

# Equipment for Airborne Troops

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Chapter VI, Equipment for Airborne and Amphibian Troops

Quartermaster Equipment for Special Forces

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One of the more spectacular developments in modern warfare has been the use of parachute troops to occupy hostile airfields and strong points, paralyze communications and generally hamper enemy activities, usually in preparation for the arrival of the main forces in an advance. Experiments with parachute troops were begun by the United States Army a number of years ago but the technique was not actively developed and, at the beginning of the national emergency in 1940, there were no organized parachute units in this country. Russia and Germany, on the other hand, had taken up the idea and had developed parachute troops on a considerable scale. The Germans wove these units into the frame work of their new "blitzkrieg" technique and they were used with considerable effect in the 1940 campaigns, notably in Norway and the Netherlands. A development collateral to that of parachute troops was the use of glider-borne units, which followed the parachutists closely in expendable gliders and, except for the fact that they left their conveyances on foot, operated in much the same way. Glider-borne infantry, as well as parachutists, was used by the Germans in the invasion of Crete in the spring of 1941. Other armies, including our own, now began devoting attention to the development of units of this type, as well as to parachute organizations.

The development of parachute units was taken up in the United States Army with the general expansion which began in 1940. Since they were intended to 'fight on foot, though transported by air, the parachutists were classified as infantry and their organization began at the Infantry center at Fort Benning, Georgia. Their equipment became the concern of the Infantry Board, with headquarters at the same post. Along with other problems the Board took up the study of proper clothing for the parachute troops and very soon called upon the Quartermaster Corps for cooperation in its development.

The Infantry Board, from the information available, concluded that special footgear, cushioned and reinforced to lessen the shock of landings, was essential. German parachutists were known to use a special laced boot, with well reinforced leather uppers and a thick rubber sole. The "smoke jumpers" of the United States Forest Service, fire fighters who parachuted to their assignments in otherwise inaccessible localities, used a laced woodsman's boot with a strong ankle brace which fitted over it. The Infantry Board, after considerable experimentation involving actual parachute jumps, recommended a boot which combined what it considered the best features of the German boot and the Forest Service device. Toward the end of October 1940 it submitted to the Chief of Infantry a sample pair of these boots with the recommendation that they be adopted as standard for issue to parachute troops. The proposed boot had rubber soles, sponge rubber innersoles and ankle bracing features. It was proposed that the same boot, without the

braces or the rubber innersoles and with a leather sole, be adopted for issue to non-jumping personnel of the parachute organizations.<sup>1</sup> These proposed issues were not favorably considered at first in the Office of The Quartermaster General, which at this time was taking a conservative attitude toward the developments of new items for special troop uses. "Due to the magnitude of the present program," Brig. Gen. Corbin, Chief of the Supply Division in this office, pointed out to the Chief of Infantry, "the number of different items issued to troops must, of necessity, be restricted to those which are absolutely required rather than to those which can possibly be used." As for the parachutists' jumping boots, he recommended that the service shoe, with rubber soles and heels, be used instead. If ankle braces were required, these were available in commercial designs. He saw no reason why non-jumping personnel of the parachute units should have any special footwear at all.<sup>2</sup>

The Office of the Chief of Infantry, however, strongly backed the recommendation of its board. "It has been definitely established by experienced agencies, civil and military," Col. E. W. Fales of this office assured The Adjutant General, "that a special type footwear is necessary for parachute jumpers in or that foot and ankle injuries may be reduced to the minimum." An officer of the Marine Corps, jumping from a training tower at Hightstown, New Jersey, without using any special footwear, had recently broken his ankle. The descent from the training tower, it was pointed out, was relatively slow and the jumper was subjected to

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<sup>1</sup>Infantry Board to the Chief of Infantry, "Parachutists Jumping Boots", October 29, 1940; Col. E. W. Fales to The Adjutant General (3rd indorsement), December 14, 1940.

<sup>2</sup>Brig. Gen. C. L. Corbin to Chief of Infantry (2d indorsement), November 26, 1940.

