Major Bartels, Chief of Air-Sea Rescue Center Sicily, reports that at Taormina the center had a well developed signal communications network of its own, that was staffed with highly qualified signal personnel.[2] Communication lines existed not only to the X Air Corps and that corps' units as well as to the subordinate operational rescue points, but also to the headquarters of Air Command Africa. The rescue service was also supplied with an ample number of ground radio stations. No authentic reports are available on rescue operations, which were highly diversified and particularly interesting, in this area. This is especially unfortunate since remarkable performances were achieved owing to the warmer temperatures of the water in the Mediterranean, which favored rescue operations by improving the chances of survival.

Medical Officer (Major) Dr. Mathes reports, for example, that a sergeant who was downed at sea and spent seven days adrift in the Mediterranean in his one-man pneumatic floatcoped with the problem of thirst by sopping up the dew with a piece of gauze from the gunwhales of his boat every morning.[3] Another case was reported orally to the present author at the time as follows: A fighter pilot who had studied chemistry spent a week

adrift on a one-man pneumatic float in the Mediterranean. He is said to have produced relatively good drinking water with a distiller he constructed with the aid of a signal ammunition cartridge. It is said of the same pilot that he was adrift close to Malta and spent his time making a close study and table of the British air units' identification signals.

First Lieutenant Kretschmar reports that, after receiving instructions from the X Air Corps at Taormina, he established the first regional air-sea rescue command on African soil in Tripolis in April 1941. Three He-59 planes were stationed at the post to provide rescue services for German transports from Italy to Africa at a time when the German front had moved far forward to the East and the command post of Air Command Africa was already at Derna, approximately 600 miles away. The regional air command therefore was shifted temporarily to

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2. Colonel A. Bartels: Der Seenotdienst der Luftwaffe im Mittelmeer in der Zeit vom April 1941 bis Dezember 1941.

3. Dr. Max Mathes: Der deutsche Seenotdienst waehrend des zweiten Weltkrieges, p. 53.

Benghazi. Here, as First Lieutenant Kretschmar reports,[4] conditions were unsuitable for seaplane operations because the port was taken up almost completely by supply shipping. For this reason the four assigned He-59 seaplanes were stationed on a small lake in the vicinity of the port. The He-59 planes proved only conditionally suitable for operations in this part of the Mediterranean, for which reason another two Do-24 planes, which proved highly suitable, were assigned at the request of Air Command Africa. In addition, this rescue station was assigned two air traffic control boats. In point of supplies the regional air-sea rescue command was favorably situated.

In the meantime the Africa Corps had continued its advance and had reached the area between Derna and Tobruk, so that the regional air-sea rescue command again had to move forward. Command headquarters displaced to Derna and the Do-20 planes, of which the command by this time had five, were stationed in Bomba Bay, while the four He-59 planes were left behind at Benghazi. Protected by high dune ranges, Bomba Bay provided excellent anchorage for seaplanes, but supply and billetting conditions were difficult. All supplies, such as replacement parts, gasoline, and rations had to be moved forward from Derna,

approximately 60 miles distant. Serious difficulties were encountered at Bomba Bay in the matter of billets for technical and flight personnel, but the problem was solved finally with help from the Italians.

From then on Bomba Bay for some time remained the center of air-sea rescue activities in the Cyrenaika, and played quite an important role in this respect during the battles for Tobruk.

The German air-sea rescue service suffered less through enemy action along the coast of Africa than elsewhere, because the British soon noticed that it made no difference between friend and foe when called to assist persons in distress, so that they also profited from its presence. A case which is typical in this respect is reported by Major Kretschmar:[4] In June 1941 a Ju-88 reported sighting a pneumatic boat with three men aboard approximately half-way between Tobruk and Crete. The Do-24 dispatched to the spot found on arriving there that a British twin-engine seaplane had arrived first but was unable to land, although it made three attempts, because of the rough sea (sea condition 5). Major Kretschmar,

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4. Major W. Kretschmar: Der Aufbau des Seenotdienstes an der Lybischen Kueste.

at that time holding the rank of first lieutenant, then made the attempt with his three-engine Do-24 and surfaced on his second run. Three British airmen were in the boat and, taking them aboard his plane, he took off for his return flight. The British rescue plane watched the entire rescue operation and then accompanied the German plane for some time, after which the German and British planes waved a parting to each other and took off en route to their separate home stations.

Sea conditions were a more serious difficulty off the coast of Africa than enemy action. Although Do-24 planes were stationed at Bomba Bay and were even used occasionally under sea condition 5, many a rescue would have been impossible if air traffic control boats had not been available, the crews of which in an exemplary manner participated in the rescue activities, accounting for a high percentage of the successful operations. Very often when planes were unable to surface because of sea and general weather conditions, boats were called in by radio and guided to the spot of a disaster.

According to Major Kretschmar, a total of 241 rescue missions were staged off the coast of Lybia in 1941. Of these, 85 missions were successful, accounting for

96 persons rescued, some of them crew members of ships and some of planes.

It remains to be mentioned that the air-sea rescue station at Bomba Bay was separated from Air-Sea Rescue Center Sicily in the summer of 1941 because of the great distances involved and placed under Air-Sea Rescue Center Aegean Sea, with headquarters at Athens-Phaleron. This center from then on was responsible for the fourth mission in the Mediterranean, mentioned on page 86, above, that of providing rescue services in operations to conquer Greece and Crete.

Major Fengler, hitherto Chief of Air-Sea Rescue Center North, with headquarters at Wilhelmshaven, was selected to head the Aegean Sea Center. Major Fengler was dispatched early enough to report on 1 April to the VIII Air Corps, under Generalleutnant von Richthofen, in Bulgaria, which country German troops had occupied in March. The VIII Air Corps was part of the Fourth Air Fleet, to which General der Flieger Zander had been attached for the handling of marine air missions. However, some time was still to pass before the rescue center at Athens-Phaleron

was established.

The presentation which now follows is an abridgement of a comparatively accurate and exhaustive report by Lieutenant Colonel Fengler.[5]

To begin with a squadron of five He-59 planes was organized under First Lieutenant Freiherr von Buchholz, a thoroughly capable officer. This squadron had to be flown overland to its new zone of operations from Germany. The first operating base was at Varna, Bulgaria, where a small and well protected seaplane base was first prepared to receive the planes by an advance detachment sent on ahead by truck. After stopovers near Vienna and on lake Balaton, the squadron only reached Varna after the operations had already commenced against Greece on 9 April.

Major Fengler had received from the Fourth Air Fleet three Ju-52 and two FW-58 planes with an appropriate staff and withthese land-based units took off for Salonika already on 10 April. He landed without meeting resistance on Mikra airfield, five miles from Salonika, which city had just been taken by a panzer division. From this airfield an improvized air-sea and land rescue service was started immediately with good success. The squadron of

rescue seaplanes, coming from Varna, finally arrived at Salonika on 22 April. Owing to the overcrowded state of the port the seaplanes had to tie up to buoys just opposite the City Theater situated on the nearby beach.

The air-sea rescue planes commenced diversified activities already while still at Salonika. They not only carried out numerous missions to rescue personnel wrecked at sea in the operations during the occupation of the numerous islands, but also transported signal personnel to the occupied islands, dropped pneumatic floats at the Straits of Corinth to enable the German troops to cross, and picked up airmen who had landed by parachute or crash landed on the islands, besides transporting wounded parachutists from the Peloponnesus to hospital. The diversity of the activities in which units of the air-sea rescue service engaged and the reliability with which they functioned is illustrated poignantly by the following entry from a diary:

> On 1 May 1941 a He-59 plane transported a naval commander to Volos, from where he was to pilot the SS Larissa through the mine field. The ship struck

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5. Lieutenant Colonel M. Fengler: Seenotzentrale Aegaeisches Meer.

a mine nevertheless and sank, and the rescue plane returned to port with the entire ship's crewof 15.

By the end of April 1941 the Greek mainland and islands were occupied by German troops, and on 7 May the rescue squadron displaced from Salonika to Athens-Phaleron. The radio center was also moved, and General Zander succeeded in obtaining three Do-24 planes from Air-Sea Rescue Center Sicily, which proved a valuable reinforcement for the squadron. A unit of smaller seaplanes temporarily attached to the rescue service proved unsuitable and achieved no success in rescue operations.

Unfortunately, no air traffic control boats could be made available for the otherwise liberally supported rescue operations, and since all usable surface craft were required by the troops for their crossing operations, the air-sea rescue service was able to secure only three boats. One of these was a Greek customs service cutter, the other were two conditionally seaworthy motorboats, and only the customs cutter was equipped, inadequately, with radio. These three craft were manned by naval personnel, who, in common with the other personnel, rendered valuable services and proved capable of making the necessary improvizations to meet the needs of the current situation

All three boats were held ready at separate points in the vicinity of Crete.

With the opening of the operation against Crete, German army units embarked at night on small ships to make the crossing to the island. British cruisers found and attacked the flotilla and sank a number of the small ships. However, it is hardly likely that many lives were lost here, since the German troops were equipped with life-belts and the water was warm. Flying three missions, one Do-24 plane alone rescued 57 soldiers. At this time so many distress signals were received at the command post of the rescue service that the rescue units were compelled to work in areas instead of responding to individual calls for help. British losses also were none too small, and here also the German rescue service helped. Thus, in spite of heavy seas, the German rescue boat stationed at the Island of Antikythera alone rescued 65 Britishers when German aircraft in a daylight attack sank the cruiser Gloucester out of a British fleet of cruisers.

From authentic notes, Lieutenant Colonel Fengler has calculated that 171 German soldiers were rescued in the 21-25 May 1941 period.

On 23 May General Bodenschatz, from headquarters, arrived at the air-sea rescue command post and expressed great appreciation of the performances of the rescue service in the Crete operation.

During these days signal communications were not always reliable and special mention must therefore be made of the commendable action of General Zander in maintaining constant contact between the air-sea rescue center on the one hand and the air corps and air fleet on the oth other and in supporting the rescue service in every possible way.

General Goltz refers incidentally to a report entitled "Kreta" by the headquarters of the Fourth Air Fleet, in which the following, probably written by General Zander, is said concerning the Air-Sea Rescue Service:

> .....The forces available to the Air-Sea Rescue Service in the Aegean Sea at the end of the campaign in Greece were inadequate for the requirement of the attack against Crete, where two divisions had to be air-carried over the sea, and the forces of the reinforced VIII Air Corps were committed exclusively in trans-sea attack missions. Repeated requests by the air fleet for the assignment of additional air-

rescue seaplanes resulted in an increase of only three Do-24 planesreleased from Air-Sea Rescue Center Sicily, which were intended for transfer to the area of Greece.

1. In organizing the rescue service the main point therefore was to devise improvized means to make up for what was lacking. All aircraft which could in any way be used for rescue operations were consolidated under Air-Sea Rescue Center Aegean Sea, which transferred from Salonika to Phaleron. These consisted of the following:

a. The actual air-sea rescue seaplanes of the command, namely, five He-59 and three Do-24 seaplanes;

b. The FW-58 planes allocated to the fighter squadronsfor the drop delivery of pneumatic boats when needed;

c. Supplementary land-based aircraft from the 76th Weather Reconnaissance Squadron and from the aircraft reserve pool of the Fourth Air Fleet, also for the drop delivery of pneumatic boats;

d. A newly arrived squadron of He-60 planes of the 126th Naval Reconnaissance Squadron, as search planes for the air-sea rescue units;

2. Owing to the small number of ships and boats in the Aegean Sea there wasno possibility to procure a sizable number of rescue surface craft. With the utmost difficulty only three conditionally suitable craft were equipped for use;

3. Out of supplies arriving from the Zone of Interior an adequate number of pneumatic boats was stockpiled for air-drop delivery in case of need at Air-Sea Rescue Center Aegean Sea;

4. Arrangements were made with Naval Command Southeast to insure that all ships in the Aegean Sea, particularly units of the Italian Navy, could be called in quickly to assist in rescuing personnel

in distress at sea;

5. Sub-bases of the rescue service were established at Melos and Molassi.

These arrangements made it possible to avert heavy losses in personnel at sea, and it was also due to this set up that a large percentage of the soldiers left dirfting in the sea after one-half of the 1st Powered Glider Squadron had been destroyed could be rescued.

During the entire course of the operations aircraft of the Air-Sea Rescue Service saved 178 persons, while the boats of the service saved another 84. These achievements deserve special mention, since some of the rescues were made in the immediate vicinity of Crete during heavy weather and were possible on this scale only by overloading the planes. Following destruction of the 1st Powered Glider Squadron a large number of personnel were also rescued by immediately dispatched Italian speedboats and by British Cruisers Lupo and Lyra, the action of which was exemplary. In addition, a considerable number of lives were saved through the air-drop delivery of pneumatic boats to the soldier adrift in the

sea.....

In some points the above report differs from that by Lieutenant Colonel Fengler.

A few days after the occupation of Crete Auxiliary Air Traffic Control Ship Drache, a vessel of 1 870 tons, also commenced operations. The Drache had been built in Germany for Yugoslavia, and after the capitulation of that country had been assigned to the Air-Sea Rescue Service. It was the most heavily armed naval vessel available to the German military forces in the Aegean Sea, for which reason it was generally used as a rear escort unit to protect Italian transports to Crete. On one of these occasions the Drache rescued 200 German soldiers from a steamer sunk out of the convoy. Altogether, the Drache saved more than 700 persons, losing seven of its own crew in the operations involved.

When Motor Yacht Troll IV, the property of Dr Opel, was found it was also assigned to the air-sea rescue center at Athen-Phaleron as an auxiliary air traffic control boat and also was used to protect transports to and from Crete.

Steps were now taken to further adapt to German purposes the seaplane base at Athens-Phaleron, where the air-sea rescue center and its rescue squadron had established themselves shortly before the operations against Crete. The base had a slipway but no crane. The standard large cradle wheels for Do-24 planes therefore had to be obtained from Germany, so that these seaplanes could br hauled ashore on the slipway for repairs. Appropriate supplies also were requisitioned to complete the equipment of the existing repair facilities.

On 3 June 1941 Generalmajor Goltz, Inspector of the Air Sea Rescue Service inspected the air-sea rescue center, and two days later Major Fengler was transferred to the Black Sea with part of the existing organization. His position at Athens-Phaleron was taken by Major Bartels, hitherto Chief of Air-Sea Rescue Center Syracuse, and who now simultaneously became Chief of Air-Sea Rescue Services, Mediterranean. In his new position Major Bartels had tactical control over Air-Sea Rescue Center Sicily--at the time commanded by Squadron Leader First Lieutenant Woleke--, Air-Sea Rescue Center Athens--of which he himself was the chief--, and the new Air-Sea Rescue Center Constanta just established under Major Fengler.

In addition, Major Bartels was given administrative command over the 3d Air-Sea Rescue Group, consisting of the 6th Squadron (under First Lieutenant Woelke and later under First Lieutenant Warganz) at Syracuse, the 7th Squadron (under 1st Lieutenant Tretter) at Athens, and the 8th Squadron (under First Lieutenant Freiherr von Buchholz) at Constanta.

With the transfer of the Second Air Fleet to the Mediterranean Theater in December 1941 Lieutenant Colonel Engelhorn assumed the post of Chief of Air-Sea Rescue Services, Mediterranean, and was designated Chief of Air-Sea Rescue Command South. Major Bartels was transferred on 28 December 1941 to Germany as Chief of Air-Sea Rescue Services Center (North Sea and Baltic) and Commanding Officer, 2d Air-Sea Rescue Group.

After Regional Air-Sea Rescue Command XII (Black Sea) had been separated from the Mediterranean Command and assigned to the Fourth Air Fleet as an independent regional air-sea rescue command, the following organization developed during 1942:

SECOND AIR FLEET

THEATER

AIR SEA RESCUE COMMAND, HEADQUARTERS TAORMINA

Regional Air-Sea Rescue Command X, Syracuse, under Major Gruhne and controlling the 6th and 10th Air-Sea Reascue Squadron and Flotilla, respectively.

Regional Air-Sea Rescue Command XI, Athens-Phaleron, under First Lieutenant Tretter (not certain), and controlling the 7th Air-Sea Rescue Squadron and 11th Air-Sea Rescue Flotilla.

Regional Air-Sea Rescue Command XI was assigned to the X Air Corps, part of the Second Air Fleet, and in 1942 was transferred together with the Corps to Heraklion, Crete, after having established an air-sea rescue detachment command in Suda Bay.

Planes and boats stationed on the African coast were under the tactical command of the air-sea rescue commands in Tripolis, Benghasi, Derna, and Bomba Bay. The commands at Tripolis and Benghasi were under the Regional Air-Sea Rescue Command X, Syracuse, while those at Derna and Bomba Bay had been assigned to Regional Air-Sea Rescue Command XI, Athens, for reasons of expediency, as previously mentioned.

The year 1942 also brought numerous rescue missions, many of them successful, with large-scale operations during convoy battles playing a special role. Here again, detailed surveys and descriptions of rescue operations

during the second year of air-sea rescue activities in this part of the Mediterranean theater are lacking. One incident which aroused widespread interest at the time was the rescue of a German fighter pilot by the Italian Navy after he had drifted for ten days in his one-man pneumatic boat. Another was that of a fighter pilot picked up by First Lieutenant Warganz in an audacious mission just over 1 000 yards off La Valette and under direct anit-aircraft artillery fire from Malta. A grievous loss suffered by the rescue service was that of a Do-24 after the air-sea rescue station was established in Tunis. Under First Lieutenant Woelke, one of the most able air-sea rescue pilots--who had been decorated previously with the German Cross in Gold--, the plane was on a return flight to Syracuse with ten persons aboard at the time it was lost. Also during this period units of Air-Sea Rescue Command 2 (South) made their 1000th rescue, an event which the Commander in Chief commemorated by special mention of Lieutenant Colonel Engelhorn in the Luftwaffe Roll of Honor.

In the meanwhile Regional Air-Sea Rescue Command XIII had been established at a lake near the Mediterranean coast close to Marseille late in 1942. The new

regional command was assigned to the Third Air Fleet (France) and had the mission of providing rescue services in the western Mediterranean.

The occupation of Southern France by German troops, the Allied landings in Northern Africa, and the resultant necessity to transfer Third Air Fleet units to the southern French Mediterranean coast created the need for the mission mentioned under point 3 at the opening of this section, namely the mission of providing rescue services in this area. Air actitities had lessened considerably in the English Channel areas in the summer of 1942, for which reason the 2d Air-Sea Rescue Squadron--under First Lieutenant Mehlhorn at Cherbourg--extended its area to include the coastline of Holland and transferred a number of its planes to Amsterdam-Schellingwoude. This released the 3d Air-Sea Rescue Squadron , under Captain Luchmann, from there for transfer to the French Mediterranean coast.

The transfer commenced with the movement of two Do-24 planes and the necessary complement of ground service personnel to the French Berre air base at Etang de Berre, 24 miles northwest of Marseille. These two seaplanes reached their new base after stopovers on the Seine River near Paris and at Hourtin, an air-sea rescue sub-base near the mouth of the Gironne River and mentioned

Luchmann[6] reports, not a single take off failed in the year from November 1942 to October 1943.

The replacement of all He-59 by Do-24 planes except two by the autumn of 1943 did much to improve the execution of rescue missions by air. Only one case is on record of a Do-24 plane being unable to surface while on a

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6. Captain Gottfried Luchmann: Der Einsatz von Seeflugzeugen und Seefahrzeugen im westlichen Teil des Mittelmeeres im Jahre 1943.

mission to pick up crew members from units of a harbor defense flotilla. Although unable to surface because of too rough seas, however, seaplanes dropped survival ration buoys to the men afloat and maintained contact with them until a deep sea tug from Toulon rescued them.

A number of rescue missions failed in the first few months because the combat units committed in the area had completely inadequate survival equipment and had not received instructions on the importance of carrying along that equipment on their combat missions. In one squadron of fighters the personnel carried only their parachutes and not even lifebelts, and nothing was done to correct this behavior before loss of life and continuous exhortations finally convinced them of their error.

Every opportunity was taken to give flight personnel training in night flying because the presence of numerous enemy fighter units made it impossible to execute rescue missions, particularly along the coast of French Northern Africa, during daylight. Thus, in August 1943 a Do-24 planes was able to rescue the crew of four of a Ju-88 21 miles off the African coast in a night mission.

Heavy losses at sea occurred in July-August 1943, when Ju-52 wings and Gigant squadrons flew over the

repeatedly already in Section B.of Chapter 2.

The rest of the squadron took off on 20 December 1942, but had to stay over at Hourtin until 13 January 1943 because the new base had been destroyed previously and repairs had not progressed far enough for it to accommodate such a large number of planes. Concurrently, Regional Air-Sea Rescue Command XIII was established at Berre under Major von Fedrigoni, which during the following months distributed the rescue units assigned to the area as follows:

The rescue squadron was stationed at Berre, one air traffic control boat at Port de Bouc--in Gulf Louis de Vos, west of Marseille--, one air-traffic control boat and two He-59 planes at St. Raphael--southwest of Cannes--and one air traffic control boat at Port Vendre--near the Franco-Spanish border.

