

SOME COMMUNICATIONS PROBLEMS

of a

RECONNAISSANCE TROOP

44-90

SCOPE

Section 1.

Communications problems and difficulties arising from radio personnel or equipment prior to entry into combat.

Section 2.

Communications problems during the period of combat and the performance of radio equipment.

Section 3.

Summary of communications weaknesses brought to light, with recommendations for future improvement.

GLOSSARY OF TERMS

- CW----- Carrier wave; used to refer to the SCR 506 or similar radio set.
- AM----- Amplitude modulation; used in this paper interchangeably with "CW".
- FM----- Frequency modulation; when unmodified refers to the SCR 508.
- Dual Communications----- Two radio sets in a single vehicle, one FM one AM. (My definition.)
- Multiple Communications----- More than one radio in a vehicle or unit but not dual communications.
- Dielectric----- Insulatory; opposed to conductivity.
- Long Range Radio----- When unmodified refers to SCR 506 or radio with similar characteristics.

Some Communications Problems
of a
Reconnaissance Troop

SECTION I

The Reconnaissance Troop of the Cavalry Group (Mecz)* was heavily provided with radio communications equipment. It was perhaps more heavily endowed with radio equipment than any other type of combat unit in the field. Certainly it had more CW radio operators.

Out of a total of 140 enlisted men in the Reconnaissance Troop 22 were trained and rated operators. CW operators. Except in command post vehicles these rated operators were distributed on the basis of two to each armored car, wherein they doubled as either gunner or assistant driver. Each armored car contained a SCR 508 and a SCR 506. Every other $\frac{1}{2}$ ton truck in the platoons was provided with a SCR 510.

In addition to this communications equipment there was a SCR 510 mounted in one of the four $\frac{1}{2}$ ton trucks

* See T/O&E 2-27, WD, 15 Sept 1943.

of the Troop Headquarters Platoon. And in the Troop Trains there was one armored car, equipped as described in the preceding paragraph, a maintenance half-track with a SCR 528 and a maintenance $\frac{1}{2}$ ton truck which had a SCR 510. Of the three supply section half-tracks none were authorized radio equipment.

The Reconnaissance Troop, then, was provided with a total of 12 SCRs 506, 12 SCRs 508, one SCR 528 and 11 SCRs 510. Out of 40 self-propelled vehicles in the Troop 25 had radio equipment. Put another way, there were 40 vehicles in the Troop and 36 radios. Rated communications personnel totaled 24, there being 22 operators, a Communications Sergeant of the fourth grade and one Radio Repairman who was a T/4. The personnel who tended the SCRs 510 throughout the Troop did so in addition to their primary duties and were not rated. It should be obvious therefore that whatever organizational weaknesses the Reconnaissance Troop may have had, the ability to communicate via vehicular radio was certainly not one of them.

Troop B of the 116th Cavalry Reconnaissance Squadron, 101st Cavalry Group was provided with equipment and personnel as has just been described. This Troop was

my wartime command.

Now after having reviewed the communications personnel and equipment status, let us look at some of the problems and situations arising therefrom.

1. Morale and Personnel

The one big communications problem which pervaded almost all activities of Troop B was the large number of rated communications personnel. These 22 operators, all technicians, were in addition to the number of rated and non-commissioned personnel who were otherwise necessary for the operation of the Troop.

Together this bloc of technician-operators accounted for nearly half of all the technicians in the Troop. Out of 52 technicians in the unit 24 were rated communications personnel. Without these men only about 39% of unit strength would have been consumed by rated personnel (including NCOs). But with the radio people included 56% of the total enlisted strength was rated, leaving only 44% Privates and P/fcs. And of this 56%, 40% was taken up by technicians alone, while only 16% was taken up by NCOs. This figure of 40% was higher than

in any other company sized combat unit in the armored division or the infantry division.*

In the Reconnaissance Troop this large percentage of technicians, added to the complement of NCOs, left only 62 men out of an enlisted strength of 140 who were available for details. This condition was the bane of our existence when in garrison, for it required these non-rated men to perform details much more frequently than they should have. It was always a thorn in the side of efforts to improve morale. Inspectors General in different parts of the United States were more or less uniform in requiring that Technicians, Grade 5 be exempted from "KP" and other such details. During some considerable periods of time we found that men were performing "KP" as frequently as once a week on top of their other details.

It seemed to us as though the planners of the Tables of Organization had allowed just enough privates to barely get by provided the Troop was at full strength with all personnel present. However, with 15% always absent on pass or furlough and with men in the hospital or at schools we found ourselves continually beset with

* See wartime divisional T/Os.

the morale problem arising from the frequency of details. And if the Troop should happen to be understrength by any appreciable number of men, the morale problem could be seen affecting the overall efficiency in every activity the organization was engaged in.

To say that this problem could be relieved by eliminating the 22 radio operators is of course true. It would. It would lower the percentage of rated personnel to about 39%, which is not a bad figure. But at the same time it would also denude the Troop of dual communications facilities and eliminate the advantages of long range communication. Looking back on my experiences it would seem to me that a solution to the problem would be to eliminate most of the rated operators, leaving only enough to operate one AM set per platoon and one in the Troop Headquarters.

It is stated, I believe, as a principle of employment that elements of the New Reconnaissance Battalion of the armored division will not be sent on missions which take them beyond the range of their communications facilities. The same I assume to be true of the elements of the new Light Armored Regiment whose

radio equipment is the same. In the companies of these new reconnaissance units all dual and CW equipment has been eliminated forward of the Company Headquarters.

In this case the range of the company nets will be 15 miles under favorable circumstances, since the largest set available to the platoons is the SCR 508. And this 15 mile range can only be maintained when lower atmospheric conditions are favorable and when no substantial objects break up the line of sight between sets in contact with each other. Under circumstances where line-of-sight contact cannot be had between FM sets there is now no alternate means of radio communication which can be resorted to. There is no SCR 506 whose wave length dimension is greater than most obstacles encountered in the field, and whose ground wave is less sensitive to the earth's dielectric properties. Nor has there been provided any other type of AM set, either voice or combination voice-CW, which would guarantee continuous radio communication during the frequent periods when the SCR 508 is ineffective.

