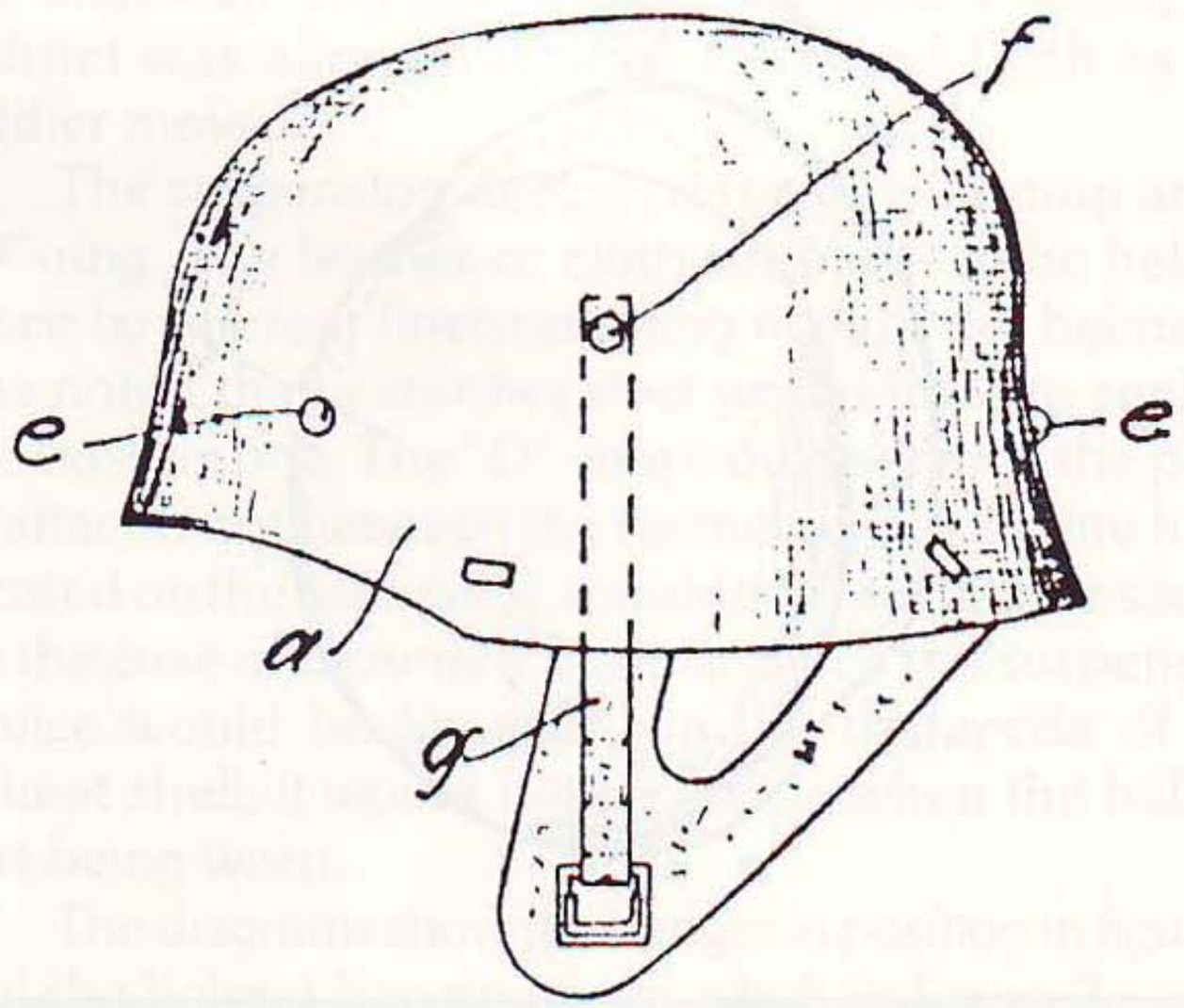
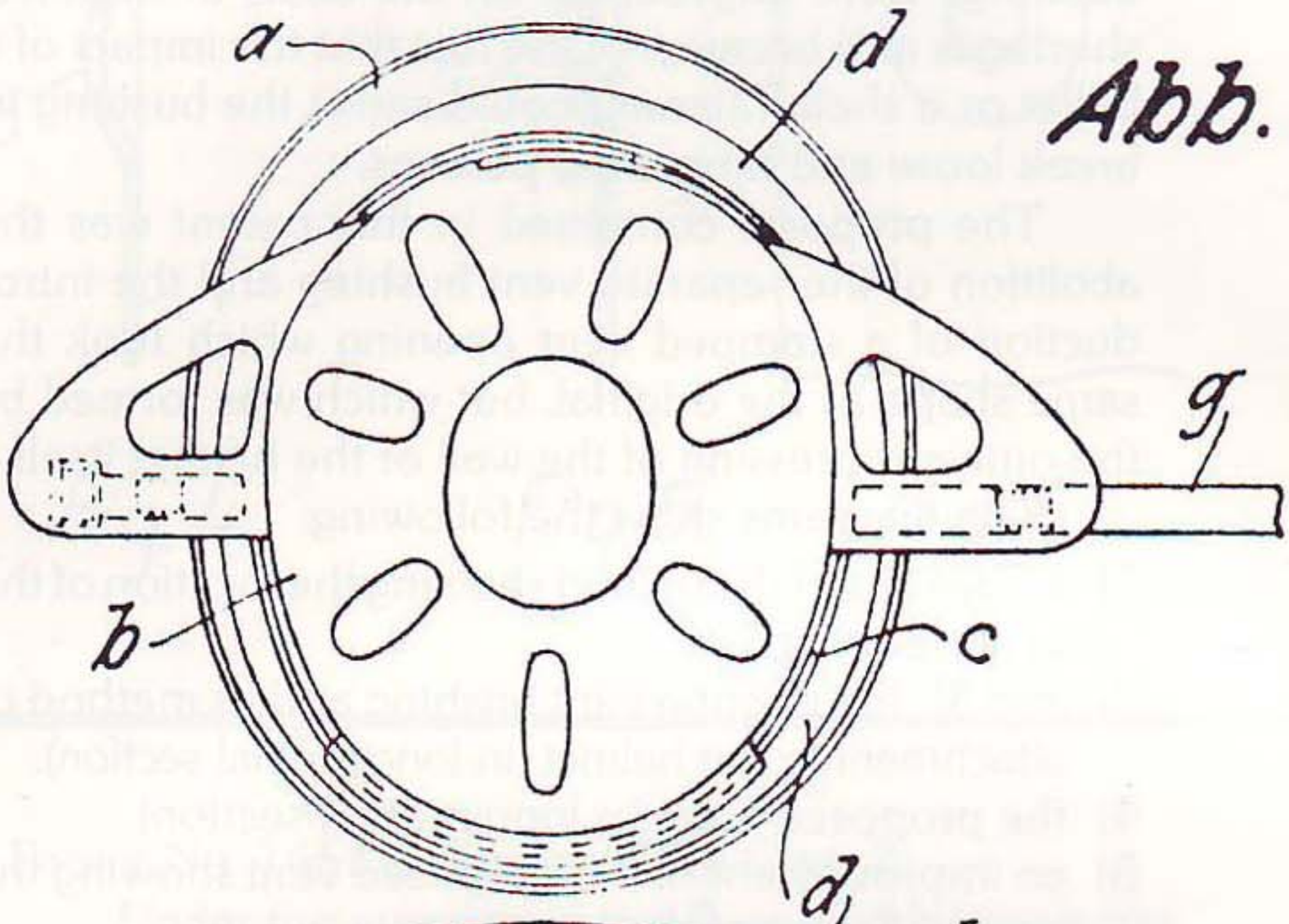
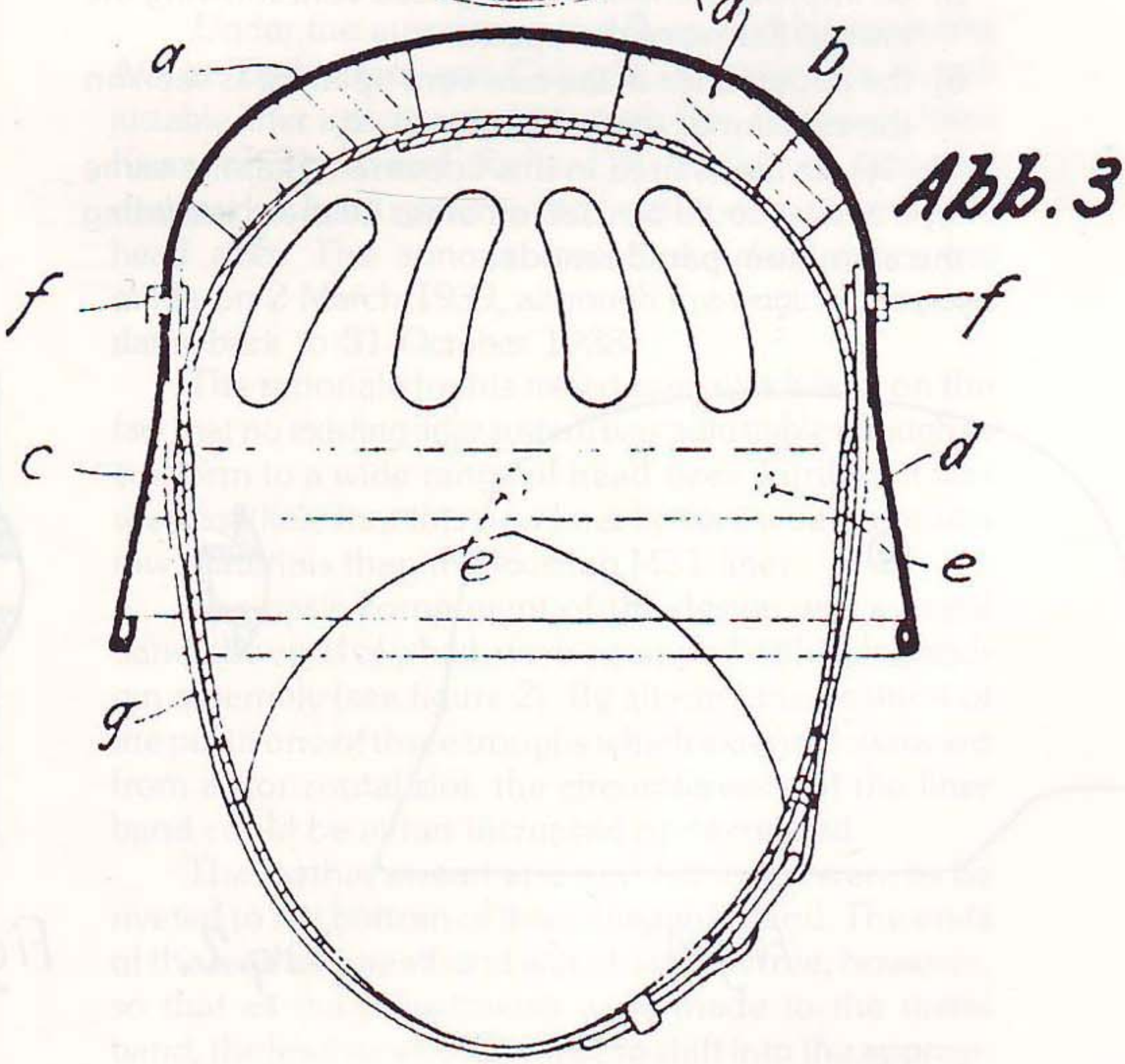


ABB. 1

The leather portion of the inner liner had seven oval openings to allow improved ventilation for the upper part of the head.

It was proposed that this helmet be used by both flying personnel and motor vehicle drivers.





Patent No. 1458613 Group 72g Class 2

On 29 October 1938, a patent was applied for by Erich Kisan and the Eisenhüttenwerk Thale in Thale am Harz. The patent dealt with a modification of the ventilation bushing on the M35 steel helmet.

It was argued that the separate, inserted vent bushings were impractical on the basis of material shortages and because of the fact that the impact of a bullet or a shell fragment could cause the bushing to break loose and hit nearby persons.

The proposal contained in this patent was the abolition of the separate vent bushing and the introduction of a stamped vent opening which took the same shape as the original, but which was formed by the outward pressing of the wall of the helmet itself.

The diagrams show the following:

1) a side view of the helmet showing the location of the vent opening.
2) and 3) the existing vent bushing and its method of attachment to the helmet (in longitudinal section).
4) the proposed vent (in longitudinal section).
5) an improvement of the proposed vent showing the inward flaring of the aperture.
6) the appearance of the new vent opening as seen on the exterior of the helmet.

It was also stated in this document that the same type of vent could be used on other helmets, including the aluminum parade model.

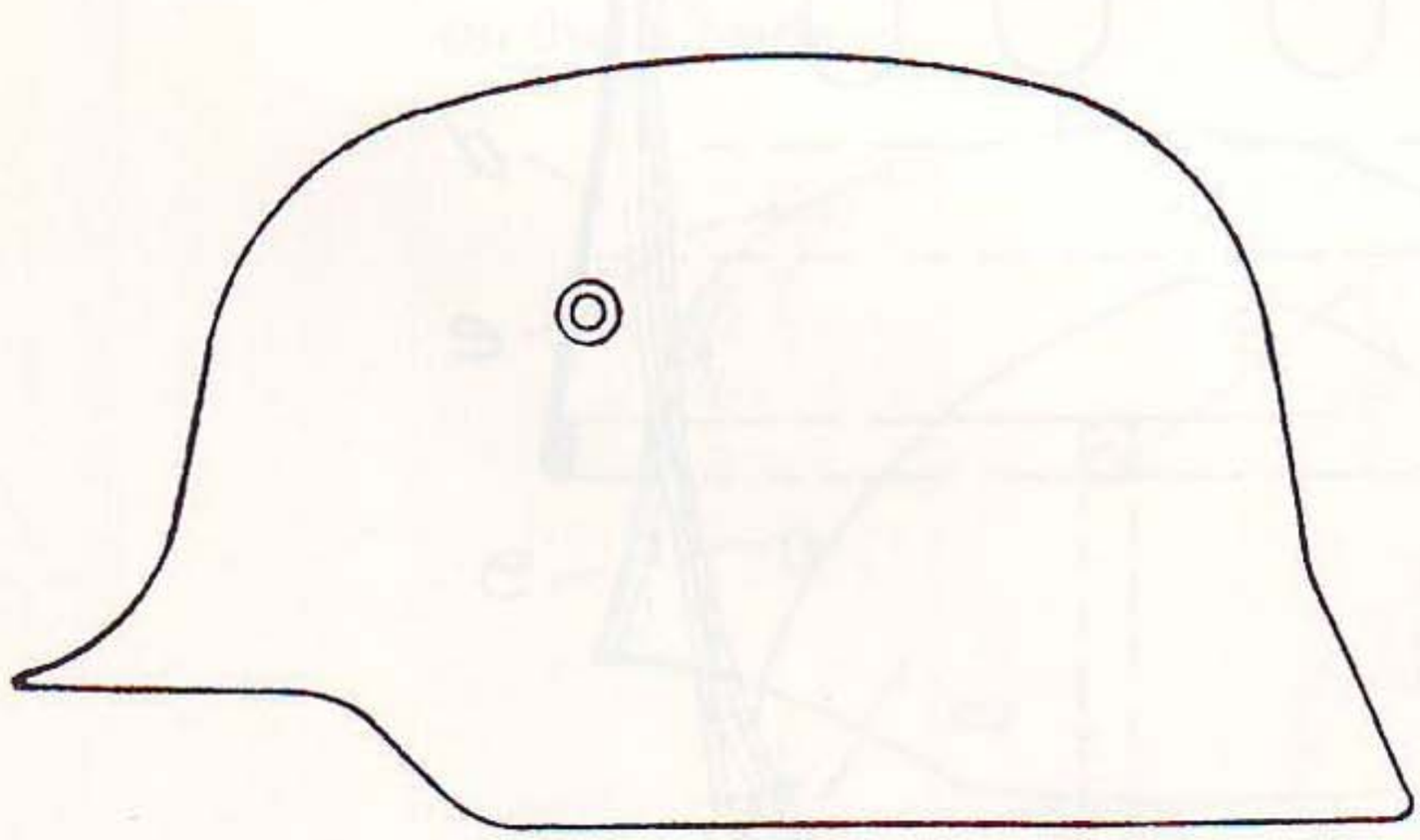


Fig. 1.

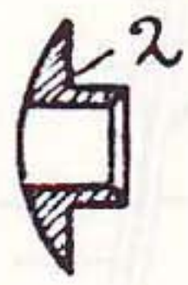


Fig. 2.



Fig. 3.