In the initial stages rescue dperations were hampered seriously by the inadequacy of communication facilities, a situation which improved considerably later in the year. Another initial weakness was that the seaplanes encountered difficulties in surfacing and taking off at sea when the mistral wind was blowing, which also occurs occasionally in summer. Nonetheless, as Captain Gottfried

coastal sector between the Rhone Estuary and the Franco-Italian border on transportation missions to the Island of Corsica. The crews of these transport planes and super gliders not only lacked experience in marine aviation--a lack which always results in inaccurate position reports--but, what was more important, had received no training and instructions on the use of their survival equipment. Captain Luchmann reports that cases became known of Gigant gliders having to surface at sea in which the entire crews were drowned because they had neither lifebelts nor pneumatic boats along.

The above circumstances prompted the rescue command to hold a number of Do-24 planes under constant standby alert. Whenever transport units were sighted, these rescue planes took off to escort them to Corsica. This not only insured instant help whenever necessary but did much to improve the morale of the transport crews. However by no means all transport units were sighted, and all efforts by Regional Air-Sea Rescue Command resulted in only a small percentage of the transportation missions being reported to that headquarters in time. The result was

that numerous transportation missions were flown without rescue escorts, some of them at a heavy cost in lives lost at sea.

In contrast, cooperation was excellent with the torpedo bomber wing operating under Lieutenant Colonel Kluemper primarily against enemy convoys between Gibraltar and Oran. Continuous close contact between the wing and the rescue headquarters made it possible for the latter to maintain units under alert whenever torpedo squadrons were dispatched on attack missions. This resulted in a considerable number of torpedo aircraft crew members saved at sea. In appreciation of these rescue actions, the wing commander paid a personal visit to Berre to express his thanks.

That rescue aircraft could also be used successfully in other missions is shown by the case of the German hospital ship used in the first exchange of wounded personnel between the two opposing sides which took place in the Mediterranean. Position reports received from the hospital ship while on a return trip to Marseille with a load of wounded German personnel in the autumn of 1943 revealed clearly that the ship, approaching the French coast, was heading directly for German minefields. The

disaster was only averted by the dispatch of a rescue plane which carried a naval officer to the hospital ship. This officer was precisely informed on the location of the minefield and steered the ship around it and safely into port at Marseille.

The description of an unusual large-scale rescue operation by planes and surface craft, which was a complete success but resulted in the loss of four Do24 rescue planes is now offered to close this account of rescue activities in this coastal area.

The Italian armed forces capitulated on 9 September. In the night of 9-10 September an Italian fleet of several destroyers and the battleship Roma attempted to leave the port of Spezia through the Straits of Bonifacio en route to a port in Northern Africa or Gibraltar. A small number of German bombers intercepted the fleet at the western exit from the straits, sinking the battleship and one destroyer. In this action use was made of a new type of bomb, on the effects of which reports from as many eye witnesses as possible were desired. The Air-Sea Rescue Service therefore at 0835 on 10 September dispatched six Do-24 planes and two air traffic control boats to participate in the large-scale rescue operation

expected. Unfortunately, the six Ar-196 fighters assigned to escort the rescue craft had to return prematurely because of the small operational range. Furthermore, the propellor of one of the rescue boats was damaged, and the young and inexperienced pilot of one of the rescue planes was afraid to surface in the rough sea and returned without accomplishing his mission. The other five planes all surfaced. The first of these returned at 1230 carrying nineteen persons rescued from rafts and pneumatic floats, including the commander of one of the destroyers. The crew of the rescue plane reported that the other planes sent out were still busy at their rescue work but would return shortly. However, all four planes failed to return. What had happened was as follows: Immediately after the first Do-24 had taken off for its home flight, an American Liberator bomber arrived on the scene. After circling the surfaced German seaplanes a few times, this plane attacked with weapons fire. One after the other it destroyed all four seaplanes, which were still carrying on their rescue mission and were unable to return the fire of the attacker because of the rough sea. Three crew members of the seaplanes were wounded, but all managed to escape fro their burning planes and succeeded in remaining together. The ranking pilot, First Lieutenant

Kersten, knew the precise plans for the complete rescue operation and calculated that the air traffic control boat dispatched from St. Raphael should reach the scene of the disaster around midnight. At 2330 he commenced firing signal shots and at just about midnightanswering shots were sighted in the north. Thirty minutes later the rescue boat reached the spot. By about 0100 the boat picked up all 24 members of the German planes' crews in addition to another 69 Italians and was on its way at top speed to St. Raphael, where it tied up around midday. The assigned mission had thus been accomplished at great expenditure of effort and with a considerable measure of success but also at considerable cost in materiel. The loss of these four rescue seaplanes was to have particularly adverse effects later, when four Do-24 planes had to be released in the summer for transfer to the Crimean Peninsula. There, they were required to support Regional Air-Sea Rescue Command XI (Black Sea) in providing rescue services for theGerman troops in their withdrawal from the Kerch Peninsula.

The above report on this large-scale rescue mission is supplemented by a report from the commander of Air

Traffic Control Boat 604, who, incidentally, was the son of Lieutenant Colonel Fengler, repeatedly mentioned in this study. This was the boat which had set out from St. Raphael and returned with a total of 93 rescued German and Italian personnel. Following reports by a reconnaissance plane that it had seen pneumatic floats still afloat in the area, the rescue boat returned to the scene of the disaster five days later and rescued another eight Italian seamen who had not been found in the first search. Fengler, whose report is in a letter addressed to Generalleutnant Goltz dated 18 May 1954, continues with an account of the operations of air traffic control boats in the western Mediterranean. In spite of their increased armament, the boats still proved very seaworthy and executed numerous rescue missions even in the heaviest seas. During weeks of stormy weather, particularly during the spring mistral season, these boats were the only means available for the conduct of rescue operations at sea. One point which Fengler criticizes is that the raised open steering post, which definitely should have been used as an observation post in search operations could not be used for this purpose. In later models, this weakness was removed, since these boats had a

second raised wheelhouse, which was covered.

In the year from November 1942 to October 1943 units of Regional Air-Sea Rescue Command XIII rescued 270 persons in distress at sea. Of this large number more than one hundred admittedly were saved in one single operation, that described above. However, the other 160 were rescued in numerous successful missions, many of which were of long duration and were carried out under exceedingly difficult circumstances. Furthermore, units of the service in this area also were employed in innumerable other auxiliary missions.

With the withdrawal of the German Africa Corps in October 1942 and the landing of Allied troops in Northern Africa followed by the Allied advance on Tunis in late 1942 and early 1943 the German air-sea rescue bases along the African coast had to be abandoned, according to a report by Major Hans Haeger.[7] All that remained of the organization in Africa was a detachment command at Tunis. All rescue planes and surface craft from the other bases were distributed among the regional rescue commands at Syracuse, Athens, and Constanta. Anticipating that the Luftwaffe would play a large role in defense against Allied operations to conquer the Italian mainland, a

new regional air-sea rescue command was established on the Island of Sardinia as Regional Air-Sea Rescue Command XIV, with headquarters at Maddelena. the sub-bases

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7. Major Hans Haeger: Der Seenotdienst Italien, November 1943 bis Mai 1945.

of this command were at Elmas on a lake northwest of Cagliari, and at Olbia on the east coast of Sardinia. Regional Air-Sea Rescue Command XI (Athens) together with its assigned units became an independent rescue command and was separated from the control of Air-Sea Rescue Service Command 2 (South).

When German forces were forced to evacuate Sicily in July 1943, the Chief of Air-Sea Rescue Services (South) transferred his headquarters to Vigna di Valla, at Lake Braciano , near Rome, Regional Air-Sea Rescue Command X to St. Margherita di Ligure, the 6th Air-Sea Rescue Squadron to Portofino, and the air-sea rescue flotilla to Spezia. Detachment commands were established and assigned rescue craft at Orbetello, Cap de Fino (Corsica), Tarento (in the Gulf of Taranto), and Ancona.

According to the report by Major Haeger, the fluctuating military situation resulted in the following distribution of air-sea rescue services in Italy in November 1943:

Headquarters, Air-Sea Rescue Services Command 2 (South), under Colonel Engelhorn, at Venice.

Regional Air-Sea Rescue Command X, under Major Haeger, at St. Margherita di Ligure;

10th Air-Sea Rescue Flotilla, under Captain Gabbert, at Venice;

6th Air-Sea Rescue Squadron, under Captain Weiss, at Venice;

Air-Sea Rescue Detachment Commands or sub-bases at Savona, Portofino, Spezia, Piombino, Orbetello, and Pola.

In the spring of 1944 the Portofino sub-base was transferred, together with the regional air-sea rescue command, to the seaplane base at Spezia-Cadimare. Repairs to boatswere carried out in the naval shipbuilding yards at Venice, Genoa, and La Spezia. The difficult task of moving the air-traffic control boats from the Ligurian to the Adriatic Sea was accomplished as follows: The boat were hauled ashore by slipway, lifted by crane onto a special type of trucks, known as Kuhlemeyer trucks, and transported by road on the Genoa-Piacenze route to the Po River. Here they were transferred by crane and slip-way to the water to proceed downstream on the Po River under their own power to Venice.

Later in 1944 the superiority of Allied air forces operating from bases in the Foggia area and on Corsica became so pronounced that the air traffic control boats had to confine their operations almost exclusively to

nights although they by now had their maximum armament of two four-barrelled 20-mm guns with a traverse of more than 360°, plus one double-barrelled machine gun and one antiaircraft machine gun. Most mishaps at sea in this period involved transportation units of the Navy, sea-borne transportation, also at night, having become an unavoidable necessity after the Allies had destroyed prac practically all rail routes leading south. Even at night Allied units frequently attacked German transport ships travelling unescorted close to the steep shores. Thus, an air traffic control boat under Sergeant Becker was shot in flames by three Thunderbolt planes and sunk after tenacious resistance off the precipitous coast of Portofino in the spring of 1944.

In the autumn of 1944 the position of a Chief of Air-Sea Rescue Services Command(South) was abolished as part of a reduction of forces in the air-sea rescue services and as part of the general changeover in the highest level of command in the southeast. Major Haeger was transferred as Air-Sea Rescue Service Staff Officer to theOperations Branch of the German Air Command in Italy and Captain Braue, as Commanding Officer, 26th Air-Sea Rescue Group, assumed command over all remaining units of

the Air-Sea Rescue Services in the theater. Rescue boats at this time existed only at Spezia, Piombino and Orbetello in the Ligurian Sea, and at Venice, Triest, and Polia in the Adriatic. No further mention is to be found but Major Haeger refers to an air-sea rescue service search squadron of FW-190 planes under the command of First Lieutenant Langer. Allied air superiority in the Adriatic now also became overwhelming. Here, an air-traffic control boat which put to sea from Triest in the autumn of 1944 under the flotilla commander to rescue the crew of a downed enemy plane was attacked and sunk by British fighter-bombers, and some of the crew were lost.

The biggest nighttime rescue operation of the year was started from Spezia when an Italian destroyer manned by a German crew was torpedoed approximately 30 nautical miles south of this naval port. Air traffic control boats rescued approximately eighty German naval personnel in this operation.

The FW-190 search planes stationed at Udine also flew frequent reconnaissance missions for the Navy, because it was considered possible that the enemy would invade the Italian mainland in a drive on Venice. The

enemy maintained such close and constant watch over the German air base, however, that planes could only take off at dusk. It was on one of these missions that the squadron leader, First Lieutenant Langer, was shot down in an air battle shortly after himself shooting down a four-engine Boeing plane.

In April 1945 all all air traffic control boats were turned over to the Navy, which committed them in actions together with E-boat units. Naval reconnaissance (air), and sea-borne supply operations ceased because of the withdrawn fronts. Prior to the capitulation aircraft and surface craft were destroyed. The personnel of the Air-Sea Rescue Service were taken prisoner together with the Tenth and Fourteenth Armies, some at Rimini and some at Ghedi.

In the July 1944 to May 1945 period units of the air-sea rescue services in Italy rescued 175 persons of various nationality in distress at sea. All in all, units of the Air-Sea Rescue Center Sicily, later Regional Air-Sea Rescue Command X (Syracuse) according to Major Haeger rescued 1913 persons.[8]

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8. Major H. Haeger: Der Seenotdienst Italien, November 1943-Mai 1945, p. 2.

b. The Black Sea. As mentioned previously, Major Fengler was transferred on 5 June 1941 from Air-Sea Rescue Center Athens-Phaleron, together with part of the existing air-sea rescue organization, to the Black Sea, thus creating conditions in advance for air-sea rescue services in the impending Russian campaign, in which the Black Sea also had to be considered as a combat area. The rescue center was established in Rumania, at the small seaside resort of Mamaia, north of Constanta. This site was particularly well suited for the purposes, situated as it was on a narrow tongue of land separating the Black Sea from a large lake. The Rumanian seaplane base was at this point, whereas a German land-based fighter unit had established itself in the land aircraft base farther north, at the end of the tongue of land. The 8th Air-Sea Rescue Squadron, under First Lieutenant Freiherr von Buchholz, established itself in the seaplane base with its eight He-59 planes, followed in the autumn by the first Do-24 plane.

Two FW-58 aircraft were stationed at the land aircraft base, and two air traffic control boats, one Type A and one Type B, were stationed in the port of Constanta. The Type A boat had been brought in by rail, but the

movement of the Type B boat had caused considerable difficulty. Boats of this type intended for the movement were dismantled in Hamburg and shipped by a special type of truck, known as the Kuhlemeyer truck, on the autobahn to Regensburg. Here they were reassembled to proceed downstream to the Black Sea under their own power.

With the opening of hostilities against Russia, the necessity arose for the maintenance of air reconnaissance over the western half of the Black Sea. This mission was assigned jointly to the air-sea rescue squadron and the

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1. This section is based on the following studies:

Generalleutnant Konrad Goltz: Der Seenotdienst der Luftwaffe vom Juli 1940 bis zur Neuorganisation im Fruehjahr 1942; II Teil: Mittelmeer, Schwarzes Meer und Ostsee.

Colonel Julius Hansing: Der Einsatz des Seenotbereichskommandos XII im Schwarzen Meer in den Jahren 1942-43.

Lieutenant Colonel M. G. Fengler: Seenotzentrale Schwarzes Meer.

Major Walter Gladigau: Der Seenotdienst der Luftwaffe im Schwarzen Meer.

Captain H. Huelsemann: Der Seenotdienst im Schwarzen Meer, Juni 1943-August 1944.

See Map 24, Appendix Volume, for localities and other details mentioned.

Naval Training Detachment at Constanta. The rescue squadron was given tactical control over two Rumanian seaplane squadrons stationed at Mamaia and three Bulgarian land-based squadrons stationed at Varna to support it in the execution of its reconnaissance mission. These statements by Lieutenant Colonel Fengler[2] are of especial interest since this is the first mention made of an air-sea rescue squadron being assigned reconnaissance tasks as a concurrent mission. Excellent personal and official relations and cooperation were maintained between Major Fengler and Colonel Georgescu, the capable and versatile commander of the seaplane base and the Rumanian squadrons. Similarly good relations existed between the regional command, under Lieutenant Colonel Gladigau, at Varna, and the corresponding Bulgarian command agencies.

The daily mission of morning and evening reconnaissance between Odessa and the Bosporus and that of protecting friendly shipping and submarines were executed with good results.

Frequent air battles developed between German fighters and Soviet air units in the almost daily attack by the Soviets against Constanta. These battles were kept under constant observation by a rescue plane

maintaining a constant patrol at sea, so that it was possible to rescue all fighters shot down with the exception of one, who failed to get clear of his plane. On 3 August 1941 a case occurred which can be considered as the ideal in air-sea rescue operations. Of the two FW-58 auxiliary air-sea rescue planes attached to the squadron, one was on sea patrol at the time and saw the pilot of a German fighter plane bailing out after colliding with a Soviet plane. It immediately dropped a pneumatic boat to him at the spot where he reached water with his parachute. He had hardly climbed into his boat when a He-59 rescue plane called to the spot arrived and picked him up. It should be noted here that during the highly diversified and eventful rescue operations in the Black Sea the FW-58 auxiliary air-sea rescue planes were used in the missions for which they had been originally intended.

On the whole numerous rescue operations and other incidents are on record showing that the He-59 and even more so the Do-24 planes were able frequently to hold

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2. Lieutenant Colonel Fengler: Seenotzentrale Schwarzes Meer, p. 2.

their own against Soviet planes in spite of their weak armament. Lieutenant Colonel Fengler reports, for example, that on one occasion an air-sea rescue plane on 6 October shot down two Soviet planes. Other points worthy of note in the account given by the Chief of the Air-Sea Rescue Center are as follows: In addition to frequent bombing attacks by Soviet aircraft, Constanta also came under fire by two Soviet cruisers on the morning of 26 June 1941. One of the cruisers, the Moskwa, sank after striking mines and hits by coastal artillery. Four He-59 rescue planes picked up 41 survivors from the cruiser's crew found clinging to the wreckage. On 18 August 1941 a He-59 plane reported having sunk a Soviet submarine. The plane had been dispatched on a mission from Varna, the regional headquarters base in Bulgaria. Lieutenant Gladigau convinced himself personally of the authenticity of this report, and states that, in addition to a large patch of oil, the contours of the submarine were clearly visible in calm weather.

The regional command at Varna received a number of air-sea rescue planes from the 8th Squadron besides three Arado-98 planes, all of which were stationed at Tsesika, which had served as a German seaplane base in World

War I. Of the three surface craft available the air traffic control boat was stationed in the port of Varna, and one motor lifeboat each in the ports of Burgas and Balchik.

From early 1942 on Do-24 planes arrived gradually to replace the He-59 planes.

Regional rescue headquarters were established in a high building, with the radio station installed on the roof. Another radio station was organic to a group headquarters of the Bulgarian Air Force. The group command, together with the three land-based squadrons it controlled, was assigned tactically to the regional rescue command One of the squadrons had Me-109 planes, the other two had Wrana planes, a Polish model.

The equipment of the Bulgarian squadrons was completely inadequate for marine operations and had to be supplemented by the regional rescue command. Cooperation was smooth and without difficulties. The personnel were well trained and aggressive. At the request of the

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3. Major Gladigau: Der Seenotdienst der Luftwaffe im Schwarzen Meer, p. 2.

Regional Air-Sea Rescue Command six Bulgarians, the crew members of three rescue planes, received the Iron Cross II Class in recognition of special services rendered, and twenty Bulgarian officers and men were decorated with the German Order of Merit for Foreigners in various classes. The Commander in Chief of the Bulgarian Air Force detached a lieutenant colonel as permanent interpreter to the regional rescue command and proved very receptive to suggestions and desires.

The main mission of the regional rescue command was to conduct naval air reconnaissance and to provide escorts for friendly convoys. The escort planes took over their ships at the three mile zone line outside of the Bosporus and escorted them to the Rumanian border where units of the rescue center at Constanta assumed responsibility. During these escort missions planes frequently sighted enemy submarines. Attacking themswith bombs and weapons fire they prevented successful torpedo attacks against friendly ships. Special missions to hunt down submarines were flown when radar stations or reconnaissance aircraft reported the position of a submarine. The planes committed in such missions were Arado-98, He-59, and the Bulgarian planes, all of which were provided with a smkeshift

device for the release of depth charges.

No real combat missions were flown from Bulgarian bases, for which reason actual air-sea rescue activities were small. Three seamen were saved from a transporter which sank immediately after being struck by a torpedo in June 1942; the rescue mission was carried out by a rescue seaplane. In another case units were dispatched to salvage a German rescue seaplane, which had been forced down by engine failure near the Turkish coast and was adrift in heavy seas with Captain Gladigau aboard. Soon after dark the Rumanian naval units participating gave up the search, considering it hopeless. The Bulgarians continued, however, and after seventeen hours an E-boat found the plane and towed it into port at Burgas. On 7 May 1942, at the beginning of the Kerch operation, the regional rescue command transferred to the Crimea.

Following the capture of Nikolaievsk by German forces, the rescue center stationed He-59 planes in that port. They were highly successful in their operations, but later one of themwas lost.

As the German armies drove deeper and deeper into the Soviet Union, Soviet attacks against the west coast

of the Black Sea gradually ceased and the outpost rescue station at Nikolaivsk was closed down. On 23 November First Lieutenant Freiherr von Buchholz left the squadron; he was killed later while serving as a bomber pilot. His place in the squadron was taken by First Lieutenant Beste-horn. A winter of exceptional severity for these latitudes in 1941-42 necessitated the transfer of all seaplanes from Mamaia to Varna. On 18 December Major Fengler left on transfer to the air-sea rescue center in Holland.

According to Major Fengler, who states expressly that his figures are not complete, the air-sea rescue center while still under his command had rescued 61 persons against a loss of fourteen rescue personnel. The heavy losses are explained by the diversity of the tasks the rescue service personnel were required to perform in addition to their normal missions.