It would seem to me that with the elimination of CW equipment, resulting in loss of dual communications facilities, the new reconnaissance companies of the Light Armored Regiment will have less to offer the Corps com-

mander than they could. With one long range set in each reconnaissance platoon the company's radius for special operations could be considerably increased and its all around communications be made more dependable.

The addition of one AM set in each reconnaissance platoon would require a total of eight radio operators for the company instead of the two as at present. This is only one-third of the number of communications personnel in the wartime Reconnaissance Troop. A substantial out. Yet it would give the present company the same possible range of communication as the wartime organization when it is assumed that the subdivisions of the platoon will not be widely separated.

Operational situations, both in and out of the combat zone, in which my Troop found itself may serve to indicate the desirability of AM sets and other communications problems.

2. In New England

In the spring of 1942 my Troop was ordered from Ft Devens, Mass. to Dow Field, Bangor, Maine. Its mission was to defend the air field against any kind of

hostile infiltration and also to exercise periodic surveillance over a portion of the Roanoke River. The section of the river to which patrols had to be sent was far beyond the effective range of a SCR 508. Communications between the base and the patrols was maintained by SCR 245 or SCR 193. At that time these latter sets were the only radios with which we were equipped. However, they were very similar to the SCR 506.

3. Eastern Virginia

At a later period my Troop was operating under the Eastern Defense Command in the tidewater district of Virginia. In the course of our operations there was a communications problem which in our previous experience we had not encountered. We had noticed that when passing through a certain area near the eastern edge of Dismal Swamp it was practically impossible to maintain radio contact for more than a few hundred yards. The first time we encountered this condition we were prone to conclude that the absence of communication was due to some inefficiency of the radio operators.

A week or two later we had occasion to operate

in the same area where we again experienced an almost complete loss of contact. A thorough check by radio maintenance personnel indicated that all sets were on proper frequency and that there were no maintenance shortcomings in the radios themselves. After having moved on for a few miles we noted that communications gradually came back until the entire net was operating at normal efficiency.

Some days later I sent two armored cars back into this area to see if they could find out what the trouble was. They tried every field expedient they knew of to improve contact. Yet they were unable to effect any improvement as long as they remained in this area. However when they both moved out of the area their communication returned to normal.

We were never able to determine the cause of this dead area, but we felt that there was probably some strong dielectric property in the ground at that particular locality. We were not able to locate any "competing" high powered transmitters in the vicinity. Grammer and Goodman have this to say about dielectric properties:

"The conductivity and dielectric constant of earth vary widely. The depth to which ground currents of appreciable amplitude exist ranges from about five feet at the very high frequencies to fifty feet or more at broadcast frequencies and below. Therefore the earth constants are not particularly sensitive to surface conditions such as recent rainfall. A number of types of terrain are listed in order of their relative conductivity: sea water, fresh water, rich moist loam, clay, rocky soil, sand. If surface is not level, or if it be wooded or contain many buildings, the effective conductivity is reduced." *

While our personnel were familiar with atmospheric and other conditions which cut down on the range and quality of radio contact, they had never before seen conditions which resulted in a virtual blackout of the whole net. Neither before nor after that time did we experience a similar condition in this country or in Europe. I think it would be helpful and advisable to provide tactical units with the locations of such areas before they are sent to operate in them, especially those

* A.R.R.L. Antenna Book, Grammer and Goodman, West Hartford, 1947, p 10.

in the continental United States.

4. In Tidewater Carolina

From January to June, 1944 my Troop was based by itself at Camp Branch, North Carolina near Morehead City. In itself the Troop constituted the Beaufort Inlet Sub-Area of the Eastern Defense Command. As such it was responsible for surveillance of about 60 miles of coastline. This stretch ran from the vicinity of Cape Hatteras to just North of the New River Inlet, North Carolina. Amongst other duties, it was directed that this surveillance would consist of irregularly scheduled patrols during the day and night.

When these patrols had passed outside a radius of two or three miles from the base station their SCRs 508 became unreliable. After they had passed a few miles farther, their only hope of communicating with the base station was their SCRs 506. This set proved very reliable under these circumstances. The distances of these patrols was such that the SCR 508 was wholly inadequate.

There was another communications problem that occurred while Troop B was on this same mission. Camp Branch had been operating a fixed radio installation and a rather complicated telephone system prior to our arrival. It was operated by a Signal Corps detachment of about 20 men.

Sometime after our arrival the bulk of this detachment was withdrawn, throwing part of the responsibility of operating and maintaining this system on the communications personnel of my Troop. They had to maintain long lines, operate a civilian type switchboard, furnish reliefs for the fixed radio installation and establish radio contact with higher headquarters when the fixed radio failed. Without trained communications personnel in the Troop these additional burdens would have been extremely difficult.

Thus far in this paper we have considered some of the communications problems which confronted Troop B prior to its entry into combat. We shall next look at a selected group of situations which occurred in the combat zone.

SECTION II

1. Along the Sarr River

Troop B's initial commitment to combat was just East of the Sarr River between Sarrlautern and Sarrbrücken. The nature of its mission was defensive. It relieved an

organization which had been in the same positions for the previous 30 days, and therefore the Troop inherited an already functioning telephone system.

During this general defensive phase of operations Troop B placed reliance on communication facilities according to the following priority: wire, mounted messenger, dismounted messenger, radio. Radio was least used for the simple reason that other methods gave reliable contact with adequate speed. The lack of movement involved in the defensive situation and the relative security of telephone transmission were supplementary reasons for not using the radio more frequently. While radio silence was not absolutely ordered, it was nevertheless understood by everyone that there was no necessity for its use while the other facilities were available. Below the Troop Headquarters radios were opened only when specifically directed, but the Troop Headquarters itself was required to remain in the Squadron net most of the time. Distances between stations in this net were never more than two or three miles so that its messages were usually sent via the SCR 508. At times, though, resort had to be made to the SCR 506.