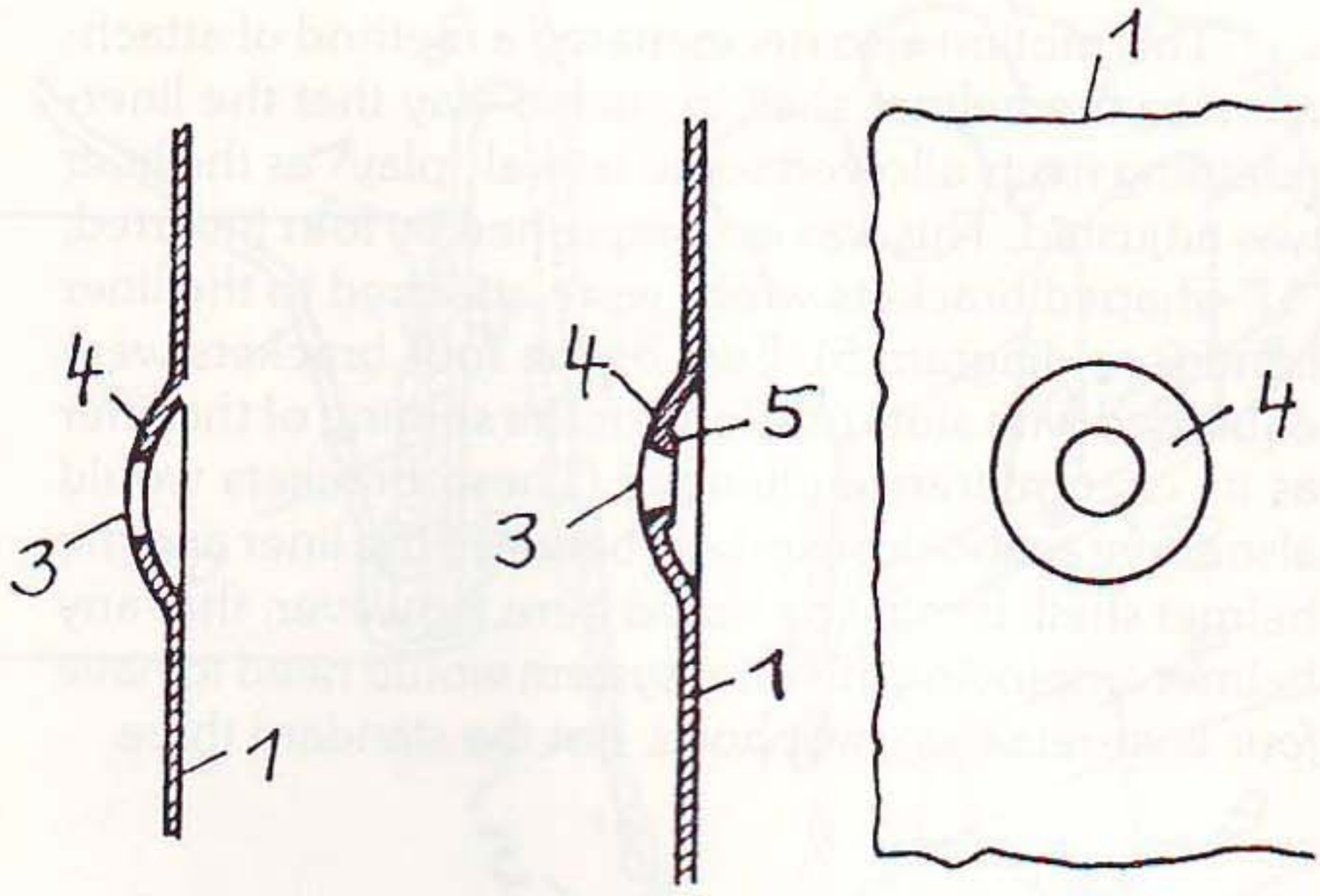


Fig. 4. Fig. 5 Fig. 6

Patent No. 1458614 Group 72g Class 2

Under the auspices of the Eisen-und Hüttenwerke AG in Thale/Harz and Cologne, a design for an adjustable liner system was proposed. Two engineers, Erich Kisan of Thale and Richard E. Müller of Cologne, designed a liner system which would allow for various head sizes. The announcement of patent rights was made on 2 March 1939, although the original proposal dates back to 31 October 1938.

The rationale for his new design was based on the fact that no existing liner system was adjustable enough to conform to a wide range of head sizes. Further, it was seen as likely that this new liner system would use less raw materials than the existing M31 liner.

The basic component of the design was a metal band, the ends of which were equipped with a slot-and-pin assembly (see figure 2). By altering the position of the pin in one of three troughs which extend downward from a horizontal slot, the circumference of the liner band could be either increased or decreased.

The leather sweatband and felt insert were to be riveted to the bottom of this adjustable band. The ends of the leather sweatband were to be left free, however, so that as the adjustments were made to the metal band, the leather would be free to shift into the appropriate flat position.

This motion also necessitated a method of attachment to the helmet shell in such a way that the liner-retaining rivets allowed some lateral "play" as the liner was adjusted. This was accomplished by four inverted, "U"-shaped brackets which were attached to the liner band (see diagram 5). Two of the four brackets were equipped with slots to allow for the shifting of the liner as its circumference changed. These brackets would also serve as shock absorbers between the liner and the helmet shell. It must be noted here, however, that any helmet employing this liner system would need to have *four* liner-retaining rivet holes, not the standard three.

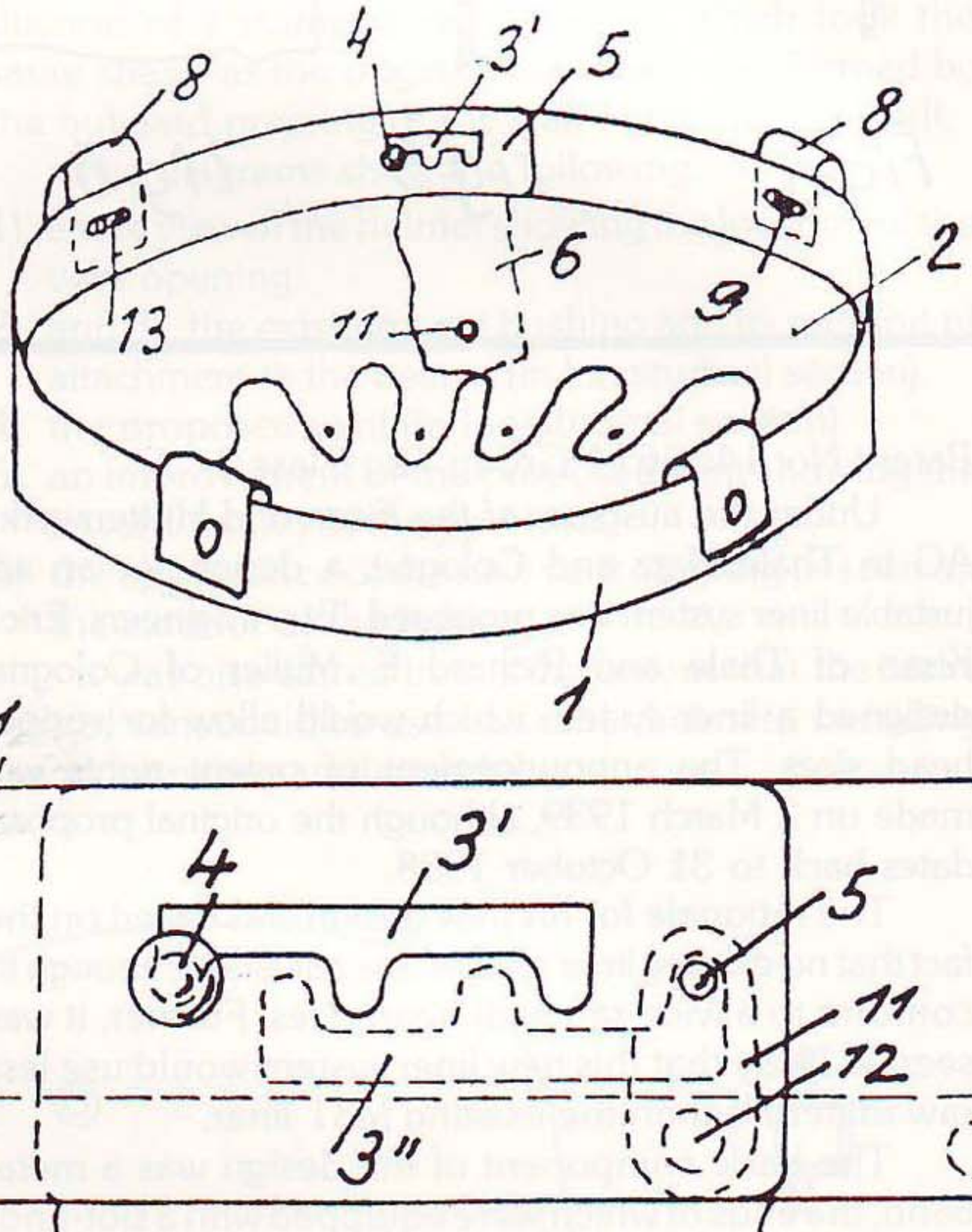


Fig. 1.

Fig. 2

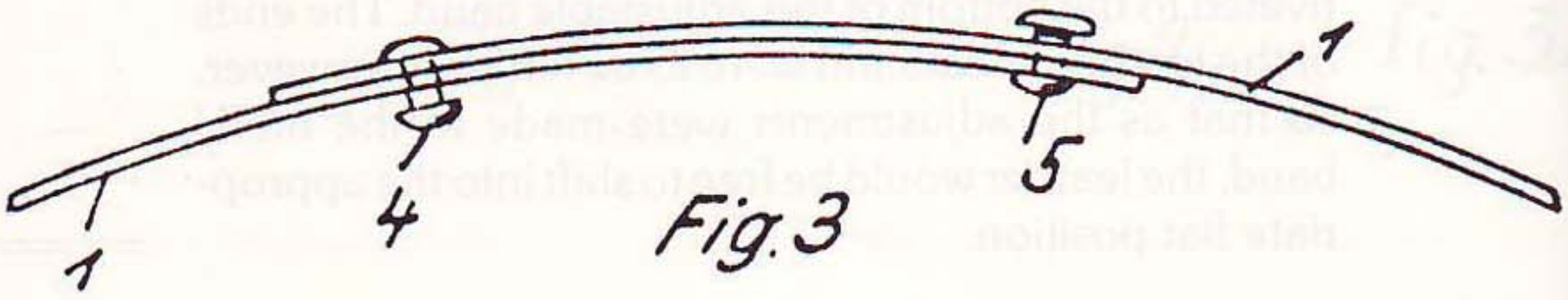


Fig. 3

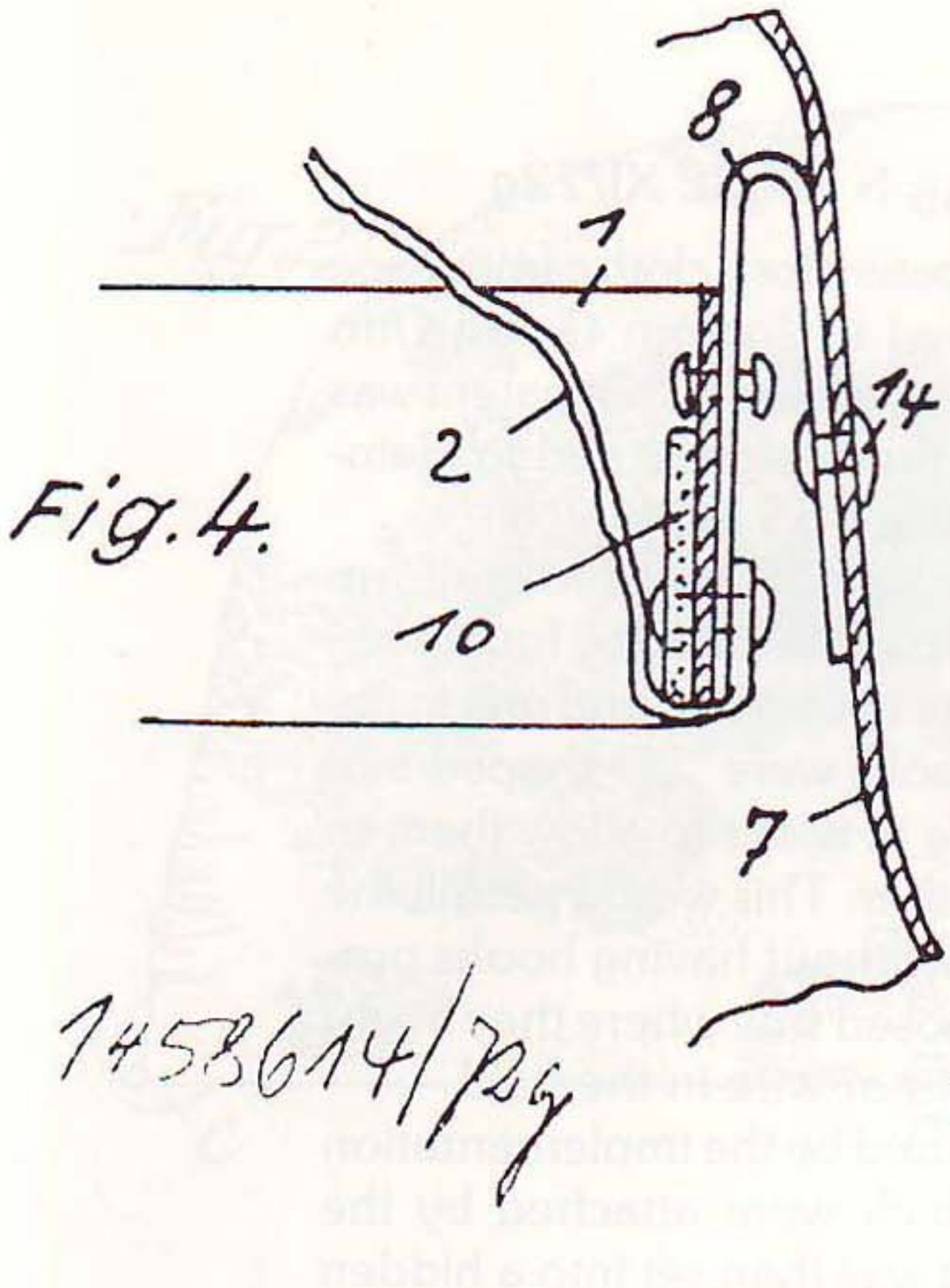


Fig. 4.

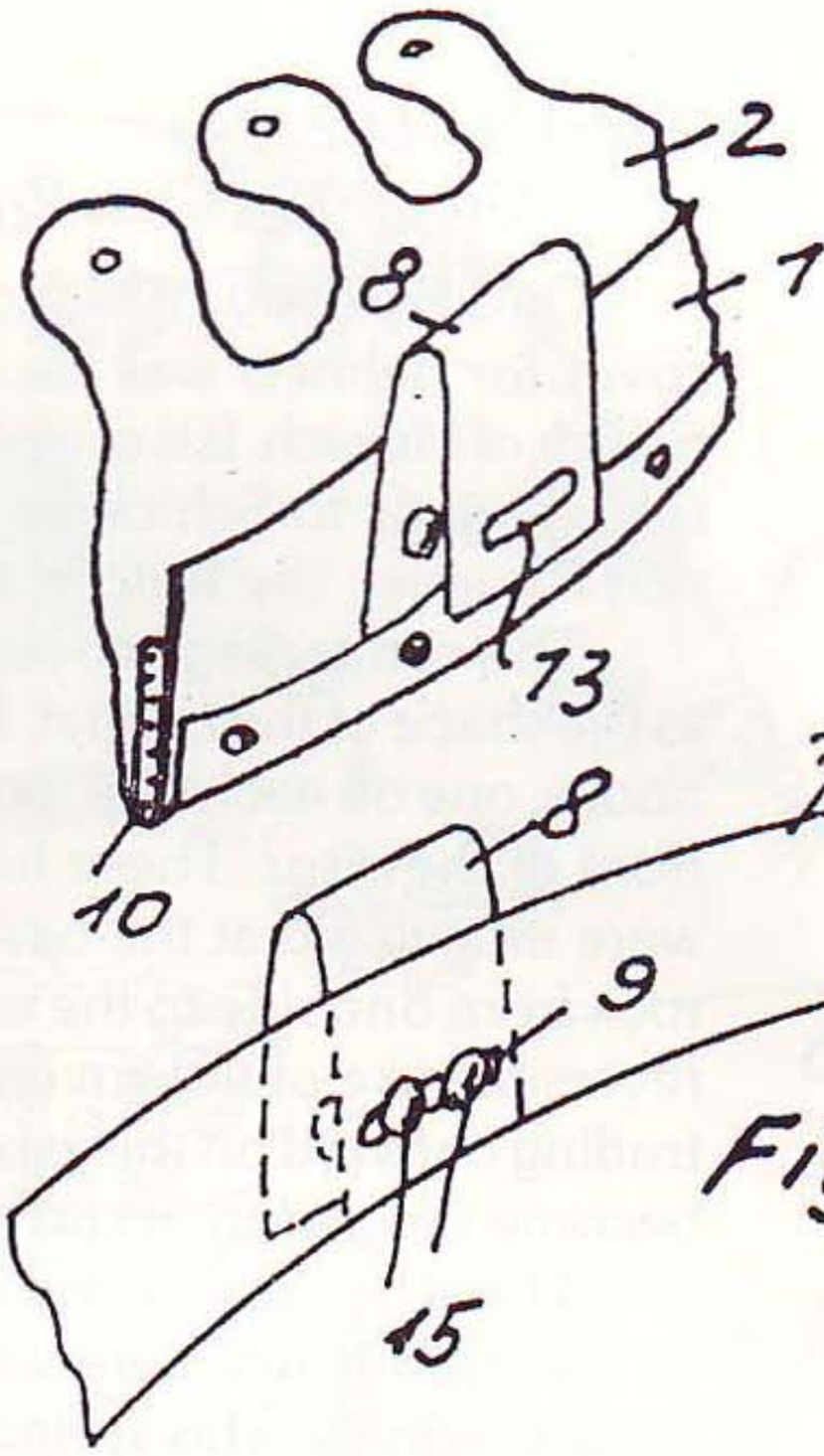


Fig. 5.

