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TECHNICAL REPORT # 74-84

EXTENDABLE VEHICULAR CAMOUFLAGE PAULIN

Final Report

By

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## Introduction:

Instant, or at least speedy, camouflage is needed for any vehicle in a combat zone. Current military vehicles do not have a "built-in" camouflage capability which may be rapidly utilized. Canvas-covered military cargo vehicles have the potential for camouflage if the standard canvas material is replaced by a multi-layer camouflage material. In normal use the top and sides serve the normal function of protection from the elements while providing some camouflage by the nature of the material. When parked, the top can be unfolded and the various layers of camouflage can be deployed around the vehicle to hide it and alter its silhouette. To get underway, the top can be folded rapidly and stowed in its traveling configuration.

Several approaches toward instant camouflage recently investigated have concerned silhouette disruption by fake foliage deployed like a magician's bouquet, sprayed-on expandable foam and terrain reflection by roll-up mirrored materials which obscure the item being camouflaged. The use of a fold-out paulin provides yet another concept.

Development: A comprehensive "Model Study of Instant Vehicular Camouflage" by Franklin Institute Research Laboratories and supporting documentation by Battelle TACTEC (1973) and Dunlap & Associates (1966) provided the basis for LWL's design studies in silhouette disruption and terrain reflection to obscure a vehicle. In addition to this formal data base the idea was generated within the LWL Technical Support Division to convert existing protective canvas tops of current military vehicles into multi-layered tops which could be deployed when needed (see Figure 1 and 2).

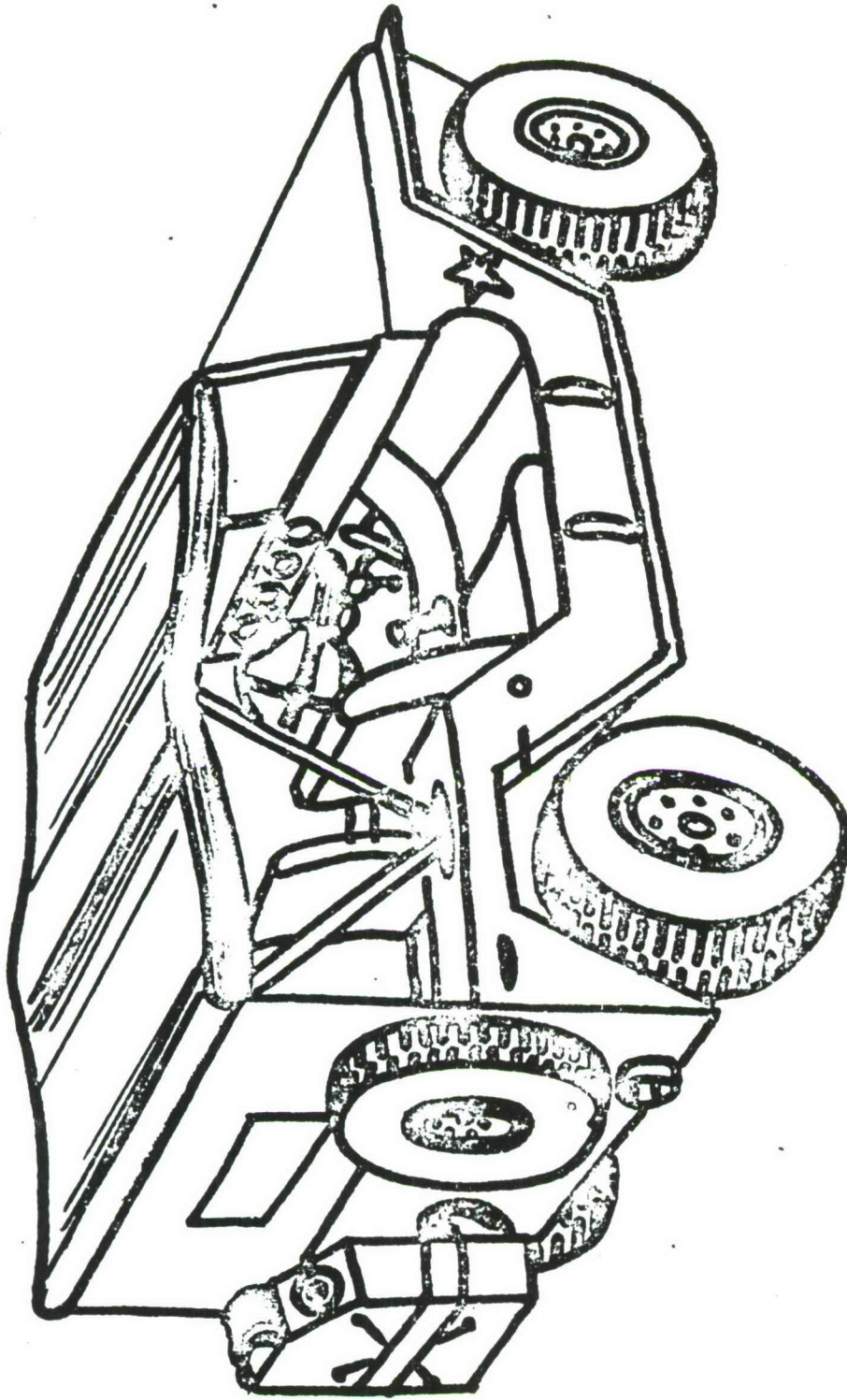
Fabrication: To verify the feasibility of the fold-out camouflage concept a prototype paulin was cut and assembled for a standard M151  $\frac{1}{2}$ -ton vehicle (jeep). It was designed so that the Velcro edges could serve to hold the folds in place during vehicle operation (see Figure 3) and also to fasten together the edges of the material when deployed (see Figure 4). The material at this time had not been waterproofed but was considered ready for field evaluation.

