

the army  
moves ahead in

# underwear research

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By Frank Spagna

Army QM Research and Development Laboratories  
Philadelphia Quartermaster Depot  
Philadelphia, Pa.

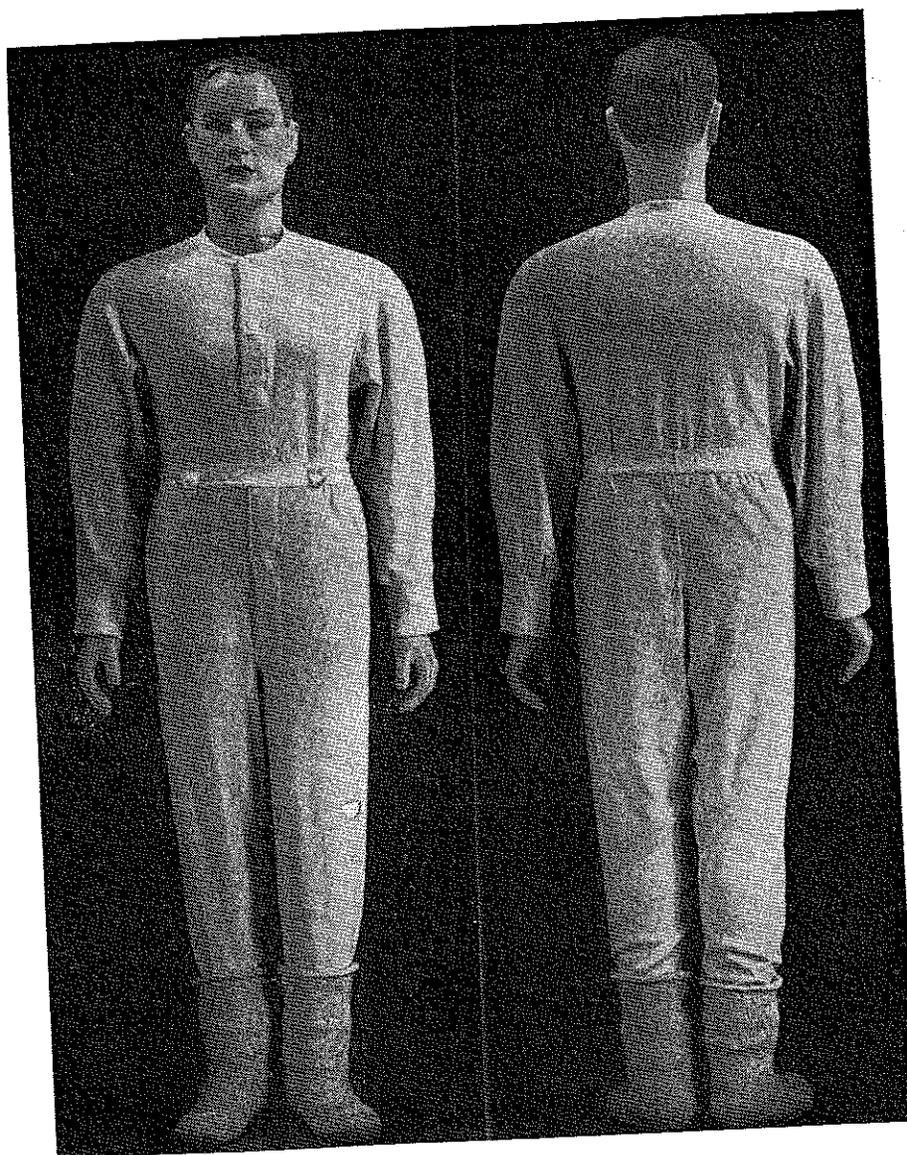
### EDITOR'S NOTE:

In our last issue we published an article on the changes proposed in the Quartermaster T-shirt specifications. Because of the interest aroused in the industry by this development, we asked Mr. Spagna to prepare this interesting article dealing not only with T-shirts, but with the entire Army underwear procurement program.

ONE OF THE PRIMARY MISSIONS of The Quartermaster Corps is to provide the Army with the best possible clothing and equipment from both a practical and functional viewpoint. The old phrase "an Army travels on its stomach" is incomplete because it fails to mention the importance of clothing to enable a soldier to function at his best in all types of weather and under all climatic conditions. Obviously, a soldier who is improperly clothed cannot function at his best. It is not vanity alone that makes us want the American soldier to be the best equipped and the best dressed in the world.

An important item of apparel utilized by the American soldier in all climates is, of course, underwear. These

Right, loose-fitting, pajama-type heavy underwear, developed by QM, features ribbed fabric knitted with wool-cotton blend.



garments must be comfortable, durable and washable. They, like everything the soldier wears or carries in combat, must be as light in weight as is practicable. Manufacturing costs must be reasonable, and adequate production facilities must be available to meet procurement needs. Over a period of years, it has been proved that a knitted fabric lends itself to these requirements better than other constructions.