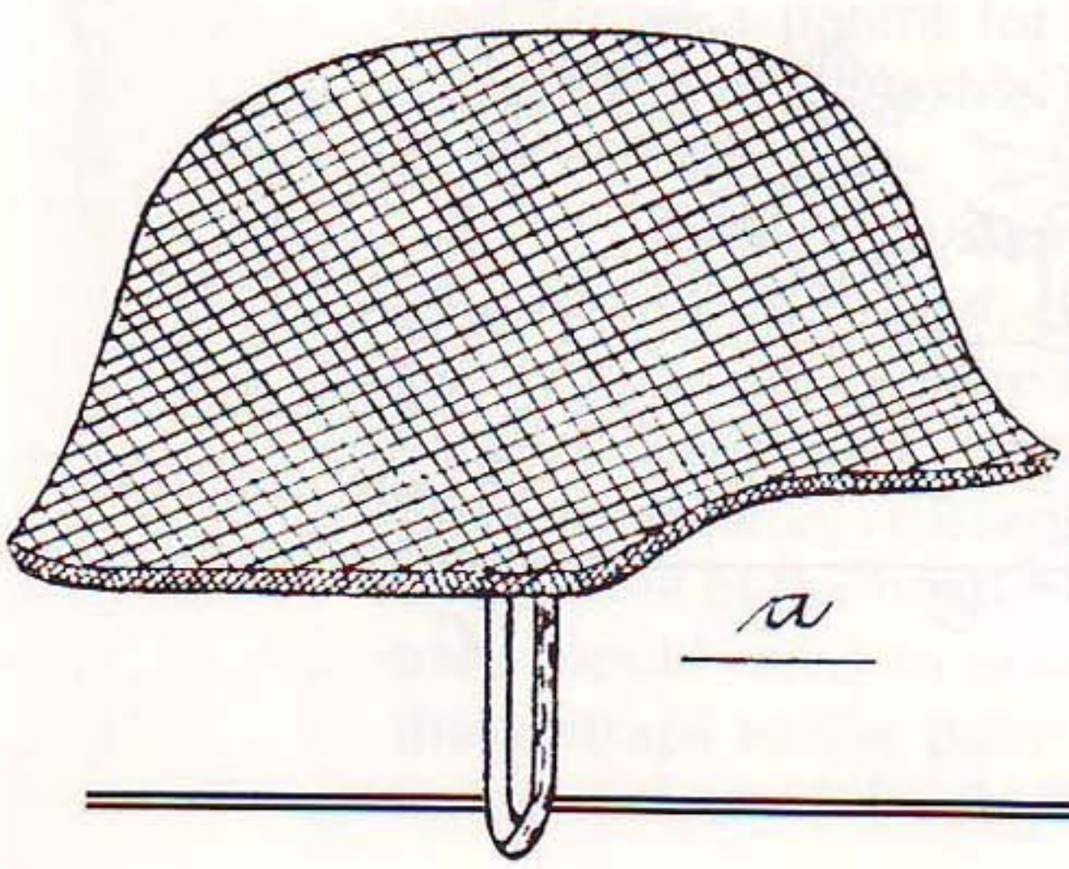
Fig. 6.

1458614/2G

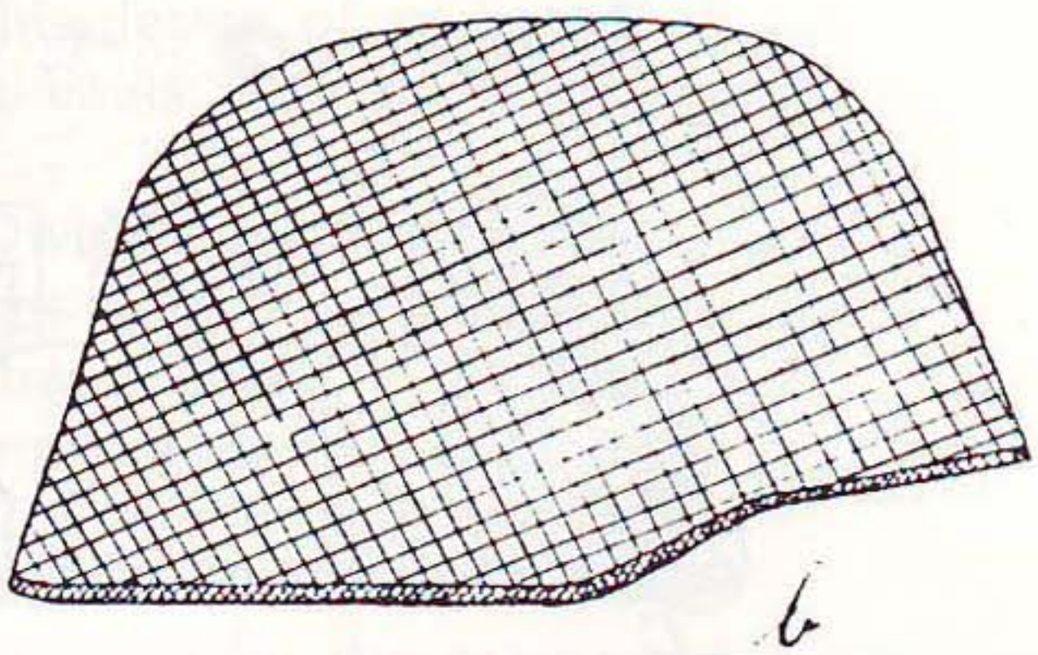
Patent No. 1458653 Group 72G Class 2

Gerhard Worlitzer of Heidelberg received a patent for a helmet camouflage net on 21 July 1938. His design was a typical netting which was shaped to fit the helmet, but it was equipped with a rubberized, elastic seam which would fit around the lower edge of the helmet, thus insuring a secure fit. The inventor also mentioned in the patent document that hooks could be used in place of the elastic band. It was felt that, by the use of the elasticized band, the camouflaging material could be readily changed to better suit the surroundings.

The diagrams show the netting in place on a steel helmet (figure a) and the netting alone (figure b).



a



b

Patent No. 682324

Group 72g Class 2_{05} N 40332 XI/72g

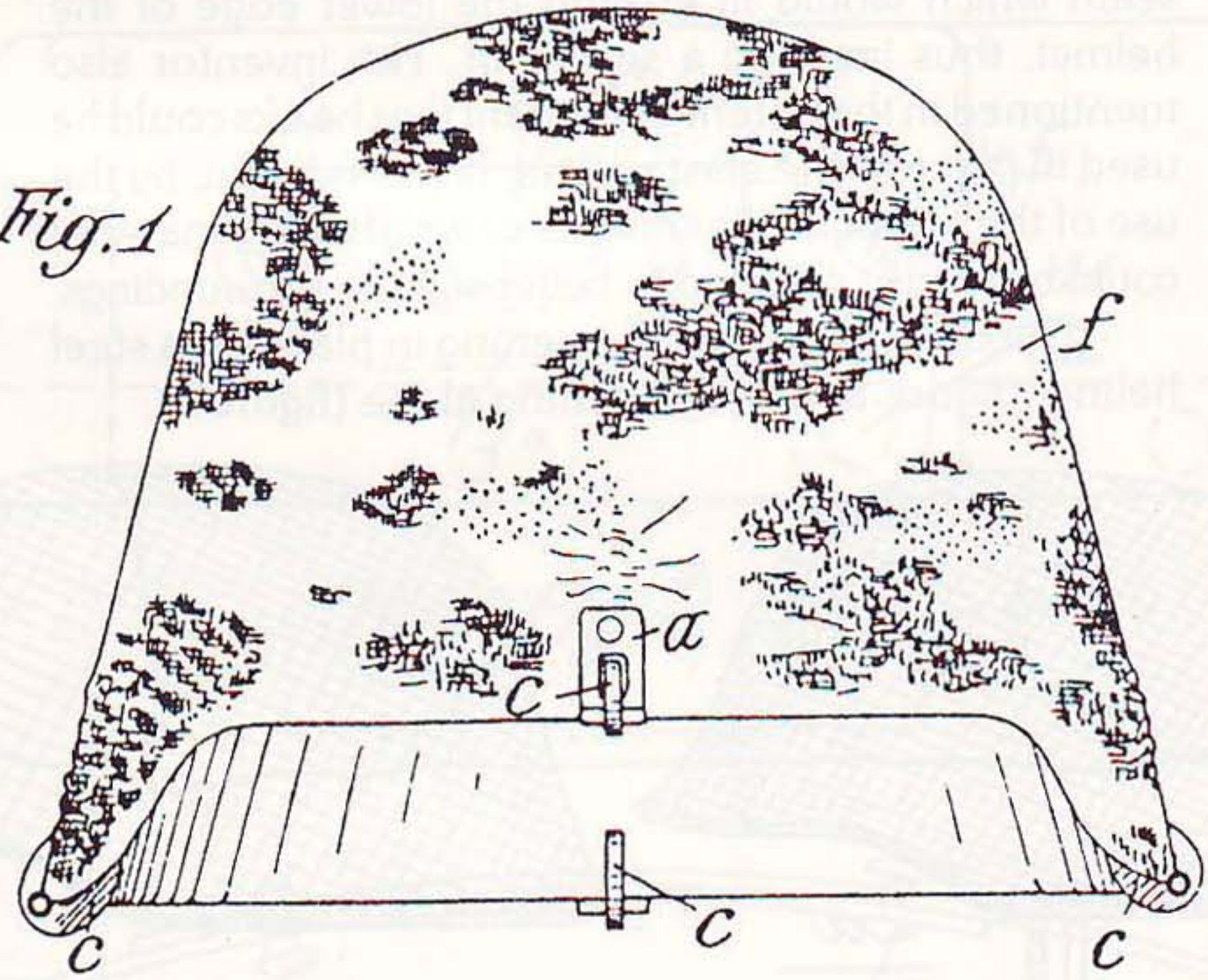
On 3 February 1937, a patent for a cloth camouflage cover for helmets was issued to Joahnn Georg Otto Schick of Munich. It is of interest to note that patent was issued jointly to Schick, as the designer, and to Heinrich Himmler, the Reichsführer-SS in Munich.

The camouflage cover was designed to conform to the shape of the helmet. It was secured by four metal hooks, one on each side, one in the rear, and one in the front at the visor. These hooks were "U"-shaped and were articulated at the base in order to allow them to rock from one side to the other. This would permit the reversible use of the cover without having hooks protruding outward on the exposed side where they might become tangled in branches or wire in the field.

These hooks were secured by the implementation of coil spring retainers which were attached by the hook assembly. This spring was then set into a hidden seam in the cover. Constant tension was assured by this method, which also allowed for the reversibility of the cover.

The diagrams show the front and side views of the cover as well as various aspects of the spring-loaded retaining hooks

Fig. 1



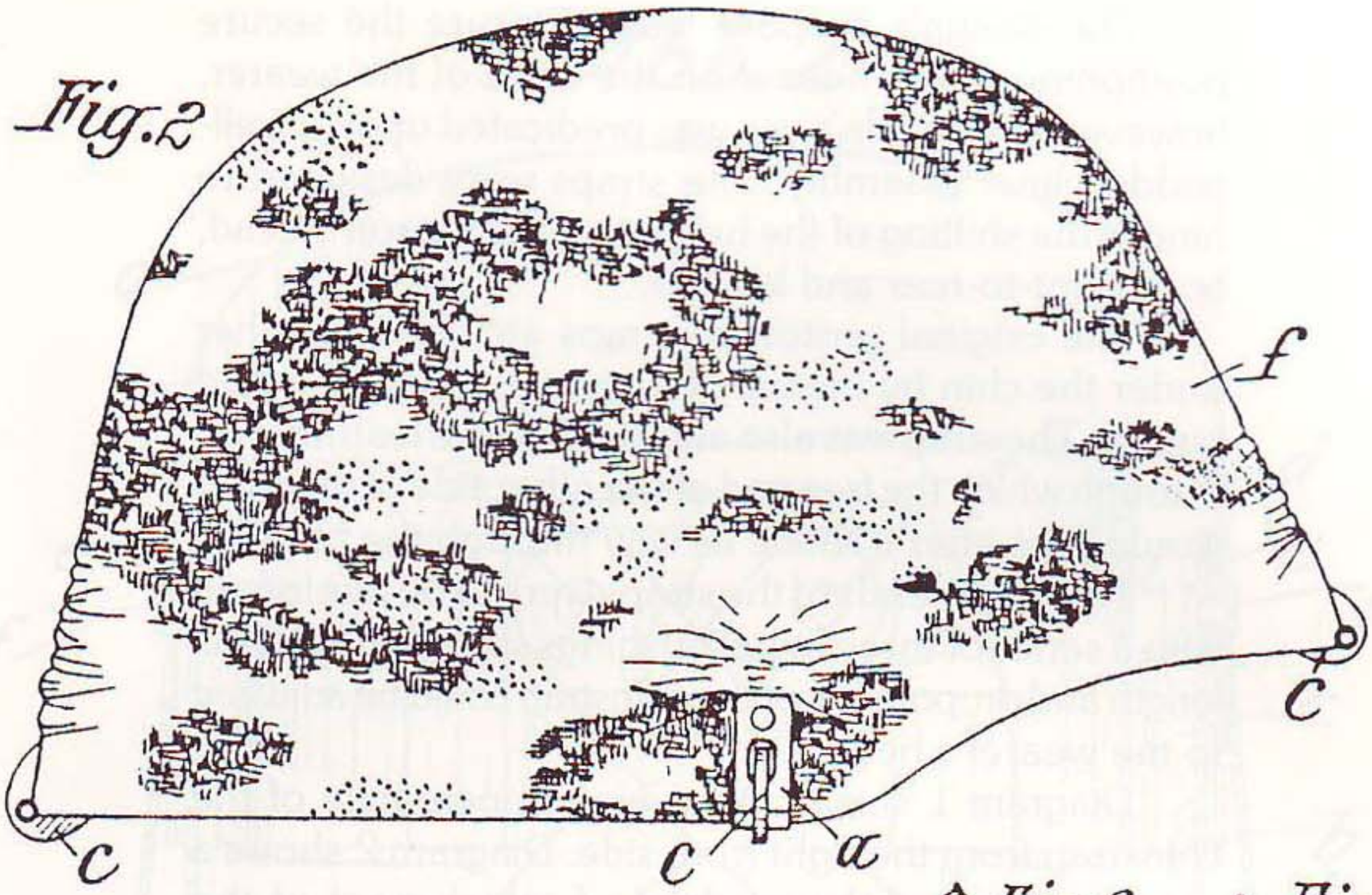


Fig.2

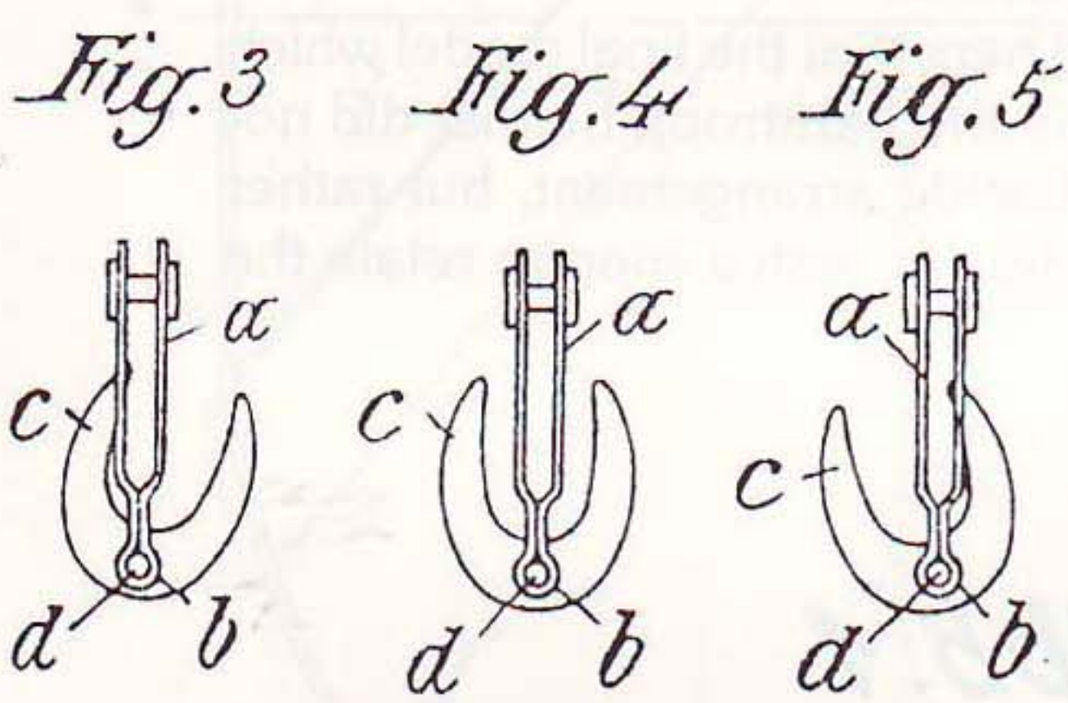


Fig.3

Fig.4

Fig.5

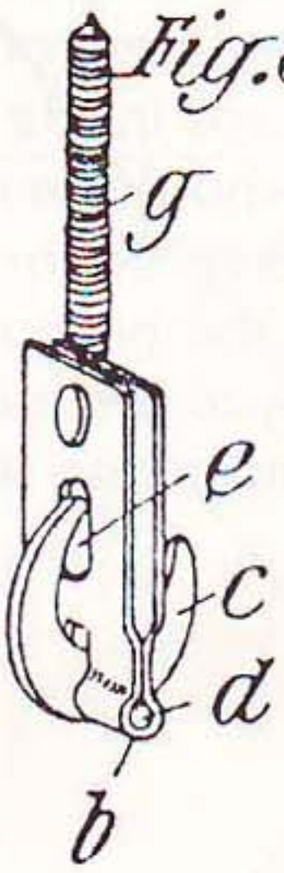


Fig.6

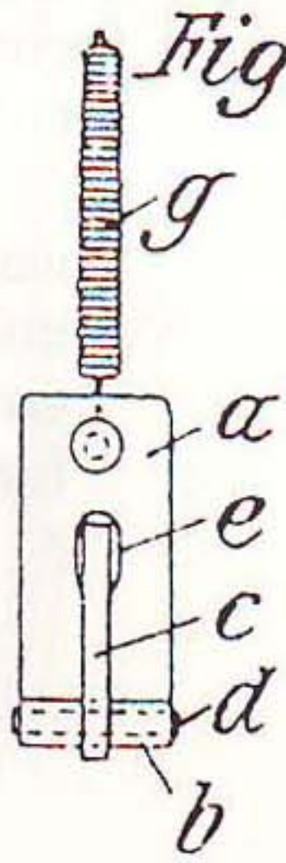


Fig.7

Patent No. 1483258 Group 72g Class 2

Karl Heisler of Magazinstrasse 14, Berlin Ost 27, was issued a patent for his design of an improved chinstrap system for steel helmets. The date issued was 21 April 1938.