After the use of the latter radio set my Troop

command post was sometimes shelled, and very accurately. This enemy activity made it necessary to move the transmitting vehicle to a different location prior to using the big set. In this way no personnel were hurt unnecessarily. The enemy artillery was unable to get a "fix" and fire before the transmitting vehicle had moved from the place where it had just sent a message.

Some time later while in this same sector the 101st Cavalry Group was ordered to attack and drive the enemy East of the Sarr River. Because of the nature of the terrain and other local conditions the attack had to be largely dismounted. In the case of the 116th Squadron to which Troop B was assigned the attack was entirely on foot. Our Squadron attacked in column of troops with Troop B leading. Since the attack was wholly on the ground vehicular communication could not be used. We managed to borrow a few SCR 300 radios from the 26th Infantry Division, next on our left, but these were not enough. In my Troop we had to dismount some of the SCRs 510.

As soon as the Troop had progressed beyond 2,000 yards and was entering its objective towns, Shaffhausen,

SPÜRK

SCHAFHAUSEN-
-HOSTENBECK

WHERDEN
→

1 KILOMETER

116 CAV ATTACK (DISADV)

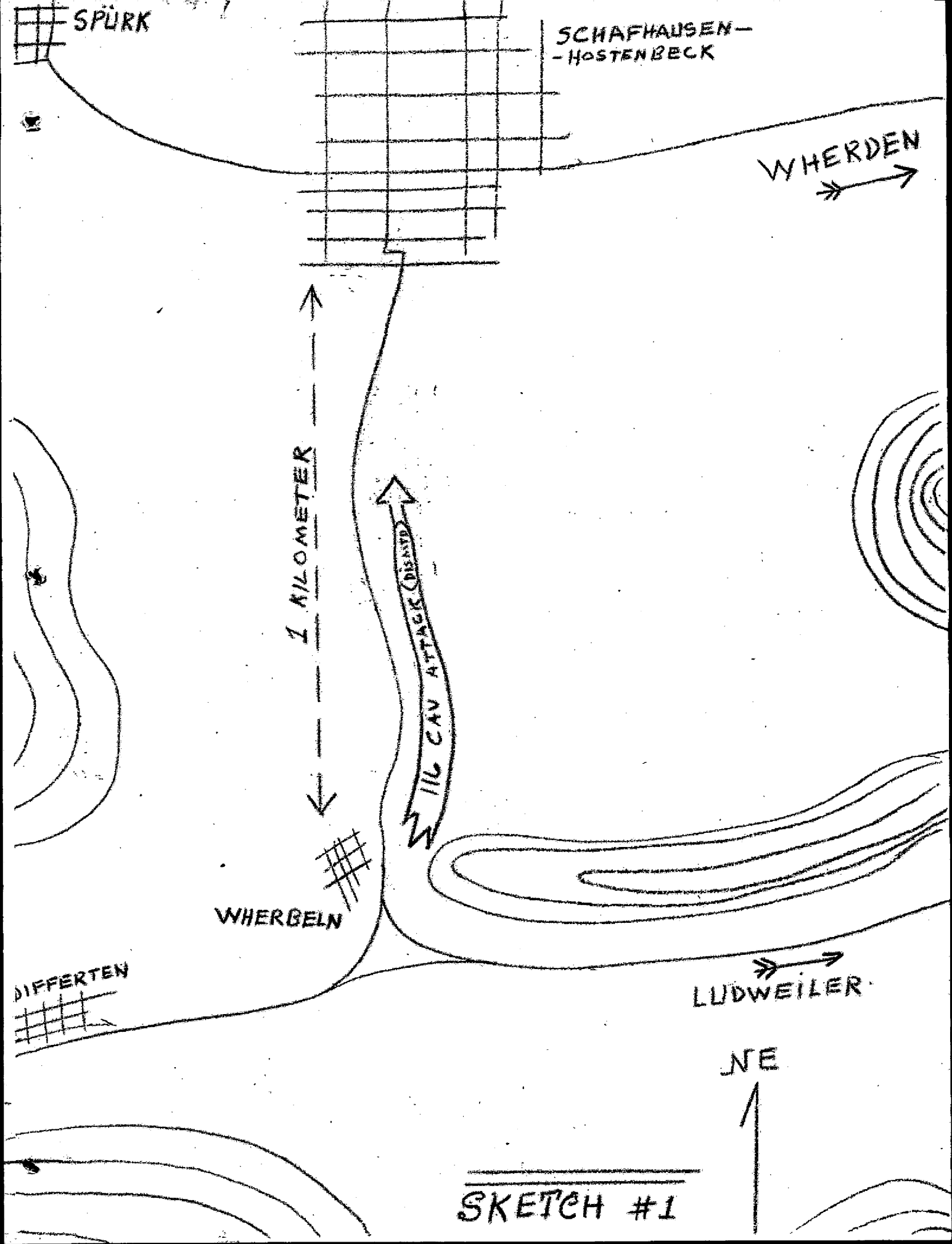
WHERBELN

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SKETCH #1

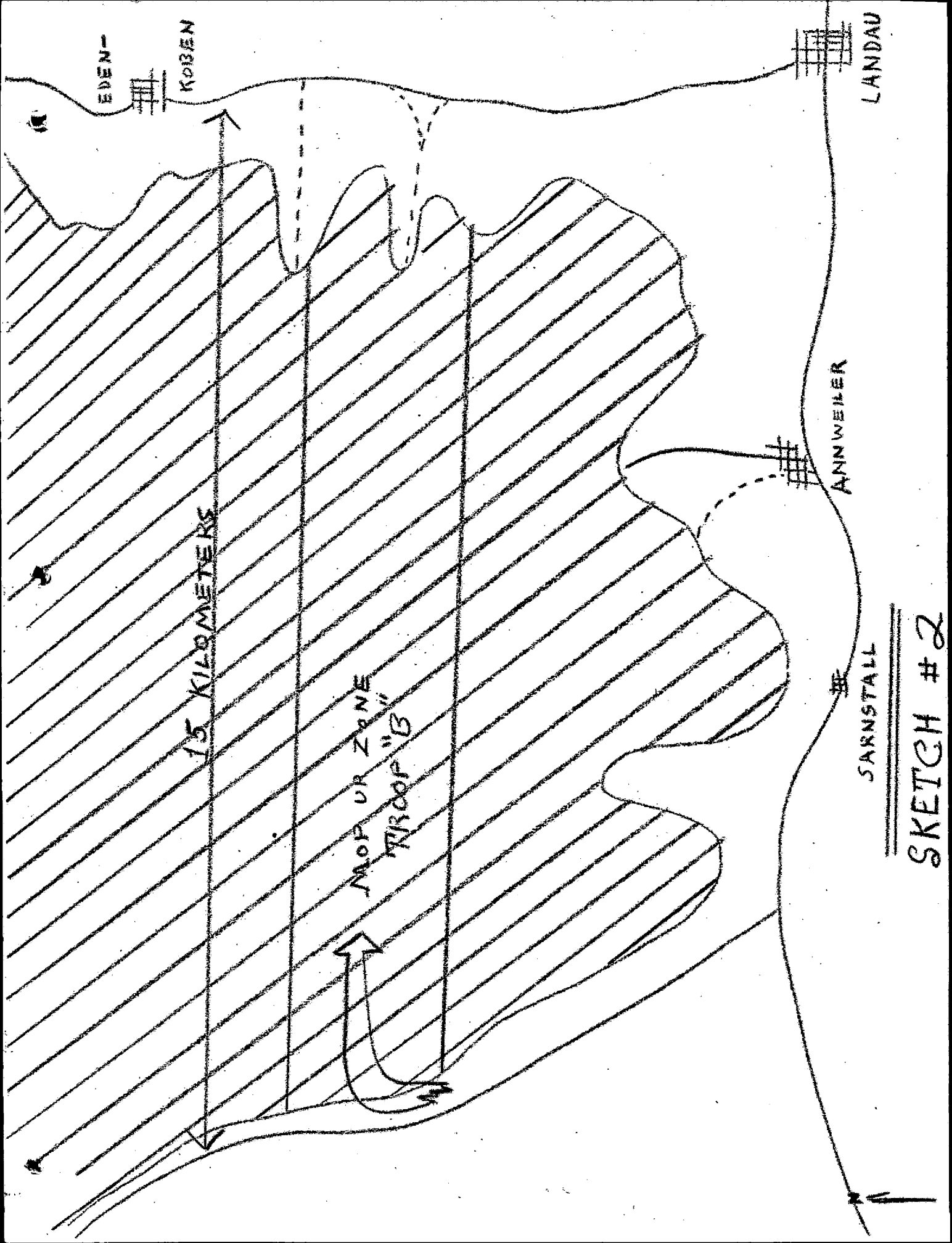


Hostenbeck and Spürk (see sketch #1), radio contact using these small sets was mostly non-existent. Except by runner, I was out of communication with all but one of my platoons, and radio contact with the Squadron Headquarters was so occasional that it could hardly be referred to as "contact." Although Cavalry units were not provided with wire equipment, nevertheless