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much less shock to feet and legs than when jumping from an airplane. The Infantry Board had used the best data available, supplemented by experimentation, in preparing its proposed boot. Boots were urgently needed at Fort Benning, where the 501st Parachute Battalion expected to commence instruction in jumping at an early date. Delay in procurement, due to the adverse recommendation of the Quartermaster Corps, was "delaying the ability of this battalion to train itself and be prepared to expand into 3 additional battalions as planned..."<sup>3</sup>

The objections of the Quartermaster Corps were overruled and the boot, "to conform in all details with the sample boot as approved by The Infantry Board," went into procurement.<sup>4</sup> This first U. S. Army parachutists' boot, however, like most first issues, did not prove wholly satisfactory in use. There was a tendency for the layers of the sole to pull apart at the toe and, with more experience, the special ankle bracing features and the sponge rubber innersoles came to be considered superfluous. A new design was worked out between the Office of The Quartermaster General and the Boston Quartermaster

Depot, very similar to the standard service shoe except for a higher cut, a hard toe and rubber soles and heels.<sup>5</sup> This boot was tried out

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<sup>3</sup>Col. Fales to The Adjutant General, December 4, 1940, cited above.

<sup>4</sup>Gen. Corbin to Chief of Infantry, January 23, 1941.

<sup>5</sup>Corbin to Assistant Chief of Staff, G-2, "Parachute Jumpers' Boots", May 1, 1941; O.Q.M.G. Public Relations Press Release, August 10, 1941; Quartermaster Corps Tentative Specification, "Parachute Jumpers Boots", June 23, 1941.

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by a number of service boards, for possible wider use, as well as by the parachute units at Fort Benning. E. A. Wagner, shoe consultant of the Office of The Quartermaster General, visited Fort Penning and conferred with a number of officers and enlisted men of the parachute battalion, getting their criticisms and recommendations. While the basic design was considered satisfactory, a number of refinements were believed desirable. The bellows tongue, until it was softened by use, tended to blister the front of the foot, looseness in the quarter gave insufficient support to the in-step, there was not enough resilience in heel and sole, heels pulled off readily and there were other complaints. New experimental boots were accordingly made up in test quantities and new tentative specifications were prepared in the Boston Depot, designed to correct the evils complained of.<sup>6</sup>

Tests of the experimental boots conducted at Fort Benning, by the 502nd Parachute Infantry, including two months regular wear by personnel, jumping and practice marches, showed that most of the new features were unnecessary or undesirable. A sponge rubber filler in the sole and a more resilient rubber heel, designed to lessen landing shock, failed to afford appreciable relief of this sort

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<sup>6</sup>Standardization Branch, Report of Test and Development Work in Progress, September 8, 1941- April 1, 1942; E. A. Wagner, "Report of Trip for Inspection of Parachutists Boots, Fort Benning, Georgia, December 13, 1941; Corbin to The Adjutant General, "Experimental Boots for Parachute Jumpers", January 13, 1942; Lt. Col. B. E. McKeever to The Quartermaster General (1st endorsement), February 25, 1942.

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and had a harmful effect on long marches. They caused the foot to move around too much in the boot and produced blisters. A new split tongue seemed to offer no improvement over the bellows tongue. A modified upper pattern with side support,

however, gave a better fit to the in-step and ankle. This new feature was recommended by the special test board which had been set up to try out the experimental boot, while the other new devices were rejected. New specifications, modifying the standard parachutists' boot in line with these recommendations, were prepared by the Boston Quartermaster Depot in August 1942.<sup>7</sup> At the desire of the Infantry Board a softer tannage of leather than that used in the service shoe was also incorporated. in the upper of the revised parachutists boot.<sup>8</sup>