This chinstrap system, which was used in the German paratroop helmet, consisted of two forked sides. The vertical ends of the straps passed in front of the ears, while the angular segments passed behind the head, where they crossed. Each end was to be secured to the shell of the helmet by means of bolts. Any liner used would need to allow space for the passage of these straps to the point of their attachment on the inside surface of the shell.

The design's purpose was to insure the secure positioning of the helmet on the head of the wearer, however, the system's use was predicated upon a well-padded liner assembly. The straps were designed to hinder the shifting of the helmet on the wearer's head, both front-to-rear and laterally.

The original prototype straps attached together under the chin by means of a typical, single-pronged buckle. The strap was also equipped with a leather loop through which the free end of the other side of the strap would pass after it made its way through the buckle.

The upper ends of the straps were to be reinforced with a series of three metal bushings so that the overall length and proportions of the chinstrap could be adjusted to the wearer's head.

Diagram 1 shows the overall appearance of the chinstrap from the right front side. Diagram 2 shows a cutaway view of the method of attachment of the chinstraps inside the helmet.

It should be noted here that the final model which was accepted for use in the paratroop helmet did not utilize the proposed buckle arrangement, but rather employed the friction buckle with a snap to retain the free end of the strap.

Abb. 1

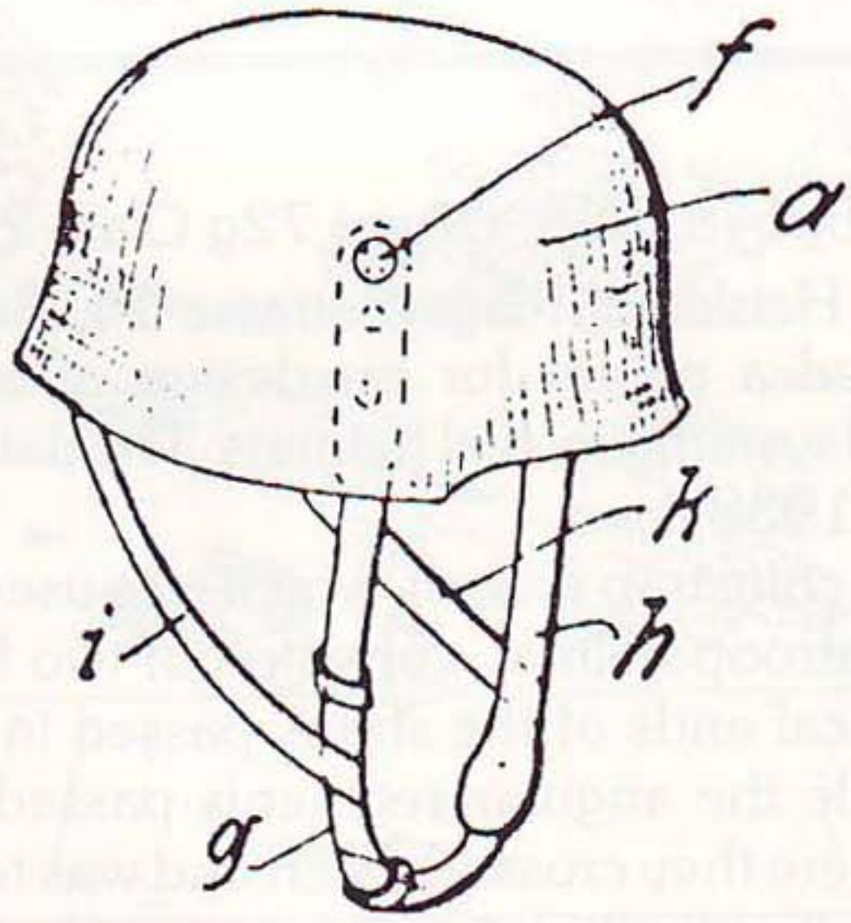
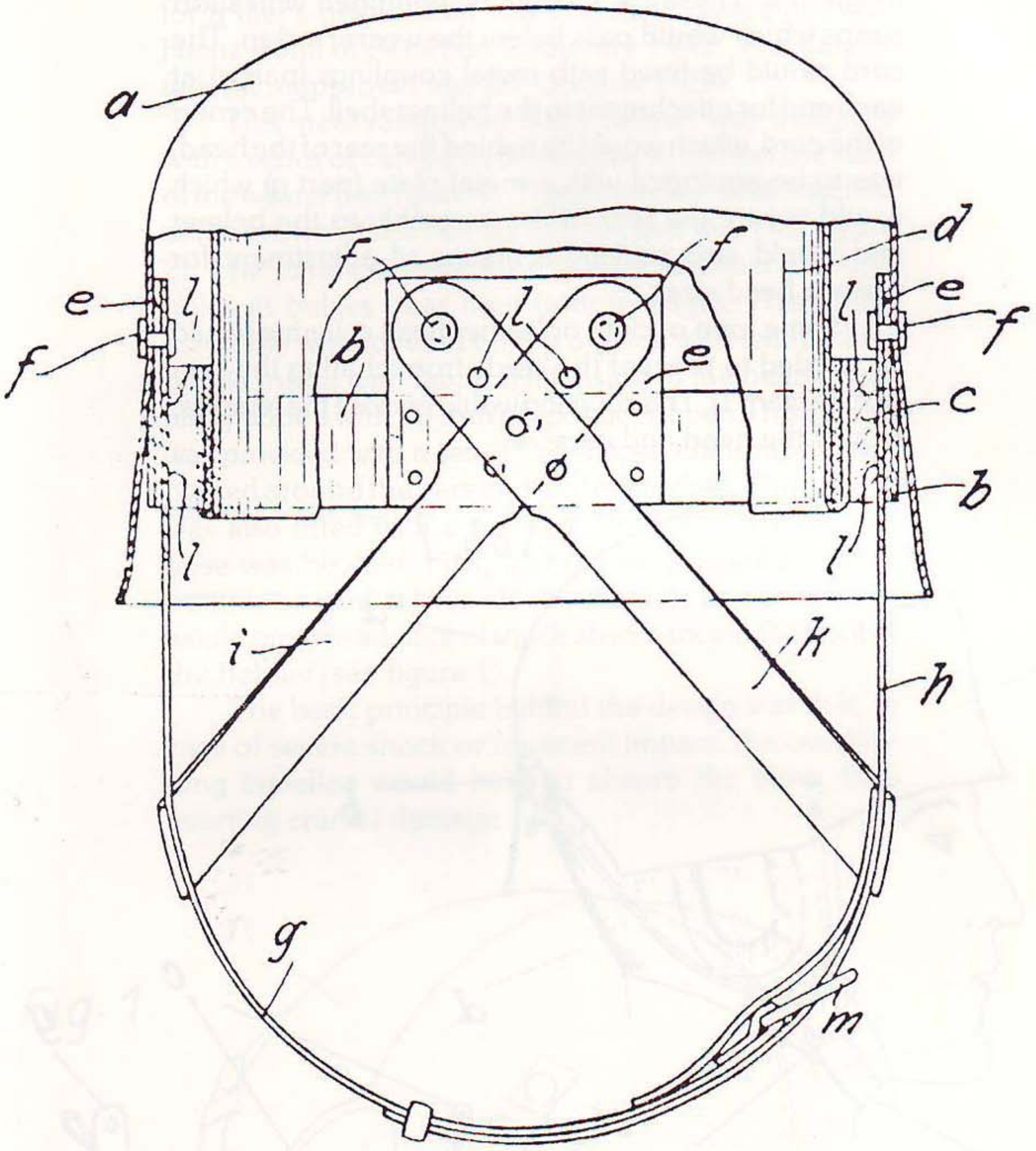


Abb. 2



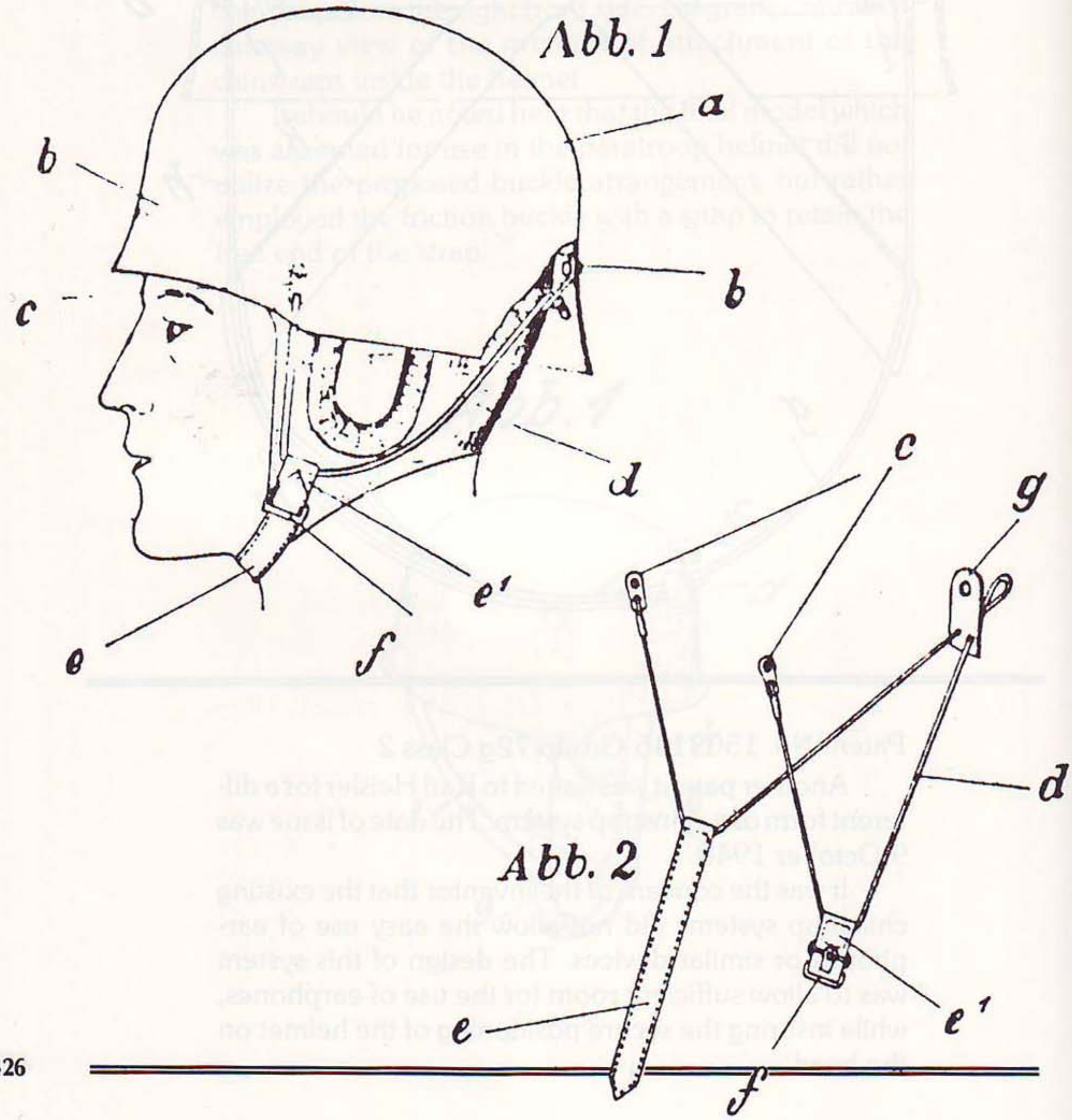
Patent No. 1503145 Group 72g Class 2

Another patent was issued to Karl Heisler for a different form of a chinstrap system. The date of issue was 9 October 1940.

It was the concern of the inventor that the existing chinstrap systems did not allow the easy use of earphones or similar devices. The design of this system was to allow sufficient room for the use of earphones, while insuring the secure positioning of the helmet on the head.

The design consisted of a length of cord which would be maintained in two "V" configurations, as in diagram 2. These "V"s would be equipped with short straps which would pass below the wearer's chin. The cord would be fitted with metal couplings (part c) at each end for attachment to the helmet shell. The center of the cord, which would lie behind the rear of the head, was to be equipped with a metal plate (part g) which would secure the rear of the assembly to the helmet and would also provide a means of adjustment for various head sizes.

Some form of cloth or leather head covering would be needed to prevent the cords from chafing the skin (see diagram 1). This covering would enclose the temples, rear of the head and ears.



Patent No. 766 199 Class 72g Group 102

The West German Patent Office recertified a patent for a flier's helmet that was originally issued to Paul-Heinz Röhll of Berlin on 9 January 1942. The date of federal reapproval was 25 October 1954.

This steel-reinforced flier's helmet was designed with a series of curved steel lamellae to protect the skull of the wearer (see figure 4). These lamellae were attached at the crown of the helmet to a circular disc (see figure 2). The lamellae were then riveted together through holes in bulges near their bottom edges. This entire assembly was covered on the outside with leather and on the inside with fabric. The inside of the helmet was also padded with 20 mm of sponge rubber. The helmet was provided with a set of "Y"-shaped chinstraps which passed around the ears and under the chin. The helmet was also fitted with a padded "grab roll" whose purpose was twofold. First, it could be grasped to aid in putting on and taking off the helmet, and second, it would provide additional shock absorbancy in the front of the helmet (see figure 1).

The basic principle behind the design was that, in case of severe shock or fragment impact, the overlapping lamellae would help to absorb the blow, thus averting cranial damage.