we had foreseen what would probably happen in this attack. Therefore we made arrangements to follow the Troop Headquarters with two wire lines and to bring enough wire equipment to lay lines to each platoon when it reached its objective. This was successfully accomplished and gave reliable communication. Though we had done everything we could to the portable radios, we were unable to raise the level of their performance.

While considering portable radios, or "walkie-talkies," let's look at another dismounted situation.

2. East of the Rhine

Troop B along with its parent organization received an order to "mop up" a zone in a densely wooded and mountainous area (see sketch #2). This area had been



SKETCH #2

by-passed by the principal elements of the XXI Corps. The zone assigned to my Troop was about three kilometers wide and 15 kilometers in depth and was entirely devoid of roads. It was not possible to lay telephone wire for numerous reasons. Our only hope for communication, therefore, lay with the portable radios. At this time we were unable to borrow any SCR 300 sets, so every section had to dismount one SCR 510 and carry it on foot. During the course of this operation elements of the Troop fought several actions with groups of enemy infantry, yet at no time after the operation started was I able to communicate with any part of my Troop. In the small actions which took place the sections and platoons were "on their own." The fact that the sections went through to the limiting line and that the overall mission was accomplished is in no way attributable to the SCR 510. They were wholly ineffective in the dense woods and mountains.

In the same general locality that the preceding operation occurred, an instance happened which involved long range communication.