Major Hansing took the place of Major Fengler as Chief of Air-Sea Rescue Center Constanta. Owing to the necessity to withdraw all rescue craft from Mamaia because of the ice, headquarters were also moved to Constanta. Here, headquarters were established in a private dwelling house opposite the rail depot, which was made available by the Rumanian post commander and in which the

headquarters remained later when the rescue craft transferred back to Mamaia. Because of the inadequacy of the slipway at the seaplane base, He-59 planes could only be landed with great difficulty under particularly favorable tidal conditions. Do-24 planes had to be brought into the harbor basin of Constanta when in need of repairs. Here they were lifted onto the quay by a 30-ton crane. In order to make major repairs to the seaplanes possible, a repair platoon was transferred to the Tuzla seaplane base at Varna in the summer of 1942.

Relations with the Rumanian Air Force remained good after Major Hansing assumed command over the air-sea rescue center, but were disturbed very soon after his arrival. On 26 January 1942 members of the Rumanian Air Force received German military decorations. Whereas a number of Rumanian naval aviators received the coveted Iron Cross, Second Class, Rumanian Colonel Georgescu and his liaison officer received only a high class of the Meritorious Service Cross, although they also had flown a large number of missions. In spite of repeated recommendations by the Chief of the Air Sea Rescue Center nothing was done on later occasions to repair this psychological blunder,

which for months on end impaired cooperation.

It should be noted here that in the Black Sea also air-sea rescue centers in the spring of 1942 were downgraded to air-sea (regional) rescue commands, while the existing regional commands now became air-sea rescue detachment commands or sub-bases. Also in the spring of 1942 Captain Steidle was transferred as Officer for Special Missions to what was now Regional Air-Sea Rescue Command XII.

With the opening of the Kerch operation on 7 May 1942 the air-sea rescue detachment command under First Lieutenant Gladigau at Varna was transferred to Ak Mechet, more commonly known as Simferopol, on the Crimean Peninsula.[4] Simultaneously, a Do-24 plane was stationed at this port, an air traffic control boat at Odessa, and a He-59 plane at Saki on the Great Salt Lake. Owing to the very shallow water near the shores of the lake, a landing stage approximately 200 yards long had to be built with the aid of empty gasoline drums, and the plane had to take on fuel from a flat-bottom boat. Both of the planes just referred to flew repeated missions during the Kerch offensive.

First Lieutenant Gladigau accompanied the German

troops in their drive across the Kerch Peinsula in order to take over the seaplane base at Lake Ortali, south of the city of Kerch. However, full use could only be made of this base after the capture of the Taman Peninsula, since it remained under Soviet fire from there until then. At the base the seaplanes had to tie up to buoys, and billeting was very poor.

In the meanwhile First Lieutenant Bastemann, the active and excellent squadron leader, at Constanta, had unfortunately been transferred away after having been punished for approving the flight of a plane for repairs under conditions which were contrary to regulations and which ended in a fatal crash. He was replaced by Major Gude. In the summer of 1942 another four Type B air traffic control boats were shipped in by way of the Danub and placed under Captain Strecker, who was appointed Foltilla Leader. Besides their successes achieved in rescue operations, these boats rendered excellent services in escorting seaborne transportation and particularly during the later evacuation of Anapa (the Kuban bridgehead) and Sevastopol. The seaplane squadron also received another reinforcement in Do-planes, so that it had altogether seven planes at the end of the year.

During the battles for the fortress of Sevastopol, rescue units in a number of missions brought in eighteen airmen from fighter and bomber units. One case worth mention is that of the rescue of the crew of four from a He-111 plane of the 26th Bomber Wing, who were adrift in their pneumatic boat under sea condition scale 4-5. Making a bumby surfacing, the Do-24 plane sent to the rescue burst some of its bottom rivets, so that some of its bottom plates were stove in and the plane began to leak. The pilot nevertheless made a successful take off with nine persons aboard. Appropriate preparations were

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4. The account presented here of air-sea rescue activities in the Crimea is based primarily on the report by Colonel Julius Hansing: Einsatz des Seenotbereichskommandos XII im Schwarzen Meer in den Jahren 1942/43.

made meanwhile at Constanta for the landing, so that the seaplane was lifted ashore by crane before it could sink.

By order of Air Command South, Major Hansing participated in the final German attack against Sevastopol in order to check the operability of the five airfields along the route to Cape Chersones and safeguard any materiel which might be found there. The only station found usable was the seaplane base on the northern beach of the bay. An air base command under Colonel Storch took possession of this base and set about putting it in order. The 8th Squadron and one Type B air traffic control boat arrived here in August 1942, and around the same time Regional Air-Sea Rescue Command XII displaced to Eupatoria, where it established headquarters in a sanatorium in the Frunse Park. Under First Lieutenant Behnke, an Air Signal Corps officer assigned by the Fourth Air Fleet, a motorized signal platoon maintained reliable radio communications and also established two radio beacons. An air-sea rescue detachment command remained behind in Constanta under Captain Steidle, whose place as officer for special purposes was taken by Captain Schnegelberger.

The rescue command at Varna and the sub-base at Simferopol were closed down and Captain Gladigau moved

his headquarters to Lake Ortasli at Kerch. Prior to this Captain Gladigau had moved with his rescue command for a short period to Smarsk on the shores of the Sea of Asov. Here, he had been at headquarters of the Fourth Air Fleet, by which he had been tactically controlled during the period. While here the rescue command saved two fighter-pilots, who had been shot down over the Sea of Asov with their Me-109 planes.

In the meanwhile a Rumanian fighter squadron and reconnaissance group had arrived on the land airfield at Sevastopol with orders to assume responsibility for the protection of convoys to and from Sevastopol and Odessa. Under instructions from the air fleet, Regional Air-Sea Rescue Command XII supervised the execution of these missions, since experience had shown that the Rumanian units were not always quite reliable. The rescue command also frequently made Do-24 planes available for escort missions when there was no need to maintain them under alert for rescue operations. Colonel Wild, Chief of Air Command Crimea, who had moved his headquarters to Kerch was transferred out of the area shortly thereafter and replaced by General der Flieger Zander. At the same time the Air-Sea Rescue Service concentrated most of its air and surfac

craft along the Straits of Kerch, since units of the Luftwaffe supporting the German drive into the Caucasus were committed continuously until the end of 1942 in attacks against the Soviet seaports at Novorossisk, Gelenchik, Tuapse, Sochi, Poti, and Batum. Captain Gladigau, Chief of Air-Sea Rescue Command Ortaelic, reports on this subject as follows.[5]

The ceaseless German air attacks called for the maintenance of constant air-sea rescue patrols, in which a number of rescue planes kept the approach and return routes as well as the areas of main effort continuously under observation. Although accompanied by escort fighters when on particularly dangerous missions, rescue planes were struck frequently by antiaircraft shellfire or Soviet fighter weapons fire while on their rescue patrols. In this way one rescue plane was forced to surface within the Turkish three-mile zone. In an on-the-spot inspection Captain Gladigau convinced himself of the impossibility to salvage the plane and then had it destroyed by weapons fire after the crew had been picked up. In the case of another Do-24 lost off the coast of Turkey owing to enemy action, the crew reached Turkish territory.

During the period discussed here rescue units saved

the crews of one fighter, one bomber, and one dive-bomber all German, and of one Soviet fighter. Concurrently with their rescue missions the rescue planes were required to conduct seaward reconnaissance to maintain a watch on Soviet ship movements. The excellency of the performance achieved in these missions is evidenced by the fact that every aircraft crew in the service was awarded the Iron Cross, First Class, and three crews the German Cross in Gold. In the course of the year of 1942 units of the Regional Air-Sea Rescue Command XII saved a total of 60 persons in distress at sea.

After the final surrender of the German forces in Stalingrad on 2 February 1943, followed by the German withdrawal from the Caucasus and the establishment of the Kuban bridgehead, the VIII Air Corps, under General der Flieger, transferred to Simferopol, and was given tactical control over Regional Air-Sea Rescue Command XII.

When land aircraft found themselves unable at the beginning of the mud season in late February 1943 to execute their mission of air carrying supplies to the Kuban bridgehead, the commander of Regional Air-Sea Rescue Command XII, according to Colonel Hansing, was assigned an additional mission: in addition to his other functions

he was designated Chief, Marine Air Transportation, and instructed to organize a unit of transportation seaplanes for the purpose of air carrying supplies into the bridgehead. Under a staff consisting of First Lieutenant Wind--an expert on transportation matters--, Lieutenant Stephanie, and Master Sergeant Geiger, eighteen Do-24 planes received from the various regional air-sea rescue commands were organized at Sevastopol to form the 1st

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5. Captain Gladigau: Der Seenotdienst der Luftwaffe im Schwarzen Meer, pp. 3-4.

and 2d Transport Seaplane Squadrons, under First Lieutenants Stretter and Huelsmann, respectively. Another group of 25 transport planes was organized by Major Gude at Lake Ortaslie using Ju-52 planes remodeled with floats. Flying between three and four missions daily from Sevastopol and Lake Ortaslie these units flew in 1 910 tons of supplies to the army forces holding the southern frontage of the bridgehead in the 5-25 March 1943 period, losing only one Ju-52 plane in the entire operation. The unloading point was at Gostagaika, Lake Witjasewski, north of Anapa, where army engineers had constructed a long landing stage with a loading ramp. The seaplanes tied up to makeshift rubber anchor buoys, and engineers moved the supplies ashore on rafts towed by engineer assault boats. Strong antiaircraft artillery forces were deployed to protect unloading operations. On their return flight, the planes flew out a full load of wounded personnel.

The performances achieved here were acknowledged by General Konrad, commanding general of a mountain corps, in a letter of appreciation, a copy of which will be found as Appendix 25 in the Appendix Volume. In like manner, a letter of appreciation from General Fiebig, commanding

the VIII Air Corps, will be found as Appendix 26 in the Appendix Volume.

Besides the missions dealt with above, Do-24 planes and air traffic control boats in the spring and summer of 1943 in twentyone successful rescue missions brought in 69 German, Rumanian, and Russian airmen and seamen, without incurring any losses themselves. These achievements were acknowledged by Generalleutnant Mahnke, commanding the I Air Corps--which had meanwhile replaced the VII Air Corps--, in a letter of appreciation, a copy of which will be found as Appendix 27 in the Appendix Volume.

On 20 September 1943 Lieutenant Colonel Hansing, Chief of Regional Air-Sea Rescue Command XII, was transferred to the staff of the Fourth Air Fleet as Marine Air Transportation Officer (Qu 2), his place being taken by Major Aigner, hitherto Lieutenant Colonel Hansing's Officer for Special Missions. Supplementary to his repeatedly mentioned report, Colonel Hansing has made available a precise table of the successful rescue operations executed under his command in the period from 26 April 1942 to 24 August 1943, which will be found as Appendix 28 in the Appendix Volume.

After the departure of Colonel Hansing, the regional rescue command was organized as follows:

HEADQUARTERS, REGIONAL AIR-SEA RESCUE COMMAND XII, EUPATORIA

Commanding Officer: Major Aigner
Medical Staff Officer: Major Dr. Mathes
Signal Staff Officer : Lieutenant Colonel Gruenig

Air-Sea Rescue Flotilla, with Headquarters at Constanta
Commanding Officer: Captain Gutezeit.

Air-Sea Rescue Squadron, with Headquarters at Sevastopol
Commanding Officer: Captain Huelsmann.

Air-Sea Rescue Detachment Commands at Lake Ortaslie, Feodosia, Odessa, Suling, Constanta, and Varna.

Units of Regional Air-Sea Rescue Command XII continued their rescue and reconnaissance missions up to October 1943. While searching for a German fighter shot down at sea near Novorossisk, Sergeant Schulz, piloting the search plane, was killed when his plane came under attack by a number of Soviet fighters. Although the plane was badly damaged in the attack, First Lieutenant Glinkemann--the observer, and Master Sergeant Baumann--the flight mechanic, managed to fly it home.

After all air traffic control boats had been withdrawn from the Sea of Asov and the Kuban bridgehead had been evacuated, the necessity arose to also withdraw the

air-sea rescue detachment command from Lake Ortaslie, where it was within range of the Soviet long-range artillery. For this reason the detachment command was transferred to Sultan-Eli, in the northwestern Crimea.

Toward the end of October 1943 orders arrived to evacuate the Crimea. A few hours later, however, these orders were countermanded and the peninsula then became separated from the rest of the withdrawing German lines.

With the opening of the Soviet counteroffensive against the Crimean Peninsula, Regional Air-Sea Rescue Command XII and elements of the rescue squadron returned to Constanta-Mamaia, from where they displaced later to Varna. The detachment commands at Sevastopol and Sultan-Eli remained on the peninsula. It was at this stage that the air movement of supplies commenced to the Crimean Peninsula, which by now was completely isolated from the German forces on the mainland. As long as the possibility existed for Ju-52 aircraft to land with supplies, Do-24 planes were committed to escort them on their transport missions, in addition to escorting the occasional transport ships which were dispatched.

During these supply operations a captured Soviet ship, the Kharkov, was sunk with a transport of Rumanian military personnel. Do-24 planes escorting the movement were able to

rescue 88 persons here. The Do-24 rescue planes stationed at Sevastopol also flew a number of rescue missions; these planes included the units formerly stationed at Sultan-Eli, which had been transferred to Sevastopol after discontinuation of the detachment command at Sultan-Eli.

When airfields were no longer available for Ju-52 aircraft, the Air-Sea Rescue Service assumed responsibility, as it had done in former cases, for the movement of supplies by boat and plane to the enveloped troops. As had been the case in the Kuban bridgehead operation, the rescue squadron was increased to a strength of 22 Do-24 seaplanes for the purpose. In ceaseless operations planes and boats operating from Constanta and Varna transported troops and supplies to the Crimea, evacuating casualties on the return trip.

In the meanwhile the situation had so developed that

the Soviet capture of Odessa was considered imminent. Here again, Do-24 planes in April 1944 maintained an air lift between the port of Odessa and Galats, on the Danube River. Unfortunately, no information is available on the transportation performances achieved here.

In the Crimea the remaining German forces finally were compressed in the narrow area of the Kherones Peninsula at Sevastopol. Operations now began to evacuate these troops in movements which had to be restricted to nights and in which all available air-sea rescue units participated. The headquarters staff of the Sevastopol rescue detachment command, under Captain Strecker, remained on the Crimean Peninsula to the last, and finally reached the mainland aboard Air Traffic Control Boat 426. The last plane to leave the Crimea was a Do-24 rescue plane under Master Sergeant Mueller. The plane reached the mainland with 40 persons aboard and with only two engines operating, the third engine having been damaged by weapons fire prior to the final take off. An air traffic control boat under repair at Constanta finally proceeded to within close reach of the coast at Chersones and returned with 80 soldiers aboard. According to information from Master Sergeant Gieger, almost another 300 German and Rumanian soldiers were picked up at sea by

air-sea rescue units or ships.

The German air-sea rescue service now was restricted once more to the western shores of the Black Sea. After returning the temporarily attached Do-24 planes to their parent units, the 8th Air-Sea Rescue Squadron had a strength of only six planes, five Do-24 planes having been lost in the final missions executed in the Crimea.

The air and surface units of the service in the area remained under alert for rescue operations until August. Taking advantage of this time of relative quiet, the command did everything possible to orient the crews of sea going combat aircraft with the latest developments in the field of survival and signal equipment, a field in which a training group organized under Lieutenant Colonel Fruster by Air Inspectorate 16 had done valuable work, by means of practical demonstrations, among the combat units stationed within the regional command area.

At the end of August the necessity arose to evacuate Rumania, followed a few days later by Bulgaria. The surface craft moved back to Varna, the rescue squadron to Salonika. Helped by good identification papers furnished by the Bulgarian air base commander, the ground personnel proceeded on cars and trucks through Bulgaria to Greece. One

transport of personnel from Varna, under Major Dr. Mathes, was able to cross the border by rail.

6. Master Sergeant Gieger: In letter dated 27 May 1944 to Lieutenant Colonel Hansing.

This brought the 8th Air-Sea Rescue Squadron back under Regional Air Sea Rescue Command XI, from where it had moved to the Black Sea to form Regional Air-Sea Rescue Command XII. Owing to the large number of aircraft concentrated at Saloniki the squadron, according to Captain Huelsmann, was stationed temporarily at Volos, from where it was transferred on 1 September 1944 to Athens and assigned formally to Regional Air-Sea Rescue Command XI, at the time under Lieutenant Colonel Securius.

In October 1944 the order issued by the Commander in Chief of the Luftwaffe on 19 August 1944 was also put into effect in this area. Regional Air-Sea Rescue Command XI was dissolved and its place taken by the 70th Air-Sea Rescue Group under Group Commander Sarges, whose adjutant was First Lieutenant R. Meyer. What was left of the 6th, 7th, and 8th Squadrons was consolidated to form a new squadron of nineteen Do-24 planes under Captain Huelsmann. This squadron was designated 1st Air-Sea Rescue Squadron; and a 2d Squadron, containing seven seagoing Ju-52 planes and commanded by First Lieutenant Meyer, was also assigned to the 70th Air-Sea Rescue Group. Auxiliary Air Traffic Control Ship Drachehad been handed over to the Navy in the mean while. The rest of the air-sea rescue surface craft, under

Captain Gabbert, were concentrated at Athens-Phaleron, together with all air-sea rescue planes of the rescue group.

According to Captain Huelsmann,[7] the air-sea rescue units during this period were employed chiefly in transporting troop units from Crete (Suda Bay), Samos, Leros, Rhodes, Milos, and Naxos to Athens. The standard payload for Do-24 planes established for these operations was 24 men, each with 66 lbs of baggage--to include weapons and ammunition. To begin with these transport movements were to be carried out each day at dusk, at which time rescue operationw which might become necessary were also to be carried out. Thus, two Do-24 planes en route to Crete rescued 28 crew members from a German submarine decoy boat sunk by British aircraft during heavy weather. One of the two rescue planes was able, after taking aboard its share of the rescued personnel, to rise in a take-off run broadside on to the seas. The other plane made its way afloat and under its own power to Suda Bay in approximately four hours. Gradually the British night fighters stationed on Cyprus became more and more effective. As early as on the evening of 20 September they shot down a Ju-52 with Squadron Leader First Lieutenant Meyer on board, and Captain Huelsmann assumed command over both squadrons. From now on operations had

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7. Captain Hermann Huelsmann: Aegaeis.

to be restricted to nights. Airfields were extemporarily equipped for night operations and Wuerzburg radar instruments were installed at Cape Spada--Crete, and at Milos to direct interception of the enemy night fighters. German losses nevertheless continued to mount, due in no small measure to partisans, who signalled the movements of German aircraft by means of fires and thus assisted the Allies in finding the German forces. Thus, night fighters using rocket weapons shot a Do-24 plane piloted by Master Sergeant Lange and carrying 51 personnel on fire. Sergeant Lange, one of the most successful air-sea rescue pilots, managed to surface his plane from an altitude of 3 300 feet, but only he and two others were able to escape from the plane, which sank immediately. The three survivors reached the island of Milos three days later with a one-man pneumatic boat.

Meanwhile, the fuel situation was becoming difficult at Athens-Phaleron, and one Do-24 had to ply constantly between Milos and Athens to carry in sufficient fuel to maintain rescue operations. Seaplanes also tanked at Rhodes on their way to Crete.

Then came the time when Athens had to be evacuated. The next operational base was to be at Salonika, to where

the ground service personnel, amply equipped with cars and antiaircraft weapons, proceeded overland. Under Captain Gabbert, the boat group, consisting of one Type B air traffic control boat and a number of smaller craft, left Phaleron at night. Although hugging the coast on its way to Salonika, the boat group came under attack by British E-boats already based on the Peloponnes, which sank all boats with the exception of one Type C boat.

The squadron transferred to Salonika at dawn on 12 October 1944, leaving two seaplanes behind. These two planes remained at Phaleron the whole day although Athens was already abandoned and although British airborne troops landed in the close vicinity. Taking off late in the afternoon these two planes also reached Salonika safely. From Salonika all units continued to fly their missions to Crete and the other islands although both the engines and the crews had almost reached the limits of endurance. The troops brought in from the islands to Salonika boarded land aircraft here which carried them farther to Agram.

Meanwhile losses were mounting steadily. Thus, British fighters attacked two Do-24 planes evacuating wounded personnel from Volos to Salonika. One of the seaplanes was shot down, but Gunner Sergeant Becker on the other seaplane handled his weapons so well that he interrupted

the British fighters every time they flew in to make their kill. Although hit repeatedly, this plane reached its base, but Sergeant Becker was killed in the action.

In the night of 23-24 October the squadron, which by no now had lost four of its six seaplanes, took off for Vienna, after having air-carried approximately 3 000 military personnel from the islands.

From Vienna the Do-24 seaplanes transferred to Lake Chiemsee, where they were destroyed later by British fighter bombers.

In November 1944 the air-sea rescue group was disbanded at Bug on the Isle of Ruegen.