The parachute jumpers' boot, as it settled into approved and tested form, was a 10" blucher type boot made on a standard Munson last, with a little cushioning in the sole and heel and some special support for the instep and ankle. It had a hard toe and its upper was softer than that of the service shoe. Its general appearance was that of a standard Army shoe lengthened into a short boot. The parachute units were immensely proud of this distinctive footwear and wore it with the trousers tucked into the tops and hanging over a little in neat rolls.<sup>9</sup>

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<sup>7</sup>Capt. Arthur Auton to Commanding Officer, 502d Parachute Infantry, "Test of Boots, Parachute Jumpers' Experimental", May 20, 1942; Col. W. A. Wood, Jr., to The Quartermaster General, "Test of Parachute Jumpers Boots, Experimental (5th endorsement)", July 4, 1942, Quartermaster Corps Tentative Specification, B.Q.D. No. 58B, August 3, 1942.

<sup>8</sup>Lt. Col. B. E. McKeever to The Quartermaster General, "Specification Changes, Boots, Parachute Jumpers', No. 58", April 2, 19142; QMC Tentative Specification, B.Q.D. No. 58B.

<sup>9</sup>Brig. Gen. W. C. Lee to The Adjutant General, July 1, 1942.

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The Infantry Board also prepared a sample parachute jumper's uniforms which it forwarded to the Chief of Infantry in October 1940, with the recommendation that it be issued to the 501st Parachute Battalion for service test. This sample was turned over to The Quartermaster General without change. The Quartermaster Corps, however, prepared a design of its own which, when it was tested at Fort Benning in the following winter and spring, was criticized severely. The suit had, the Test Section of the Infantry Board reported, "no virtue except wind resistance. The material was closely woven and very uncomfortable in hot weather. The suit was bulky and ill fitting. The pockets had projecting seams which caught cords and projections. Zippers on the pockets became clogged with dirt and were difficult to open. The cloth was dark green with a sheen which was objectionable in the sun. The material had a tendency to "run" when snagged. It was a one-piece garment, while a two-piece outfit was believed necessary. There were other objectionable features. In substance, the uniform was considered completely unsatisfactory. The Test Section had several alternative designs made up and tested by

the 501st Parachute Battalion. Another sample, embodying the best features brought out in these tests, including a two-piece design and standard O. D. color, was then submitted to the Infantry Board with the recommendation that it be approved for limited procurement.<sup>10</sup>

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<sup>10</sup>Lt. Col. Samuel T Williams to Chief of Test Section, Infantry Board, "Suits, Parachute Jumpers, February 36, 1941; Lt. Col. Harris M. Melasky to the President, Infantry Board, "Suits, Parachute Jumpers", May 10, 1941.

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This sample was forwarded to The Quartermaster General, with the blessing of the Chief of Infantry and the recommendation that it be procured without delay in sufficient quantity to equip two battalions.<sup>11</sup> This suit was made up by the Philadelphia Quartermaster Depot, after review in the Office of The Quartermaster General, substantially as received, except for a change in material, and purchased in sufficient quantities to meet the immediate needs of the parachute troops.<sup>12</sup> Another design was also prepared in the office and submitted to the Chief of Infantry for comparative test by the parachute troops. Tests at Fort Benning in the autumn of 1941 showed preference for the design originally prepared there and, with certain modifications, including the addition of suspenders, this was recommended for continued procurement.<sup>13</sup>

Since the parachute organizations were to be enlarged rapidly and procurements had been delayed pending the outcome of the tests, the Office of The Quartermaster General directed the Depot to prepare specifications exactly as requested by the testing board at Fort Benning and approved by the Chief of Infantry, with a view to immediate procurement.<sup>14</sup>

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<sup>11</sup>Col. E. We Fales to The Quartermaster General, "Parachute Jumpers Suit", June 2, 1941.

<sup>12</sup>Intra-office memorandum, Oberrender to Capt. F. K. Ball, "Suits, Parachutists", July 2, 1941; Corbin to Assistant Chief of Staff, G4, "Parachute Jumper Suit", July 14, 1941 intra-office memorandum, C. & E. Branch to Standardization Branch, "Suits, Parachute Jumpers", December 17, 1941..