After the dismounted operation just described

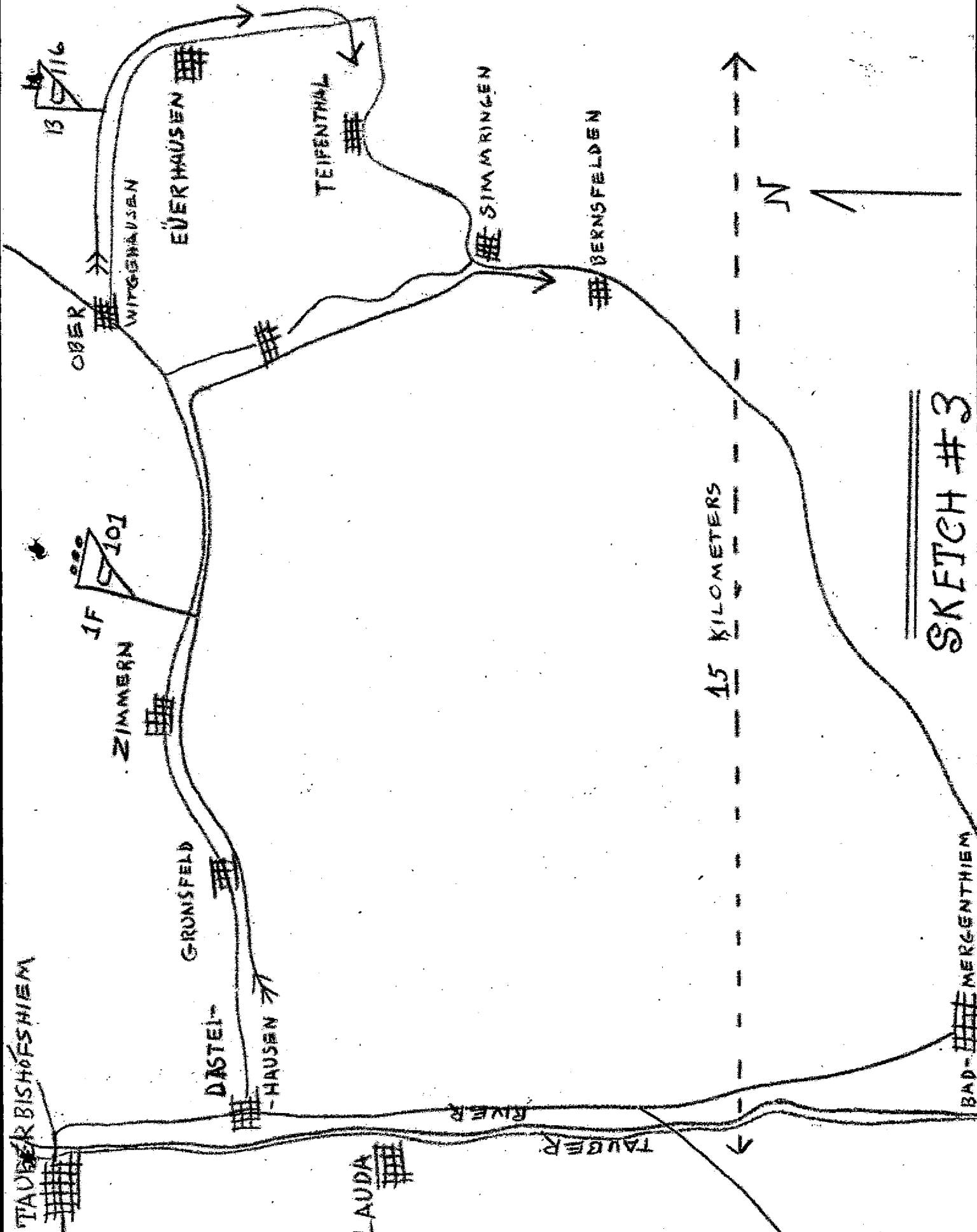
Troop B had assembled with its vehicles in the vicinity of Sarnstall, Germany (see sketch #2) south of the area which had been mopped up. An order was received from the Group Headquarters to dispatch one platoon immediately to the assistance of one of the other units in the Group. It had been surrounded by a larger German infantry unit. This situation had taken place over 20 kilometers from Sarnstall, and it was off the North edge of our map by several kilometers.

The solution was simple. The platoon in question simply went into the Group AM net and proceeded in accordance with the wishes of that headquarters. They were talked into position when they went off their map to the North.

The speed which was essential in this situation could not have been attained if the platoon in question had not possessed long range radio equipment.

3. Communication with Attachments

After crossing the Tauber River near Tauber-bischofsheim, the 116th Squadron was directed with the balance of the Group to screen the South flank of the XXI Corps. Troop B was assigned its part of the screen



SKETCH #3

BAD-MERGENTHIEM

and began its movement into position. It had no attachments.

As the Troop was turning South (see sketch #3) it received a message that one light tank platoon and one assault gun platoon of the 101st Squadron had been attached and that they were moving to join. When attachment was effected these platoons were operating West of Zimmern. They had been told generally where to go and were directed to come into my Troop command net for detailed instructions. Since neither platoon had a long range set it was impossible for them to come into my AM command net. The initial distance was too great and the ground was too hilly and wooded for them to contact me via their SCRs 508.

