CHEMISTRY

# New Dirt Chasers

**Research is yielding new soap formulas and cleansers which will be available after the war. Now they are used to help clean up the Axis.**

By GLENN SONNEDECKER

➤ SEARCH for better soap extenders and cleansers is putting unfamiliar ingredients in wartime dirt chasers for the home and turning up radically new soaps for the armed forces, plus a promise of post-war relief to those plagued by hard water and tough cleaning jobs.

Some day the housewife may read a soap label like this one the soldier sees as he unwraps a bar of one of the newest Army products:

"This soap is the result of extensive research by the Quartermaster Corps, and is designed to meet as many of your requirements as possible. It can be used for 1, toilet uses; 2, laundering of clothes; 3, cleansing mess kits and similar equipment; 4, shaving. It will do all these things in soft, hard, or sea water at any reasonable temperature."

How can a soap do these things? The answer is in synthetic detergents: new cleaning agents that are complex organic chemicals, such as fatty alcohol sulfates.

Even before Pearl Harbor Army scientists foresaw the time when war might bring a shortage of materials for ordinary hard water soaps. As war clouds gathered they foresaw the time when Americans might be hanging out the wash in all parts of the world—perhaps using water icy cold as it comes from a mountain stream, or salty as dipped from the ocean.

The Navy's Bureau of Ships was at work on the problem too—as early as 1938. Experts from industry also undertook to see just what could be done with these dirt chasing chemicals.

Getting a bar that would look and act like soap was one of the last stumbling blocks. First one binding agent or diluent was tried, then another. The bars absorbed moisture from the air, crumbled, became incrusted and abrasive.

Then a scientist asked, "Why not use ordinary soap? It's a binder that has all the properties we want."

It worked; and the armed forces all over the world are now using a similar half-breed formula which calls for roughly a third or more of the total content to be a regular soda soap and at least a fourth to be a synthetic detergent.

Thirty-two million pounds of these bars have been bought or contracted for by the Navy alone in a little more than a year. Results of using the better synthetic compounds in salt water are said to measure up to conventional soaps used in soft water. Development work is still in progress.

Large quantities of fresh water, precious mid-ocean cargo, are being saved aboard ship by one of the formulas developed at the Naval Engineering Experiment Station at Annapolis. The clothes are washed in sea water, rinsed a couple of times in sea water, then soused in fresh water for the final rinse.

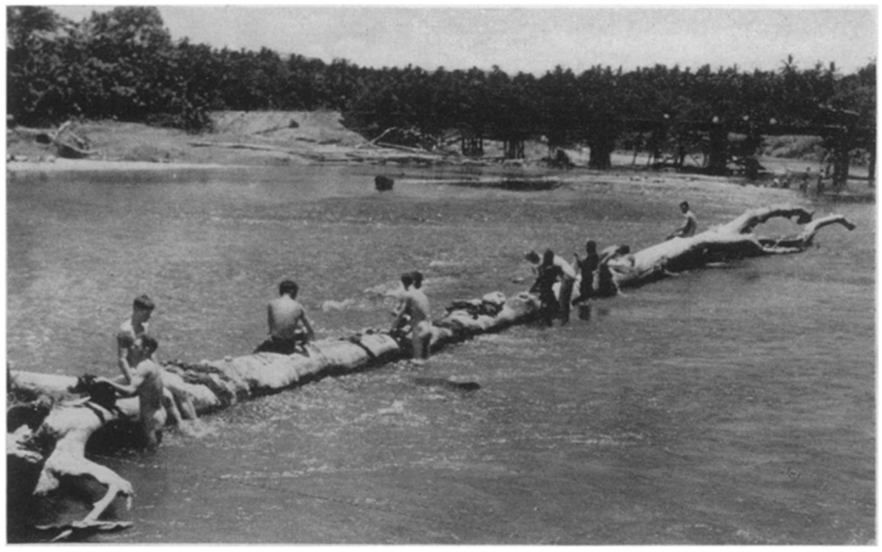
The first family of these synthetic soaps immigrated to this country from Europe about 1930. They were called the gardinols, known in chemical circles as fatty alcohol sulfates. They are born from the marriage of the hydrocarbon chain from the alcohol—12 to 16 carbon atoms long—to the main part of sulphuric acid.