5. The North Sea and Baltic Sea up to the End of the War.[1] Whereas the advancing German armies had carried the war farther and farther into other countries, thereby creating ever new missions for the Air-Sea Rescue Service in the coastal waters of those countries, the situation had remained relatively unchanged in the North Sea and the Baltic. Apart from occasional incursions by British planes over Germany and German planes over England, both parties in the North Sea had restricted their activities primarily to seaward reconnaissance.

A relatively large number of marine and other aviation schools were stationed in the Baltic, and Air-Sea Rescue Center East--meanwhile transferred to Bug on the Isle of Ruegen--provided the necessary rescue services for the seaward activities of these training units.

A few weeks prior to the opening of the Russian campaign, Lieutenant Colonel Engelhorn returned from Sicily and reported at headquarters of Air Command Baltic at Dievenow, with instructions to build up a new air-sea rescue service organization in the eastern reaches of the Baltic.

The German offensive launched on 22 June 1941 made such rapid progress eastward that it was possible after a very short while already to transfer to Libau the air-sea rescue

squadron organized at Holtenau under Squadron Leader First Lieutenant Loesch. At the same time Lieutenant Colonel

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1. This section is based on experience gained by the present writer while serving assignments as Chief of Regional Air-Sea Rescue Commands V and VI and as Chief of the Air-Sea Rescue Liaison Detachment with the Home Air Fleet (Luftflotte Reich), and on the following studies:

   Lieutenant Colonel M. Fengler: Seenotzentrale Nord, Wilhelmshaven.

   Lieutenant Colonel C. Hess: Die Loesung der Einsatzfrage im Seenotverbindungskommando Luftflotte Reich and Seenot-einweisungslehrgaenge.

   Major Wolfgang Kretschmar: Der Seenotdienst in der Deutschen Bucht von 1941-43.

   Captain Gottfried Luchmann: Der Einsatz von Seenotflugzeugen und -fahrzeugen in der Deutschen Bucht von Oktober 1944 bis Kriegsende.

Engelhorn established an air-sea rescue center at Riga, which was attached to Air Command Baltic, and stationed rescue craft at the bases in Riga, Libau, and Helsinki. The entire service described here was organized on a war-time footing, which included equipment with weapons and special radio distress signal code charts. No information was available on rescue missions conducted in the area, and there was so little need for the service that Lieutenant Colonel Engelhorn was transferred from Riga very soon and assigned to Air Inspectorate 16. It was only in 1944 that Libau, Reval, and Riga became important centers for the evacuation of wounded and other personnel by air and sea. These operations were controlled by commands in the Baltic.

Lieutenant Colonel Bartels was the first officer to serve as Chief of Air-Sea Rescue Services I (Center), to which post he had been assigned at the end of 1941 after his transfer to Kiel-Holtenau on 28 December 1941 from Air-Sea Rescue Center Athens, where he had served simultaneously as Chief of Air-Sea Rescue Services Mediterranean. In his new post Colonel Bartels controlled Air-Sea Rescue Center North Sea, with headquarters at Wilhelmshaven and Air-Sea Rescue Center Baltic, with headquarters at

Bug on the Isle of Ruegen. Simultaneously he commanded the 2d Air-Sea Rescue Group composed of the rescue squadrons stationed at Nordeney and Holtenau.

The personnel rescued at sea in the Baltic were from the marine aviation schools and other training units stationed along the Baltic coastline, which usually carried out practice flights over the Baltic Sea, and from supply planes using the Kattegat route. In the spring of 1942 Air-Sea Rescue Center Baltic, with headquarters at Bug, was redesignated Regional Air-Sea Rescue Command (Air) VI.

Hitherto, all rescue surface craft had been consolidated in what were called boat groups together with all other boats required for various purposes at the various naval air bases, naval firing ranges, and similar installations, and were under the command of the appropriate bases. The air-sea rescue planes were organized in the 9th Squadron, generally known as the Replacement Squadron, which was responsible for the training and procurement of replacement crews for the Air-Sea Rescue Service. This squadron was controlled directly by the Chief of Air-Sea Rescue Services I (Center). After redesignation of the air-sea rescue centers as Regional air-sea rescue commands, the regional command in the Baltic also was to be given administrative and

tactical command authority, through the squadron leaders and flotilla leaders, over the planes and surface craft required for air-sea rescue operations. This new arrangement had proved advantageous in every respect in the English Channel area, in the Mediterranean, and in the Black Sea. In the Zone of Interior, however, difficulties arose because under the new arrangement the various base commanders and their staff officers for surface craft would have been deprived of some of their command authority over air traffic control ships and Class A and B boats in favor of the local regional air-sea rescue commands.

To find an acceptable solution for the new chains of command, complete the organizational build-up of Regional Air-Sea Command VI, and work out a service manual for air-sea rescue operations on the basis of experience gained in other theaters of operations, the present writer at the end of 1942 was transferred from Cherbourg to Bug, on the Isle of Ruegen, to serve an assignment of several months as Chief of Regional Air-Sea Rescue Command VI in the Baltic. In the execution of his assigned mission, the present writer prepared a service regulation for Regional Air-Sea Rescue Command VI clarifying the chains of command for air-sea rescue planes and surface craft, and issued a

number of orders establishing new tactical doctrines for the rescue service. Of all these documents only two were available at writing. One is a very informative order to the 6th Air-Sea Rescue Flotilla. The other is a map showing the wire communications available to Regional Air-Sea Rescue Command VI, which at the same time affords a good insight into the signal communications network as it existed along the Baltic coast at the time (Appendix 29).

Early in 1943 regional headquarters displaced to Swinemuende, primarily to obtain improved cooperation with the Navy. The area of responsibility of the regional command extended from the German-Danish border through Trelleborg and from there along the entire German coastline covering the German reaches of the Baltic to the far Baltic coastline.

Regional Air-Sea Rescue commands existed at Kiel-Holtenau, Swinemuende, and Pillau, and 23 Type A and B air traffic control boats were stationed at the various air bases between Kiel-Holtenau and Pillau. The rescue service also received support from a number of motor lifeboats of the German Lifesaving Society (Deutsche Gesellschaft zur Rettung Schiffsbruechiger), the operations of which were controlled by voice radio messages transmitted through the

Ruegen radio station. Rescue aircraft could be dispatched from Kiel-Holtenau, Bug--on the Isle of Ruegen, Dievenow, and Pillau. The four air traffic control ships available were stationed at Kiel, Warnemuende, Swinemuende, and Pillau.

Mishaps at sea due to enemy action were a rare occurrence in the Baltic up to mid-1943. In contrast, quite a number of rescue missions involved aircraft participating in the frequent practice flights at sea which were forced down at sea by various causes, such as engine trouble or

fuel shortages. The risk of interference by hostile aircraft was very remote and rescue air and surface craft were avilable in adequate numbers, so that such rescue missions as a rule were executed speedily. The only real difficulties encountered were due to weather conditions. One mission, involving the rescue of the crew of a BV-138 which had made a forced landing near Karlskrona off the southern coast of Sweden, illustrates the dangers of the Baltic Sea in bad weather. Air Traffic Control Ship Greif, a vessel of 1 000 tons displacement, and a length of 220 feet (see last page of Illustration Appendix 34), was dispatched to rescue the plane. Steering north the ship was unable to hold its course on its way from Sassnitz, where it encountered rough seas of sea condition Scale 7 and itself came in danger of being wrecked. With its ventilators filled with water from the waves the ship had to take shelter behind the coast at Falster. The BV-138--incidentally a very sensitive seaplane--was anchored meanwhile in comparative calm, protected against the wind by the Swedish coast. It was salvaged later as a wreck but with all crew members alive.

A remarkable fact is that even at this early stage British air units flew night missions to bomb important

points in the Baltic, such as Peenemuende, and to mine certain areas of the sea. It was on one such occasion that the first hostile aircraft downed in the Baltic were brought down by naval antiaircraft guns in the coastal area off Swinemuende. Rescue units were dispatched to pick up the British crews, but no records are available as to whether the rescue missions succeeded or not. As a rule the mines dropped by British aircraft in these missions were quickly taken up by the German Navy.

Shortly before transfer of the present writer to Regional Air-Sea Rescue Command VI Air Traffic Control Ship Rolshoven (1 000 tons displacement, see Illustration Appendix 1) struck a mine off Bornholm and sank. All crew members were rescued, but the loss of this valuable ship, which was considered the flagship of the Marine Air Arm and had a cabin aboard for Reich Marshal Goering, caused quite a sensation in higher command levels. The investigation conducted by the Regional Air-Sea Rescue Command revealed that the responsible officer on the ship had neglected to enter on his chart the latest mine warnings issued regularly by the Navy. It was in one of the areas thus declared by the Navy as mined that the ship had come to grief. This incident illustrates the importance of close cooperatio

between the Navy and the Air-Sea Rescue Service even in this area which was so far distant from the actual scene of real naval warfare.

In the spring of 1943 Regional Air-Sea Rescue Command VI issued a comprehensive bulletin to all Luftwaffe and other military agencies concerned within the its operational area. The bulletin contained all pertinent information on the organization and operations of the air-sea rescue services. A copy will be found as Appendix # 30 in the Appendix Volume.

In the North Sea Major Fengler in January 1941 assumed command over Air-Sea Rescue Center North, which remained attached to Patrol Command North Sea. So far as can be ascertained from existing records, the same post was held later by Major Dreyer, from June 1941 on, and, again later, by Major Securius, who was assigned as Chief, Regional Air-Sea Rescue Command V (formerly Air-Sea Rescue Center North) in the autumn of 1942 and remained in that post until April 1943.[2] At the time Lieutenant Kretschmar commanded the air-sea rescue squadron stationed at Nordeney. Rescue planes were stationed at Borkum, Nordeney, Langeoog, and List (on the Isle of Sylt). Type B air traffic control boats were at Borkum, Nordeney, Wilhelmshaven, and List. In addition, the service was supported by a large number of motor

lifeboats of the German Lifesaving Society, which were controlled in their operations by the air-sea rescue service. A directive governing the special commitment of motor lifeboats of the German Lifesaving Society issued in June 1942 by Lieutenant Colonel Bartels, as Chief of Air-Sea Rescue Services I (Center), will be found as Appendix # 31.

At the time under discussion Regional Air-Sea Rescue Command V was responsible for the area from the Dutch-German border across the Bight of Helligoland to the port of Esbjerg in Jutland. It was only in June 1943 that this regional command assumed control over Air-Sea Rescue Detachment Command, Aalborg, until then under Regional Air-Sea Rescue Command VIII (Stavanger).

Cases of personnel in distress at sea were a rare occurrence up to the beginning of 1942. One such incident is reported by Lieutenant Colonel Fengler[3] as follows: On 29 January 1941 a rescue seaplane on patrol sighted the crew of a twin-engine fighter from Jever, on the Danish coast,

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2. Lieutenant Colonel Werner Securius: In a letter on 12 June 1954 to Generalleutnant K. Goltz.

3. Lieutenant Colonel M. Fengler: Seenotzentrale Nord, Wilhelmshaven.

adrift on an ice floe. A patrol boat was called to the scene immediately and rescued the wrecked men. On 22 February 1941 eight British planes were downed near Helligoland. Owing to poor visibility the search planes sent out found no signs except patches of oil. On 3 March 1941 two British aircraft made forced landings in the tidal shoals off Borkum during stormy and rainy weather. Five rescue boats and two rescue planes participated in the rescue action immediately launched. One of the planes picked up three of the Britishers, but itself then crashed. In the end rescue units picked up the Britishers and the crew of the crashed German rescue plane. Without going into details the report by Colonel Fengler closes with the statement that rescue units succeeded in saving nine men on 11 March 1941. The above incidents have been reconstructed from entries in Colonel Fengler's diaries and are recorded here because they can be considered as typical of the conditions existing at the time in the North Sea.

In his letter to General Goltz, mentioned above, Lieutenant Colonel Securius, who directed air-sea rescue operations in the North Sea from the autumn of 1942 to April 1943, refers to increasingly frequent British incursions across the North Sea around the turn of the year 1942-43,

and to German defensive and pursuit operations and the resultant cases of personnel in distress at sea. He himself had the misfortune of striking a ground mine while aboard a Type B boat. His two engineers were killed, and the boat was a total loss, but he and the rest of his crew escaped.

Major Wolfgang Kretschmar, who served part of the time between 1941 and 1943 in command of the air-sea rescue squadron at Nordeney, estimates that in this period units carried out approximately 800 rescue missions, saving approximately 120 lives. Roughly 25 percent of these missions were carried out by surface craft.[4] These figures are submitted here with reservation, since Major Kretschmar was not at Nordeney throughout the period on which he reports, and since he himself remarks that it is no longer possible to furnish precise information. Furthermore, the ratio of personnel saved to missions executed--according to Kretschmar's figures--appears exceedingly small. According to his report rescue missions in the Bight of Helligoland from 1941 on were flown with fighter escorts, because the British had shot down two rescue planes. In

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4. Major Wolfgang Kretschmar: Der Seenotdienst in der Deutschen Bucht von 1941-43.

1941-42 the large majority of all personnel in distress at sea were from German night attack units, which crossed a part of the Bight of Helligoland on their way to England; from 1943 on the majority were from British and American air units on their large-scale attack missions against Germany. In the winter of 1941-42 air-sea rescue units were unable to operate from Nordeney because of the ice conditions. During this time He-59 rescue seaplanes relied on their floats as skids when taking off and landing on the frozen lake at Zwischenahn. Operating from here these units rescued three German fighter pilots and two British airmen.

In April 1943 Lieutenant Colonel Sabratzky replaced Lieutenant Colonel Securius in command of air-sea rescue services in the North Sea. From the account given in Section 3 (The English Channel and the Atlantic), above, and from the brief remarks by Lieutenant Colonel Securius previously quoted, it is evident that main emphasis in air activities at the end of 1942 and the beginning of 1943 shifted steadily towards the eastern exit from the English Channel and to the North Sea, because the hostile air forces now were beginning to fly into Germany by routes across Holland and the Bight of Helligoland. In the late summer

of 1943 the present writer assumed command over Regional Air-Sea Rescue Command V (North Sea) and Lieutenant Colonel Sabratzky was transferred to Regional Air-Sea Rescue Command VI (Baltic) at Swinemuende. Regional Air-Sea Rescue Command V still had its headquarters at Wilhelmshaven-Sengwarden, the premises of Naval Command Headquarters North. Here, the chief of the regional command was attached to but in no way controlled by Patrol Command North Sea, under Admiral Lucht.

At this stage Regional Air-Sea Rescue Command V, which controlled the three detachment commands at Nordeney (Bight of Helligoland), List--on the Isle of Sylt (the areas off the North Fresian Islands and the coastal waters off southwest Jutland), and Aalborg (the areas off the northwest coast of Jutland, the Skagerak, and the Kattegat), was adequately equipped with materiel. This was due in large measure to the fact that after the closing of the naval operations in the Channel some of the boats and planes stationed there had to be withdrawn to the North Sea. The motor lifeboats of the German Lifesaving Society were controlled by voice radio through the Elbe-Weser radio station and could be reached by telephone even when not at their stations.

A list of the surface craft employed in air-sea rescue operations under the regional command will be found in Appendix 32. The large rescue flotille involved was under the command of Captain Majewski. The rescue planes of the command operated from modern seaplane bases.

The number of German and enemy crews reported in distress was almost equal, but rescue operations became steadily more and more difficult because of the action of hostile harassing planes. Furthermore, the enemy during this period in a steadily increasing measure sent out their own rescue planes and surface craft to all areas of the Bight of Helligoland in efforts to rescue their own valuable flight personnel. With this objective in view, hostile planes even attempted to force down German rescue planes carrying rescued personnel in order to transfer to their own rescue craft the rescued personnel and the crews of the German rescue planes.

Owing to the pressing need for fighters in normal combat missions, it became increasingly difficult to provide fighter escorts for rescue operations. For this reason the assignment of an organic search and escort squadron of land based aircraft to the Air-Sea Rescue Command was approved in the summer of 1944. The squadron originally

assigned consisted of only four (?) Ju-88 planes, some of which were exchanged for FW-190 planes. Several months later the Night Fighter Command declared that it no longer required Type Me-410 aircraft. The Air-Sea Rescue Command therefore adopted this model and turned in all other land-based aircraft. In the last few months of the war the Me-410 proved exceptionally satisfactory. The planes were manned exclusively by seasoned crews from rescue planes who, owing to their long service in air-sea rescue squadrons, were experienced in rescue-search operations and in marine-air navigation and through excellent cooperation provided good protection for Do-24 units employed in rescue missions. Captain Ossowski served as Search Squadron Leader until December 1944, and Captain Wiesner from then on until the end of the war. The squadron was based at Jever, so that its planes could be committed speedily whenever needed. The squadron also provided escort planes to protect Ju-52 mine-clearing aircraft during operations. These aircraft patrolled the shipping routes in the Bight of Helligoland and river estuaries to explode enemy magnetic mines by means of a huge electro-magnetic metal ring.

Cooperation with the Navy was particularly advantageous in the case of Regional Air-Sea Rescue Command V.

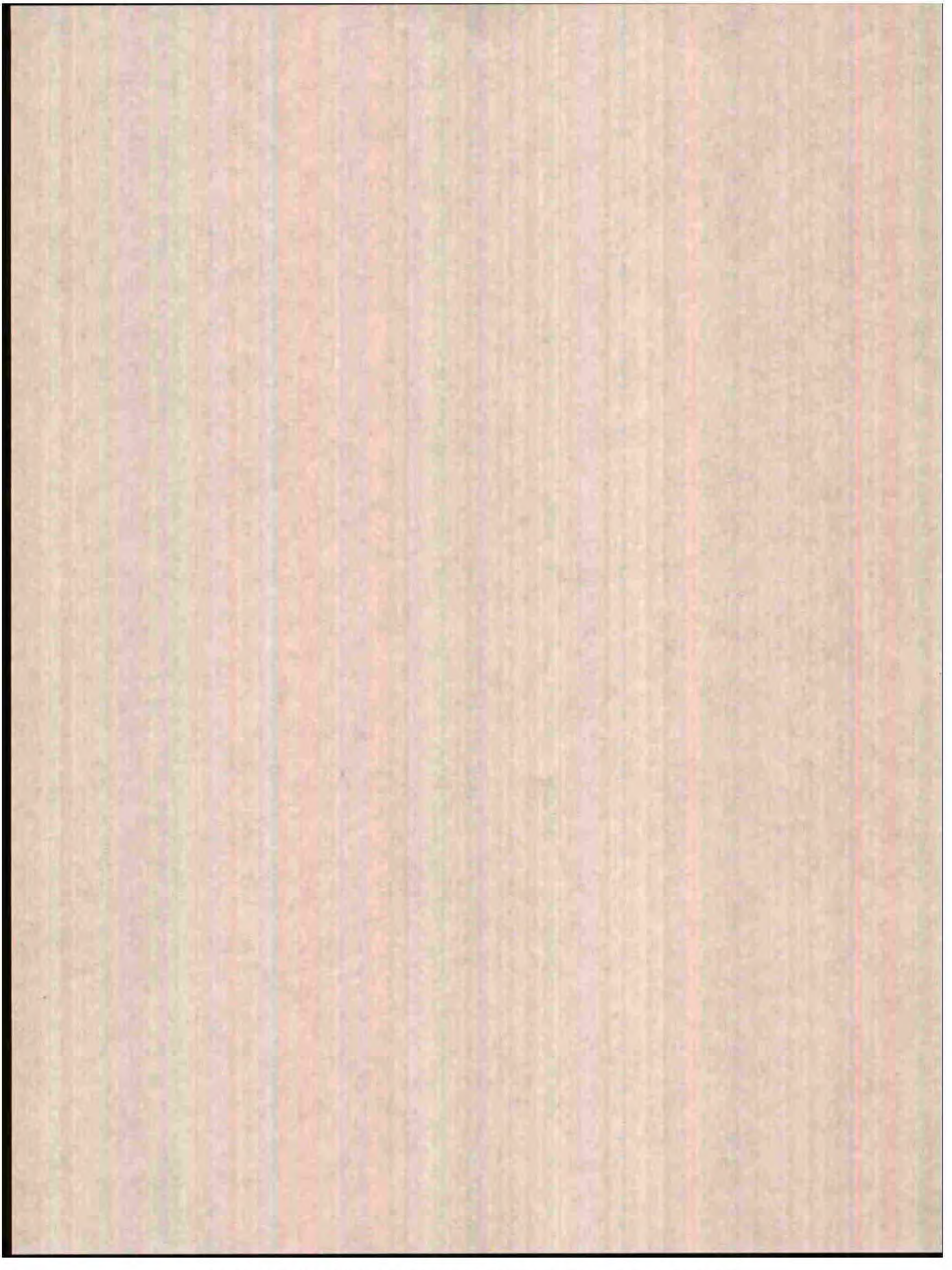
Up to early 1945 Patrol Command North Sea continued to conduct lively convoy traffic from north German ports to Holland and other countries. These convoys came under frequent attack by enemy torpedo bombers, destroyers, and E-boats. The convoys travelled almost exclusively at night, and while they were en route the rescue service maintained its units under alert in the appropriate coastal areas. In this way rescue units were able to carry out quite a number of successful rescue missions to save personnel in distress after enemy attacks against the convoys.