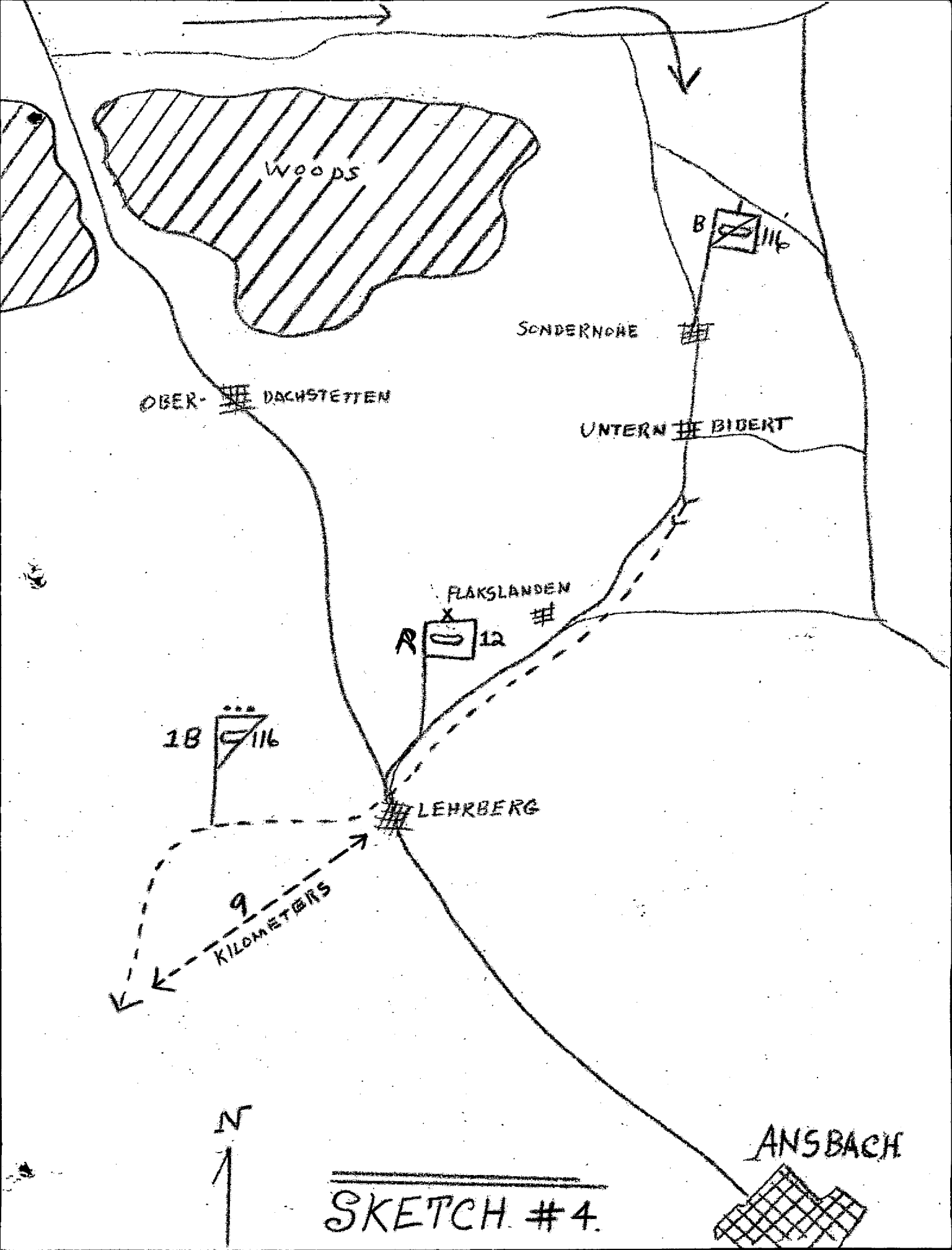
The result of this situation was that the light tank platoon arrived on the screening line before Troop B. Not being able to get instructions from me, they went past where I had intended to place them. They passed through Simmringen, the farthest point on the screening line, and drove unsuspectingly into the town of Bernsfeld. As the light tanks turned the last corner before entering Bernsfeld they encountered two PAK 75mm anti-tank guns which were reinforcing a dug-in infantry position.

Had the attached tank platoon possessed just one SCR 506 or its equivalent this situation would not have come about. The attached assault gun platoon did not arrive in the vicinity of the screening line until after Troop B and therefore it met with no unfortunate circumstance.

4. Security for Combat Command

During a later period Troop B was attached to Combat Command R of the 12th Armored Division. The combat command was in the process of attacking in column South down the highway between Uffenheim and Ansbach. The CC had been stopped cold by a strong enemy position in the vicinity of Burgbernheim, and was in the act of bypassing this position to the East when my Troop was attached. After the CC got to the flank of the position it turned South again and split in two parallel columns. My Troop's mission was to protect the flanks and rear of both columns. (See sketch #4.)

From the very beginning communication with the CC headquarters was by AM radio. Troop B was required to keep an armored car with SCR 506 at the CC headquarters



SKETCH #4.

throughout the week that it was attached.

The length of the parallel columns of the combat command precluded reliable contact with CC headquarters with the SCR 508. And the fact that the two parallel columns were separated by hilly and wooded terrain made it difficult to maintain lateral contact by use of the same set. However, since the two columns were not widely separated, I tried to use mounted messengers. These latter were frustrated by by-passed elements of German infantry, and so even at this close range resort had to be made to the SCR 506 radio.

During the course of this operation the CO of Combat Command R requested one platoon from my Troop for a special reconnaissance mission. The platoon was sent to the CC headquarters. It was directed to reconnoiter the road net West of Amzbach to determine whether elements of the CC could by-pass the city in that direction (see sketch #4). The platoon was not reinforced. After picking its way through small German detachments it found itself opposed by a company of enemy infantry. After having progressed this far the platoon was out of contact with the CC headquarters via the SCR 508 net. The platoon