## Evaluation:

The prototype unwaterproofed paulin was exposed to the rigors of 50 mph operating speeds and showed no signs of becoming unfastened or flapping in the breeze, even after deployment and re-stowage in dusty conditions.

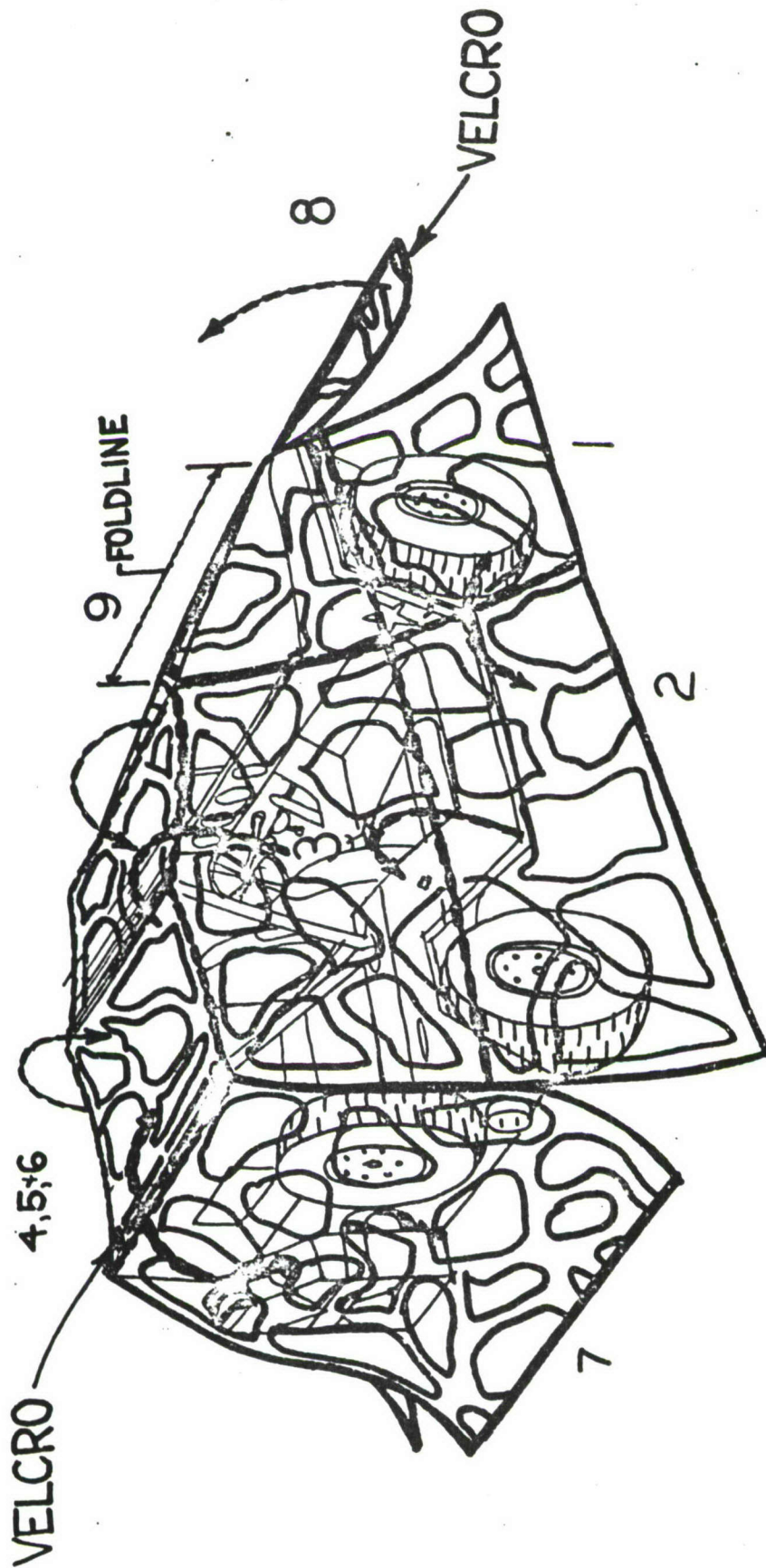
Efforts were made to enhance the effectiveness of the paulin by sticking pieces of foliage into pockets designed into the paulin for this purpose (see Figure 5). Color photographs were made with the paulin draped jeep next to a tree line from a distance of about 30 meters (Figure 6) and 125 meters (Figure 7).

In addition to the purely camouflaging function the paulin, by adding appropriate poles or stakes lends itself to simple adaptation as a shelter or covered mini-command post (Figure 8).



# STOWED CONDITION

Figure 1. Paulin Design Sketch Stowed.



## OPEN CONDITION

Figure 2. Paulin Design Sketch Deployed.