<sup>13</sup> Col. Maxon S. Laugh to Commanding Officer, Provisional Parachute Group, "Parachute Jumper's Suit", September 3, 1941; "Proceedings of a Board of Officers which met at Fort Benning, Ga., at 1:30 P.M. on November 4, 1941..."; intra-office memorandum, Standardization Branch to C. & E. . Branch, "Parachutist Clothing", November 18, 1941.

<sup>14</sup>Intra-office memorandum, C. & E.. Branch to Standardization Branch, "Suits, Parachute Jumpdrs", December 17, 1941; Lt. Col. L.O.. Grice to Commanding General, Philadelphia Quartermaster Depot, "Suit, Parachute Jumper", December 19, 1941.

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The parachutists' suit, as designed largely at Fort Benning, consisted of a coat and trousers of cotton uniform twill. The coat, or jacket, had four patch pockets fastened with snaps and a full belt. It was closed with a zipper all the way up to the throat and had a standup collar for extra protection to the back of the neck. There were rollback, buttoned cuffs and shoulder loop with snaps.<sup>15</sup> The trousers had large cargo pockets, fastened with snaps, on the sides wall down the thigh. The legs were tapered toward the bottom, with elastic gussets inserted to insure snug fitting into or over the boots.<sup>16</sup> The suit was fairly close-fitting, but roomy enough for completely free movement of arms and legs. It had a minimum of protuberances likely to catch on shroud lines and a considerable cargo pocket capacity.

Special problems came up in connection with the use of the standard Army helmet by parachute troops. The shock of the opening of the parachute was likely to rip the helmet loose from the head, or to separate the steel helmet from the inner liner. There was also danger that the neck might be broken by this same shock, or that shroud lines might catch under the chin. The M-1 steel helmet was an Ordnance item, but the liner was procured by the Quartermaster Corps. Between the office of The Quartermaster General and the Jeffersonville and Chicago Quartermaster depots,

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<sup>15</sup>Quartermaster Corps Tentative Specification, P.Q.D. No. 114, December 30, 1941.

<sup>16</sup>Quartermaster Corps Tentative Specification, P.Q.D. No.113A, February 24, 1942.

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with the cooperation of manufacturers, specifications were worked out for a revised helmet liner for parachutists' use. This liner used the standard plastic shell, but had a special chin strap, with a protective leather cup fitting closely over the chin and an elastic neckband. These devices were fastened to the helmet liner itself by a special hammock suspension.<sup>17</sup> The whole arrangement was intended to absorb the shock to the head and neck involved in parachute openings, to protect the wearer from possible strangling by tangled shroud lines and to anchor the helmet more firmly on the head.

In the winter of 1941 Company B of the 503rd Parachute Battalion was sent to Fort Douglas, Utah, for winter training. Full sets of the ski and snowshoe patrol equipment then under procurement by the Quartermaster Corps were issued to this unit.<sup>18</sup> Report of these winter activities did not reach the Office of The Quartermaster General, however, in time to be of use in the revision of this group of equipment which was then under way.<sup>19</sup>

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<sup>17</sup>Lt.Col. C. N. Elliott to The Quartermaster General, "Specifications, Revision of Liner, Helmet, M-1", July 4, 1942; QMC Tentative Specifications: J.Q.D. No.97, April 1, 1942; C.Q.D. Nos. 63&, 64A & and 66, July 17, 1942.

<sup>18</sup>Brig. Gen. Harry L. Twaddle to The Quartermaster General, "Ski and Snowshoe Patrol Items", November 7, 1941; Col. Harry F. Haslett to The Quartermaster General, "Special Winter Ski Clothing", December 29, 1941.

<sup>19</sup>Dr. Terris Moore to Col. Georges F. Doriot, "Report on Para-Ski Troops Special Equipment", October 5, 1941.