After the regional rescue command had received its squadron of search planes, Me-410 planes occasionally carried out seaward reconnaissance for Patrol Command North Sea, furnishing information which was valuable not only to the naval command concerning probable attacks against convoys, but also of value to the rescue service since it facilitated the precautionary posting of rescue craft against the eventuality of coming needs. It must be remarked at this point that the Patrol Command North Sea at the time had no units of its own which could have carried out reconnaissance missions of this type, which extended sometimes even as far as the E-boat bases on

the coast of England. Although engaged frequently in air combat, in which it downed a number of enemy aircraft, the search squadron incurred no losses itself.

Seaplanes of the Do-24 squadron stationed at Nordeney were no longer used in search operations, because this would have exposed them too long to the hazards of enemy air action, the enemy air superiority at the time being so pronounced that enemy fighter bombers, long-range fighters at times had complete mastery over the Bight of Helligoland. The seaplanes were dispatched only when the precise location of the person or persons in distress was known; whenever possible these missions were carried out with radio navigation and with adequate protection by land-based escort aircraft, so that the missions could be completed as speedily as possible.

When German convoys came under attack, the rescue units dispatched were usually air traffic control boats. Operating at night, these boats could soon reach the attacked convoy, pick up seamen adrift in the water from sunken ships, take aboard the crews of sinking ships or wounded personnel, and carry them swiftly to shore. Similar rescue provisions were made for blockade breakers and minesweeper and outpost patrol units. In these rescue operations motor lifeboats



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of the German Lifesaving Society were employed quite frequently.

Inside the Bight of Helligoland, where the tidal shoals were not navigable at night and the small ships plying these waters were compelled to travel by daylight, enemy fighter-bombers destroyed many a ship. That it proved possible to save wrecked crews, and in some cases even vessels, under these circumstances was due to the devoted efforts of the lifeboat crews of the German Lifesaving Society. Without regard for the hazards of weather conditions or of enemy action, these men with their intimate knowledge of the waters in their areas reached persons in distress with surprising speed no matter how difficult the navigational conditions were. Their devotion to duty and the matter-of-fact manner in which they submitted to

military authority deserve the highest commendation. Some of these boats participated with a number of Type B air traffic control boats in an operation repeated frequently under the code designation"Scholle Alert"(Bereitlegung Scholle) in 1944 during the increasingly frequent large-scale enemy air attacks. Two factors contributed to make these alerts or assemblies possible: (1) During the last few months of the war a large number of Type B boats and motor lifeboats were available within the Bight of Helligoland, and (2) it was noticed that during large-scale attacks the enemy needed all fighters to escort the attacking bombers, so that a period of relatively small risk could be expected for the rescue boats in their assigned positions during the hours of approach and departure of the enemy air formations. The alert usually applied to approximately twenty boats and was designed to cover the entire area of the Bight of Helligoland, as will be seen from the map included in Appendix 33. Approximately eight boats participated in what were called "minor Scholle alerts" (kleine Scholle), covering an area marked with angles in the same map.

The Scholle alert not only made speedy rescue action possible, at times on the personal initiative of the

individual boat helmsmen, but also provided an excellent opportunity for seaward reconnaissance.

The regrettable fact that a large percentage of rescue missions failed because the crews of combat aircraft operating at sea failed to take adequate precautions against the eventuality of mishaps at sea--in some cases taking along no survival or signal equipment at all--had caused Air Inspectorate 16 to take numerous measures as far back as in 1942. These measures were devised to counter the fateful complacency of aircraft personnel; the reasons why they rpoduced no satisfactory results will be given in Chapter 3, Section 1, on the experience gained in air-sea rescue operations.

After his transfer to Regional Air-Sea Rescue Command V, the present writer had the opportunity to introduce entirely new measures in this field through the establishment of training courses at Aalborg in which instructions were given on proper behavior when in distress at sea. From January 1944 on the courses were held each week, with very few exceptions, and by December 1944 reached a total of 1 315 participants.

These courses also will be dealt with more exhaustively in Chapter 3, Section 1.

The units stationed at Aalborg, where the courses referred to above were conducted, were responsible for rescue operations in the Skagerrak and the Kattegat areas, where quite a number of successful rescue missions were carried out in the last two years of the war. One important factor, which was a great advantage for training activities, was that the enemy air superiority was hardly noticeable in these areas.

The autumn of 1944 brought the reorganization of the air-sea rescue services referred to repeatedly in the foregoing chapters, a subject which will be dealt with in more detail in this present section.

The order to implement the reorganization was contained in a directive from the Luftwaffe High Command dated 19 August 1944 and was explained in more detail in an "Interim Bulletin" issued by the Chief of the Marine Air Arm (General des Seewesens der Luftwaffe) and Inspector of the Air Marine and Air-Sea Rescue Services dated 1 November 1944. Both of these documents will be found in the Annex Volume as Annexes 34 and 35.

The purpose of the reorganization was to release personnel for home defense through a simplification of the command

set up of the rescue services. In spite of numerous inquiries by General Goltz, it has not been possible to ascertain what the real reasons were for the complete dissolution of so important an operational organization of the Air-Sea Rescue Service through measures aiming at a reduction of force. Of interest here is what Colonel Aldinger, GSC, who, together with Colonel Hoffmann, GSC, handled matters of organization in the Office of the Commander in Chief of the Luftwaffe. In a letter to General Goltz dated 27 December 1955/ Colonel Aldinger remarks first that he has no records of any kind in his possession and then continues as follows:

> So far as I can remember, the Luftwaffe in August 1944 was required to release large numbers of personnel to the Army and to the SS. This led to efforts throughout the entire organization of the Luftwaffe to simplify the overall command machinery, which was excessively large when compared with the number of aircraft still in operation. It is only natural that these emergency measures produced hardships and difficulties. Another consideration is that the air-sea rescue mission at that time had become illusory in many areas owing to the loss of German control over the coastlines.....

It is perfectly true that by 1 November 1944, the date on which the bulletin was issued, the areas of operations at sea had contracted extraordinarily. However, where such areas still existed, namely, in Norwegian waters and in the North Sea and the Baltic, air-sea rescue activities were at a peak. With nine out of the former 13 regional air-sea rescue commands already more or less non-existent, the number of air-sea rescue personnel available was so large that it would have been possible without difficulty to leave the remaining four regional commands unchanged.

In brief the reorganization involved the following;

(1) Discontinuation of the post of a Chief of Air-Sea Rescue Services at air fleet level;

(2) Consolidation of the air-sea rescue squadrons with the rescue flotillas of surface craft to form group commands with unclear chains of command;

(3) Discontinuation of the air-sea rescue operational command posts, namely the regional and detachment commands

(4) The units consolidated in the new groups were directed in their operations by the individual land-based air unit (squadron, group, or wing) whose personnel were involvedin a current rescue mission;

(5) The Air-Sea Rescue Commander attached to each

air fleet was required, through appropriate measures, to insure that the land-based units were capable of conducting such rescue and similar missions. This was to be achieved through such means as instruction on air-sea rescue operations and the assignment of Air-Sea Rescue Service liaison officers.

The situation created by the above directive in the zone of the Home Air Fleet is described in a critical stidy of some of the more important points. This study will be found in Appendix 36. The Home Air Fleet (Luftflotte Reich), which in the meanwhile had assumed responsibility for the North Sea and Baltic coastlines extending from the mouth of the Schelde River to Pillau, decided to adopt the following solution:

Lieutenant Colonel Hess, Chief of the Air-Sea Rescue Service Liaison Teamm took the place of the former Air Fleet Chief of Air-Sea Rescue Services, and exercised administrative, disciplinary, and tactical command over the 80th and 81st Air-Sea Rescue Group Commands which replaced the regional commands in the North Sea and the Baltic.

The 80th Air-Sea Rescue Group was stationed at Nordeney, under Captain Luchmann. First Lieutenant

Holtkamp commanded the land-based rescue squadron, Captain Majewski the flotilla of surface rescue craft.

The 81st Air-Sea Rescue Group was stationed at Bug, on the Isle of Ruegen, under Major Born. The names of the squadron and surface fotilla commanders are unknown.

The rescue air and surface craft remained at their former stations.

The signal company organic to the Air-Sea Rescue Service was disbanded. The Signal Staff Officer of the 2d Fighter Division therefore assumed responsibilit

for the technical and personnel requirements of the rescue service. Annex 6 of the Luftwaffe general directive regulating radio traffic remained in force. At Nordeney and Bug the two group headquarters established rescue command posts. The Air-Sea Rescue Service Liaison Detachment transferred from Wilhelmshaven-Sengwarden to headquarters of the 2d Fighter Division atStade, where it was given a desk in the headquarters permises.

The a bove arrangement established clearcut operational and command controls and command channels in the sea areas involved and the rescue service continued to function here in the customary satisfactory manner.

That the rescue service continued to provide for the needs of the Navy as well as it had done before is evident from the following case: Near the Dutch island Schiermonnikoog, a German naval outpost boat travelling alone was struck by bombs and badly damaged on 26 November 1944. The crew succeeded in beaching their boat on the tidal flats where it broke in two. On receipt of signal messages sent out, Squadorn Leader First Lieutenant Holtkamp took off to the rescue immediately with a Do-24 plane from Nordeney. Within twenty minutes he found the wrecked boat. The tide was falling and the only spot where he could surface was a rill approximately 130 to 190 feet wide and 1 600 feet

long. The surfacing operation was complicated by a side wind and by the fact that it was already dark. In spite of these difficulties Lieutenant Holtkamp made the pin-point landing and in several trips with pneumatic boats the wounded were first ferried across to his plane. Shortly before midnight he arrived back at Nordeney with his first load of 13 wounded. He also accomplished his second flight without incident, bringing back 21 naval personnel. On his third trip, he encountered an enemy night fighter and was only able to surface after diverse maneuvers to shake it off. On his return trip with 24 persons, the rest of the rescued crew, aboard, he again encountered an enemy night fighter, but nevertheless landed successfully at Nordeney. Thanks to the excellent way in which it was handled, one single plane thus rescued 58 naval personnel before daylight and the incoming tide exposed them to a very uncertain fate.

In the last winter of the war the Air-Sea Rescue Service encountered particularly grave difficulties in operations off the coast of Holland. At the time a bomber wing dispatched units regularly over this area on extremely difficult missions of a special nature connected with the launching of V-weapons, so that the wing's units were

a constant target of vigorous British offensive defense action. The rescue service had Type B boats stationed at IJmuiden, Helder, and Terschelling. These boats covered the most seriously exposed areas. They had been pushed as far out as possible and were able from their stations to carry out successful rescue missions. However, weather conditions were frequently so bad that they were unable to operate, and quite often so bad that the Navy even had to call in all outpost patrol craft in these areas. The only possibility would have been to use modern motor lifeboats of the German Lifesaving Society here. However, developments in the military situation superseded the preparations being made for the assignment of lifeboats of this type. (See Appendix 37).

The ceaseless day and night attacks by enemy bomber forces against the German Zone of Interior resulted in an acute shortage of fuel and replacement parts for units of the rescue service. This applied particularly in the North Sea, where these units had to be maintained under constant alert. In early March, for example, a number of Me-410 planes were inoperable because of the impossibility to move in the replacement parts required for their repair. For this reason, and with approval from the Home Air Fleet,

the crew members of six Me-410 aircraft were sent by rail to Sagan, in Silesia, in mid-March to pick up six of the aircraft of this type held ready there for transportation to the front. These six planes took off shortly before Soviet forces reached Sagan. Five of them reached Jever, one had to land south of Berlin because of engine trouble.

Because of the advance of Allied forces in the West, the 2d Fighter Division at the end of March received orders to displace to Leck-Eggebeck. The Air-Sea Rescue Service Liaison Detachment transferred to the seaplane base at Schleswig. During the evacuation of Northern Frisia the Do-24 and Me-410 squadrons also had to leave their bases at Nordeney and Jever respectively. Ten Do-24 planes displaced to List, on the Isle of Sylt, and nine Me-410 planes to Westerland. During the movement the seaplane carrying the 26 members of the group headquarters staff developed engine trouble and had to be surfaced at sea. Wit one engine running, the seaplane made its way afloat to Neuwerk, where it was left high and dry on the beach at low tide. It was towed off at the next high tide by a mine sweeper which brought it to Cuxhaven. A Type B air traffic control boat then towed it to List, from where

it carried out a few rescue missions during the last four weeks of the war.

Radio contact still existed with the three seaplanes left behind in Holland, which were needed there to cover the withdrawal in the coastal areas in addition to carrying out a few rescue missions. These three planes were only recalled at the end of April and reached Cuxhavenundamaged as the last air or surface craft from these sea areas.

After capitulation the Do-24 seaplanes, altogether 15 including those from Aalborg, were dismantled and wrecked, similarly to the Me-410 airplanes at Westerland.

An interesting point is that one Do-24 seaplane was not dismantled. Under British orders a former Do-24 crew carried out a number of test flights in the summer of 1946. Then it was towed out northwest of Sylt by a British air-sea rescue boat and taken under fire by British fighters. Although it developed a heavy list, the fighters were unable to sink it, so that it had to be destroyed by a demolition charge on the following day.

During the last months of the war rescue operations in the Baltic also came under the influence of Allied airforces, which preferred flying by way of Helligoland Bight

and Schleswig Holstein to attack Central and Eastern Germany. However, the number of persons reported in distress at sea in the Baltic nevertheless remained smaller than was the case in the Bight of Helligoland.

In addition to its planes, the 81st Air-Sea Rescue Group (Baltic) relied in its rescue operations mainly on the motorlifeboats of the German Lifesaving Society stationed in its command area. Most of the large number of Type B boats in the area were consolidated under the Luftwaffe Ships and Boats Command (Kommando der Schiffe und Boote der Luftwaffe) for use in special missions. The seaplanes of the rescue service in the Baltic also were assigned numerous diverse missions in addition to their normal duties. They flew numerous missions to Pillau and other Baltic ports to evacuate seriously wounded military personnel, and one fact which deserves special mention here is that the Do-24 planes stationed at Bug, on the Isle of Ruegen, in continuous missions flew out thousands of children to Ruegen from the childrens homes at Lake Nester, although the area already was enveloped by Soviet armored forces.

As mentioned above, almost all Type B boats, the two air traffic control ships Greif and Hans Wedel, and

Salvage Barge 31, all of them from the 81st Air-Sea Rescue Group (Baltic) and the 60th Air-Sea Rescue Group (Eastern Baltic), were employed in special missions, mainly to evacuate wounded personnel and refugees. The operations of the 81st Flotilla, including Air Traffic Control Ship Greif, were directed by Major Born from headquarters at Bug on the Isle of Rugen. Captain Schirmack controlled the rest of the Type B boats, Air traffic Control Ship Hans Albrecht Wedel, and Salvage Barge 31. Captain Schirmack had been Flotilla Chief in the English Channel. Under orders he had moved his boats after loss of the Channel ports to Kiel. From here he had been ordered to proceed immediately with twelve boats to the command area of the First Air Fleet in the Baltic. Here he had stationed three boats at Windau, three at Libau, and the rest under his personal command at Pillau.

With the advance of Soviet forces into Eastern Prussia and Soviet seizure of Pillau the hitherto quiet situation in these areas changed overnight. It became necessary to abandon Windau, and the ships carrying out the movement came under day and night attack by Soviet aircraft, E-boats, and submarines. The first requirement was to move in supplies through the port of Memel for the German troops.

From Pillau the boats of the flotilla carried rations, ammunition, and medical supplies to Memel, returning with a full load of wounded personnel; occasionally the transports moved through the Kurishes Gaf. Then came the mission of evacuating the wounded and refugees from Pillau, in which operation elements of the 81st Flotilla also participated. During the initial stages of this movement the boats were required to make the full trip to Swinemuende; later, they dropped off their passengers at Hela, from where bigger ships were employed for the further transportation. Later, the Type B boats were required urgently in the Bay of Danzig. Here, they were employed together with naval units as submarine chasers, or in supply missions to outposts still held by German troops--such as at Neukuhren, and finally in evacuating such outposts when they became completely untenable, as was the case at Heiligenbeil in the Frischhes Haff. In between, genuine "distress at sea" cases occurred. Such was the case when a hospital ship was shelled and set on fire at sea level with Gotenhafen. Here, three Type B boats and the air traffic control ship proceeded to the spot immediately and took aboard 900 wounded personnel from the flaming ship. The performances in seamanship and the devotion

to duty displayed on such occasions merit the highest respect and commendation. Thus, Captain Schirmack reports [5] that on 18 January 1945 Air Traffic Control Boat 535, under Master Sergeant Engelhardt, rescued the ten-man crew of the SS Steinburg, wrecked north of Libau under sea conditions which were so bad that even the Navy had been compelled to call off all rescue operations. The official report

5. Captain Schirmack: In a letter to the present writer dated 10 May 1957.

on this rescue operation has remained in existence and it is considered justifiable to include it in this study as Appendix 39.

Mention will also be made here of an outstanding performance by units of the 31st Flotilla during the period under study here: In the night of 17-18 March Type B boats of the flotilla in continuous operations evacuated the entire 5'200-man strong garrison of the city of Kolberg. Although the city was completely enveloped and in spite of fierce pressure by the Soviet forces, the operation was carried out successfully at very small cost in losses under the protection of light naval units firing over the bridge connecting the city with Kolberg-Bad. This outstanding performance of seamanship combined with spectacular courage was rewarded by the unreserved recognition expressed by the commander of the destroyer unit in his after-action report.

When Pillau finally capitulated after having been under continuous artillery fire for some time, Captain Schirmack left port with his eight boats, each carrying 150 wounded personnel, and reached Bornholm after a stormy voyage. After transferring their wounded passengers to shore, the boats proceeded immediately to Stralsund for

a perfunctory overhauling job, after which the flotilla reported for duty again to Headquarters, 81st Air-Sea Rescue Group at Bug.

In the meanwhile, units of the 81st Flotilla and Air Traffic Control Ship Greif also had carried out numerous missions in evacuating wounded personnel and refugees from the coast of Pomerania and Mecklenburg to Schleswig Holstein. In addition units participated with the 60th Flotilla in evacuating the naval hospital at Strahsund shortly before that city was captured by the enemy.

Occasional estimates giving the number of persons evacuated in the above movements as between 250 000 and 400 000 have encountered serious doubts, and strenuous efforts to obtain authentic figures unfortunately have produced no results. Captain Schirmack estimates that his flotilla while operating in the eastern reaches of the Baltic moved between 50 000 and 80 000 evacuees. It is therefore considered justifiable to state that the number of persons evacuated by planes and by the boats of the two air-sea rescue groups was far in excess of 100 000.

The terrible losses resulting from the sinking of large transport ships such as the Steuben and the Gustloff can no doubt be regarded as the greatest marine tragedies

in the annals of history, and the Air-Sea Rescue Service was completely unable to prevent them. The officers and crews of these ships were unable to put out boats or do anything else to enable even a small percentage of the wounded personnel and refugees to remain afloat. A very small number managed to survive by clinging to wreckage until lifeboats arrived. All others either sank with the ships or succumbed to the cold waters of the Baltic Sea within a few minutes. As previously mentioned, almost all of the Type B boats present in the Baltic at the time were employed in the transportation of wounded personnel and refugees, but even if they had been available for rescue operations they could have done little to increase the number of persons saved. Rescue planes were unable to surface within the area owing to the bodies and wreckage covering the surface of the sea for miles around. All they could do was to verify that thousands of the passengers were dead.

Shortly before the surprisingly quick surrender of Ruegen, Major Born displaced with his squadron of Do-24 planes to Guldborg-Lolland, Denmark. Captain Schirmack first dispatched two Type B boats with wounded personnel, women, and children to Kiel and then followed with what

was left of his flotilla and Salvage Barge 31. The two boats dispatched to Kiel were sunk, together with more than one hundred other small craft, in the heavy low-level attack carried out by enemy aircraft against Kiel harbor just as they arrived. Air Traffic Control Ship Hans Albrecht Wedel had been sunk previously in an air attack in the Bay of Danzig prior to the capitulation of Pillau.

What was left of the 81st Flotilla, a number of Do-24 seaplanes, and Air Traffic Control Ship Greif, the latter with hundreds of refugees aboard, gradually assembled in accordance with orders at the seaplane base and in the port of Schleswig, to which point the seaplanes and boats of the Air-Sea Rescue Service which had escaped to Denmark also returned in July.

Here, at Schleswig, all operational units of the Air-Sea Rescue Service, plus a large number of training surface craft from the Marine Training School of Lobbe and from other seaplane bases were turned over to the British. Some of the marine personnel remained at the Schleswig seaplane base as instructors for British personnel and for other purposes; all other crew members were sent to prisoner of war camps for discharge.

