



PAINT RESEARCH IN WARTIME

Chemists and physicists are solving many a finishing problem related to war equipment



Paint has many special uses in wartime. An instance in point is indicated by this picture which shows a crew at work applying camouflage paint to a bomber.

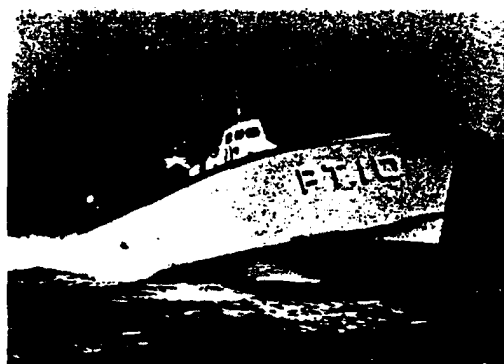
BEAUTY may be only skin deep—literally—in speaking of paint, but improved appearance is what has chiefly concerned people when thinking of finishes. Today, with paint off to war with about everything else, bright, gleaming attractiveness is largely “out,” and dullness is the ideal.

Paint for military purposes has had to be endowed with many new characteristics to meet such requirements as camouflage, blackout, luminosity and a multitude of highly-specialized uses. This has imposed on paint research chemists as severe a responsibility as that which faced manufacturers converting from peacetime production to making unfamiliar war material. But the experts responsible for our modern finishes have been equal to the demands made upon them. The contributions of finishes research to the war effort—at least those that can be told—make an inspiring story.

The maintenance needs of America's fast-growing Navy and Merchant Marine call for the production of a great variety of paint finishes to meet exacting specifications. Patrol torpedo boats of the “mosquito fleet” are speed demons with a powerful punch.

CAMOUFLAGE PAINTS

Even the simple quality of dullness posed a problem. Although paint men could produce a non-reflective finish as readily as a high-gloss one, it was discovered that it made a great difference what angle the light came from! In other words, an apparently dull-as-dishwater finish coat would not reflect a dangerous amount of tell-tale light from the sun, or from a searchlight or a flare coming from almost directly overhead, but it might mirror brilliantly a beam striking at tree-top elevation.



Chemists in the Du Pont laboratories were given the task of developing a method of measuring the reflectance factor of dull paints at all angles in incidence. Today, a device known as the goniophotometer is in service and it does this quickly and accurately.

Long before the phrase "lend-lease" came into the language, these finishing experts, as the result of a casual inquiry from the United States Navy Air Corps, developed some experimental formulas on camouflage paints for airplanes. According to standard practice, these finishes were applied to panels, which were tested for durability by outdoor exposure in different parts of the country. The studies were made at paint farms in Florida, Texas, Delaware, New Jersey, Illinois, Michigan and California where more than 60,000 coated metal, wood and composition sheets are constantly under test.

Near the completion of the test period, the British Government let it be known that it was searching for an improved paint for aircraft. The laboratory men reached



Checking up at one of the Du Pont "Paint Farms" where exposure tests are conducted to determine the protective and durability characteristics of paints under varying climatic conditions. This research is carried on continuously at "farms" from Coast to Coast and from the Great Lakes to the Gulf.

into the special series of formulations and brought out a finish that had already proved its durability.

This synthetic finish—the first of its kind ever produced for airplanes—is an alkyd type not unlike the smooth coat of "Dulux" finish on your refrigerator, but it is dark and dull. Today, the United States Army and Navy Air Corps largely use this finish which was ready and tested when needed, all because a question or two had been asked by a Navy Air Corps official in 1938.

A PLUS VALUE

Sequel to this brief case history is one of those accidental discoveries that now and then softens the disappointments with which the road to research is so generously paved. An unsuspected hidden virtue of the new enamel was revealed with the discovery that it withstood the destructive action of de-icing fluids!

Previously, the liquids spread on plane wings to prevent the formation of ice raised havoc with lacquer finishes. This rapid deterioration made it necessary to ground the planes frequently for laborious touch-up and repainting work to protect the metal. Ice in winter or at top altitudes no longer keeps aircraft idle for ill-spaced hours of repair finishing.