Fig. 1

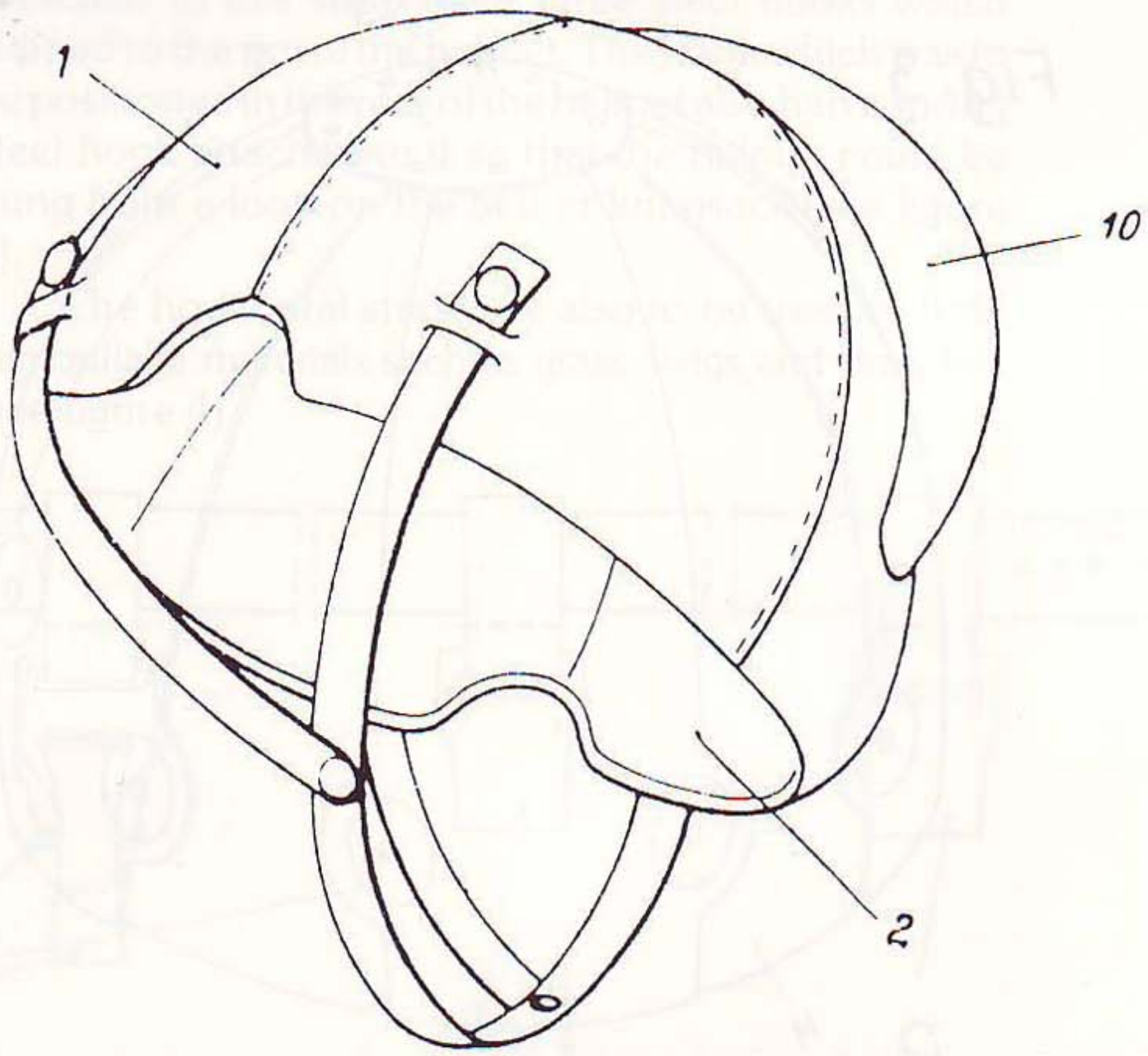


Fig. 2

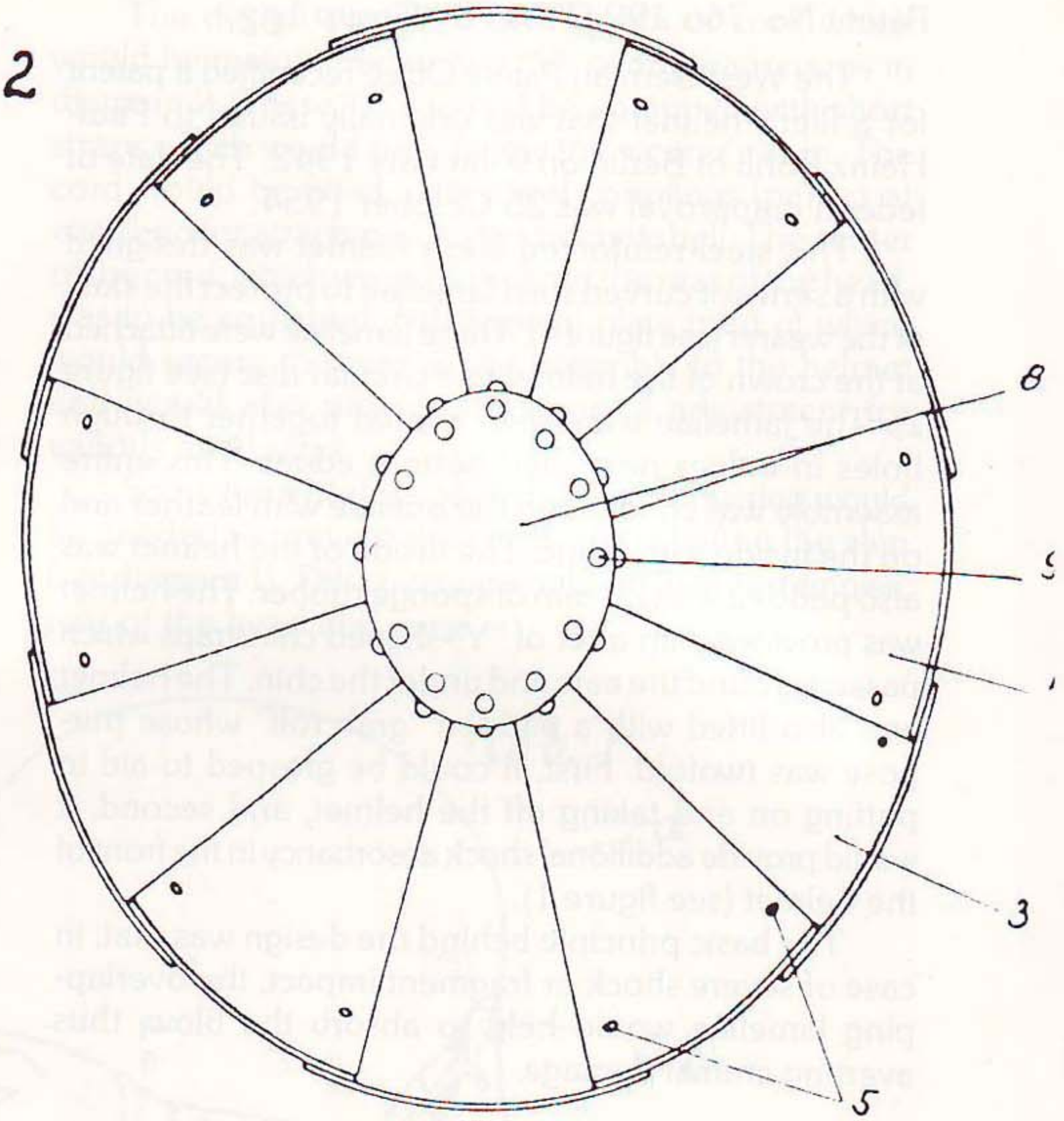


Fig. 3

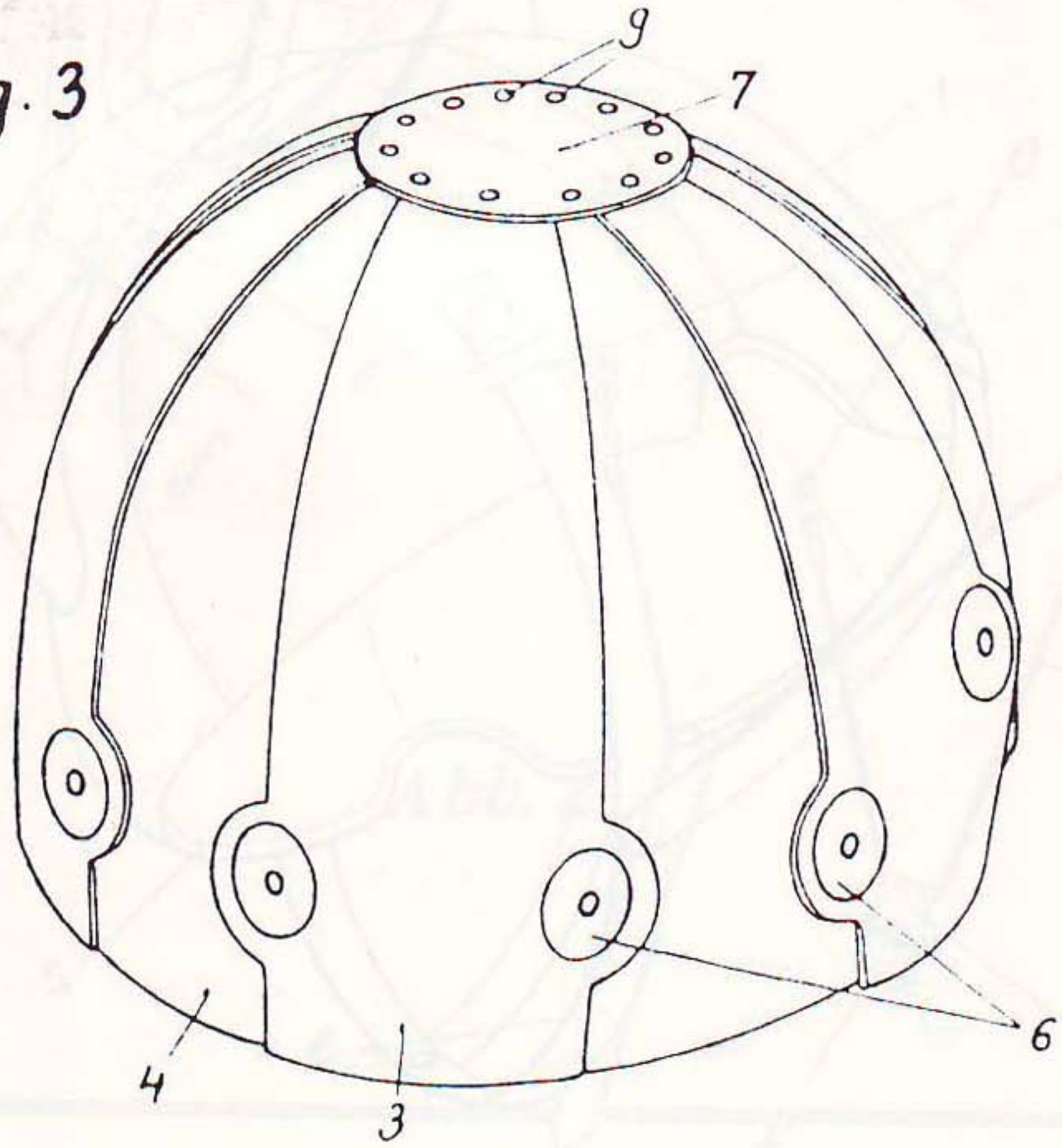
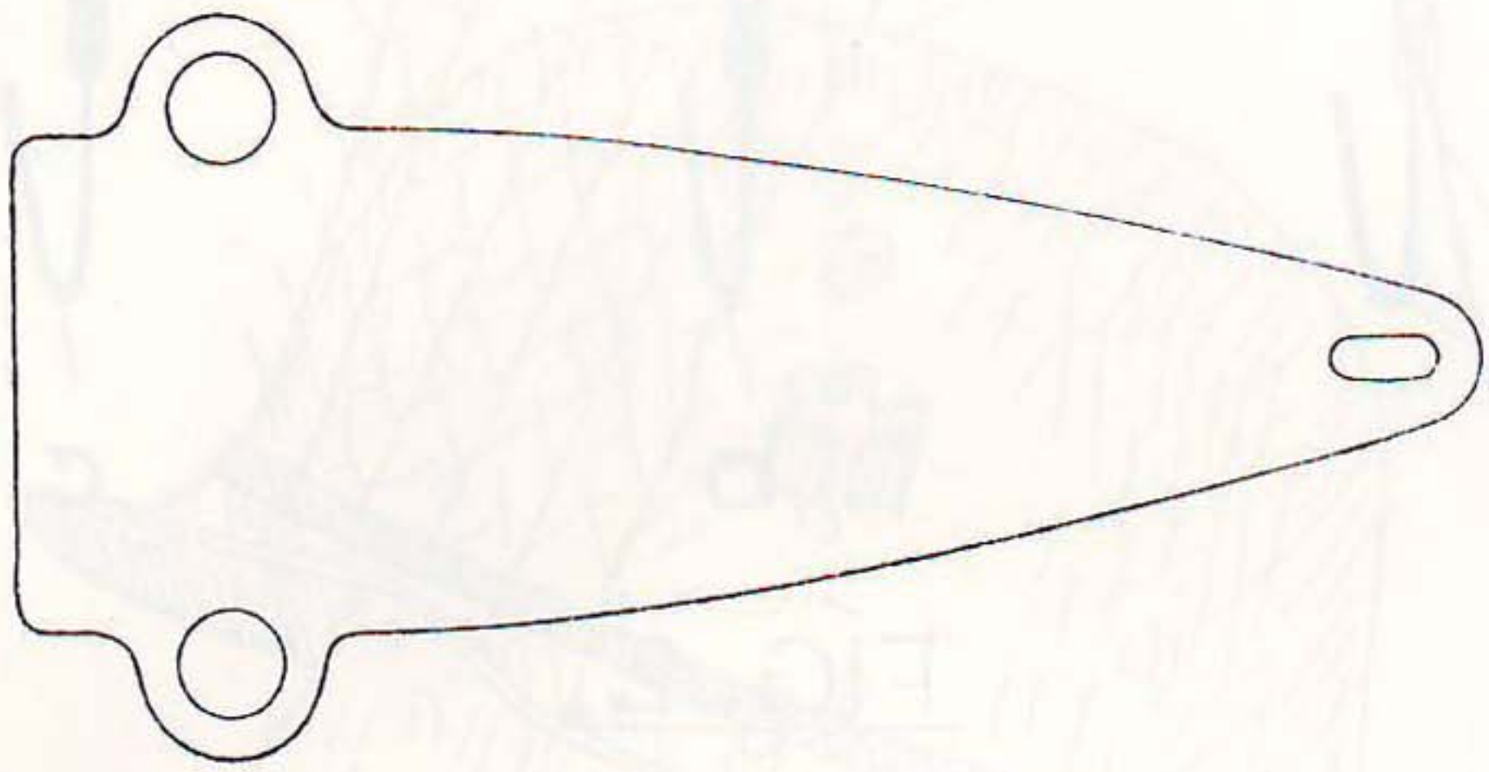


Fig. 4

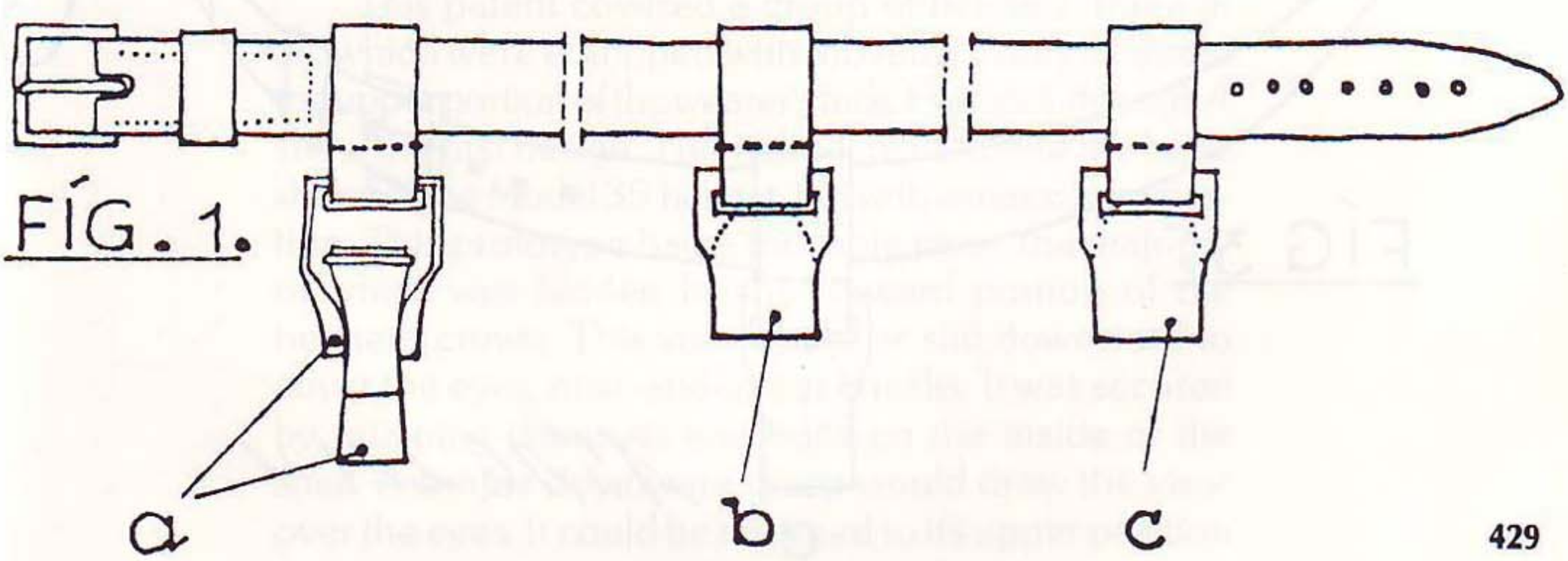


Patent No. 1516244 Group 72g Class 2

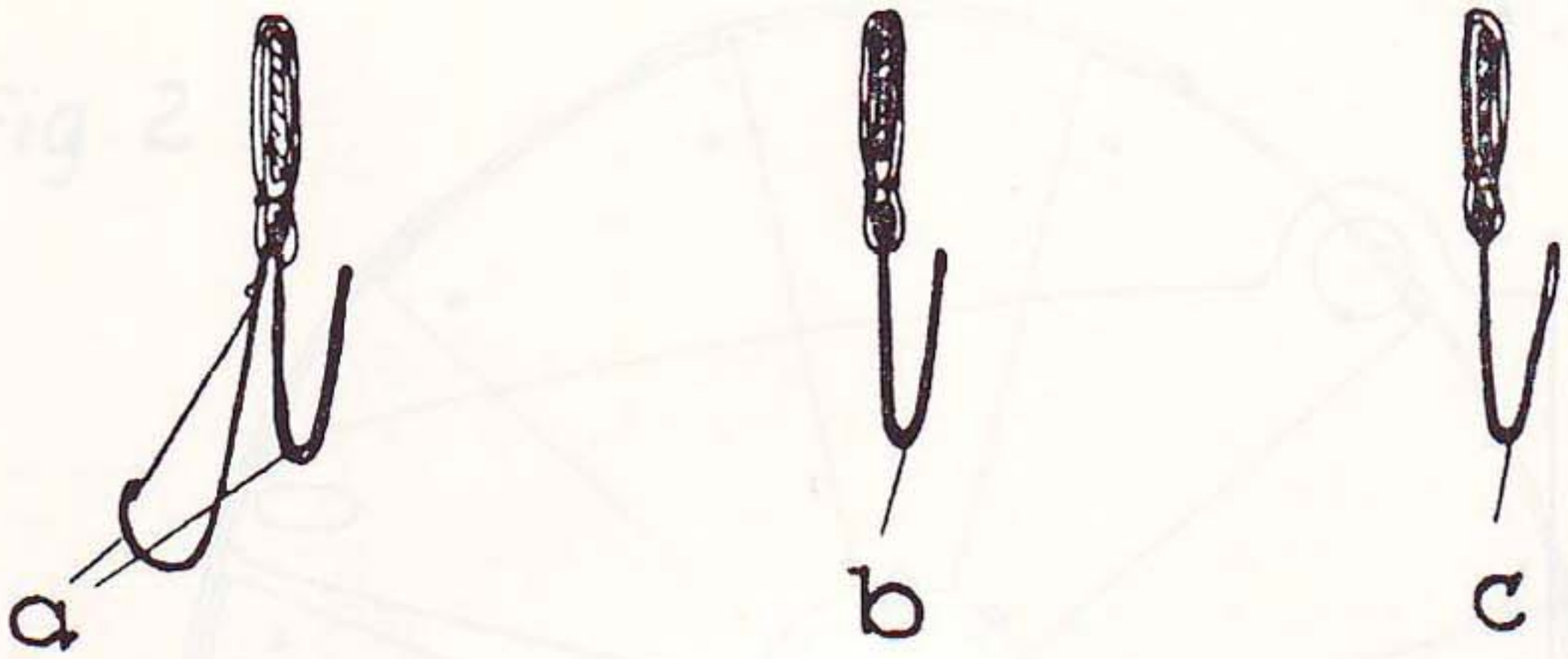
Stephan Glich of Markt Schwaben, Upper Bavaria, designed a helmet-hanging and camouflaging apparatus which was officially patented on 23 March 1942. This device was intended to be used for both suspending the helmet from the belt or knapsack and for securing camouflaging materials to the helmet.

