☆ ☆ ☆ ABSTRACTS ☆ ☆ ☆

Oils and Fats

Edited by
M. M. PISKUR

World production of whale and fish oils. F. Bassi. *Olearia 2,* 845-57(1948). History, methods, and statistics are presented.

Preparation of synthetic fat products in Germany. W. Wachs and J. Reitstotter. *Angew Chem. 20B,* 61-8(1948). A comprehensive review on paraffin oxidation, manufacture of fat, uses, and nutritive value.

Fat and fat interchange. K. Thomas and G. Weitzel. *Naturforsch. u. Med. Deutschland 1939-46. Biochem. pt. I,* 57 pp. This is a review of progress on the physical, chemical, nutritive, digestion, etc., information on fats and lipids which was published in Germany during the war period. 492 literature references.

Saponification value. Emile Andre and Monique Maille. *Oleagineux 3,* 525-31(1948). The determination of saponification values of various oils and spermaceti with alcoholic KOH in ethyl, propyl, and butyl alcohol solutions are tabulated. The use of propyl alcohol was advantageous, for less time was required, and results were accurate. MeOH yielded poor results. Solution of KOH in butyl alcohol stored poorly, and it was not water soluble enough. On long reaction the values obtained decrease. For example, the saponification values of olive oil with different reaction times were respectively: 186.3 at 45 minutes, 185.0 at 60 minutes, 183.7 at 90 minutes, and 180.1 at 105 minutes. In general, the saponification value increases with the time of reaction to a maximum, then decreases. In the case of a certain dauphin fat the maximum is reached at 90 minutes with KOH in EtOH and in 75 minutes with KOH in PrOH. Like information is given for several oils.

Gossypol content of Belgium Congo cottonseed and its by-products. G. Neirinckx. *Bull. Agr. Congo Belge 39,* 819-40(1948). The ultrarapid method of Podolskaya, using Fehling's solution was compared with the aniline method for determination of gossypol in cottonseeds, giving, resp., 0.39-1.18 and 0.45-1.25% on 22 samples. In each individual sample the figure was consistently slightly lower by the former method. Other data on the seeds of various origin in Congo are: moisture 10.64-11.20, protein 17.50-24.62, fat 18.20-23.20, ash 3.21-4.13, and cellulose 21.10-28.75. Proportion and analyses of hulls and linters are also presented. Recovery and detoxification of gossypol are discussed.

Additional data on effect of polyoxyethylene stearate on the crumb softness of bread. H. H. Favor and N. F. Johnston (R. T. Vanderbilt Co., Inc., East Norwalk, Connecticut). *Cereal Chem. 25,* 424-5(1948). Data indicated that there was no significant difference between the mean hardness of bread with and without 0.5% polyoxyethylene stearate after one day. On the other hand, bread made with the P.O.E.S. was significantly softer than the control bread after 3 days. In the case of both breads there was a significant increase in firmness of crumb as the bread aged from 1-3 days and the rate of increase of the bread containing P.O.E.S. was significantly less than that of the control bread. Further work on the baking characteristics of this material indicates that it does have considerable dough conditioning and improving effect when used with certain types of flour not covered in the original paper. This is being investigated more thoroughly.

A study of the use of the antioxidant nordihydroguaiaretic acid in dairy products. II. Its antioxygenic properties in unsweetened frozen cream. J. W. Stull, E. O. Herreid, and P. H. Tracy (Univ. Illinois, Urbana). *J. Dairy Sci. 31,* 1024-8 (1948). Concentrations of 0.00125-0.005% nordihydroguaiaretic acid were found to retard the development of oxidized flavor in unsweetened frozen cream during storage for 11 months. In the absence of added Cu, the keeping quality of the cream which contained NDGA and was pasteurized at 150°F. for 30 minutes was comparable to that pasteurized at 170°F. for 15 minutes but to which the antioxidant had not been added.