IMPROVED METAL PRIMERS

Less spectacular, perhaps, but representing long hours of intensive study on paint problems are the numerous instances wherein Du Pont laboratory technicians have assisted the Army and Navy in special tasks. Tersely, among more than a score of subjects, in a recent informal summary of contributions to the war effort, the chemical director listed zinc chromate primer with this comment:

"Our type of zinc yellow primer for airplanes is being used in the large dip tanks of manufacturers throughout the country. We feel we have been instrumental in maintaining the level of quality, particularly on the score of stability."

Zinc yellow primer is important. It is the ideal first coat on the now much-employed aluminum alloy metals. In some respects also, zinc chromate possesses certain advantages over the old standby red lead as an undercoating for steel. When production takes advantage of the time-saving obtained with quick-drying synthetic resin varnishes, the yellow rather than the red undercoat is once again in order. Use of red lead is also ruled out if a welder's torch is used, for poisonous vapors are released under intense heat.

The mass of problems to be solved in this industry's



Measuring gloss with the goniophotometer at the Philadelphia Laboratory. This instrument has been helpful in developing airplane finishes with just the right degree of dullness to meet the requirements.

laboratories in wartime was gigantic, and the answers were needed fast; paint research has been called upon to become virtually an extension of military finishes research.

OTHER DEVELOPMENTS

Among the subjects covered by the chemical director in his memorandum report are many more items indicative of the scope of this behind-the-scenes military paint research work. For example, we quote: "In co-operation with the United States Army Quartermaster Corps and a committee of the WPB, we have carried out a lengthy program for the purpose of establishing alternate vehicle compositions to eliminate scarce raw materials from the painting of Army motorized equipment. This program has involved the preparation and exposure of approximately one hundred and fifty different top-coat compositions."

Another paragraph mentions molded plywood planes and the development of an adhesive based on a liquid form of "Butacite" polyvinyl resin, the sandwich filling in safety glass. He refers to this resin as "accomplishing results over heavily-molded sections apparently not provided by other available adhesives."

Other technical advances mentioned include the development of cold-crack-resistant putties to improve aerodynamic efficiency of wings by reducing the drag caused by seams and depressions; a rust-inhibitive green primer for steel seaplane runways; pioneering work on the use of dip-tank sealers for plywood leading to the establishment of a number of these time-saving tanks in aircraft factories.

Dozens of such tasks, large and small, some approaching the sensational in importance, others merely time-consuming routine testing programs, are being done by finish-research groups nationally in the all-out drive to attain both quality and quantity production.

The industry is also engaged in working on paints to protect and camouflage stainless steel airplanes. It is making an extensive study on the water and gasoline sensitivity of various types of zinc chromate primers for the Bureau of Aeronautics; cooperating with the WPB

metals conservation sub-committee in evolving organic finishing systems to replace tin and zinc; supplying the Army Engineers Board with information on paint for pontoons and testing methods for shatterproof films on glass. In short, nine-tenths of paint research activity is now devoted to helping win the war.

A SPECIAL DEPARTMENT

As a matter of fact, the Finishes Division of the Du Pont Company has formed a special War Service Department, with the personnel pledged to all-out co-operation with the Government service branches as well as prime and sub-contractors engaged in war work. Its functions are: (1) To assist Government agencies in modernizing existing paint specifications and preparing new ones; (2) To recommend correct finishing systems and application methods for fast and economical painting; (3) To provide technical assistance in painting for protection and maintenance of war plants and arsenals; (4) To suggest proper methods for the safe storage and handling of inflammable coating materials; (5) To aid in selecting capable manufacturers who know how to finish all types of products.

In addition to this personal aid, manufacturers of war materials are also provided with informative war-service literature. One booklet describes and illustrates eleven ways to speed up finishing and to conserve materials. Another series of bulletins on Government Specification Paints contains color chips, together with complete information on application, drying time and other factors that must be considered in establishing production schedules.

Thus, the Du Pont organization is helping to release one brake after another in production. The activities referred to here are merely a few samples, outlining a single chapter of the remarkable story of how industrial research is meeting the challenge of war. When paint scientists and the laboratory men of all fields can return to their peacetime tasks of making better things less expensive, a lot of newly-acquired knowledge will be convertible to the better world of tomorrow.



Army tanks and motorized equipment of many different kinds need paint protection that will withstand the rigors of field service. Du Pont paint research has been called upon to become virtually an extension of military finishes research.