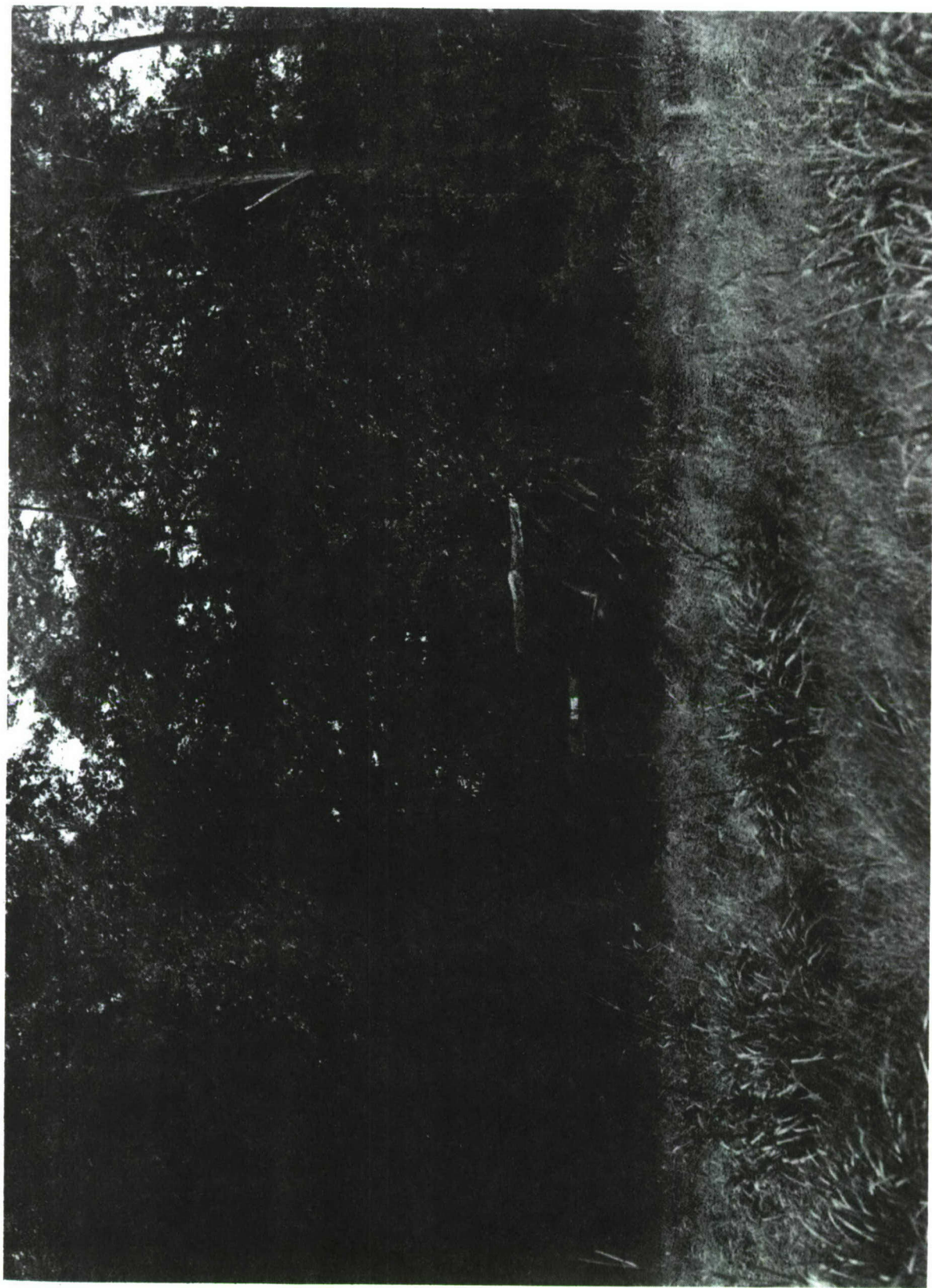


Figure 3. Extendable Vehicular Camouflage Paulin Stowed.