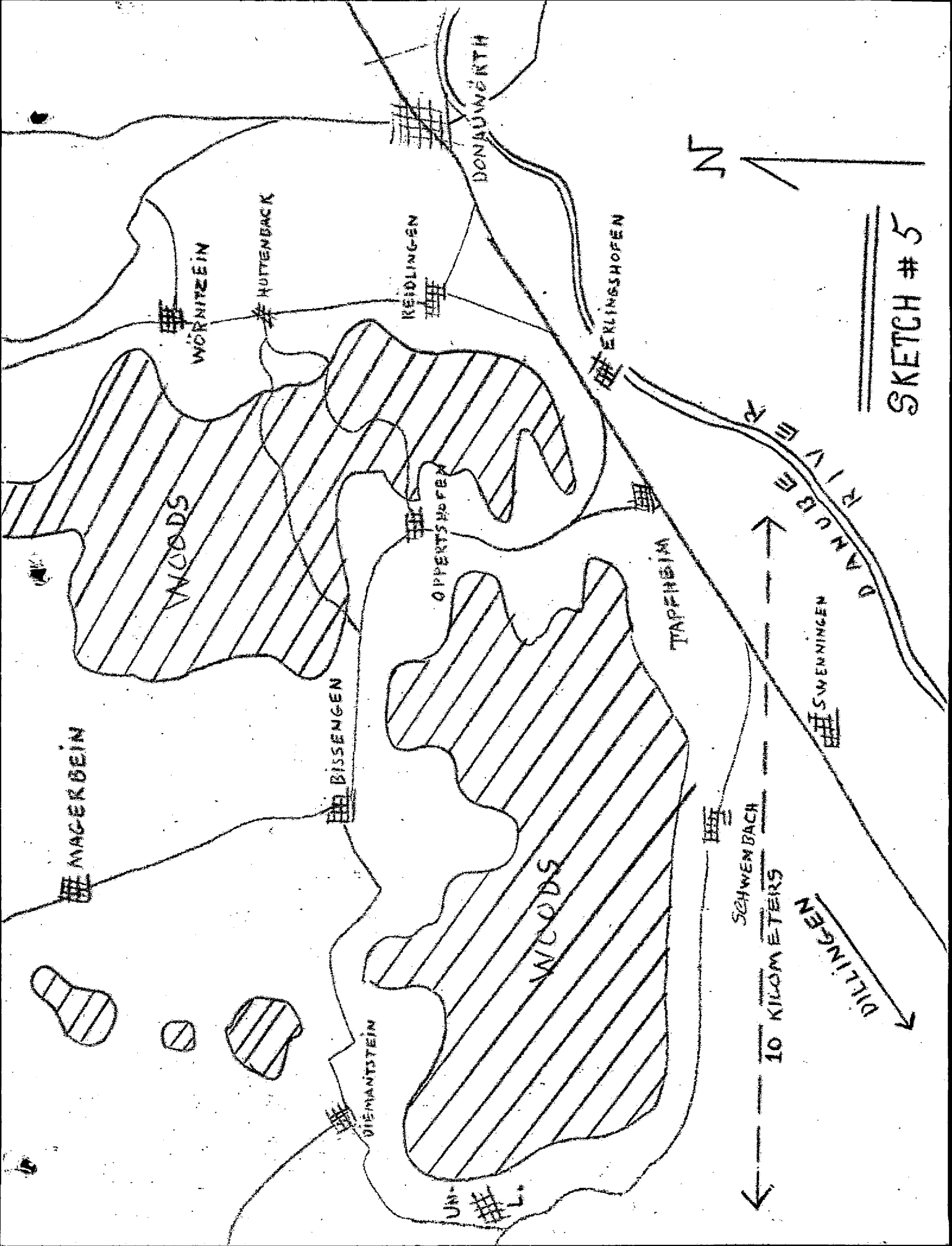
leader, therefore, felt particularly fortunate since all he had to do to regain contact with the combat command was to flip the switch on his SCR 506. He was then able, without any delay, to report his situation and receive instructions.

5. Along the Danube

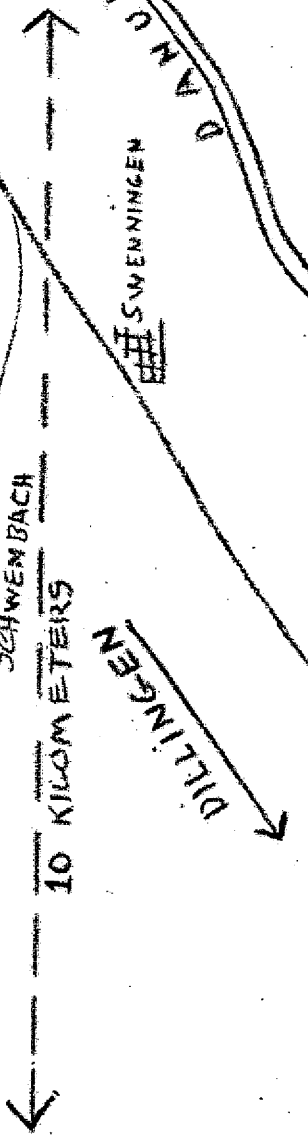
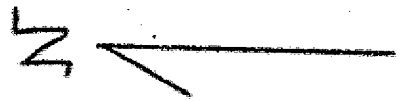
At a later time Troop B with its parent organization was closing on the Danube River from the North. The 116th Squadron reached the river at Tapfheim (see sketch #5). This was on the left flank of the XXI Corps and also left of the 12th Armored Division.

The first mission assigned Troop B was to reconnoiter the general area Schwenbach-- Un L. -- Diemantstein -- Bissengen -- Oppertshofen -- Tapfheim, holding the bulk of the Troop in squadron reserve in Tapfheim. The purpose of this was to determine whether the by-passed enemy units in this area were capable of operating effectively against the squadron rear.

When the reinforced patrol passed Schwenbach heading West it lost FM contact with Troop Headquarters. In order to continue its reports it had to come into the



SKETCH # 5



Troop AM command net. And it had to continue with the big set until it reached Oppertshofen, moving South. If the patrol had not had a long range set it would have had to deplete its strength by one "Jeep" each time it had a message to send.

A day later Troop B moved North to Oppertshofen to take its place in the Squadron screening line. The 116th Squadron had been directed to screen the left flank of the XXI Corps. In the course of this mission Troop B had to send mounted patrols through the woods northeast of Oppertshofen (see sketch) to the road connecting Wörnitzlein -- Hüttenback -- Reidlingen. With the short distances involved here we felt sure that the Troop command net could operate on PM.