The apparatus consisted of a leather strap which lay horizontally around the helmet. This strap was secured and adjusted by a single-pronged buckle. Attached to this strap were three steel hooks which clipped to the rim of the helmet. The hook which was to be positioned in the rear of the helmet also had a spring steel hook attached to it so that the helmet could be hung from a loop on the belt or knapsack (see figure 3).

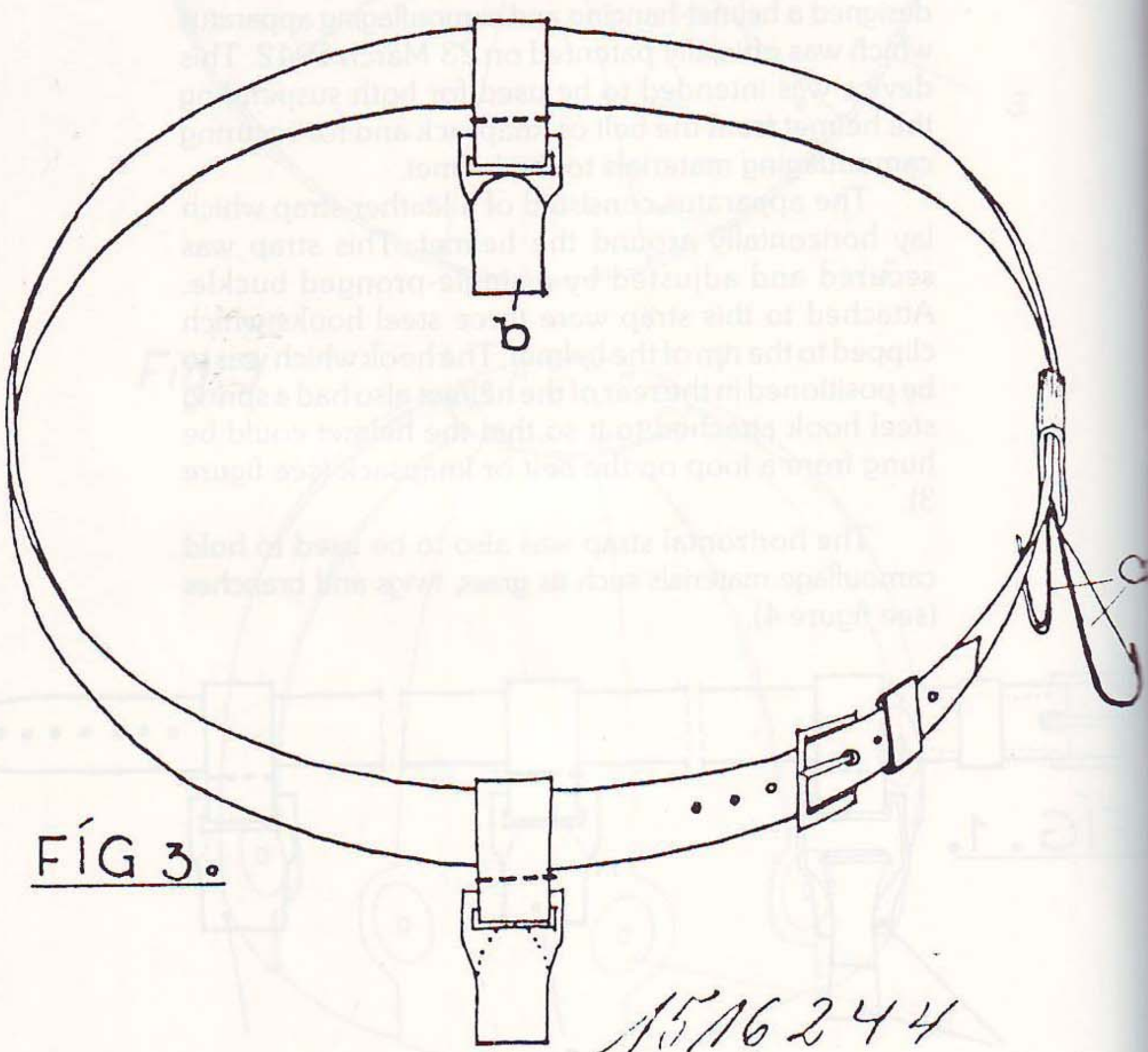
The horizontal strap was also to be used to hold camouflage materials such as grass, twigs and branches (see figure 4).



FÍG. 1.



FÍG. 2.



FÍG 3.

C

415162444



FÍG. 4.

Patent No. 722275 Class 72g Group 102

A patent was issued to Amelie Banfield von dem Knesebeck of Berlin-Grunewald on 2 February 1938 for her designs of visored steel helmets. This patent was held pending until 21 May 1942.

This patent covered a group of helmets, three in all, which were equipped with movable visors to shield the upper portion of the wearer's face. Figures 1 through 4 show the first design. This helmet maintained the basic shape of the Model 35 helmet, but with a major modification. This prototype had a movable visor, the majority of which was hidden by the forward portion of the helmet's crown. This visor could be slid downward to cover the eyes, nose and upper cheeks. It was secured by retaining channels and bolts on the inside of the shell. A simple downward grasp would draw the visor over the eyes. It could be returned to its upper position

Abb. 1

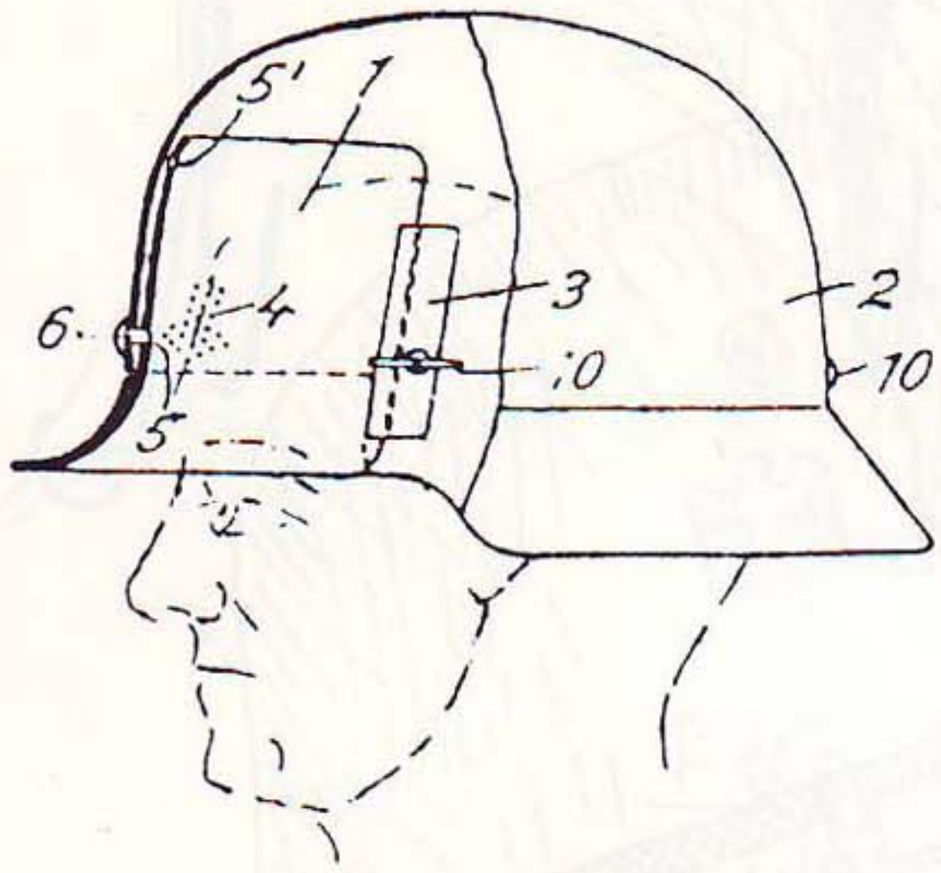


Abb. 2



Abb. 3

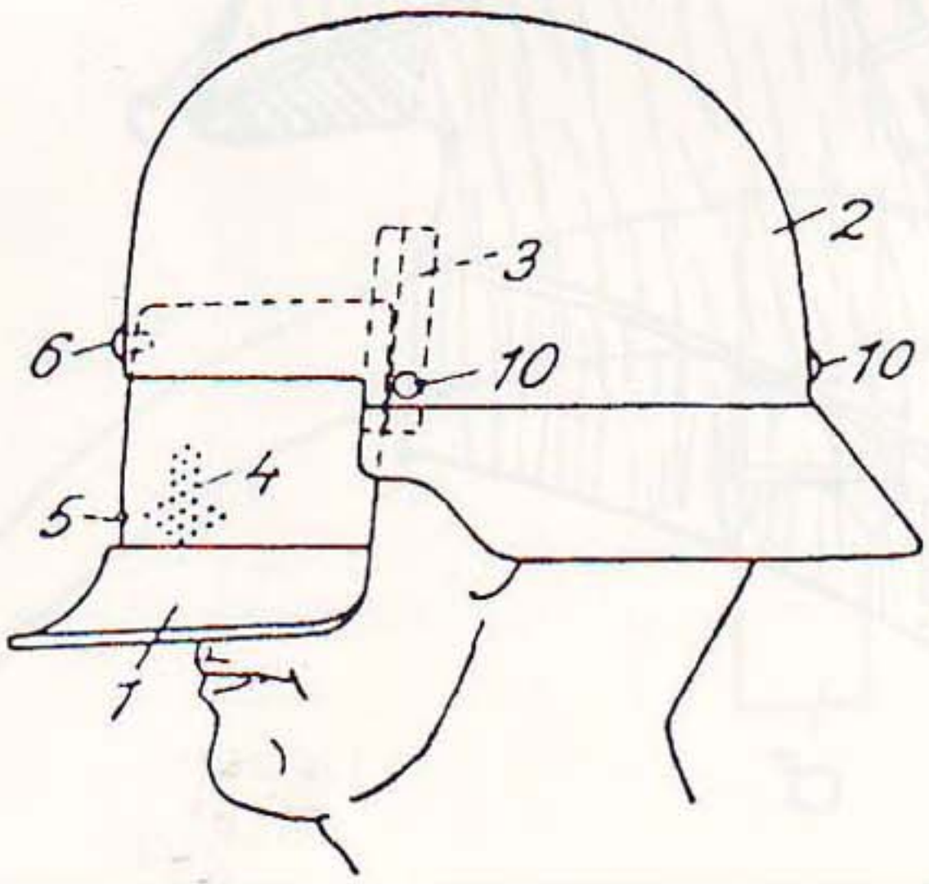
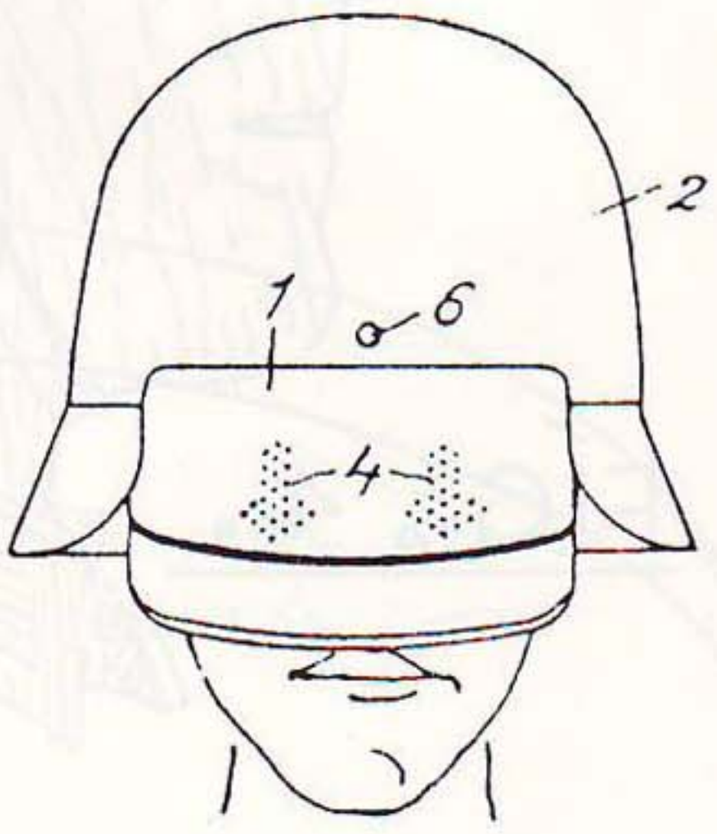


Abb. 4



as easily. Perforations opposite each eye were provided for vision.

Diagrams 5 through 7 show a different method for the implementation of a visor. In this prototype, the shape of the Model 35 helmet is also maintained, but the visor was to be found on the outside of the shell, hinged by two bolts on the sides, directly above and behind each ear. The visor was to be held in the up or down position by the friction of a retaining bolt head on the front of the shell. The majority of the helmet's original apron and all of its visor would have had to be removed in order to allow room for the visor's articulation. Slits were to be provided in the visor to permit vision. A variety of other possible visor perforations are shown in figures 10 through 12.

Another type of visored helmet is shown in figures 8 and 9. The visor arrangement was similar to that in the preceding prototype, but the overall shape of the

helmet greatly resembled the British Mark I. It is assumed that this prototype might also use any one of the three eyeslit variagions as pictured in figures 10 through 12.