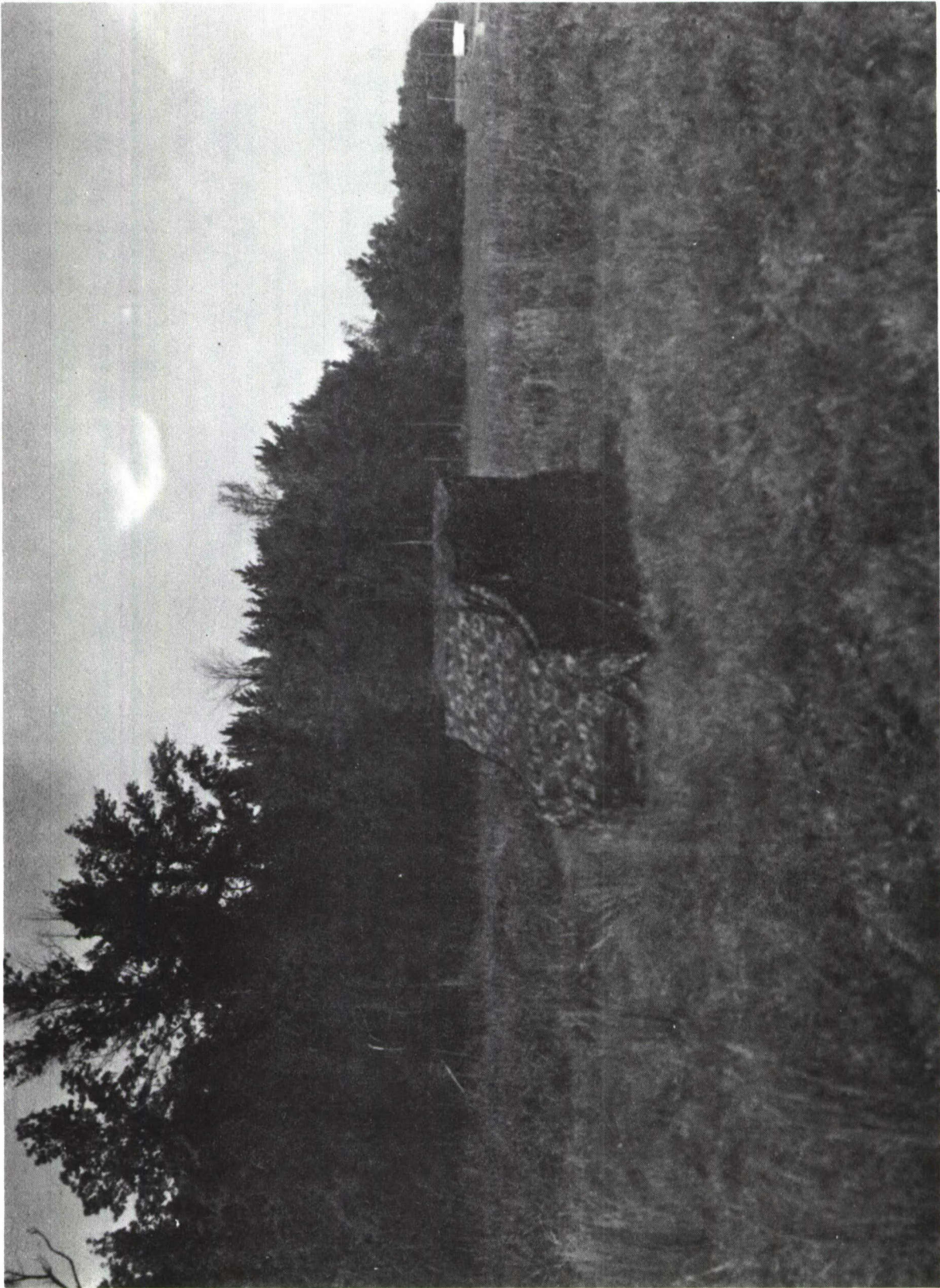


Figure 4. Extendable Vehicular Camouflage Paulin Deployed.