6. Air Inspectorate 16 up to the End of the War. On 30 November 1942 Generalleutnant Goltz, the first officer assigned as Inspector of the Air-Sea Rescue Service, was retired on pension. All who have any knowledge of the development of the service from personal experience or have gained some insight into the subject from this brief outline will confirm that, in spite of all adverse circumstances, and particularly in spite of the lack of any mobilization plans for personnel or materiel, General Goltz in the course of the war succeeded in creating an organization which, as an armed operational and rescue service was a complete innovation. They will also confirm that, due to the industry and devotion of all military and other personnel in its ranks, this service achieved performances which equal those of any other branch of the armed forces.

General Goltz was succeeded by Colonel Klintsch, until the Chief of Air-Sea Rescue Services Command 3 West), whose post was taken over by Lieutenant Colonel Freiherr von Buddenbrock, hotherto Chief, Section A, Air Inspectorate 16. Lieutenant Colonel Siepermann, in turn, was transferred to take over the position vacated by Lieutenant Colonel Freiherr von Buddenbrock. Lieutenant

Colonel Pruter remained as Chief of the Training and Examining Staff (Lehr- und Pruefstab) established by General Goltz.

Air Inspectorate 16 remained with the rear echelon of the Luftwaffe High Command (code designation Kurfuerst) in premises in the same reserve near Potsdam. Major Stedler, Chief of the Signal Staff Section, was replaced by Major Boehmer, who was followed later by Captain Ross. Major von Fedrigoni probably took over Staff Sections B and C in the Spring of 1944. When the forward or operational echelon of the Luftwaffe High Command (code designation Robinson) withdrew from Eastern Prussia to the rear echelon headquarters, Air Inspectorate 16 had to vacate its premises in the game reserve and transferred in June 1944 to Pragerstrasse 9, Dresden. From there it transferred on 16 August to the Luftwaffe caserne in Brandenburg on the Havel (near Berlin), and in October from there to Boetenitz Castle, near Dresden. In the meanwhile all personnel had been transferred out of the Training and Examining Staff with the exception of the chief, Colonel Pruter, Staff Section C (Ships and Boats) had been discontinued altogether, and the whole staff of Air Inspectorate 16 had

been reduced considerably.

In January 1945 the inspectorate was ordered back to Berlin and placed under Generalmajor Czech, Chief of the Marine Air Arm (General des Seewesens), who had headquarters at the Gatow airfield near Berlin. With this change the current inspector, Colonel Klintsch, was transferred out of the inspectorate.

According to a report letter from Air Staff Engineer Zeller to General Goltz dated 12 March 1946, the history of General Czech's staff from then on was more or less as follows: On 3 April 1945 the entire staff displaced to Grossenbrode, opposite Fehmarn Island. As the situation became more and more critical and after discharging all civilian personnel, the staff boarded Motor Ship Atlanta, a Luftwaffe vessel, on 4 May to transfer to the Schleswig region. The ship put to sea at 0400 and at 1130 came under attack by fighter bombers. General Czech and five members of the ship's crew sustained more or less severe injuries, the captain of the ship losing both hands, and the ship sprang a leak, and therefore had to put into port at Bagnkop, on Langeland Island, to land the casualties and undergo repairs. On 13 May the Atlanta again departed on a course for Schleimuende. On 20 May the ship

reached Schleswig after several stopovers on the way. From here the entire crew was sent to prisoner of war camps.

CHAPTER 3

EXPERIENCE GAINED AND STATISTICAL DATA

1. Wartime Experience in Air-Sea Rescue Operations.[1]

(1) General. The most practicable and natural solution in the future would be to leave all responsibility for air-sea rescue operations to the Navy, which also should have tactical control of all aircraft committed in operations at sea in any type of mission. This would place the responsibility for the organization of the sea-rescue service, for the training of all personnel for that service and the aircraft crews in nautical and technical subjects, as well as the training of personnel to man the air traffic control ships and boats in the appropriate and most capable hands.

The air-sea rescue service must be so organized in peacetimes that it can be expanded, both in respect to personnel and materiel without any difficulties in case of war. Just as is the case with all arms and services of the military forces the necessary mobilization preparations should also be made beforehand for this service. Unfortunately this was not done prior to World War II. Another mistake made in World War II was that, pursuant to the requirements of Hitler Directive # 1 concerning secrecy, the Chief of the German Air-Sea Rescue Service was not informed in time of the possible expansion of the zones of operations at sea, a circumstance which in frequent cases resulted in inadequate preparations.

In reestablishing an air-sea rescue service, it would be highly desireable for the Navy to reassign to such activities as many former members of the old organization as possible. Even the most perfect training program could not take the place of the practical experience gained by the crew members of air-sea rescue surface craft and aircraft in their wartime operations, and this applies particularly to the aircraft crews. Only at the cost of an enormous expenditure in funds and effort would it be possible for a marine air school to give its personnel practical experience in surfacing at sea under stormy conditions. It would seem advisable to assign the responsibility for the direction and organization of the new service to a naval officer who was a member of the air-sea rescue seaplane forces of World War II.

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1. This section is based on a draft study on the subject prepared by Generalleutnant Konrad Goltz and on pertinent excerpts from various reports and the personal thoughts of the present author on the subject.

(2) Organization. The basic organization of the Air-Sea Rescue Service as ordered in the spring of 1942 proved satisfactory. The moethod of organizing the service in regional commands controlling search and rescue squadrons and surface craft flotillas distributed among its sub-area air-sea rescue commands as the locally responsible agencies can be recommended.for adoption in the future. The fact should be noted here that in 1944 the search and rescue squadron operating in the North Sea frequently rendered good naval reconnaissance services for the Navy. Possibly, the missions of these squadrons could be combined in a similar manner in a future organization.

(3) Air-Sea Rescue Aircraft. The type ultimately adopted for general use in air-sea rescue missions was the Do-24 seaplane. It was a good plane in general and proved highly satisfactory. As has been revealed in the foregoing account, of air-sea rescue operations, however, the fuselage was not sturdy enough for rough seas. The Brequet-Bizerte proved sturdier and had a considerably lower surfacing speed, but its power reserve when taking off was insufficient.

The model to be adopted for a future air-sea rescue service should be a seaplane with a sturdy fuselage, a low surfacing speed, and all possible starting aids. Besides having an appropriate carrying capacity, it should be equipped with handy

devices to facilitate work in hauling aboard shipwrecked persons and adequate space for their medical tteatment.

The helicopter will play an important role in future air-sea rescue operations, since it provides the possibility to search large areas of sea very carefully. Above all it has the advantage that the whole area can be kept under observation during the actual rescue operation. In the case of seaplanes, in contrast, the persons to be rescued are frequently lost sight of during the surfacing and are then often difficult to find again, particularly during heavy seas.

Furthermore, helicopters can make far more accurate deliveries of survival equipment by air dron than any other type of aircraft.

The Me-410 aircraft of the land-baesd air-sea rescue squadrons proved highly satisfactory in search and escort missions. They were manned by trained air-sea rescue personnel and, although inferior to the enemy fighters in speed, their cooperation with the seaplanes carrying out the actual rescue work was excellent and highly advantageous. In addition, it is a matter of record t that during the almmst one year of their existence the land-based search and escort squadrons shot down a number of enemy fighters without themselves losing a single unit. A similar but more up-to-date modxl therefore should prove suitable not only for air-sea rescue but also for naval reconnaissance missions.

(4) Air-Sea Surface Rescue Craft. Whether the wide variety of surface craft needed by the former Air-Sea Rescue Service will be a feature of any newly established Marine Air Arm depends on the nature of the new arm.

For the air-sea rescue operations as such only a few standard types of surface craft are needed. As long as seaplanes are in use it will remain necessary to have air traffic control ships with protal or gantry cranes. These extremely valuable ships were used for air-sea rescue operations only in cases of

special emergency, but they were indispensable as salvage and repair ships, radio centers and numerous other important functions pertaining to air-sea rescue operations. A 1 000-ton ship of this type, carrying a helicopter on its aft deck, would prove exceedingly useful as a multi-purpose air-sea rescue ship, particularly during bad weather and in cases of planes in distress far from any shore.

In the light of experience it appears that the following two types of surface craft will be needed for medium- and close-range rescue missions: (1) as a fair-weather boat: a speedboat capable of travelling up to 50 nautical miles per hour and strongly armed for use in fair weather to choppy seas. It must have a long operational range and the machinery must be so constructed

that the boat can travel long distances at an economical slow speed; (2) For use in stormy weather: The only boats for use in stormy weather available to the former air-sea rescue service were the motor lifeboats of the German Lifeboat Society stationed along the north sea coast; in other areas the lack of these boats was seriously felt. For stormy weather activities the service would require boats capable of operating in any seas, and they must be of the most modern types. All surface craft must have the most up-to-date equipment for treating persons exposed to freezing temperatures and must have a corresponding dispensary aboard. Each ship and boat must carry a medical officer or noncommissioned officer who has received specialized training.

If at all possible two crews should be held ready for each boat, so that it can be held under constant alert.

(5) Rescue and Signal Equipment. The following items proved particularly satisfactory: the pneumatic boats together with the survival kit they contained, the type of signal cartridges used and the distress flares dropped by the search and rescue planes as markers. The following items, while not quite as satisfactory as those listed above were nevertheless useful: the the buoys used as survival ration containers--only in a few cases were these delivered by air drop, the distress signal

signal flares included in the survival packs of the pneumatic floats --it was found that the melting grease from the flares dripped onto and damaged the gunwhales of the pneumatic floats--, the NS 2 type distress signal transmitters included in the boat kits--these were too complicated in operation because a kite or balloon was required to carry the antenna aloft.

Mention was made in Chapter 1, (1), c, of all other signal equipment used, such as the signal equipment items carried by fighter crews together with their pneumatic float and lifebelt. In some cases fighter pilots failed to carry along this survival kit because it took up so much space that they could hardly move in the cockpit.

The main principle in the future development of rescue, survival, and signal equipment therefore must be to have everything as small, light, compact, and effective as possible. Thus the unwieldy signal pistol used should be discarded and replaced by the hand-fired signal cartridge, which should be so perfected that the user can fire it even if his hands are frozen. In designing new types of aircraft

consideration must be given to the necessity to load all survival and rescue equipment in such manner that it will be easily accessible and, in the case of aircraft with large crews the pneumatic boat , including all accessories, must be provided with an automatic release and an automatic inflating device.

Urgent attention is drawn to the details given in the section which follows later on experience in the medical field, pp. 157-58, which should be taken into consideration in the manufacture of a new type of lifebelt. It would be highly desireable if some chemical could be developed for supply in tabloid form to render sea water potable. Finally, the 16 field manuals formerly in existence dealing with such subjects as behavior when in distress at sea and the various items of survival equipment should be revised and abbreviated to form only two manuals containing (1) Regulations for air units operating at sea, and (2) regulations on the maintenance of equipment. Detail on what were called the Schaumannzuege will be found on 150 and 151, below.

(6) The possibility existed already in the last years of the war to maintain contact by voice radio with fighter units during air-sea rescue operations. It would be a big step forward if all communications during rescue operations were conducted by voice radio in the future, as was customary in the British rescue service in World War II. In the advanced stage of development which radio communications have since reached, it should be

possible to develop a lighter and more handy set which could be packed in the pneumatic boat, or, carried on the person, could be used in cross-sea flight without an antenna.

(7) Air-Sea Rescue Training. As mentioned previously, thousands of men were lost during the war because they had received no instructions or had been inadequately instructed, on what to do if they were forced down at sea. Either these personnel had not enough survival and signal equipment along on their mission or they had not been trained properly to make the best use of what they had.

To increase the interest of personnel employed in missions at sea in the subject of preparations against the eventuality of distress at sea, the Air-Sea Rescue Service Inspectorate, in addition to detailed regulations, published a number of brief bulletins with colored illustrations on the subject. Specimens will be found on pages 34 and 35 of the Illustrations Volume attached to this study. When it was found that these pamphlets failed to achieve their purpose, General Goltz reports, Luft Inspektion (Inspectorate 16 of the Luftwaffe General Staff) with approval from the Chief of Luftwaffe Supply and Administration decided on the construction of two-wheeled trailers to carry all items of rescue and

survival equipment required for instructional purposes. With instructors, these trailers were to travel from unit to unit to hold brief courses. Unfortunately this plan met with just as little success as the efforts of local air-sea rescue units in efforts to arouse the interests of the combat forces. Lieutenant Colonel Prueter, who was then sent out by the inspectorate with as staff of instructors and examiners to conduct survival training courses, met with more success in the various combat units. In August 1943 the present author attended a number of these courses and submitted a report on his impressions to the appropriate agencies. Owing to the importance of this subject for the newly established German air forces, the report is quoted below in the original text:

> On tour with the Instruction and Examining Staff it was noticeable that the attitude of the combat units towards the problem of survival when downed at sea varied in accordance with the attitude of the unit commander concerned and depended also on whether the unit had already experienced cases of personnel in distress at sea or was likely to experience such cases in its imminent missions. The attitude thus varied between one of intense interest, reasonable interest, and indifference. One circumstance was common to all units. This was the almost complete impossibility to carry out practical exercises because of the lack of time and the lack of suitable

sea areas. For this reason the feeling in all units about the possibility of a future crash at sea varied between one of unpleasant anticipation or foreboding to one of hopeless fatalism.

My conviction has been reaffirmed that a change here definitely could be brought about by the inclusion of the already recommended brief courses in nautical subjects as part of the training program. There is no other possibility except such courses to teach aircraft crews how to handle their survival equipment and how to behave when afloat at sea. With the steady improvement of survival and rescue equipment, particularly the continued development of pneumatic boats, practical exercises in the use of this equipment will improve the chances of success in rescue operations and will fully repay the effort spent in the few days to be devoted to training in nautical matters.

As a result of the above report, the present writer received instructions to conduct the suggested courses in nautical subjects at Aalborg. More details will be found in Appendix # .

If our new air forces are to be properly prepared for all eventualities, all flight personnel must be trained in courses of this type. Costly experience has shown that there is no other way. The courses could be held at the operational center of the air-sea rescue service of the new Marine Air Arm (Kiel-Holtenau?) and should be made an integral part of the training program.

(2) Experience in the Medical Field.[1] Simultaneously with the establishment of an air-sea rescue service organic to the Luftwaffe, thought was also given to the problem of medical treatment for personnel rescued from drowning. Under peace conditions the medical officer of the appropriate marine air base was responsible but with the expansion of the service to meet the needs of war, a medical organization was created as part of the Air-Sea Rescue Service.

The medical organization was so arranged that the Chief Medical Officer was stationed at headquarters of the Chief of the Air-Sea Rescue Services together with a staff of varying strength of clerks. In addition he had available a small reserve in marine and air medical personnel for quick assignment to replace any losses which might occur.

At regional command level the medical service was headed by the regional medical officer, who, in addition to his clerical staff also controlled the local hospital and medical dispensary personnel. At detachment level there were no table of organization medical personnel, but assignments could be made from the personnel reserve of the Chief Medical Officer of the Air-Sea Rescue Services if the necessity arose. Specialist personnel were included in the crews of all units. Thus, each rescue plane

and each air traffic control boat had one, each air traffic control ship two naval medical noncommissioned officers. These personnel were controlled by the medical section of their local air-sea rescue command. Medical officer personnel usually stayed at local headquarters in the main center of operations and proceeded by plane or boat to wherever their services were required.

This separate air-sea medical service was a valuable help in providing speedy and proper medical treatment, but in some areas neither the personnel nor the installations provided were made full use of because really serious cases of distress did not occur all too frequently. For this reason the Air-Sea Rescue Service maintained no medical services of its own along the long coastline of Norway but relied on the locally permanent

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1. Medical Staff Officer (Major) Max Mathes: Der deutsche Seenotdienst waehrend des 2. Weltkrieges, pp. 24-64.
2. Medical Staff Officer (Major) H. Horst Winkler: Die Seenotgefahren als Aufgabengebiet der Sanitaetsoffiziere bei fliegenden Verbaenden und an Fliegerschulen.

   Nuernberger Dokumente, Vol. XXV: Bericht ueber Abkuehlungsversuche an Menschen.

medical installations of air bases or other locally stationed military units. A far more satisfactory solution was found in France and in the Black Sea, where the air bases and the Air-Sea Rescue Service had separate medical installations during the early phases of the war. Later, however, all of these installations were consolidated undxr the control of the locally assigned medical officers of the Air-Sea Rescue Service, so that the medical installations of the service now had to provide medical services also for the locally assigned units of other military arms and services. This arrangement had the great advantage that all medical personnel in such installations received training in air-sea medical treatment; another important advantage was that all special equipment was available, which would otherwise have been difficult, since such equipment was not a standard item for the other medical services.

~~The results of Over-Exposure to Cold~~. In the initial stages medical treatment was restricted more or less to the treatment of wounded personnel, and the rescucitation of drowned or semi-drowned persons, etc., but the medical officers employed in the Air-Sea Rescue Service soon found that personnel lost at sea after rescue were exposed to another danger, that of exposure to excessive cold. This subject drew special attention because

the means for rescuing personnel from drowning had been so improved that the main remaining threat to persons downed at sea was that of death from over-exposure to cold, the effects of which often thwarted all efforts to save a person's life. The difficulties encountered in this field of medicine were so great that every means was employed to find new methods to cope with the threat. Above all, no real concepts concerning the causes of death from cold existed. Experiments had been carried out with animals, but the findings proved exceptionally hard to apply to humans. In the various types of warm-blooded animals the regulation of body-heat varies widely. Furthermore, the processes which take place in the skin of furred animals, from which most of the specimens used in experiments come, cannot be applied in examining the precesses in the human skin.

It was due to the above reasons that thought turned to carrying out experiments with humans, the results of which were known in 1942 (Appendix 40). It is impossible to find words strong enough in condemnation of the methods employed in these experiments, particularly in view of the fact that they were not restricted to submitted voluntarily to the procedures. It would be wrong not to mention here the experience gained in these experiments. They were gained at the cost of so much human

suffering that it would be irresponsible not to benefit from them in the future development of means to combat death from cold.

The 1942 report on experiments conducted with humans summarized as follows:[2]

(1) The rectal temperature curve of a person submerged in water at a temperature between 33° and 10° F. drops slowly in the initial stages to approximately 91° when it becomes steeper. Acute danger of death exists when the rectal temperature falls below 86° F.

(2) The direct cause of death is heart failure. The direct damage done to the heart is evident from a constant irregularity observed under all circumstances in all cases, commencing at a rectal temperature of approximately 86° F. It is due to overstrain on the heart from the regularly observed highly increased blood viscosity and to a pronounced closure of the periferal area vessels. The heart probably also is injured as a direct result of the cold.

(3) If the entire body, including the throat and the back of the neck, is submerged, the fall in temperature is accelerated. This must be ascribed to the lack of counter-regulation through heat and vascular centers. Brain oedemae also occur.

(4) During the cooling process the blood sugar content increases and does not return to normal as long as the temperature

remains at its low level. There are indications of intermediate disturbances of the metabolism.

5. The person under treatment has respiration difficulties because of the rigor of the breathing muscles.

6. After the person is removed from the cold water the temperature may continue to drop for the next fifteen minutes or longer. Colds result which might lead to death after rescue.

7. Strong exterior heating cannot harm the person suffering from a subnormal temperature.

8. No successful results were observed in treatment with strophantium. The question whether such treatment might help is still open. It is not considered advisable to administer medicines designed to increase the peripheral circulation.

9. The most effective treatment was found to be a vigorous application of heat, beast of all submersion in hot water.

10. Experiments in the use of clothing specially prepared to counteract the effects of cold water showed that such clothing more than doubles resistance.

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2. Nuernberger Dokumente: Bericht ueber Abkuehlungsversuche am Menschen, pp. 586-7.

11. Suggestions are submitted for the improvement of life-belts.

Another report on the experiments with humans gives the following results:[3]

1. Doses of alcohol given prior to and during exposure to cold speeded the cooling off process. During the application of warmth very small doses of alcohol are beneficial because of the resultant expansion of the peripheral cessels.

2. The downward curve of temperatures is retarded if sugar (100 to 200 grams of Dextrose) is administered before or during submersion in cold water. Sugar does not accelerate re-warming.

3. The temperature sinks more rapidly in persons who have received/no sugar prior to the immersion than in those who have, both being sober, but not as rapidly as in those who have imbibed alcohol. Re-warming is slower than after sugar has been taken and much slower than if alcohol is administered during the warming process.

4. Serial tests prove that the constitution of the experimental subject has no effect on the rate of the declining temperature. The only factor which makes any difference is a good layer of fat. Fat slows down the cooling process but also the restoration of body heat.

5. A major source of danger is sub-temperature in the

marrow of the cervical vertebrae. This points up the indispensable necessity to develop lifebelts which will support the body upright in water, so that the upper breast and head remain out of the water.

6. With very few exceptions death occurs when the rectal temperature sinks below 79-81°F.

7. Cause of death: In all cases a centrally caused failure of the circulatory system with a maximum expansion of the right section of the heart.