Abb. 5

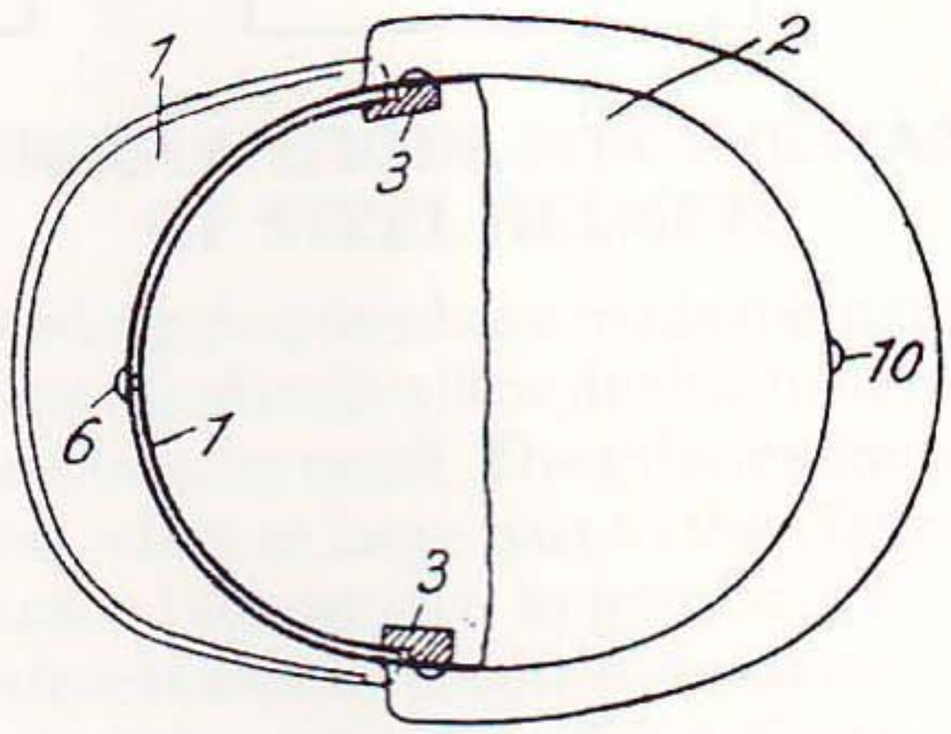


Abb. 6

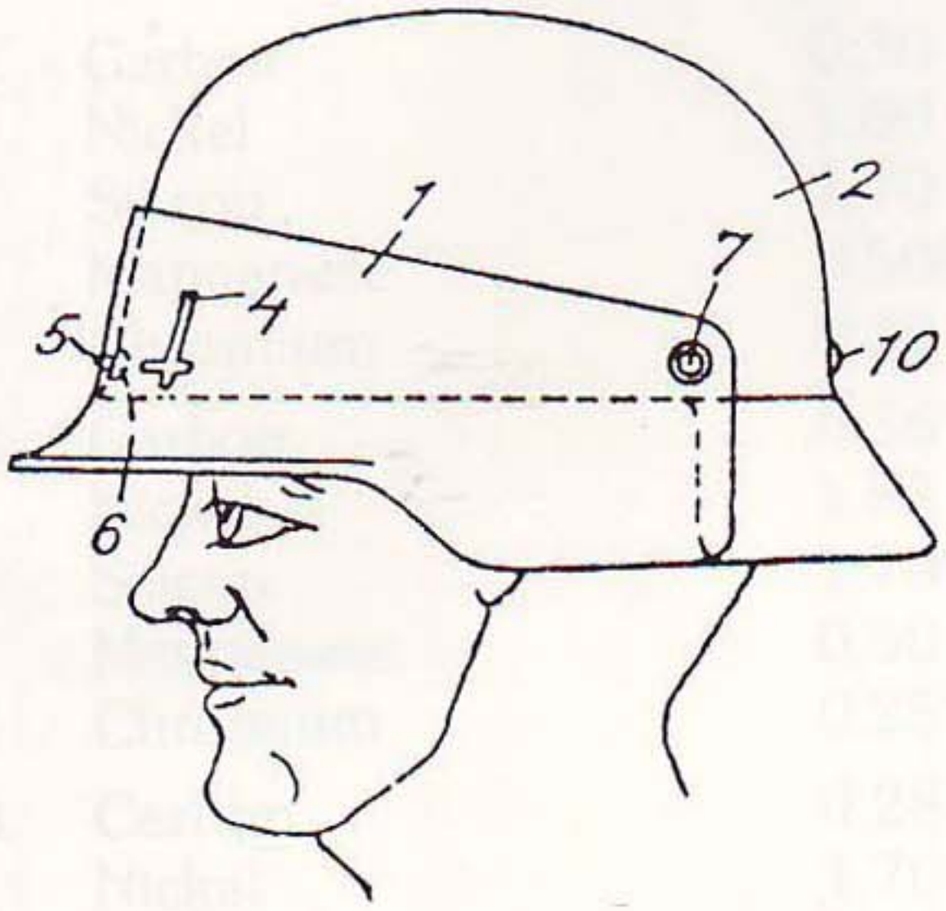


Abb. 7

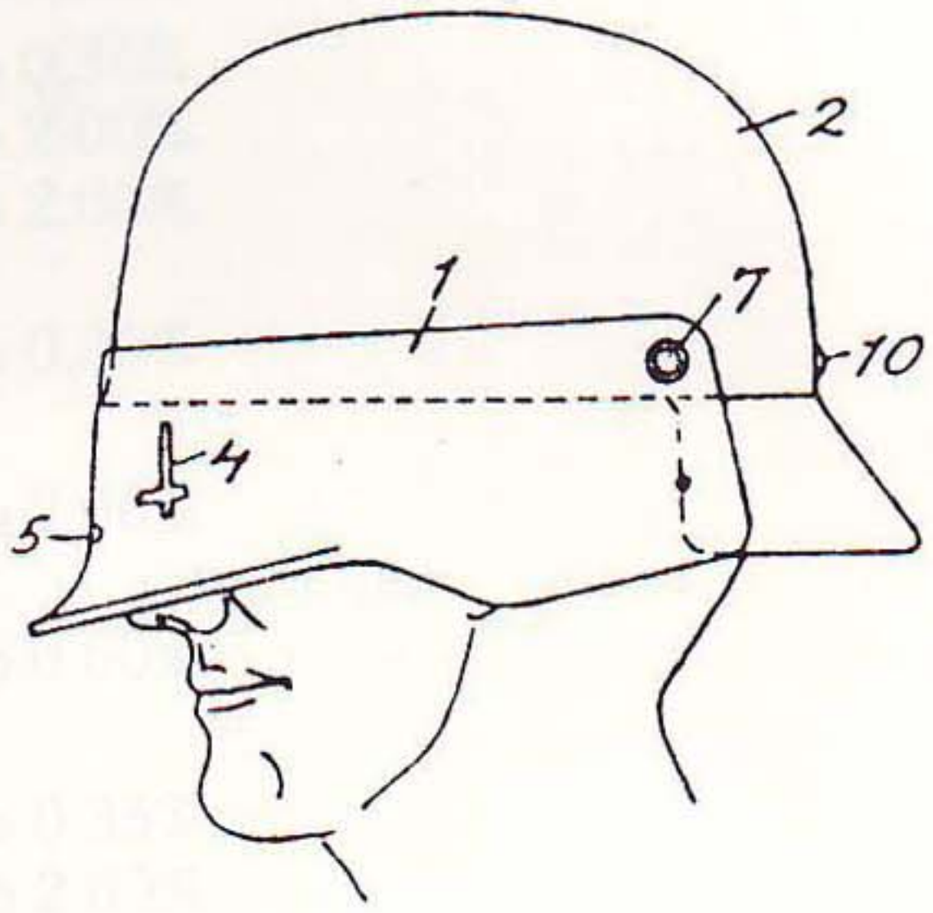


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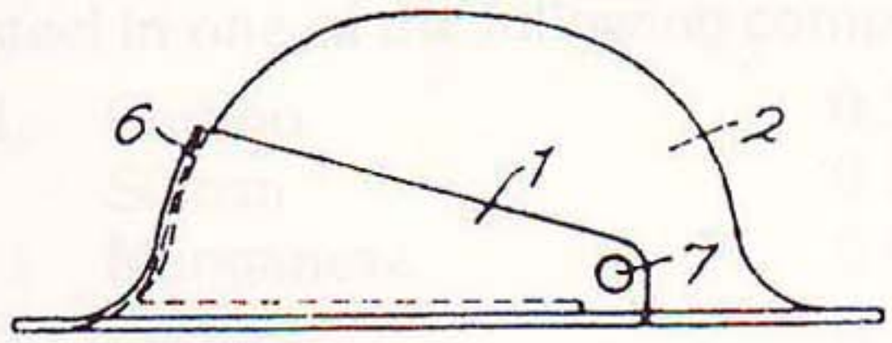


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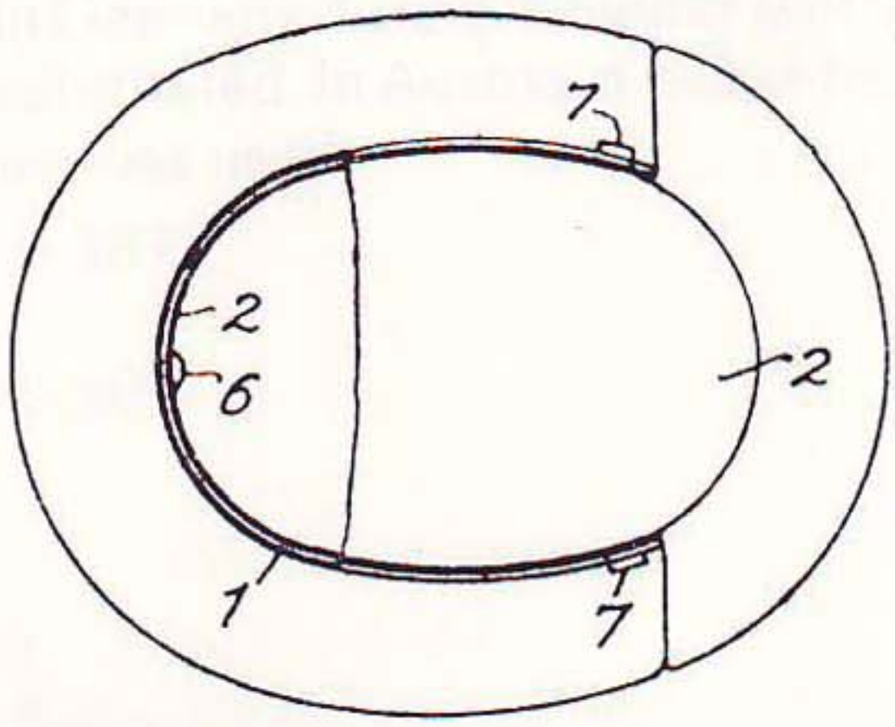


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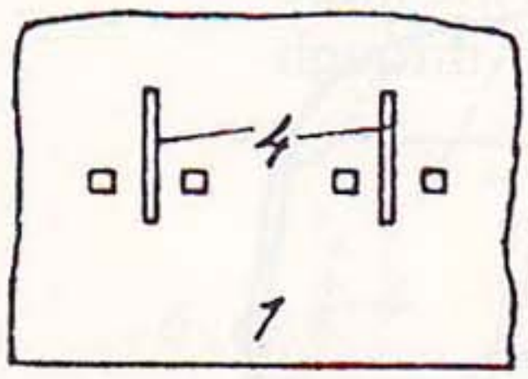


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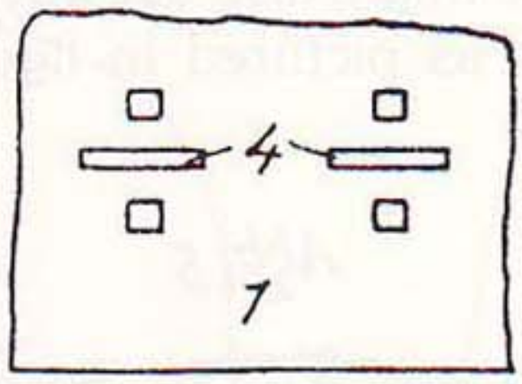
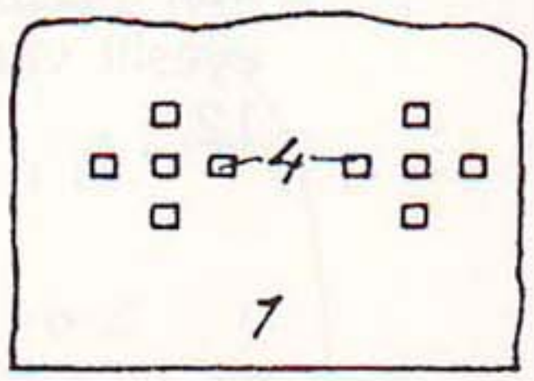


Abb. 12



TECHNICAL REGULATIONS FOR THE MANUFACTURE OF STEEL HELMETS

Although the preceding chapters have made mention of some aspects of helmet production, specific details will be dealt with here, even though a certain amount of repetition may result. The information stems partially from Austrian sources and refers in large part to the German pattern helmets made in Austria. Austria had decided to introduce the German helmet in late 1916 for its own forces and the production was to take place on Austrian soil. The technical information was originally supplied to Austria by Germany and therefore the data from the two countries ought to be comparable. The starting material in the helmet's manufacture was a chromium-nickel steel which had the following varying compositions in Austria

1.	Carbon	0.30 to 0.35%
	Nickel	1.80 to 2.00%
	Silicon	1.70 to 2.00%
	Manganese	0.50%
	Chromium	0.30 to 0.35%
2.	Carbon	0.36%
	Nickel	1.85 to 2.00%
	Silicon	1.70%
	Manganese	0.50 to 0.60%
	Chromium	0.25%
3.	Carbon	0.28 to 0.35%
	Nickel	1.70 to 2.00%
	Silicon	1.40 to 1.75%
	Manganese	0.50 to 0.60%
	Chromium	0.25%

Since nickel was a scarce commodity in Germany during the latter part of the war, a carbon-manganese steel was substituted. In Austria, a nickel-free steel in one of the following compositions was used:

1.	Carbon	0.30 to 0.38%
	Silicon	0.25%
	Manganese	0.40 to 0.50%
2.	Carbon	0.35%
	Silicon	1.50%
	Manganese	0.70%
	Chromium	0.50%

In any case, the steel had to demonstrate the following strength values:

1. Strength of the helmet steel in planchet form:
   a. strength — ca. 75 to 85 kg/mm²
   b. stretching — ca. 12 to 14%
2. In the form of highly annealed helmet steel:
   a. strength — ca. 70 kg/mm²
   b. stretching — ca 14%

The steel was supplied to the rolling mills in ingot form by the steelworks. Here, they were rolled out into planchets and were then sent to the drawing mill. The rolling plant, which had no facilities for helmet production, sold the planchets to the Army administration, which in turn sent them to the helmet manufacturers. There were very strict regulations which governed the total helmet manufacturing process and these will be presented in the following section. First of all, the conditions for the steel supply process and the supply of linerless helmets from this steel will be indicated. These regulations originated in the beginning of June 1916 and are very likely the first official German acceptance regulations.

"Conditions for the Supply of Steel
and the Linerless Helmets Stamped from It."

A. General Comments

1. The helmets are to conform to the specifications in the attached diagrams (now unfortunately lacking). They are to be drawn in one piece from sheet steel and then the border is to be crimped. After the installation of the various holes and iron fittings, the helmet is to be tempered. After cleaning the outer surfaces by sandblasting, the lacquered coating is baked on the helmet. If the need arises, the regiment number may be applied to the helmet by means of a transfer.

2. The steelworks are obligated to scrupulously differentiate the smeltings by marking each of the ingots. The sheet steel produced by the drawing mills which do not have their own steelmaking facilities is to be approved at the time of procurement by the War Ministry. The necessary templates for the production of the helmet, for the punching of the holes, and the stencils for the application of the regimental numbers are to be procured through the War Ministry.

B. Acceptance

3. The acceptance procedure is broken down into the following:
   a. the release of planchets for fabrication
   b. the testing of the external quality of the helmets and the undertaking of the ballistic testing after tempering, but before the installation of other fittings and the application of lacquer.
   c. the final acceptance through testing of measurements, weight, lacquering, and ballistics.

a. Release of the Planchets for the Manufacturing Process

4. The release of planchets takes place under the auspices of a representative of the War Ministry and also of the steelwork, so long as the

steelwork carries out the drawing process. Otherwise, the release will take place at the Eisenhüttenwerk in Thale/Harz (see also heading 6). The presence of representatives from the drawing mill at the time of acceptance is permitted.

5. The steelworks are required to maintain records of the supply of planchets and to keep data on the following: the number of the smelting, exact analysis, size of the smelting, and the total weight of the planchets made from that smelting. Each planchet is to be stamped with a factory designation and the smelting lot number under the control of the acceptance officials. The preceding information must be sent to the War Ministry prior to the sheet-rolling process.

6. The representative of the War Ministry is to select one planchet out of each one hundred from a particular smelting lot, or a minimum of two, grand total. The weight of the planchets must be around 30 kilograms. He will then order these planchets to be rolled out into sheets of a 1.0 mm thickness and thence three helmets are to be stamped out of this material. If the established requirements for the helmet's final acceptance are fulfilled (see heading 11), the helmets will have their holes punched and will be tempered. Following this, they will be ballistically tested as outlined under heading 9.

Those plates made in the steel mills which do not have drawing facilities will be rolled out at the Eisenhüttenwerk in Thale/Harz and will be treated as previously mentioned. During this testing procedure, the presence of a representative each from the steel mill and the drawing mill will be permitted.

If these helmets meet the requirements, then the total smelting lot will be released for rolling.

The rolling mill is to perform the sheet-rolling process on the planchets marked with the smelting designation under the supervision of the acceptance officials. The rolled metal sheets are allowed to have a maximum tolerance between -0.03 and +0.07 mm. It is in the interest of the rolling mill to observe these limits carefully.

If a smelting lot proves to be unsatisfactory, it will be returned to the steelworks. The cost for the production of the test helmets are to be borne by the steelworks. Rifles and ammunition are to be provided free of charge.

The rolling mill is to stamp the initials of the steel mill and the number of the smelting lot (e.g. B.R.93) into the center of the helmet blank (later to become the inside of the crown of the helmet) immediately after the blank has been cut out of the metal sheet.

In addition to this, the drawing mill will stamp its own initials and the size of the helmet into the left, inner side of the apron (e.g. T.64).

b. Testing of the Exterior Quality and the Undertaking of the Ballistic Testing

7. After the tempering process, the helmets are to be shipped from the tempering plants for acceptance in lots of 1000 (or partial lots of 500).

8. Helmets with bulges, tears, scaling, bubbles, scars, impurities or

scorifications will be separated by the acceptance officers and destroyed. This material is counted as scrap against that particular smelting lot.

9. For ballistic testing, the helmets will be presented in lots of 101 units. One helmet from each lot will be selected by the acceptance officer. The test will be carried out from a range of 40 meters with a rifle made available by the Rifle Testing Commission.