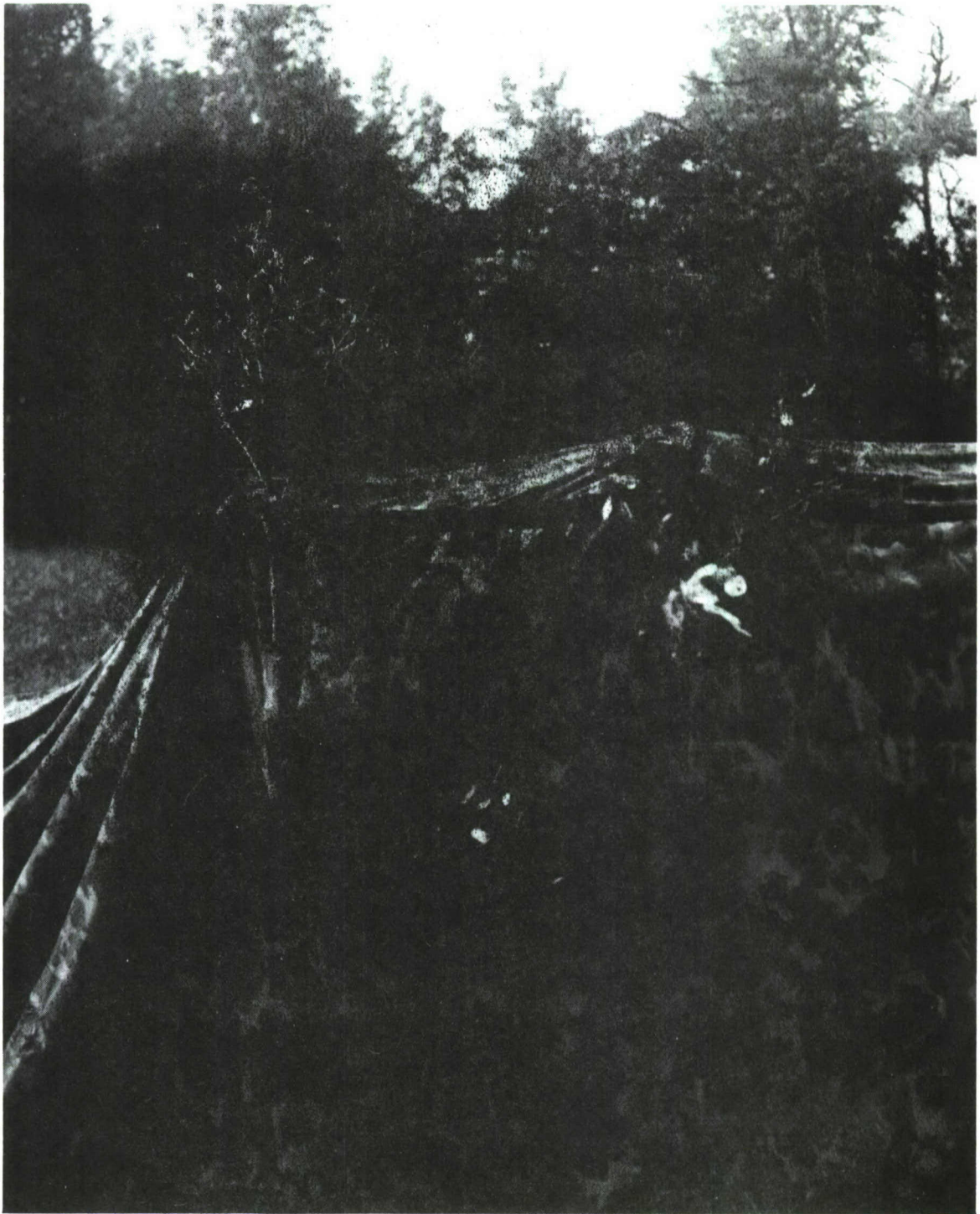


Figure 5. Detail of Foliage Stuck in Paulin Pockets.