WHAT'S NEW

SPECIFICALLY what military and naval units of America's armed forces are serving outside the United States may be news, but if in private conversations or correspondence you disclose the identity of troop units or ships, you may be helping the enemy. The Nazis and the Japs want to know America's fighting strength overseas on every battle front, and their agents are collecting every bit of news that is revealing. The Office of Censorship in Washington is again urging all American citizens to safeguard their sons and daughters overseas by keeping secret troop-unit identifications and ship names. Don't give the Axis any information.

FIVE additional Army-Navy "E" awards have recently been presented with stirring ceremonies in recognition of Du Pont production for the war effort. At the five plants thus honored, the new Army-Navy "E" pennants will fly proudly beneath the Stars and Stripes as do the twelve previously raised over other plants operated by Du Pont and Remington. The men and women who have won the right to wear the coveted "E" pins are the workers at the Kankakee and Chickasaw Ordnance Works, the Du Pont Repauno High Explosives Plant, the Nylon Research Laboratory and Pilot Plant at the Experimental Station, and the Du Pont Ammonia Department employees at the Belle Plant.

EFFECTIVE January 1, 1943, the Krebs Pigment & Color Corporation, a wholly-owned subsidiary of E. I. du Pont de Nemours & Company (Inc.) for the past eight years, was dissolved, and its assets and business transferred to the Company's Pigments Department.

This change of name involves no change in the personnel of the sales, manufacturing or research organization, nor will there be any change in the management or policies. In short, the same organization will continue to serve consumers of white and colored pigments in the same manner as heretofore.

NYLON-BRISTLED brushes are now cleaning the powerful guns on the ships of the United States Navy. These brushes, somewhat resembling those used to wash milk bottles in the kitchen, vary greatly in size—small ones for anti-aircraft guns, large ones for the huge 16-inch guns on battleships. Any heavy fouling in a gun is first removed with a stiff wire brush; then the nylon brush, dipped in kerosene or other light oils, is forced through the barrel. Nylon does the job better than hog bristles, and the new brushes are easy to keep clean.

METHODS of fabricating "Lucite" methyl methacrylate resin into airplane enclosures and other products are described in the new illustrated manual on "Lucite for Aircraft." It presents detailed information on the care and handling, sawing, blanking and punching, drilling, threading and tapping, routing and shaping, sanding, scraping, finishing, cleaning, cementing, forming, mounting and installation, and repairing of "Lucite." Pictures and diagrams illustrate these operations. This manual, which also carries a complete listing of the mechanical, thermal and other general properties of the plastic, will be sent by the Plastics Department of the Du Pont Company at Arlington, New Jersey, to executives, business men and engineers who request it on their business letterheads.

READERS of this magazine will be interested in a 32-page booklet in which is printed brief stories about chemistry, as broadcast on the "Cavalcade of America" program during the past year. "Lumped together," to quote from the Foreword, "these stories mirror the upsurge of American war production. These, and others like them, should be small solace to the Axis. That should make them sound all the better to us." Copies may be obtained from the Advertising Department of the Du Pont Company at Wilmington, Del.

INDUSTRIAL painting is of interest to paint maintenance men, but editors of *Coronet Magazine* believe that the public at large should know more about "Three-Dimensional Seeing" (See *THE DU PONT MAGAZINE*, Nov.-Dec., 1942). In *Coronet's* January number, "industrial color conditioning" is hailed as an outstanding development with a tribute to Du Pont paint engineers for their part in contributing this technique that makes possible greater safety and efficiency in the war effort.

FOR quick and reliable repair of cracked cylinder heads, engine blocks, water jackets and valve ports in automobiles, trucks and tractors, the Du Pont Company is introducing a new product, called "Motor-Weld," in its No. 7 Line. "Cracks are sealed without clogging or harming the cooling system of motors," says a laboratory report. The compound functions equally well in water and standard anti-freeze solutions. "Motor-Weld" is poured into a radiator in which the water has been warmed by running the motor. Contents of the one-pint bottle will seal even large leaks, and if left in the motor will help prevent further leaks.

"CAVALCADE OF AMERICA," heard over the air each Monday evening, has been selected by radio editors of the United States and Canada as one of the three best dramatic programs presenting different plays. Lux Radio Theater and the Screen Guild Players are co-sharers of this honor as determined by the latest annual poll conducted by *Motion Picture Daily for Fame*.