In the past, knitted fabrics presented a serious shrinkage problem. Now, however, this shortcoming has been alleviated by the recent development of commercial mechanical preshrinking processes and by the adoption of chemical treatments to inhibit, in the case of wool, detrimental felting shrinkage.

Without question, the excellent cooperation industry gives the Quartermaster Corps has led to the adoption of new garment designs and more stringent shrinkage requirements in underwear specification, thereby providing Army underwear which is vastly superior to that procured in the past.

#### WINTER GARMENT IMPROVED

The first major redesign and improvement in modernizing Army underwear was made in the so-called winter or heavy underwear field. An entirely new concept of design was introduced, and a loose fitting, pajama-type garment was adopted. This change was the result of a major comprehensive investigation which revealed that the old tight-fitting style of heavy underwear was unsuitable from a comfort and functional standpoint.

A pajama type, winter underwear of 10½-11 ounce square yard fabric, knitted in a ribbed construction from a blend of 50 per cent wool/50 per cent cotton yarn, was formally adopted by the Army in the spring of 1950. The specification provides that the wool be chemically treated to reduce the natural tendency of wool fibers to mat and felt when laundered, and in addition that the basic fabric be preshrunk to cut later shrinkage to a minimum.

As is normally the case when most major changes are made, there were many "bugs" to be ironed out in the specifications. Numerous meetings and conferences were held with industry representatives, with the result that today the Army is purchasing extensive quantities of these garments. Field reports from troops in Korea have shown that they are being well received and

are well liked by the American soldier.

At the present time, additional laboratory investigations are being conducted to continue improvement of this item. Many experimental fabrics have been knitted of varying constructions using cotton, wool and synthetic blended yarns. These fabrics are being tested in order to ascertain the effects of the various constructions and blends on physical properties such as fabric strength, fabric shrinkage, and the many factors involved in evaluating comfort and utility.

#### T-SHIRT SHRINKAGE PROBLEM ON ROAD TO SOLUTION

As an adjunct to the work carried out on the winter underwear, the problem of excessive shrinkage of the Undershirts, Cotton, Quarter-Sleeve, more commonly called "T-shirts" was investigated. The present specification does not contain a shrinkage requirement and consequently, in order to allow for the high degree of shrinkage, the shirt is cut extra-long in body length. Not only is this an unsatisfactory method of correcting for shrinkage, it results in the use of excess material and subsequently higher costs. It should be emphasized that the high degree of shrinkage is primarily the result of the tumbler drying used in Army laundries. Since many commercial and home laundries are now adopting this drying method, shrinkage from tumbler drying is also becoming a matter of concern to the civilian.

Again, with the Quartermaster Corps and industry working together, the problem is being solved. Laboratory test data shows that proper preshrinking can reduce shrinkage to five to ten per cent; far below the 20 to 30 per cent usually encountered. It appears that with preshrinking, we will no longer need to cut the shirts extra long. The slight increase in cost for preshrinking will be more than offset by the saving of fabric it makes possible. In addition, over a period of time, the improved dimensional stability will lower replacement costs considerably. A new specification incorporating a preshrinking requirement is currently in preparation.

Exploratory investigations are also being carried on directed toward further improving the durability and comfort of the T-shirt. Of particular importance is the effect of cotton/synthetic blends on fabric properties such as

fabric shrinkage, fabric strength, moisture absorption, and comfort.

#### OTHER ARMY RESEARCH PROGRAMS DISCUSSED

The Quartermaster Research and Development Laboratories are continuing a variety of investigations into the fields of chemical finishes, synthetic blends, and knitted constructions. Effects of these experiments on fabric characteristics and physiological reactions are being explored. Newly designed knitted constructions such as waffle knit, quilt knit, and fabric constructions based on the brynje vest principle are continually being studied and evaluated.

The development of a new item from initial consideration to final specifications comprises a series of well defined steps. Preliminary laboratory screening tests are used to select the fabrics or garments which merit further development. Additional laboratory tests are conducted on improved models until finally one or two are selected for field tests by the Quartermaster Board. The item is then service tested by Army Field Forces. On the basis of the test reports the best item is determined, minor modifications made if necessary, and a specification prepared and reviewed with industry. If the new specification represents a significant change, industry advisory committee meetings are held for the purpose of pointing out the revised requirements.

The Quartermaster Corps sincerely appreciates the willingness of industry members to assist in solving problems connected with supplying adequate underwear for the military services. We recognize that only through such cooperation between industry and government can each understand the other's problems and, therefore, arrive at the best solution to make the American soldier the best equipped, best dressed, and best fighter in the world.

#### PLAN MEETINGS ON SIZE STANDARDS, SHRINKAGE

The shrinkage terminology committee of the Underwear Institute will meet October 7th to study shrinkage claims in advertising and to consider an ASTM report on shrinkage testing methods.

The committee on size standards will confer October 13th with Mansfield Lonie of the U.S. Bureau of Standards on the use of body measurements to formulate new standards.