8. The only possibility of restoring persons exposed too long to low temperatures is to submerge them as soon as possible in hot water at temperatures up to 89°F. Such treatment might restore life even after cessation of breathing and heart beat. Contrary to existing assumptions, the quick application of heat by means of hot water will not cause death due to the sudden pulsation of blood through the peripheral vascular system, but can save the life of the person so treated. Since a hot-bath treatment cannot be gined on speedboats, experiments were made at pouring water at a temperature of 89-91° F. over the person, in full uniform rescued from cold water. Subjects so treated did not continue to cool off considerably and could be left without

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3. Nuernberger Dokumente: Bericht ueber Abkuehlungsversuche am Menschen, pp. 587-589.

about ten to fifteen minutes without danger awaiting final treatment. This follow-up treatment a particularly important factor since the Navy complains that there are no facilities to give hot baths on small types of naval craft. It is extremely important when a large number of persons are rescued in one batch from cold water. In the past it has been possible in such cases to save only those who received medical aid first, since the belief existed that rapid heating would have fatal consequences.

9. Heating with arc lamps is far too slow, so that the life of the patient is endangered.

10. Injections to stimulate the blood circulation are useless, even if injected into the heart, because the circulatory system is so far paralyzed that the flow of blood is too slow.

11. When the marrow in the neck and back of the head areas drops to too low a level the liquid pressure rises to about 480 mm compared with a normal pressure of 120-150 mm. In such cases fatal consequences can be averted by puctuating the lumbar to release liquid.

What has been said above represents a summation of the results observed in clinical experiments. These will be followed now by a brief presentation of the experience gained in practice by physicians in the air-sea rescue service.

Dr. Mathes states the factors contributing to the rapid loss of body heat by the human body as follows:[4]

1.a. The heat conducting properties (convection) of gaseous substances;

1 b. Contact with solidsand liquids;

2 . Ex-radiation;

3 a. The wet state of clothing or the flow of fluids through the clothing;

3 b. The wetting of clothing;

4. Evaporation;

5. Respiration

The important factors for the cooling process of a human body submerged in water are the following:

a. Contact;

b. The flow of water through the clothing;

c. Evaporation .

4. Major Dr. M. Mathes: Der deutsche Seenotdienst waehrend des 2. Weltkrieges, pp. 25-41.

To reduce the loss of body heat through conduction and contact efforts must be made to develop means of creating an insulating layer around the body when submerged in water. Thus it was found absolutely essential for a person in cold water to keep on his clothing to prevent increasingly rapid cooling through reduction of convection, since a warmer layer of water forms between the body and the clothing.

The insulating layer must consist of materials which can be worn dry and when in water and should have the lowest possible heat conducting properties. For example, natural wool is better than cotton, because it does not conduct heat as rapidly; in the dry state both are about equal. To maintain an insulating layer the body must remain as still as possible in the water. It is completely wrong to keep moving in water in an effort to remain warm, a fallacy which is often observed. The loss of body heat in water is far greater than the heat generated by the body. Therefore every motion of the body in water accelerates the cooling process and, in addition accelerates exhaustion, as is shown by a report on experience in air-sea rescue operations, as follows:

> Rescue mission 9 April 1942, north of Langeooge: Spitfire shot down. The pilot was wearing lifebelt. Although the sea was calm, he was unable to reach two pneumatic boats

dropped within 10 and 12 feet of where he was floating 25 minutes after he had crashed. At the first rescue attempt he was still conscious. At the second and successful attempt he had lost consciousness but was still able to swallow a small quantity of cognac. He regained consciousness after six hours in the hot box. While in the water he had discarded no clothing but had lost much body heat through exertion in beating about wildly with his arms. (Bliefert, H. 1942).

In rescuing the survivors from troop shipe which had been sunk and which had not been adequately equipped with survival items such boats and lifebelts, it was found that those who had discarded their clothing in order to be better able to swim succumbed far sooner to the effects of cold and exhaustion than those who had been able to secure lifebelts and therefore had kept their clothing on.

When first introduced for use a newly designed suit called a froth suit (Schaumanzug) seemed to be a great improvement. The suit was padded and impregnated with a chemical substance which produced

a thick foam when it came into contact with water, sea water being even more effective than fresh water. This foam prevented the escape of body warmth and, since the suit was made to fit snugly all over the body, the water could not wash out the foam or otherwise carry away heat. Even in very cold water, down to 34 and 40° F. these suits prevent the harmful effects of cold for as long as four to six hours. It was found soon, however, that the protective suits were not popular with flying personnel; in the narrow space on some types of aircraft, such as the Ju-88 and fighters, it was found that they seriously hampered the movements of the wearer. Another factor was that, owing to the thick padding, the suits caused perspiration, and once they had become damp they were useless because once the chemical had become moist it did not produce enough foam in a real emergency. Another reason why the suits were unpopular was that they were fairly difficult to put on and thus delayed crew members, particularly when they were to take off in a hurry. The suits were only introduced in the summer of 1944, and then only in small numbers, so that not much experience was gained concerning their practicabilit for use in combat operations. The results obtained in experiments and in actual tests under combat conditions indicate, however, that foam suits would be a very helpful item of survival equip-

equipment if generally introduced in marine aviation after the noted defects have been removed. The major requirements would be to have a suit pliable enough that even when impregnated and when soaked in water it would still fit the form of the human body.

Evaporation only begins to play a role when the person is taken from the water and exposed to the air. Particularly in wind, evaporation then has a considerable cooling effect and continues until the body is dry. This period of subsequent cooling can be reduced by a change of clothes and by drying the body with towels. However, everything possible must be done to prevent repeated wetting, since evaporation then would greatly increase the loss of body heat.

At the end of 1942 the German Air-Sea Rescue Service introduced the quick heating method of treatment for persons who had been exposed to cold water. It must be borne in mind, however,

that between one-half and two hours will pass before a man rescued at sea can be moved to land by airplane, while the movement by boat or ship will vary between two and six hours or e even longer. If treatment only commences after the patient reaches land one therefore cannot describe this as rapid heating.

Medical officers in the service therefore endeavored to find means to apply the quick heating treatment at the point of rescue by placing the necessary equipment on ships, boats, and planes. In the case of ships, it was possible to include a bath in the ship's hospital after the necessary reconstruction work was carried cut or, in an emergency, use could be made of the captain's bath or the crew showers. However, the Luftwaffe had only four such ships in Norwegian waters and only about three operating off the French coast, and these played a relatively small role in rescue operations. The problem was far more difficult in the case of the air traffic control boats. Here, the lack of space made the installation of baths impossible. A solution was found finally by installing a two-way cock in the cooling system of the engine, by means of which the water from the cooling system, the temperature of which was approximately 116° F., could be diverted to a shower under

which the patient could be placed. An early plan to take along rubber baths was discarded because these could hardly be used when the sea was rough and because of the shortage of raw materials. It was found that the best method was to place the patient, still wearing his wet clothing, under the hot shower. Only at a very late stage collapsible baths of Perlon or Igamit were produced and three of them included in the standard equipment of all boats.

After the patient had been thoroughly soaked in hot water and body heat was adequately restored, he was undressed, dried, and given dry clothing, of which a reserve supply was carried on all rescue ships, boats, and planes. Then he was wrapped in woollen blankets and put to bed.

By the above method it was possible when only s small number of patients was involved, as in the case of aircraft--and particularly fighter--crews, it was possible to apply the quick warming treatment immediately on ships and boats. However, this was difficult and frequently impossible in the

case of major disasters at sea, and thus particularly in the case of ships lost at sea, when only a small percentage of those rescued could be given the quick warming treatment and space was inadequate for general warming methods.

No solution was found for the problem of how to apply the treatment immediately, on the spot, on rescue planes. One method tried was that of electrically heated sleeping bags, two of which were to be carried by each rescue plane.of the Do-24 type. The heating coils in the bags were wired for a 24 Volt current and were to receive their current from the plane's electrical system. However, the heat thus generated wasstoo small to secure rapid warming of the body. As was the case with the hot baths, the bags were heated to a temperature of 95° F. However, the conductivity ratio of water to air being 25:1, and when the motion of the water is taken into consideration, it is obvious that the heat thus supplied was completely insufficient to restore body heat.quickly. Another drawback of the sleeping bags was that they were so sensitive to moisture, so that failures were too frequent for use on seaplanes and boats. Plans to test the use of a type of heating bag used by the German army in the Eastern Theater were not carried out in the Air-Sea Rescue Service by the end of the war and

suggestions that planes should carry along a supply of heated sand or bran could not be applied because the application would have been too complicated on aircraft.

For the above reasons the only possibility on rescue planes was to undress the patient as soon as possible, rub him down thoroughly with dry towels, and then dress him in a training suit. The questionremains open whether it would be possible to use the so-called fever cabin developed by the Siemens-Reiniger Works for hyper-thermal treatment with appropriate modifications; In like manner no experience is available from the Air-Sea Rescue Service as to the practicability of raising the body temperature by producing fever through the use of pyripher. A point which also remains to be cleared up is whether the serious reduction of the glycogen content of the body caused by slow cooling would leave the body in any condition to raise the temperature appreciable from its own resources.

Where treatment to restore body heat took place on land,

proper baths were almost always available in which the patients could receive treatment with very good results. But even here difficulties developed in the case of mass disasters, since the relatively limited facilities at public baths then were inadequate. In such cases the patients were distributed by motor transportation among a number of hospitals as speedily as possible. Radio messages were sent ahead by the rescue vessels stating the number of wounded personnel and the number of personnel requiring heat treatment they would be landing, so that the necessary arrangements could be made ahead of time.

In Norway the traditional sauna baths proved very helpful when large numbers of patients required heat treatment, since the relatively large sauna bath installations permitted the treatment of a number of persons simultaneously. However, it was necessary to heat up the sauna installations as soon as the warning reports arrived, since some time was required to attain the necessary temperatures.

It is necessary to warn here expressly against the indiscriminate use of analeptics immediately after the rescue, since these have a pronounced toxic effect. As A. Irish puts it: "The main reason for the serious toxicity of analeptics when administered to persons suffering from over-exposure to dold is to be found in the increased tendency to cramp because of the changed processes

of excitation." Accumulations can also occur, since cold delays the neutralization of the toxicity. Therefore, only small doses should be administered and repeated dosages should be given only with the utmost care. According to F. Grosse-Brock lobeline and coramine produce fatal effects when administered in dosages which would not be harmful to a person at normal body temperature. Since the authorized supplies of the Air-Sea Rescue Service medical instal lations included only lobesyme, no experience was gathered on the use of other chemicals of these types. The subjective impressions of the effects of lobesyme were good, particularly its effects in reexcitation of the respiratory center. H. Kilian (1946) also claims to have observed good effects produced with euphyline and eupaverine.

Whenever the patient was conscious he was given fruit sugar in the form of preparations known under the trade names of Dextro-energen and Dextropur, usually dissolved in coffee, in order to restore the balance of glycogen, the loss of which can be particu-larly serious when the body cools out slowly. The cafein content o of the coffee has a simultaneously stimulating effect on the cir-culation. For this reason rescue aircraft carried each a can

containing several liters of coffee. On ships and boats facilities were available to prepare fresh supplies of coffee when required, which had the advantage that it could be administered hot. It was found particularly important to administer dextrose dissolved in a drinkable fluid in order to counteract the the effects of thirst and exhaustion evident in persons rescued after a long stay in pneumatic boats.

The advisability of administering alcohol was a highly controversial problem in the German rescue services. Initially, alcohol was a standard item of supply in the medicine chest of all air-sea rescue planes, ships, and boats, later the use of alcohol was strictly rejected and it was cancelled from the authorized medicine supply lists. It appears, however, that the regulation prohibiting the use of alcohol was frequently disregarded. It was observed that, when the condition of the patient was not too serious, alcohol, in the form of cognac, produced very beneficial results, since it raised the subjective spirits of the patient and could thus do much to prevent collapse due to exhaustion. Experience on the use of alcohol can be summarized more or less as follows: In light and medium (1st and 2d degree) cases small doses of alcohol given immediately when treatment begins and if evaporation can be prevented appear to have a beneficial effect; in more severe (3d and 4th degree) cases

great care should be exercised in the use of alcohol. Persons in distress at sea under no circumstances should consume alcohol before they are rescued, since alcohol would accelerate the loss of body temperature.

The following example is that of a plane which crashed into the sea in the outer port of Salonika. Four of the crew, two of them seriously injured, were picked up after five-and-onehalf hours in the water, one them having died in the meanwhile. They had lashed themselves to a one-man pneumatic boat. The one who died before the rescue had consumed considerable quantities of alcohol. The three men saved had lost considerable body heat (according to H. Huelsmann, 1944).

Frequent cases also were observed of collapse after rescue, a condition described in the rescue service as rescue collapse. In these cases it was noticed that the men remained fully conscious while still in the water and supported the rescue operations, but collapsed immediately or very shortly after rescue. It must therefore be considered possible that collapse during or immediately after rescue might be due in part to psychological influences, since there can be no doubt of a serious condition of psychic trauma in such subjects, due to the effects of the preceding air battle, the sinking of their ship, or similar incidents.

Injuries Sustained as a Result of a Jump or Crash at Sea.[5] Once the decision is taken to bail out or to crash land at sea, the first consideration must be to avoid bodily injuries. Injuries sustained from shock when the parachute opens, or from strangulation by the parachute cable, frequently prevent proper use of lifebelts or pneumatic boats during the first few decisive moments. The effects of a free fall, due to a jump from too low an altitude, or to the unconscious state of a person, or to a condition of altitude sickness, is just a likely to have fatal results at sea as on shore. When there is no wind, the danger exists of becoming entangled in the cables of the parachute unless the jumper can extricate himself in time; in too strong wind the jumper might be dragged along the surface of the water. In both cases the danger of drowning is acute. A crew member injured, not necessarily fatally, in the crash to such an extent that he cannot leave the plane quickly enough becomes a burden to his fellow crew members or will drown with them. A large percentage of persons drowned was due to this cause.

Drowning.[6] Another problem of grave importance in the Air-Sea Rescue Service was that of the prevention of death from drowning. The most important preventive items here were preumatic lifeboats and floats, and lifebelts. Great efforts therefore were expended

on the problem of arriving at the best and most practicable models of these two items.

Dr. Mathes states the main points required in a good lifebelt as follows:

(1) Adequate buoyancy to carry even unconscious persons;

(2) Adequate span of usability;

(3) Low sensitivity to outside influences;

(4) Construction to insure that the mouth and nose even of an unconscious person will be held far enough above the surface;

(5) Safe fitting, so that the belt cannot slip off its wearer, even if he should lose consciousness;

(6) A fit that will not hamper the wearer in the normal performance of his duties, since the danger exists otherwise that the belts will not be worn constantly.

5. Major Dr. Winkler: Die Seenotgefahren als Aufgabengebiet der Sanitaetsoffiziere...., p. 3.

6. Major Dr. Mathes: Der deutsche Seenotdienst im 2. Weltkrieg, pp. 42-46.

(7) The lifebelt must be easily visible to facilitate spotting during rescue search;

(8) Mass production methods must be possible.

None of the various types of lifebelts in use fulfilled all of the above requirements. The two types introduced by the Luftwaffe, one a single cell belt inflated with air or dioxygen, and one filled with Kapok, were superior to those used by the Navy until the Navy introduced a new type of air-filled belt in 1943.

The inflated belt used by the Luftwaffe could be inflated either by a small compressed air container or by mouth and could be considered usable for a practically indefinite period. Having only one air cell, however, it was extremely sensitive to damage from outside influences. Generally speaking, the belt held the head of the wearer well above water since it extended in the form of a collar up the back and from the shoulders. Furthermore, it supported the wearer, even when unconscious, in an upright position because of the large bulge in front. It also met the requirements listed under 5-8 above adequately. However, if the wearer was unconscious when he fell into the water he necessarily drowned because the belt was not equipped for automatic inflation, which was also a weak point in the belt introduced later by the Navy. The kapok lifebelt in use by the Luftwaffe had an adequate

buoyancy, when new, for a period of twentyfour hours. In the case of old vests this period of usability was reduced seriously. Furthermore, the vest was impracticable for use in aircraft since it restricted the movements of the wearer too much. One dangerous feature which was a frequent cause for complaint was that the two separate rolls of kapok of which it consisted could get entangled in jutting parts of the aircraft. The vest had a special collar, which could be buttoned up in the front, but since the buoyancy at the back was too great in comparison with the front part the wearer was liable to topple forwards with his face in the water. This weak point was somewhat improved but not entirely eliminated by changes introduced in 1943. Both types, and also the type of lifebelt in use in the Navy, had leg straps to prevent the belt slipping upward over the head. Numerous persons drowned, however, while wearing these belts,

because they had fastened the leg straps too loosely or not at all, so that they were submerged too deeply in the water and their heads were not kept above the surface.

As mentioned previously, the Navy in 1943 introduced a new type of yellow air-filled lifebelt. This belt consisted of a number of separate air cells secured by air valves, so that even if a cell was damaged, the rest of the belt still had adequate buoyancy. The head was held by a collar which was inflated separately. It was found, however, that in this type of belt also the back was too buoyant, so that the body could only be held in a proper position if two cells in the back were deflated. Otherwise the wearer could fall over forwards and would not be righted without personal effort.

The use of cork to obtain better and more permanent buoyancy produced no usable results, since the belts thus constructed were too great an impediment to the wearer. This was why the introduction of the Norwegian type of belts was rejected after tests carried out by Air/Sea Rescue Command 5 (Norway). At the end of the war the Luftwaffe was testing a new multi-cell air-filled lifebelt, for the introduction of which it was too late.

Major Dr. Winkler writes as follows on the same subject:[7]

The normal floating position of a lifebelt in the water

should be with a slight lean backwards, which would maintain the pelvis and the legs, because of their weight, in an almost perpendicular position. It was found possible to maintain the floating human body in this position through the proper placing of the buoyant parts of the belt at the sides and in front. The head was held above water by means of a collar and a special chin rest both in the kapok belt and in the later types of air-filled belts. It might be important to button up the chin support prior to an emergency landing at sea. It happened repeatedly that unconscious men were carried out of a wrecked plane fuselage to the surface solely through the buoyancy of the belt they were wearing, but they drowned during the first few minutes, while still unconscious. Because of its inherent buoyancy, the kapok belt must be given preference if space in the airplane allows.

In the case of air-filled belts, the belt must not be inflated before the actual crash or bail out at sea, because

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7. Major Dr. Winkler: Die Seenotgefahren als Aufgabengebiet der Sanitaetsoffiziere....., pp. 4-5.

experience has shown that if it is inflated before, the rubber is very liable to rip when the wearer is squeezing out of the exit.

The air cells must be inflated fully. Otherwise the upthrust of the lower parts of the breast piece is inadequate, and the body is held too upright instead of in the slightly inclined position desired. Danger then exists that when the wearer begins losing control of his faculties, he will fall face forward into the water;if properly supported leaning slightly back, his head would come to rest on his collar, leaving his mouth and nose free to breathe. The body then slips down a little into the belt, or the breast part of the belt floats out forward from the breast.

The upthrust of the belts in use was not sufficient to prevent the head becoming submerged in broken water. In such conditions the only way to insure that the respiratory organs will be free is by subconscious control of breathing. The best chance is to lean back as far as possible and endeavor to keep the back of the head against the wind. This insures maximum buoyancy of the belt and greatly reduces the time that the head will be submerged under waves. Anybody trying to face the wind or, even worse, trying to swim against the current in a breaking sea will find himself constantly overrun by the oncoming waves; he will be exhausted very soon and will drown in a very short while in spite of his lifebelt.

After the above exhaustive discourses by two professional

physicians of the Air-Sea Rescue Service on this highly important problem, it would be wrong to neglect the results obtained in clinical experiments on a different subject, that of the results of exposure to the cold. These experiments were carried out on humans and resulted in diverging opinions.

It had been found in clinical experiments that one main source of danger from exposure to cold, was due to the fact that the marrow in the neck area became too cold.[8] For example, it was found in a number of cases where the neck and back of the head had become particularly cold prior to their death, that upon dissection there w were signs of extensive brain oedemae, overfilling of the brain vessels, blood in the brain liquid and in the rhombic groove. From these finding it was deduced that it was absolutely essential to develop lifebelts which would support the human form upright in water with the upper breast and head held clear above the surface.

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8. Nuernberg Dokuments: Bericht ueber Abkuehlungsversuche am Manschen, pp. 586-588.

More or less as a by-product, important indications were gathered which pointed up the defects in the lifebelts introduced by the Luftwaffe and information which was useful in the designing of new and improved types of belts.[9]

To prevent too rapid loss of body heat, the belt must prevent the wearer from lying flat in the water, since this would submerge his neck and the back of his head. The best is an almost upright position, such as that insured by the Kapok type of belt in use at the time, particularly if the clothing worn gives added buoyancy, as was the case with the fur-lined Luftwaffe winter uniform. In other respects the kapok belt was found far from reliable.