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Contact between this office and the parachute units was, in fact, sporadic until the late summer of 1942. At that time the organization of whole airborne divisions, composed of both parachute and glider-borne units, was going forward and many equipment problems involving Quartermaster Corps items were coming up. Dr. Terris Moore, of the American Alpine Club, who had been called into consultation on problems involving mountain equipment and had participated in the Alaskan Test Expedition, then just concluded, joined the staff of the Special Forces Section and was assigned to develop a close liaison with the airborne troops in connection with the development of suitable equipment and rations. Dr. Moore had wide experience in problems of lightweight equipment and was an experienced airplane pilot.<sup>20</sup>

Shortly after receiving his assignment, Moore paid a three-day visit to Fort Benning to get in touch with parachute troop training activities, to check on the suitability of existing specialized Quartermaster items in use by these troops, and to ascertain whether the new mountain equipment might not be suitable for use by parachute units in operations involving several days of isolation from supply bases. He interviewed Brig. Gen. G. P. Howell, commanding the 1st Parachute Brigade, and a number of his officers, including members of his test board;

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<sup>20</sup>Intra-office memorandum, Special Forces Section to Chief, Resources Division, "Dr. Moore", August 21, 1942; Col. Hugh B. Hester to Commanding Officer, 502nd Parachute Battalion, "Dr. Terris Moore", August 26, 1942.

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he was also allowed to participate in a night flight during which a mass parachute jump took place. He found the parachute training officers very much interested in a number of items of the new mountain equipment. No tactical maneuvers involving jumping and self-sufficiency in isolated regions had as yet been undertaken, but it was certain that there

would be a demand for special light-weight camping equipment when this stage of training was reached. Careful field research would be needed at this time to determine the minimum essential needs for this type of operation.

The parachutists' suit, Moore found, was very little used at Fort Benning, most of the men preferring to make jumps in the one-piece herringbone twill work suit. Parachutists' knee pads, which the Quartermaster Corps had procured some time before, were apparently not used at all. The special jumping boots, it appeared, were generally felt to be unnecessary for parachute jumping and landing. "Most officers and men found the standard Army shoe entirely satisfactory for this purpose and several men had actually made jumps barefooted. The parachutists' boots, however, were worn with great pride as a badge of distinction in town and when the men were on leave. Moore recommended that their issue be continued "for their contribution to esprit de corps." The only suggestion made for the improvement of the boot was the addition of diagonal strips of rubber to prevent slipping on the metal door frame when men were stepping from a plane. Helmets, he was told, sometimes broke loose in jumping, the loops for the attachment of the chin straps breaking off, apparently because of poor welding. In the development of new items needed for the parachute troops, Moore was informed, the Quartermaster Corps was considered too slow and conservative. The Air Corps, on the other hand, gave quick attention to requests of this sort and, as a result, some items that would normally have been procured by the Quartermaster Corps had been developed, standardized and procured for the parachute units by the Air Corps.<sup>21</sup>

A few weeks later Moore visited Fort Bragg, North Carolina, which was now becoming the principal center for the training of airborne troops. His mission was primarily to inspect containers and opening devices used by parachute troops for the various weapons which accompanied them. This inspection was undertaken at the request of Col. Albert J. Browning, Director of Purchases, Services of Supply, through The Quartermaster General. Moore conferred with Brig. Gen. E. C. Chapman, Commanding General of the Airborne Command, numerous members of his staff and officers and men of the 503rd Parachute Infantry. The full complement of containers used for the M-1 rifle, the folding stock carbine, the light machine gun, the 60mm. mortar, the 75mm. pack howitzer and ammunition pouches was demonstrated to him. It had not yet been decided whether the various weapons were to be attached to the parachutist or to be dropped separately, nor had the allocation of their procurement - whether to Quartermaster, Ordnance or Air Corps - been made. The devices actually in use by the Airborne Command were for the most part makeshift items, worked up by the maintenance sections of the parachute regiments. These organizations were not supplied with all the latest types of closures and some of

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<sup>21</sup>Terris Moore to Col. Georges F. Doriot, "Trip to Fort Benning, Georgia", September. 2, 1942.