During the past decade other types have been developed, often fancier molecules but usually distant cousins of the gardinols. As some of the basic chemicals for their synthesis have gone on the critical list, changes continue to occur in their manufacture and manner of use.

Any hope that householders will get the synthetic dirt chasers soon is dimmed by Dr. Conrad J. Sunde of the War Production Board's conservation division, who says:

"With requirements of the armed





*IN ACTION—New soap formulas are in action on jobs like these with the armed forces throughout the world. Soldiers, sailors and marines are shown, in this official Navy photograph, washing out the grime of Guadalcanal jungles.*

*IN SEA WATER—Aboard ship sailors find the new cleanser works in cold sea water. This is an official Navy photograph.*

forces for synthetic detergents increasing, and a limited production capacity available, it would seem that any considerable civilian use of these products does not appear possible in the near future."

Will these versatile detergents revolutionize cleaning chores in most post-war homes? It's not likely. But for special use by those who must struggle with hard water, those who now must employ expensive water softening methods, and for cleaning jobs where good hot water isn't at hand—the new formulas show great promise. They also have many industrial uses, such as for cleaning metals.

Meanwhile, housewives are wondering whether regular soap supplies will be sufficient for the duration. The soap question tossed back and forth between Washington officials has been, "To ration or not to ration?"

The supply situation has been wobbly but increased supplies of fats for soap, more imports, and greater use of extenders may give householders nearly their normal needs without rationing—if hoarding is stopped. Officials claim that the local shortages that have been cropping up here and there can usually be traced to bankrupting runs on the grocer's soap shelves or heavy war demands.

Consumption of soap in the United States has been variously estimated at from 22 to 27 pounds per person annually. Production last year was around 3,800,000,000 pounds.

Only a year or so ago there was little thought of a soap shortage. True, coconut, palm and other soap oils had been cut off from the Far East, but there were plenty of other fats and oils on the market—fats which form soap when boiled with a strong alkali.

Then early this year, as war needs rose, the government clamped down on putting edible fats and oils into the soap kettle. Manufacturers were limited to 85%, later 80%, of total fats used in 1940-41. Scarce coconut oil, which formerly made up at least a fourth of the fat used in many soaps, dropped to 5% and lower.

Since the middle of June quantities of coconut, palm and soybean oils have been released by the government to stave off the growing soap shortage and further allotments are reported tagged for such use. Increased slaughtering has made more lard and tallow available recently.

To pad out their production, soap makers have been using more and more extenders and fillers; so far keeping one step ahead of government officials who have been thinking about enforcing use of a definite percentage of substitute products.

You haven't noticed the change in soaps? It's mainly because the better extenders have little effect on soap quality or appearance. Rosins, tall oil, and silicates, such as waterglass, are being experimented with and are the ones most likely to turn up in the soap you buy in the future.

Rosin is obtained indirectly from pine trees through turpentine distillation. Soap could be made from it 100%—but you wouldn't like it. Recent research shows, however, that up to about 15%, the paler grades of rosin do the job well and cause little darkening of soap color, which has been one of the chief objections.

Use of rosin in soap has totaled about 100,000,000 pounds annually, chiefly going into brown laundry bars, but one authority believes the demand may now rise to 250,000,000 pounds. Ample supplies are available to meet the need.

Tall oil, another extender, has some of the properties of rosin and comes from the same source—pine trees—but by a different route. At paper pulp mills where the wood is digested by alkalis, the fatty acids and rosin acids are separated from skimmings as tall oil by acid treatment. Then the oil is refined by distillation.

The eight pulp mills now recovering tall oil, plus several others that could be brought into production, could probably handle all the skimmings available by acting as regional converters for the duration.

*Science News Letter, September 11, 1943*