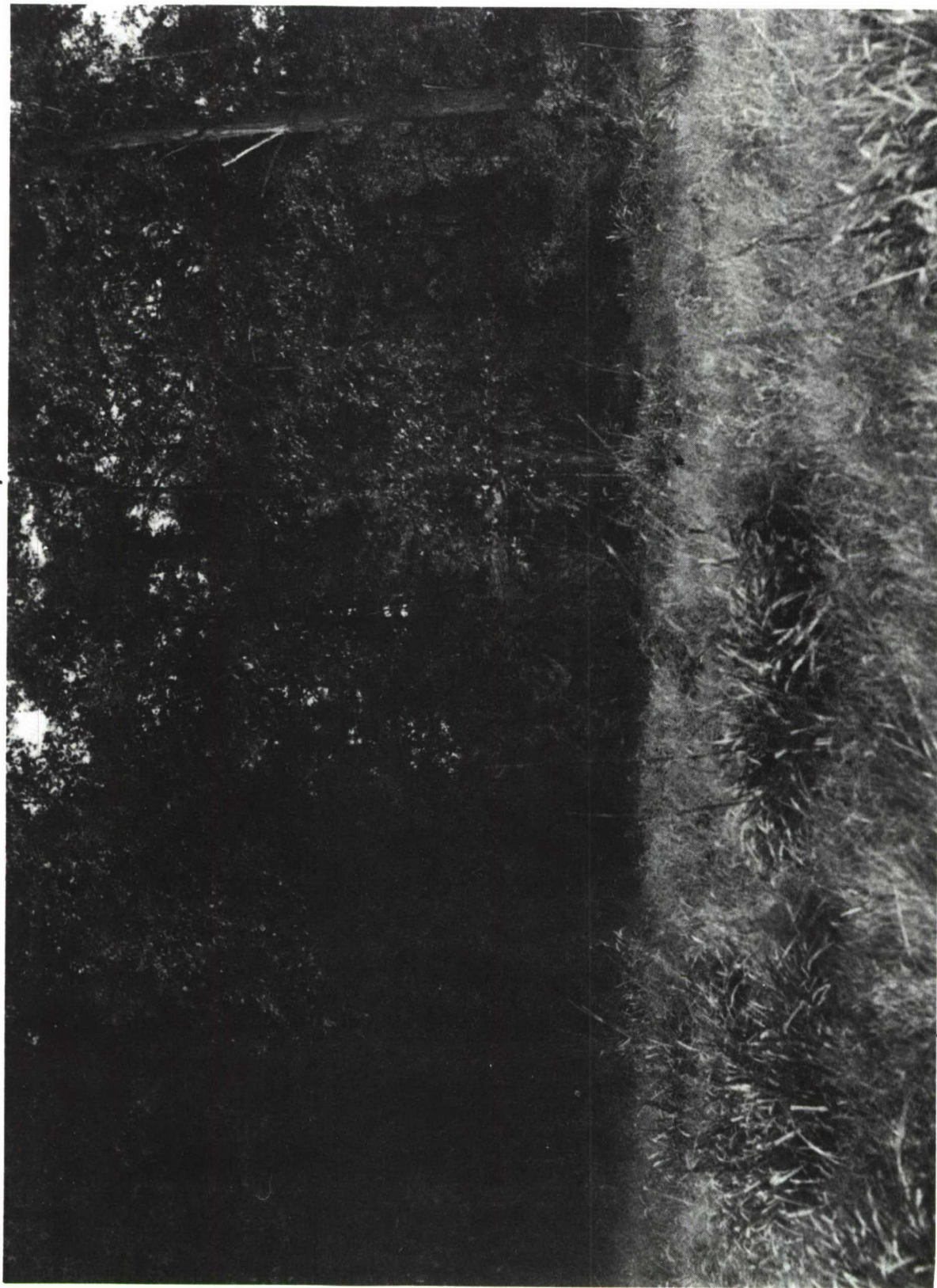


Figure 6. Paulin Draped Jeep Against Tree Line at 30 Meters with Paulin Deployed.



Figure 7. Paulin Draped Jeep Against Tree Line at 125 Meters with Paulin Stowed.