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the containers were operated by slow opening buckles, even though it was realized that zippers, or rip cords, would be necessary for the utmost speed in getting weapons cleared for action when parachutists were landing on hostile airfields and similar positions. The Research and Development Branch of the Office of The Quartermaster General, Moore recommended, should keep in close touch with the Test Section of the Airborne Command, until the basic decisions regarding this equipment were made. Until it was known whether weapons were to be dropped separately or to be borne by the men in their descent, it was of course impossible for container designs to be decided upon conclusively. As for the allocation of the items, Moore believed that the service which showed itself most active in cooperation would automatically take on this responsibility. It was largely because the Air Corps supply organization had had a field representative with the parachute troops that it had gained the reputation among them of giving the best service. The Quartermaster Corps now had similar liaison.<sup>22</sup>

In conference with Gen. Chapman's staff, it developed that other equipment problems of interest to the Quartermaster Corps were now coming up in the Airborne Command. Moore gathered such information as he could regarding these and made separate reports on them. He was shown the report on the winter maneuvers which had been undertaken by part of the 503rd Parachute Infantry in Utah the winter before and discussed it with Capt.

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<sup>22</sup> Maj. Bestor Robinson to Brig. Gen. E. G. Chapman, Air-Borne Command, Fort Bragg, North Carolina, September 27, 1942; Dr. Terris Moore to Maj. Gen. E. B. Gregory (thru channels), "Quick Opening Device for Paratroop Weapons", October 3, 1942.

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R.C. Carroll, one of the officers who had taken part in these operations. The report, which had apparently never been submitted to the Office of The Quartermaster General, included reference to some twenty items which that office had developed for the ski and snowshoe troops the year before. Considering these in turn, Moore found that practically all of them had been so much improved in design since the tests took place that comments in the report were no longer applicable. He and Capt. Carroll concluded, however, that much of the newer mountain equipment would be suitable for use by parachute troops in any winter operations.<sup>23</sup>

There were also special problems coming up in connection with the equipment of glider-borne infantry. Moore discussed these with Maj. DeGarve, the chief test officer of the Airborne Command, and officers of the 88th (Glider Borne) Infantry. Gliders were not yet available for actual tests, but some peculiar problems could nevertheless be anticipated. How, for instance, were the troops to be kept warm in the gliders at elevations up to 10,000 feet, where the temperature would average 30° lower than on the ground? The wool sleeping bag, under experimental development by the Research and Development Branch, Moore thought might be a partial answer to this problem; perhaps

the mountain sleeping bag would be needed in lower temperatures. Questions of the transportation of food and equipment and of the proper personal kit for the glider troops also came up. Moore described some of the mountain, jungle and other equipment then under procurement or experimental development by the Quarter-

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<sup>23</sup>Moore to Col. Doriot, "Report on Para-Ski Troops, Special Equipment", October 5, 1942.

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master Corps and it was agreed that he should bring down rucksacks, jungle packs and other items to see whether they might not meet some of these needs and the design of new special items be avoided. The idea of supplying the glider troops with suits having large cargo pockets, to take the place of the usual packs and ammunition belts, was also discussed.<sup>24</sup>

The Airborne Command was planning the organization of an airborne supply unit and, since Moore was known to have participated in the Alaskan Test Expedition, which had been supplied by this means, he asked to contribute the benefit of this experience in compiling a manual on the subject of this new technique. He discussed the problem on the ground, helping to outline proposed manual, and later forwarded to Fort Bragg a copy of the special report which he had prepared on the air supply of the Alaskan expedition.<sup>25</sup>

The parachutists' uniform came up again for discussion and Moore found, contrary to his impression at Fort Benning, that officers of the Airborne Command generally were satisfied with the suit, except for minor details. They explained to him that the reason the one-piece worksuit was used so much in training was that the men wished to keep their two-piece parachutists' uniforms in good condition to wear on formal occasions

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<sup>24</sup>Moore, "Report on Glider Borne Troops (Supplementary Report on T. Moore's Fort Bragg Trip, September 28-30, 1942)", October 5, 1942.