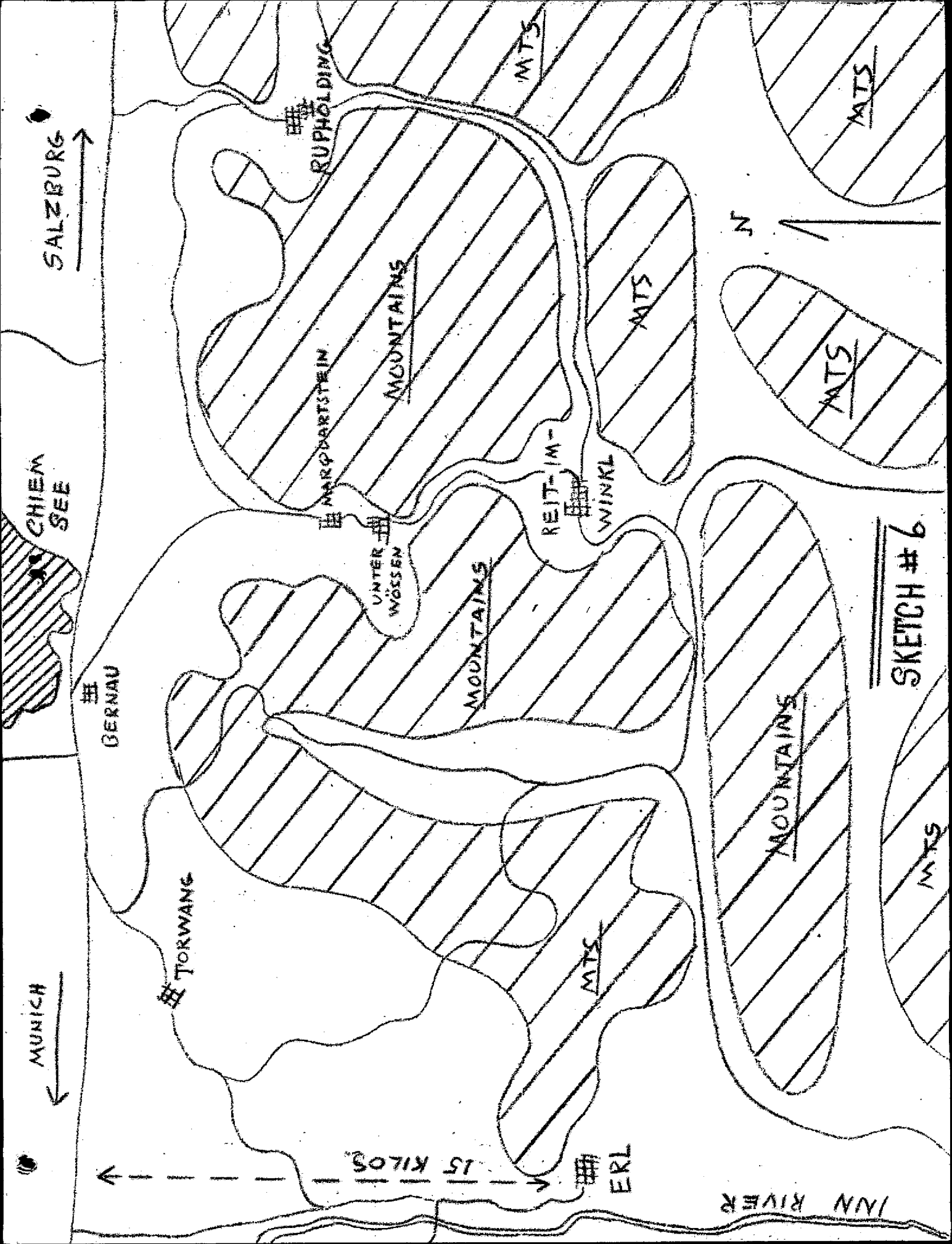
The first platoon to move out lost contact before it emerged on the other side of the woods. And just after leaving the woods it was taken under fire East of Hüttenback by enemy forces who were in firm control of the road Wörnitzlein -- Hüttenback -- Reidlingen. Again, all the platoon leader had to do was to start transmitting on his SCR 506, after which contact with Troop Headquarters was instantly restored.

In this situation, as in many others, messages were dispatched from the platoons by "Jeep." But mounted messengers always arrived far behind AM radio messages. Frequently messengers were not able to get through at all because of the action of by-passed enemy.

6. Communication in the Alps

Near the end of hostilities in Europe Troop B was located with its parent unit in Rupholding (See sketch #6). After completing one separate mission in that general area the Troop was directed to "collect," peaceably or forcibly, all un-surrendered enemy forces in the area Torwang -- Erl(Austria). Accordingly Troop B proceeded to Torwang and started sweeping southward. It reached Erl at nightfall of the second day. Just at this point the SCR 506 in my command vehicle went out. It was quickly determined that it could not be repaired with organic spare parts.

Had there been only one SCR 506 in the Troop Headquarters this problem would have been very inconvenient. It was 50 miles by road to Squadron Headquarters in Rupholding. Because of this and also because the intervening mountains varied from 3000 to 8000 feet, the SCR 508



SALZBURG

CHIAM SEE

MUNICH

BERNAU

TORWANG

MARGPARTSTEIN

UNTER WOSSEN

RUPHOLDING

REIT-IM-WINKL

ERL

INN RIVER

MOUNTAINS

MOUNTAINS

MOUNTAINS

MTS

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MTS

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SKETCH # 6

15 KILOS

N

would offer no hope of contact. However, since the command element of Troop B contained two SCRs 506, there was no problem.

In this operation the platoons had to spread out in order to thoroughly comb the assigned area. And here again the same problem occurred. Only the platoon operating nearest the Inn River was able to maintain satisfactory FM contact with Troop Headquarters. The others had to fall back on their SCRs 506 frequently.

SECTION III

Summary

In these selected wartime situations drawn from Troop B's experiences there are certain points that stand out. The necessity for long range equipment in the Troop Headquarters is easily apparent. The distances from Troop to higher headquarters were frequently far beyond the range of FM equipment. And it can be noted that a spare long range set in the Troop Headquarters was very helpful.

I think also that the necessity for a more powerful radio than the SCR 508 in platoon headquarters was shown.

Regarding the platoons further, I think it has also been shown that the SCR 510 was not equal to the requirements put upon it when used in dismounted action.

On the other hand, in the early part of this paper, we saw how the large number of radio operators in the wartime Troop increased the personnel and morale problems.

In view of these experiences, my recommendations for future reconnaissance units of company size would be about as follows:

1. Give the platoon leader a set similar to the SCR 694. A stronger set than the SCR 508 and one that can be dismounted as well as mounted in a vehicle. One per platoon.

2. Provide a spare SCR 506 somewhere in the Troop Headquarters in case of failure under embarrassing conditions. No operators need be provided for this set.

3. Keep rated personnel to a minimum, without drastically reducing the communicability of the Troop.

It seems to this writer that communications considerations should have a higher place in a reconnais-

sance unit than in any other combat organization. A unit which is primarily a security force should have the fastest and most reliable radio equipment possible for warning against surprise.

END