One shot will be fired at the main axis of the helmet at the base of the forehead shield; a second will hit approximately 4 cm above the previous point of impact, but will be fired from an angle approximately 45° below the helmet. If needed, a third shot will be fired at the rear of the helmet.

Inward bulges no greater than 2.0 cm deep may result, measured from the original dimensions of the test helmet.

Shots passing through the helmet are only permissible in the areas of transition from the crown to the visor and neck apron. A penetrating shot should indicate sufficient toughness of the material to the point where the fringes of the entry hole are not bent inward and where all neighboring material should be intact.

10. If the first helmet of the lot fails the test, then five further helmets are to be selected for testing. If any one of these helmets fails, then the entire lot is to be sent back for reprocessing.

From this retempered lot, five more helmets will be selected and all must pass the test. Should this not be the case, then the lot will be rejected and will be rendered unusable in the presence of the acceptance officer.

c. **Final Acceptance**

11. These parameters will be tested:

The measured tolerances in accordance with diagrams and/or instructions. A set of instructions exists for this testing which deals with the shape of the helmet and the proper location of the ventilation lugs from which the frontal shield hangs.

The weight, which is permitted to have a variance of -40 to +80 grams from the normal weight.

The lacquered finish, relative to its uniformity, unbroken coverage and hardness; these are a result of a proper finish baking process (8 hours at 120° Celsius).

12. Those helmets judged as acceptable will have a colored stamp imprinted on them.

Flawed helmets will not be accepted. The cost of the drawing is chargeable to the appropriate drawing mill as soon as it is established that the flaws are directly attributable to the drawing procedure of that plant. If it is established in contrast that the flaws result from the raw materials, then the account of the drawing mill will be recredited."

In the "General" section, the matter of the regimental number was considered. At a later point, the use of this number was discontinued, probably because it was thought to be no longer useful. In any case, the 118th Infantry Regiment, which was a part of the first assault wave at Verdun, did receive numbered helmets. The testing of these helmets was

carried out with Model 1871 rifles.

A group of specialized machines was necessary for the production of steel helmets:

1 parallel shear for cutting the planchets, Model A1b, with a blade length of 1570 mm
1 eccentric press for cutting the blanks out of the planchets
2 tool sets for the above
2 knee-lever drawing presses for the shaping of the helmet
2 accessory tool sets for the above
1 sizing lathe for trimming and bordering the helmet, Model A.B.i., with a maximum height of 350 mm
1 oval forming machine
1 set of accessories for the above two devices
1 crimping machine, Model UQ, to roll the helmet's edge
1 friction screwpress for the final bordering of the helmet, Model L.K., arbor diameter 165 mm
1 eccentric press, Model OP, for punching out the upper holes of the helmet, 300 mm projection of the machine
1 sizing lathe, Model TS, with a 400 mm peak height for finishing work
1 oval forming machine, Model Ld4, 400 mm peak height, 720 mm diameter

For each helmet size, one such set of machinery was required. The primary supplier of these machines was the firm of L. Schuler in Göppingen. One complete set cost 40,000 Marks at that time. Aside from the above-mentioned machinery, two combined hardening and tempering ovens were required. These ovens had an output of 3000 helmets per ten hours. The supplier of these ovens was the firm of Friedrich Siemens, Berlin. In addition, sandblasting apparatus was needed for cleansing the helmets. During the process of drawing the helmets, a series of intermediate steps was required to see to it that the helmet did not fracture because the steel was too weak.

Many dispatches which were sent between the representatives of the Prussian War Ministry, Major Küntzel and Naval Engineer Moller, and Austrian officials dealt with the increasing difficulties encountered in Germany with the production of steel helmets. From the pages of Prussian War Ministry records, it is known that 40 steelworks were contacted with regard to their possible manufacture of steel helmets. On the basis of the difficulties involved with this manufacture, only twelve plants actually produced helmets:

a) Bing Bros. AG, Nürnberg
b) F.C. Bellinger, Fulda
c) J. & H. Kerkman, Ahlen/Westphalia
d) Gnüchtel Bros. AG, Lauter/Saxony
e) United German Nickel Works, Schwerte/Westphalia
f) R. Lindenberg AG, Remscheid
g) Körting & Mathiesen, Leutsch/Leipzig

h) Hermann Weissenberger & Co., Stuttgart-Cannstadt
i) C. Thiel & Sons, Lubeck
j) Eisenhüttenwerk Thale AG, Thale/Harz
k) Eisenhütte Silesia, Paruschowitz/Upper Silesia
l) Siemens & Halske AG, Siemensstadt/Berlin

The liner assembly manufacturers did, at least in part, mark the rough side of the liner with a rubber stamp. Most of the manufacturers were located in Offenbach, although one plant was in operation in Hamburg-Altona. Several manufacturers can still be identified:

Wilhelm Leiber & Son, Offenbach
Stern & Co., Offenbach
Emanuel Kahn, Karlsruhe

Another manufacturer of accessories was the firm of Otto Koch & Co., Berlin S.0.26. This company produced both chinstraps and white camouflage covers for the steel helmets.

The following section is a translation of the orginal German regulations for the acceptance of the white helmet cover:

"to No. 2207.12.16 B 3 C b

Description and Acceptance Regulations of the White Helmet Cover for the Steel Helmet.

The cover is made of white linen fabric or substitute fabric and its shape is designed to conform to the helmet. It is made of six wedge-shaped, curved sections joined at the peaks and then sewn together with lap seams. The border of the cover is sewn with an approximately 10 mm wide double seam. The region which covers the visor of the helmet has a slight upward curve.

Both sides of the cover have 14 mm wide openings through which the ventilation lugs of the helmet pass. Thin, circular leather washers are sewn on above and below the cover's openings. The diameter of the outer washer is ca. 28 mm, but the inner wsher measures a. 36 mm.

Attachment to the helmet is accomplished by eight hooks of zinc-coated iron wire which are sewn to the underside of the cover and then are partially covered by a small piece of linen (or substitute) cloth.

The cover must fit the helmet in such a way that the entire helmet is covered; it must be well-secured and it must not hang down over the lower edge of the helmet.

The wearer's free vision must not be restricted.

Each cover must bear a size stamp (e.g. 60, 62, 64, 66, 68) and a company mark on the inside front of the cover along the seam."

In the 1920's, the steel helmet was not modified by the Reichswehr because of financial reasons, except for the fact that on 31 August 1925, it was ordered that future chinstraps should be supplied in a black color. The very first chinstraps were taken off the leather spiked helmets and these chinstraps, which were utilized with the M16/18 liners, were brown in color.

In 1931, the "Schuberth Werke" in Braunschweig applied for a patent on a helmet liner. The designer was a Herr Thannert who worked as the director of the "Liner" section of the plant. This liner was then designated as the Liner System 31 (Innenausstattung 31) after the Reichswehr's acceptance of it and was then installed in M16/18 helmets. In the following years, the liner was further improved by two men at the Schuberth Werke, Voss and Holzberg. It remained as the liner used in German M35, M35/40 and M42 helmets until the development of the simplified M44 liner system.

In the beginning of the 1930's, new conditions for the supply of steel and for the helmets made from this steel were established. These conditions were based on secret equipment requirements, but were not essentially different from those in effect during the First World War and therefore were never enacted. The Eisenhüttenwerke in Thale and the Emaillierwerk AG in Fulda were contracted to produce helmets. Thale was forcast to produce 8000 helmets per month and Fulda 3000. How many helmets actually were produced can no longer be determined. In conjunction with these preparations, regulation documents from the First World War were used.

On 1 July 1935, the Model 35 helmet was introduced, but because of missing documentation, more about its development and testing results cannot be ascertained. The later acceptance regulations, however, are known. The primary alloy used in the M35 steel helmet was a molybdenum steel, but this alloy was replaced by a manganese-silicon steel from 26 March 1940 on. This was due to a serious shortage of molybdenum in Germany. Model 35/40 and 42 helmets were stamped out of this material. The following are the acceptance regulations for the Models 35/40 and 42 helmets.

"Conditions for the Issuance of Steel and the Helmets Drawn From It (with the Exception of the Liner System).

The helmets are to be drawn, one-piece, from sheet steel in accordance with these conditions and accompanying tables. They are then to be edge-crimped, fitted with the various split-tailed rivets and vent openings. Further, they are to be tempered, cleaned by sandblasting, and then to have a coat of baked-on lacquer applied. Finally, liners which have been supplied by arrangement with the Reichswehr Ministry will be installed.

Corrosion is halted by the removal of oxidizing agents.

The steel which is supplied must, in an unhardened state, be readily able to be drawn, and in a hardened state must exhibit the necessary strength and ability to be stretched. This is all in accordance with the guidelines laid out in Section E of the acceptance regulations. The requirements of the steel material are these: ca. 200 to 230 kg resistance in hardened condition and a 5% stretch factor.

The helmets are to be manufactured with the free choice of alloys or nickel-chromium-silicon steel. In the case of reduced choice of alloying materials (e.g. when difficulties arise in obtaining nickel and chromium from foreign sources), a nickel- and chromium-free steel may be used as long as it has the necessary qualities. The following analyses serve only as supporting data:

a) Nickel-Chromium-Silicon Steel

Total	1st Example	2nd Example
Carbon	0.34%	0.34%
Silicon	1.97%	2.04%
Manganese	0.67%	0.88%
Phosphorus	0.018%	0.034%
Sulfur	0.006%	0.008%
Copper	0.15%	0.019%
Nickel	2.16%	2.63%
Chromium	0.41%	0.32%

b) Most Possible Nickel- and Chromium-free Steel

Carbon	0.35-0.40%	0.35-0.40%
Silicon	1.20%	1.10%
Manganese	0.90%	0.80%
Phosphorus	0.009%	0.010%
Sulfur	0.009%	trace amount
Copper	0.20%	0.14%
Chromium	0.13%	0.35%

B. Regulations for the Steelworks and Rolling Mills

The procurement of materials is to be taken over, at the direction of the Reichswehr Ministry, by the Eisenhüttenwerk Thale with respect to the supplying companies and the size of the shipments.

The steel is to be manufactured in an electric hearth furnace.

The steelwork is obligated to conscientiously separate the various smeltings, to stamp the ingots, to record the assigned number of the smelting, to indicate the exact analysis, count and total weight of the smelting from which the resulting planchets will be rolled. It is also their responsibility to supply these data to the Eisenhüttenwerk Thale prior to the rolling operation. The planchet size will be recorded and transmitted from the Eisenhüttenwerk Thale's drawing mill.

Each planchet is to be stamped in the steelwork with the factory designtion and the smelting number (e.g. R.93. This meant the Röchling Steelworks, smelting #93 - trans.)

In order to prevent the processing of unsuitable steel and to protect the drawing works against the possibility of unsuitable material, the Thale Works will undertake a preliminary investigation of each smelting as specified under Section C. If this testing proves to be favorable, then that smelting lot will be released for use. The release of this steel does not, however, imply its final acceptance.

The rolling mill rolls the planchets from a released smelting lot into sheets which are 1 mm thick, although an upward variance of 0.10 mm is permissible. The Eisenhüttenwerk Thale is to keep records of all these variances which are to be measured from a distance which is approximately a 2-finger breadth from the edge of the sheet.

Each helmet receives the smelting designation at the appropriate location, which is at the rear of the neck apron.

Other arrangements as regards quality, usability, and acceptance of the material will be handled directly between the supplier of the steel and the Eisenhüttenwerk Thale.

The Army Administration will confine itself to the final acceptance of the finished helmets. The Eisenhüttenwerk Thale is responsible for the acceptance of the processed, incoming steel.

C. Release of Planchets for Rolling

The release of a smelting and the resulting planchets (as mentioned in Section B above) is to be carried out by the Eisenhüttenwerk Thale.

A representative of the steelworks will be allowed to be present at the pretesting of the smelting lot.

From each smelting lot, one planchet out of every 100 will be tested, a minimum of two planchets being selected. These test planchets will be rolled in Thale and then at least four helmets will be drawn out of the sheets.

The helmets will be tested by the Eisenhüttenwerk Thale in accordance with Section E of the acceptance regulations below.

If the helmets can be readily manufactured from the steel and if the testing results are satisfactory, then the Thale plant will roll the entire smelting. If a smelting proves unsatisfactory, it is to be returned to the steelworks. The costs for manufacturing the test helmets are to be borne by the steelworks.

The test results of the planchets and their established chemical and physical properties are to be reported to the Reichswehr Ministry by the Eisenhüttenwerk Thale.

E. Acceptance

The acceptance is authorized by the Reichswehr Ministry. It is to be subdivided as follows:

a) undertaking of the ballistic tests
b) testing of the outward quality of the helmet
c) testing of the dimensions, weight and lacquering."

SECRET

Berlin, 9 July 1943

M12

Report on the Research of Helmet-testing Ammunition Made from Non-scarce Materials

Research was ordered to determine if a type of ballistic testing ammunition made of non-scarce materials for use on helmets would be suitable. A static acceptance test for helmets (e.g. through testing of their temper) was considered to be unpurposeful as long as the connections between the static testing and the behavior of the material during ballistic testing was not sufficiently clear.

Conversations at Weapons Testing Office 1/II b between Engineer Heidinger and Dr. Hänsel (on the

part of the Reich's Chemical-Technical Institute) on 3 February 1943 proposed the development of a rifle ammunition for the testing of helmets which was not made of a critical material. This was based on previous experiences with sintered iron pistol ammunition used for the same purpose. The Model 1908 Parabellum pistol was used in this testing.

The tests were set up on this basis. Helmets were supplied by the Army Clothing Office for the ammunition testing. For this testing, the helmets were maintained on a vertical axis in the following manner: The helmet was secured to a movable iron dish by means of a bolt that passed through the crown of the helmet. Wooden wedges tightened the assembly. Shots were fired horizontally at the helmet towards the front, sides and neck region. It is obvious that this arrangement is not feasible for testing a vertical shot to the top of the crown of the helmet, but this made almost no difference in the overall testing of the ammunition. This shot may be carried out later for the purpose of the acceptance regulations. A sufficiently precise point of impact may be achieved by bench-resting the pistol, using a trajectory tester and choosing a short target distance (5 meters).

The previous acceptance conditions for the steel helmets were based around an 11 mm lead bullet weighing 13 grams with a V_{25} (velocity at 25 meters) of 238 meters/seconds, thus giving an impact energy of ca. 38 kilogram·meters. Since the deformation of the sintered iron bullet upon impact is different than a lead projectile, different strains are placed upon the helmet's material. The previous ballistic conditions must then be correspondingly modified as regards the acceptance testing.

A normal charge (ca. 333 mg) and a velocity of 400 meters/seconds at 4.5 meters from the muzzle resulted in an impact energy of 48 kg·m. This resulted, as per expectations, in a total penetration of the test helmet. The propelling charge had to be reduced to the point where inward bulging of the helmet shell did occur, but resulted in no material destruction or cracking. After a series of preliminary tests during which the charge was reduced from 330 mg to 200 mg, it was found that a charge weight of 220 mg produced an average impact velocity of 180 m/sec and an impact energy of ca. 10 Kg·m. This in turn produced the desired deformation. Therefore, an impact speed of 180 m/sec

and an impact energy of 10Kg·m are established as boundaries for 9 mm sintered iron ammunition used in ballistic testing. Should the acceptance testing procedure require a higher impact velocity, a lighter bullet (e.g. a 7.65 mm sintered iron pistol round) may be substituted.

It is also important to determine if the impact deformation of the sintered iron bullet has any effect upon the results of the testing. The sintered iron projectile demonstrated only marginal flatening of the tip, while lead bullets showed massive flattening.

The research has indicated that sintered iron ammunition is suitable for steel helmet testing. The following conditions are therefore proposed for the acceptance of steel helmets:

1.) Sintered iron ammunition will be used in the Model 1908 9 mm Parabellum pistol (bullet weight 5.9 grams).

2.) The bullet's charge will be 220 milligrams of powder of the normal type. This is to be measured such that an impact velocity of 180 m/sec and an impact energy of 10 kg·m result. These conditions must be more precisely established to account for permissible deviations in the propellng charge, velocity and impact energy. These data serve as guideline values.

3.) The deformation of the bullets at impact must only result in minimal flattening of the bullet tip, but no other damage is permissible (e.g. disintegration of the bullet).

4.) The M1908 Parabellum pistol may be used for test firings. Targeting will be accomplished by bench-resting the pistol and by the use of a trajectory test apparatus. A short firing distance (5 meters) should be chosen.

5.) The helmets are to be targeted in the following locations: frontally, above the visor; in the rear, above and to the left and right sides of the liner-retaining rivet. If the need arises, each side of the helmet may be targeted, as well as the very top of the crown. This last shot would be fired vertically toward the helmet. The testing centers will stencil the appropriate identification on each helmet.

6.) The material of the helmet may only display inward bulging at the impact point. The depth of this dent may not exceed the previously established limits. Cracks, fragmentation of the steel, or total penetration of the helmet are not permissible. If the bullet hits a zone of transition between the crown and neck apron or visor,

the steel may be allowed to crack, but the bullet must not penetrate.

(signed)

Hänsel

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Patents	"Deutsches Patentamt," Berlin
Miscellaneous:	Much written and verbal information from retired soldiers, manufacturing factories and companies.

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