<sup>25</sup>Moore, "Inspection Report at Fort Bragg, North Carolina on September 28, 29, and 30, 1942", October 6, 1942; Moore to Col. Doriot. "Supply of Ground Unirs by Air", October 6, 1942.

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and on leave. The coat pockets, he was told, needed strengthening, particularly at the bottom corners, since grenades carried in them trended to drive through at the impact of the opening of the parachute. Other minor features on the suit also called for adjustment.

Various details of personal equipment came under review. Some of these Moore took up again later in Washington with Capt. Hite, who had been sent to Headquarters, Army Ground Forces, as representative of the Airborne Command. Pistol holsters were reported to break under impact at the top of the leather loop holding the wire clip which attached it to the belt. Various means of remedying this were proposed, but it was recognized that the new folding stock carbine would soon largely replace the pistol. There was also the problem of suitable ammunition belts and pouches. Airborne troops were equipped with four different individual weapons the M-1 rifle, the Thompson sub-machine gun, the .45 pistol and the carbine. The new, folding stock carbine would add a fifth. Though these issues would probably be simplified later, it was necessary to provide means for carrying ammunition for all of them. The pistol belt, Moore and Capt. Hite agreed, would meet the problem. This belt had no attached pouches, but pouches for all the different kinds of ammunition and clips were already in production and could be slipped on the belt. Canteen containers were reported to break in the same manner as the pistol holster. Moore thought that the experimental collapsible canteen might be the solution here. Parachute troops sometimes wore the musette bag in jumping and the straps occasionally ripped off it at the point of attachment. Before a stronger design of the musette bag was considered, the consultants agreed, the jungle pack should be tried out for parachute use. The wool sleeping bag, they felt, ought to be included in the table of allowances for parachute troops.<sup>26</sup>

On his next visit to Fort Bragg, late in October, Moore took with him some thirty new and experimental items of Quartermaster equipment for display to Maj. Gen. Lee, Brig. Gen. Chapman and officers of the 82nd and 101st Airborne Divisions. An exhibit was arranged and the items were on view for two days, during which some 120 officers looked them over while Moore explained them. There was great interest in a possible new pack ensemble for airborne troops. This pack, which would weigh only eight pounds, consisted of the jungle pack, the sectional poncho tent, the wool sleeping bag, the collapsible canteen, the meat can and the spoon. Its weight was contrasted with the nineteen pounds for the standard equipment which it would replace -the raincoat, two blankets, the shelter half, the canteen, cup and cover, the mess kit and the musette or haversack. The bulk of the proposed pack ensemble was about half that of the standard pack. This made it possible for parachute troops to jump with it, while jumping with the standard pack was impractical. Test officers of the Airborne Command agreed that the proposed pack was worth extensive field testing for parachute and airborne troops.<sup>27</sup>

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<sup>26</sup>Moore to Col. Doriot, "Parachutist Coat, Trousers, One Piece Suit, Canteen, Belt, etc.", October 7, 1942.

<sup>27</sup>Moore to Col. Doriot, "Fort Bragg Trip, October 20-23rd", October 26, 1942.

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Moore returned to Washington to start procurement of test quantities of the components of the proposed pack, but ran into procedural difficulties. Headquarters, Services of Supply, regarding the whole procedure as highly irregular, forbade any action until the matter had cleared through higher authority.<sup>28</sup> This delayed field testing of the items by the Airborne Command, but Moore was finally able to take the necessary equipment to Fort Bragg at the end of the year. Tests were made under realistic combat conditions, using two squads, one equipped with the standard pack and the other with the new proposed pack assembly. During the tests equipment was exchanged between the two squads.<sup>29</sup> These tests showed definite advantages in the lighter pack and, in February, a conference in Washington, including the chief test officer of the Airborne Command, a liaison officer from Army Ground Forces and representatives of the Special Forces Section of the Office of The Quartermaster General, decided to recommend its adoption by the Airborne Command.<sup>30</sup>

Meanwhile other items were being revised or developed for use by the airborne troops. Officers at Fort Benning had suggested to Moore that the parachutists' boot might be improved by the addition of

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<sup>28</sup>Moore to Maj. DeGarve, November 24, 1942.