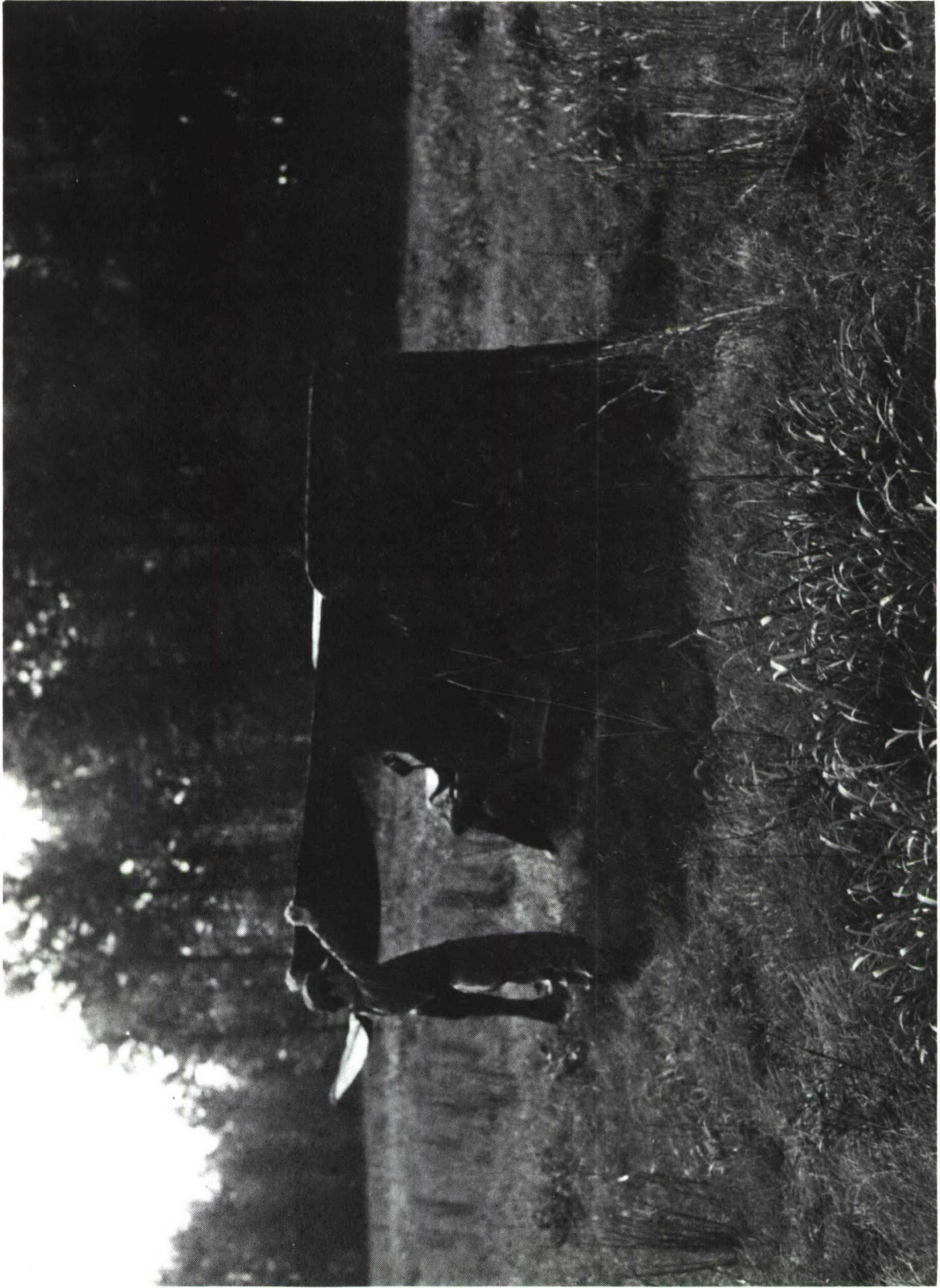


Figure 8. Paulin Adaptation as Shelter.

Conclusion: At a very nominal cost, the feasibility of a quickly extendable vehicular camouflage paulin has been demonstrated on a standard Army  $\frac{1}{4}$ -ton jeep. It survived vehicle runs at 50 mph and was able to be quickly deployed and easily refolded with minimum training of personnel.

Recommendations:

It is recommended that this concept be incorporated into new vehicle tops being procured for  $\frac{1}{4}$ -ton trucks.

The utility of the concept should be verified with larger Army vehicles such as 3/4-, 2 1/2- and 5-ton trucks. If verified, consideration should be given to making vehicle tops of this type for combat usage for all cargo vehicles.

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