Types of belts not yet in use also were tried out but proved insufficiently buoyant. This applied particularly in the case of persons under the influence of narcotics, who were unable to compensate for the lesser buoyancy by means of moderate swimming motions. They very soon dropped from the horizontal posture and sank deeper into the water; they fell over forwards and the only way to prevent their drowning was to pull their belts.

Failures in kapok belts became increasingly frequent when the belt was used repeatedly, and even when dried in open sunshine for five days on end they failed to recover adequate buoyancy.

The air-inflated rubber lifebelt without a back piece provided better protection for the neck and head, and proved more reliable in respect to buoyancy as long as it was undamaged. Here again, however, breast buoyancy was too great, so that the swimmer was

forced into a horizontal posture and the head and neck were exposed to the water almost constantly except in very calm seas.

The disadvantages of the inflated lifebelt could be removed by increasing the buoyancy in general and particularly in the back part, so that the swimmer would be held higher above the surface and a more nearly perpendicular position. The ideal position would be that achieved with a narrow lifebelt, in which the shoulders are held above water with the neck and back of the head thus protected against too rapid cooling through water. However, difficulties would be encountered in stabilizing the position of the swimmer.

Whatever the circumstances, it would be desireable to have a lifebelt which can be worn only underneath the protective

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9. Nuernberger Dokumente: Bericht ueber Auskuehlungsversuche am Menschen, p. 585.

suit (foam producing) worn by the aviator. Experience in air-sea rescue operations has shown that, with the float facilities available in modern times,-provided they function properly--, drowning is not due to primary causes but to the secondary cause of loss of body warmth through submersion in water. Tests have shown that the body loses warmth very rapidly in some circumstances even at water temperatures of around 54° F., and that a state of unconsciousness results in a correspondingly short time. A lifebelt worn underneath the protective clothing would insure better use of the heat engendered by the gas with which it is inflated. This is so because the surface of the inflated belt would be less exposed to the washing effect of thewater. Tests with the foam producing suits showed time and again how necessary it was to prevent this washing out effect of water.

The experience reports from physicians of the Air-Sea Rescue Service show that no heed was given to the fact learned through clinical experiments carried out with humans that the danger resulting from cooling of the neck and back of the head called categorically for a considerable change in the designs of lifebelts. Possibly, the results of the experiments were not made known to the proper agencies, but it is also possible that medical authorities flatly rejected the experiments. One can understand this attitude fully, but thought nevertheless should be given to

the question whether the safety of the persons to be rescued at sea does not require a careful examination of the existing types of lifebelts in the light of what has been said and their improvement in line with present day technicological developments and with the experience gained in post-war years.

Thirst and Physical Exhaustion.[10] Besides loss of body heat and drowning, thirst and physical exhaustion are the two main problems requiring attention in the air-sea rescue services.

The problem of thirst and the best means to combat it was really acute almost exclusively in southern areas, namely, in the Black Sea and the Mediterranean, while loss of body heat was the dominating problem in Norway.

In devising means to counter the effects of thirst, it is necessary to differentiate between the problem of combating actual thirst as such and that of reducing the feeling of thirst due to a shift in the balance of the body fluids.

To reduce the feeling of thirst in the mucous membranes of the mouth, attempts could be made to stimulate salivation by medical means. Such methods were not tried during the war because the expectoration of the final product would have resulted in an unnecessary loss of body fluid. Therefore, efforts were made in the rescue services to stimulate salivation by mechanical means. To gain this end the survival equipment kit contained packages of chewing gum with an addition of pervitine. Pervitine had the effect of keeping the person awake, while the action of chewing gum stimulated salivation and thus proved highly effective in counteracting the feeling of thirst, due to the feeling of dryness in the

mucous membranes of the mouth. However, this method could do nothing against actual thirst as such, since the fluids used in producing saliva were drawn from the fluids already present in the body, so that all that was being done was to produce a circulation of those fluids. To counteract actual thirst there are only two possible ways: (1) to introduce new fluids into the body, and (2) to prevent the loss of moisture from the body.

During the war no methods were known to render seawater potable, although, according to Huebner, 1942, seawater mixed with dextrose if drunk in small quantities could actually reduce thirst. There was also no possibility of carrying along drinkable fluids except in small quantities. Therefore, it is necessary to devise means to reduce the loss of body moisture. Here, the food eaten plays a large role. Rations should have a high nutritional value and a low salt content. This was why the survival kit packed in pneumatic floats included a ration of dextrose in the form of Dextroenergen (a trade name) and Schokolada (an armed forces form of chocolate containing kola and cafein).

10. Major Dr. Mathes: Der deutsche Seenotdienst waehrend des 2. Weltkrieges, pp. 50-54.

In hot southern climates the loss of body fluids through perspiration plays a large role. For this reason persons in distress at sea must avoid exposure to the sun. For this reason the larger types of pneumatic boats had a yellow sail designed at the same to provide shade. The survival equipment also included wide brimmed hats, so that the occupants at least of the larger types of pneumatic boats--from 15 feet up--were provided with means to protect themselves against direct sunshine. The survival kit also included salves against sunburn and frostbite, because experience had shown that skin troubles were an almost regular occurrence in sea areas with a high salt content, for example in the Mediterranean.

There was no possibility of packing a very comprehensive survival kit in one-man pneumatic boats, such as those carried by fighter aircraft. Huebner (1942) reported a method employed in one case to combat thirst, which was generally recommended from then on. A sergeant adrift on a one-man boat in the Mediterranean for seven days had slaked his thirst by wiping up the dew from the gunwhales of his boat in the mornings and then sucking the water from the gauze used for the purpose. Obviously this method could only serve its purpose in calm or near-calm water. In other weather the spray after evaporation would leave a salt crust

on the boat surface which would render dew water undrinkable. It was known from experience, however, that the weather was often calm in the Mediterranean, as well as in the Black Sea, for days on end, so that considerable importance was attached to this method of obtaining drinking water. It is doubtful whether the method of dousing the body with water , in order through the cooling effect of evaporation to prevent perspiration, is really any help.

To counteract general physical exhaustion the stimulants mentioned previously were an effective direct method. These included such items as chocolate and dextrose. In addition all crew members were served what was called a take-off breakfast before setting out on a mission. This breakfast consisted of non-bloating foods (for high altitude flight) of a high calorific content, for example, 1 pint full cream milk, 1 egg, 25 grams rolled oats, and 100 grams white bread. Crews setting out on long missions were given an additional ration to take along, consisting of chocolate, cookies, drops, dextrose, and coffee. This insured that the glycogen stored in the body cells would not be used up through bodily exertion prior to a crash landing at sea, if such an eventuality occurred.

Flying personnel were instructed time and again to avoid any form of physical exertion, if they at any time found themselves in distress at sea, in order to avert premature exhaustion and to prevent the water from washing out the slightly insulating layer of warmer water which collected in their clothing. Loss of body heat and exhaustion go hand in hand, since both processes diminish the reserve of glycogen built up in the body. Here, the necessity to pump up the pneumatic float with a bellows from time to time was a distinct disadvantage since it involved quite some bodily exertion.

Particular Features in Wounded Personnel.[11] When wounded personnel were rescued at sea, complications sometimes set in due to the fact that wounds which had bled very slightly or not at all while the patient was in the water bled more freely or even profusely the moment the patient was taken out of the water. This loss of blood could, by the time it was stilled, so increase the loss of body heat that the temperature would fall below the critical point, resulting in the death of the patient concerned. All medical personnel received constant reminders on these dangers and therefore always had strictures and bandages ready for immediate and quick treatment.

Retarded Harmful Effects.[12] Medical officers in the Air-Sea Rescue Service had little opportunity to observe later or retarded

effects due to submersion in water; the men rescued were removed to hospital immediately if any serious complications were observed and from there were sent to the Zone of Interior.

For the above reasons no retarded effects became known which were due to thirst and physical exhaustion. It was observed occasionally, however, that the harmful effects of a period of sub-temperature could produce circulatory irregularities of long duration. Every person suffering effects from sub-temperatures was therefore ordered held in a dispensary for several days and later was kept under ambulant medical observation.

In spite of all medical care given, cases of pneumonia were observed frequently in persons rescued from drowning. However, all patients recovered without permanent damage.

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11. Dr. Mathes: Der dxutsche Seenotdienst waehrend des Weltkrieges, p. 60.
12. Ibid, p. 57.

Regular examinations of all personnel rescued in the Black Sea showed that in some cases the filtering function of the Kidneys was impaired even after only a relatively short stay in the water and even in mid-summer conditions. The affection sometimes was so bad as to cause temporary secretions of albumenoid, kidney epithelia--with crystalline secretions in the urine, and regularly recurring Oxalaturie. These phenomena were observed most frequently 6-12 hours after rescue. During this time the body temperature also was slightly above normal, namely 102-104° F., whereas a rise in temperature was rarely, a drop occasionally, observed immediately after rescue. This applies to summer temperatures, when no patients were suffering from the loss of body heat. With proper treatment the symptoms mentioned here disappeared after a few days.

The records available are insufficient to allow the deductions of final conclusions, but do seem to justify the assumption that timely precautions can prevent permanent harm in the above respect.

In most patients dying as the result of loss of body heat an excessive development of fat, probably of hypoxanthine-hypoxidotic origin, was found in the epithelia of the main parts of the Kidneys. This was considered a result of collapse due to excessively low temperatures. To what extent these findings represent

preliminary stages of the serious changes found at obduction to have taken place is a question which requires further clarification.

F. Buechner also points out that in persons dying as the result of loss of body heat, multiple mucous erosions were found frequently in the stomach. He raises the question whether these erosions could develop into permanent peptic ulcers, but at the same time doubts this possibility.

No cases became known of patients developing ulcer troubles after treatment for sub-temperature due to loss of body heat in water. However, this might be because, as previously mentioned, all serious cases were withdrawn very soon from observation by medical officers of the rescue service. What complicates the clarification of this question is primarily the fact that chronic gsatritis and ulcer troubles are relatively frequent among flying personnel. However, this side of the question also appears important enough to stress.

Psychological Stresses.[13] The physical and psychological stresses and the constant feeling of uncertainty when adrift in a pneumatic boat for days on end can leady to depressive psychosis, resulting in such acts as suicide or assault. For this reason it is imperative to throw all pistols overboard in time.

Survival factors of paramount importance are: The firm determination to survive; ingenuity in the use of available means; seamanship and nautical abilities; a strict control of water supplies; and a controlled use of signal facilities.

Cases of miraculous rescues are on record, which were due in part to the use at the proper time of the last round of signal ammunition.

Movement of Wounded Personnel.[14] Besides its other missions, the Air-Sea Rescue Service with its various units was employed successfully in the transportation of wounded personnel. In Norwegian waters with their innumerable islets and shares the use of air-sea rescue units for these purposes frequently made the early movement of sick and wounded persons to hospitals possible in trackless territories where such movement otherwise would have been impossible. In Finland, Arado-199 and 196 planes of the Air-Sea Rescue Service were employed to evacuate wounded personnel from the front areas in the lake region to a hospital situated on the Kemi Jaervi River, where the seaplanes were able to surface on the river

and deliver the wounded personnel directly to the hospital. However units of the rescue service were undoubtedly most active in transportation missions involving wounded personnel in the Black Sea and the Mediterranean.

If personnel were wounded by enemy fire or other enemy action on board a ship at sea, the ship immediately reported the incident together with all necessary details, such as its position according to a grid map, and requested dispatch of a Do-24 rescue seaplane, which usually arrived very shortly to pick up the casualties. In such cases the crew on the rescue plane included a medical officer or at least a medical noncommissioned officer so that proper medical treatment could be given immediately. Little difficulty was encountered in transferring wounded personnel from ships to rescue planes by means of pneumatic floats. It was found

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13. Major Dr. Winkler: Die Seenotgefahren....., p. 8.
14. Major Dr. Mathes: Der deutsche Seenotdienst....., p. 60.

however, that patients with serious head injuries, such as skull fractures, commotio and contusio cerebri, and similar complications, could not be moved with safety in this way except in very calm weather. The hard impact of the plane when taking off and surfacing had harmful effects in such cases.

In contrast, the air movement of patients with abdominal injuries was particularly beneficial, since they thus were able to receive surgical treatment in time.

Besides the movements of wounded personnel from ships at sea, units of the air-sea rescue service also participated in the evacuation of wounded and sick personnel from the islands and from the opposite mainland.

3. Statistical Data on Results Achieved by the German Air-Sea Rescue Service. Owing to the almost complete lack of authentic records, it is not possible to compile precise tables of the successes achieved by units of the Air-Sea Rescue Service. Reliable figures are available only for the four regional air-sea rescue commands operating under the Third Air Fleet along the Atlantic and English Channel coastline from June 1941 to the end of 1943, and for Regional Air-Sea Rescue Command XIII (Berre, Southern France) in 1943. These figures afford an interesting insight into the conduct of air warfare in the areas involved.

For the July 1940 to May 1941 period Major Dreyer, at the time Chief of Third Air Fleet Air-Sea Rescue Services, quotes 150 persons saved by units of the Regional Air-Sea Rescue Commands I and II. No figures at all are available on Regional Air-Sea Rescue Commands III and IV for this period. It is known, however, that the results achieved by the latter two commands were about equal with those of the first two mentioned. Therefore a figure of 150 is being assumed for the areas they covered, giving a total of 300 lives saved by all four regional commands together.

An after-action report by the Third Air Fleet covering the activities of all four regional commands in the June-December 1941 period is available and will be found in Appendix 22. The figures given there are as follows:

Month	Lives saved German	Enemy	Total		
				Carried Forward from 1940	300
June	27	16	43		
July	27	27!	54		
August	9	21!	30		
September	2	2	4		
October	30	9	39		
November	23	-	23		
December	1	3	4		
	119	78!	197	Total 1941	197

For 1942 the number of lives saved is available, in a break down according to regional commands (see Appendix 42), as follows:

Regional Air-Sea Rescue Command	Lives saved German	enemy	Total		
I	38	25	63		
II	101	19	120		
III	90	38	128		
IV	4	21!	25		
	233	103	336	Total 1942	336
				Forward	833

Carried forward 833

Figures are available in the same break down for the year 1943, as follows:

Regional Air-Sea Rescue Command	Lives saved German	Enemy	Total
I	141	26	167
II	92	16	108
III	15	7	22
IV	1!	19!	20
XIII	104	79	183
Naval craft & motor life-boats	101	31	132
	454	178	639

Total for 1943 632

No figures are available for the year 1944 up to the time of the Allied invasion. The air-sea rescue services continued in full operation up to June of that year, however, so that an assumed figure of 200 certainly would not be too high.

Hence, assumed total for 1944 200

Approximate total number of lives saved in the English Channel and the Atlantic 1665

No authentic figures are available on the number of lives saved in Denmark, Norway, and Finland. Lieutenant Colonel Ludwig Wahl, at the time Chief of Air-Sea Rescue Services in Norway, gives the following approximate figures for the years of 1940-43: German

and Norwegian personnel: 2000; Enemy Personnel: 200. These figures are for a 33-month period. Air-sea rescue operations continued on the same scope and with approxinately equal success right up to the date of the capitulation. It therefore is safe to assume a figure of 1000 for the 16 months in 1944 and 1945, making a total for the Skandinavian and adjacent areas of 3 200

It is known concerning the Mediterranean that Lieutenant Colonel Engelhorn, at the time Chief of Air-Sea Rescue Services in the Mediterranean, was recorded at the end of 1942 in the Luftwaffe Roll of Honor to commemorate the 1000th life rescued by units of his command. Major Hager, who commander Regional Air-Sea Rescue Command X (Syracuse) up to the end of hostilities in Italy, places the overall figure for his command at 1913 lives saved, 1913

Carried forward (Mediterranean) 1 913

Various figures are available for Regional Air-Sea Rescue Command XI (Aegean Sea). Lieutenant Colonel Fengler reports 171 lives saved in the Crete operation between 21 and 24 May 1941, while General der Flieger Zander places the figure for the same operation at 262. After the capture of Crete, Auxiliary Air Traffic Control Ship Drache, according to Fengler, picked up 700 persons during its escort trips between the mainland and Crete. Lieutenant Colonel Securius gives a precise overall figure. According to him Regional Air-Sea Rescue Command XI in July 1944 reported its 2000th rescue to air fleet headquarters at Kiffissia. This was three months prior to the evacuation of Greece, and no figures at all are available on these three last months. The only thing that is known is that during the evacuation of all islands numerous calls were received from persons in distress at sea and that numerous lives were saved. It is therefore safe to assume a figure of 200 for this period which would make a total for the Aegean Sea of 2 200

Approximate Total number of lives saved in the Mediterranean Theater 4113.

For the Black Sea personal notes by Lieutenant Colonel Fengler are available giving a figure of 63 for the 6 June to 18 December 1941 period and of 60 for the January to April 1942 period. A precise list of successful operations by Colonel Hansing is available covering the period from 26 April 1942 to 14 August 1943 with a figure of 122 lives saved. No precise figures are available for the period from 14 August 1943 to the end of the war. Master Sergeant Gieger, who kept the records on air-sea rescue missions at Regional Air-Sea Rescue Command XII places the figure for this period at approximately 300. This would give a total for the Black Sea of 545

Very few records or other sources are available covering the North and Baltic Seas. Very few missions occurred up to 1942 , and from a report by Lieutenant Colonel Fengler dated 1 January 1942 comes the figure of 18 lives saved in February and March 1941, which would give a monthly average of 9 lives saved. This corresponds approximately to the information offered

Major Kretschmar, who places the number of lives saved in 1942 at 120. Using this figure as a basis for calculations, we arrive at the following figures(approximate): 1941: 90; 1942: 120; 1943: 120; three years in the Baltic: 100, giving a total of 430

An after-action report by the Home Air Fleet (Luftflotte Reich) gives the number of lives saved in the North Sea and the Baltic in 1944 as 608. In view of the large number of ships sunk in the Baltic in 1945, it seems safe to assume a number of 1000 lives saved in the North Sea and the Baltic in that year. This figure is hardly likely to be too high in view of the fact that 500 were saved from the sinking Steuben alone, of whom a large number were rescued by units of the Air-Sea Rescue Service. This would give another total of 1608.

Approximate total number of lives saved in the North Sea and the Baltic 2038.

The overall results obtained in air-sea rescue operations throughout the war in all areas would therefore be roughly as follows:

Atlantic and English Channel	1 665
Denmark, Norway and Finland	3 200
Mediterranean	4 113
Black Sea	545
North Sea and Baltic	2 038
	11 561

The above calculations, which are based only on assumptions, gain in probability when one considers them side by side with the information offered by the Inspectors, of whom there were two responsible for this field in Inspectorate 16. General Goltz gives an official figure of 3 382 lives saved in the period from the establishment of the Air-Sea Rescue Service to 30 November 1942; Colonel Klintzsch gives a figure of 2600 for 1943 This would leave a balance of 5 500 rescues in 1944 and 1945, a figure which does not appear at all improbable when the large numbers rescued in the catastrophes which occurred later in the Aegean Sea and the Baltic. are taken into consideration.

The above results were not obtained without losses being incurred. The only precise figures available on losses suffered by the Air-Sea Rescue Service are those given in a compilation by the Third Air Fleet. They are clear evidence that the rescue service had to pay a high price in lives lost for the successful results obtained in rescue activities.

The following losses were incurred by the Air-Sea Rescue Services within the zone of operations of the Third Air Fleet, in France:

PERSONNEL

	1943	Total for Summer 1940 to the end of 1943
Killed	21	93
Wounded	45	108
Taken prisoner	3	3
Reported missing	6	52
	75	256

MATERIEL

	1943
Do-24 planes	5
Breguet-Bizerte planes	3
Do-18 planes	18
Type B air traffic control boats	1
1 rescue speedboat	1
Army Engineer Corps assault boats	1

These losses were incurred by

a. Air squadrons with a total personnel strength of 119

b. Surface craft flotillas with a total personnel strength of 589

EPILOGUE

The development of the German Air-Sea Rescue Service, as described in the foregoing study, followed a course entirely different from that designed by its initiators. Its intended and original mission of "rescue after battle" gradually developed into one of "rescue and combat." The means available to the service for the performance of its mission were not designed for and could not be adapted to meet the requirements of the merciless type of combat involved, so that it became an unequal battle, in which the rescue service had only weapons which were entirely inadequate.

The greatness of the personnel in the service lies in the fact that they nevertheless hastened to the aid of all in distress at sea, no matter whether friend or foe, although fully aware that besides having to brave the dangers of inclement weather and stormy seas, any enemy who detected them at their work of mercy could easily destroy them. Thus, numerous comrades sacrificed their lives in this work of mercy.

However, the developments described produced another result. After their character as Red Cross units had been denied, the units in the exigencies of war were also employed in missions for which they had not been intended. Thus it came about that the Air-Sea Rescue Service was always on the job when catastrophes threatened and the sea was involved, or other bodies of water complicated

a situation. Their performances in the case of the Kuban bridgehead, in the Crimea, the Aegean Sea, and in the Baltic, are convincing evidence of the exemplary devotion to duty and the improvisational ability of the personnel of the Air-Sea Rescue Service.