<sup>29</sup>Lt. Col. Bestor Robinson to Headquarters, Army Ground Forces, "Request for Experimental Equipment", January 1, 1943; Moore, "Visit to Airborne Command (Light Weight Parachutists' Pack, Paper Parachutes, etc.)", January 3, 1943.

<sup>30</sup>O.Q.M.G. Daily Activity Report, February 12, 1943.

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diagonal strips of rubber to prevent the sole from slipping on the metal edge of the plane door as the jumper left the plane. This project was accordingly reopened. Further field investigation, however, showed that the standard sole was generally acceptable and the suggested change was not made.<sup>31</sup> The parachutists' uniform had been improved in some respects since specifications were issued late in 1941. Shortly after Moore had reported new proposals for its improvement from Fort Bragg, action was suspended on this uniform since the General Staff was reconsidering the whole question of combat garments.

The new experimental combat jacket and trousers were tried out by the Airborne Command in the winter of 1942. They were found satisfactory for its purposes and further development along the lines of the special parachutists' suit was dropped.<sup>32</sup>

A scabbard was needed for the new folding stock, M-1A1 carbine, which was now coming into production and was to be issued first to parachute troops. At the request of the Headquarters, Airborne Command, the Parachute School at Fort Benning devised a

canvas scabbard for the new weapon. This was approved by the Quartermaster Corps Technical Committee and detailed specifications for its procurement were prepared by the Jeffersonville Depot. The Quartermaster Corps had been directed to see whether some modification might be made of the scabbard for the

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<sup>31</sup>"Parachute Jumper's Boots', Project Register.

<sup>32</sup>Louis Wexler, "Report of Inspection of Quartermaster Activities at New York, N. Y. and Lebanon, Pa., June 26 to July 6 1942", Research and Development Branch, Status Report, September 30, 1942 - March 31, 1943.

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older M-1 carbine, so that the same scabbard would serve for both, but it was found that the designs of the two weapons differed too greatly for this.<sup>33</sup>

A special knife for parachutists use was taken under development by the office of The Quartermaster General early in 1942. The objective was a knife with a blade that could be opened with one hand and that could be locked in either the closed or the open position. Specifications were prepared in August and, though refinements on the design were later considered, the item proved entirely satisfactory to the test officers at Fort Bragg and the project was closed.<sup>34</sup>

Moore cooperated with the Airborne Command in the development of devices for making heavier pieces of equipment fast in transit in gliders and planes,<sup>35</sup> and continued to call attention to new items developed by the Quartermaster Corps or other agencies, in which he thought this force might be interested.<sup>36</sup> Liaison between the Office of The Quartermaster General and the Airborne Command continued close and new equipment problems were attacked immediately as they appeared.

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<sup>33</sup>Minutes of the Quartermaster Corps Technical Committee, December 3, 5, 1942; Quartermaster Corps Tentative Specification, J.Q.D. No. 280, February 22, 1943.

<sup>34</sup>Standardization Branch, Report of Test and Development Work in Progress, February 1- May 1, 1942; Quartermaster Corps Tentative Specification, J.Q.D. No. 173A, August 29, 1942; Research and Development Branch, Status Report, January 31, 1943.

<sup>35</sup>Moore to Capt. I. J. Kleinberger, "Tie Down Expedients (for Glider Airborne Troops)," November 14, 1942; Col. Georges F. Doriot to Commanding General, Army Ground Forces, "Rop-Lok Hook," January 26, 1943.

<sup>36</sup>Doriot to Maj. Robert S. Fogg, "Paper Parachutes," February 17, 1943.