Study of some chemical, physico-chemical, and technical properties of phospholipids. Jean Molines. *Travaux Lab. National des Matieres Grasses (I.T.E.R.G.) 1948,* 82 pp. The literature on distribution, methods of analysis, and properties of phospholipids is reviewed. A relationship is demonstrated between the "dilution index" of Desnuelle *et al.* and the surface tension. This suggests that the phospholipids orient themselves in one or several layers at the interfaces. Data on commercial lecithins prepared by hydration are given. The antioxidant of lecithin was associated with the cephalin constituents.

The effect of mixed tocopherols on milk and butterfat production of the dairy cow. P. H. Phillips, J. Kastelic, and E. B. Hart (Univ. Wisconsin, Madison). *J. Nutr. 36,* 695-701(1948). The results indicate definitely that the inclusion in the ration of 1 g. of mixed tocopherols per cow daily does not influence the milk or butterfat yield, and neither does it affect the per cent of butterfat present in the milk. These data do not substantiate the work of Harris *et al.* ('47), at least when the mixed tocopherols are fed under the conditions prevailing during the present experiment.

Studies of the alleged growth promoting properties of vaccenic acid. H. Nath, V. H. Barki, C. A. Elvehjem, and E. B. Hart (Univ. Wisconsin, Madison). *J. Nutr. 36,* 761-72(1948). No increase in the growth of young rats on diets containing either corn oil or olive oil resulted from supplementing the diets with vaccenic acid isolated from either butterfat or commercial hydrogenated cottonseed oil. Replacing the sucrose by lactose or starch (rice) as the source of carbohydrate in the diets, or changing the levels of the water soluble vitamins, did not alter the results as far as the vaccenic acid supplementation was concerned. Similar results were obtained when weanling rats from depleted mothers were used. Supplementing a corn oil-lactose diet with either the *cis* or *trans* forms of synthetic vaccenic acid produced no growth stimulating effects.

CALORIC RESTRICTION AND PROTEIN METABOLISM IN THE GROWING MOUSE. D. K. Bosshardt *et al.* (Sharp and Dohme, Inc., Glenolden, Pa.). *J. Nutr. 36,* 773-83(1948). With low caloric intakes, extra calories in the form of protein caused a much greater growth response than equivalent calories supplied as fat or carbohydrate. Under the conditions of this study, in which all diets contain some fat, carbohydrate, and protein, fat and carbohydrate were equal in their protein-sparing effect.

MICROORGANISMS IN THE CECAL CONTENTS OF RATS FED VARIOUS CARBOHYDRATES AND FATS. H. Nath, V. H. Barki, W. B. Sarles, and C. A. Elvehjem (Univ. Wisconsin, Madison). *J. Bact. 56,* 783-93(1948). The aerobic and the anaerobic plate counts, as well as the numbers of coliforms, were found to be decreased in the ceca of most of the rats fed sucrose diets containing a high level of corn oil. Supplementation of a high corn oil sucrose diet with "reticulogen" tends to counteract the inhibitory action of corn oil upon the growth of certain cecal microorganisms.

CHOLINE—THE CAUSE OF LIPOCAIC LIPOTROPIC ACTION ON FATTY RAT LIVERS. A. N. Wick and E. Laurence (Scripps Metabolic Clinic, La Jolla, San Diego, Calif.). *Arch. Biochem. 20,* 113-17(1949). The lipotropic action of *lipocaic* on the fatty livers of albino rats receiving a diet low in protein and high in fat was found to be due to the choline content of this preparation.

COMPOUNDS RELATED TO DIMETHYLTHETIN AS SOURCES OF LABILE METHYL GROUPS. George A. Maw and Vincent du Vigneaud. *J. Biol. Chem. 176,* 1037-45(1948). Dimethylpropiothetin is a highly active methyl donor. Methylethylthetin is less active and diethylthetin is quite inactive. Dimethylpropiothetin is an effective lipotropic and kidney antihemorrhagic agent, methylethylthetin is again less active and diethylthetin shows no protective properties. S-methylthioglycolic acid is unable to support growth or to protect animals against renal hemorrhagic damage. Its inability to act as an efficient methyl donor to homocystine has been confirmed by labeling the S-methyl group with deuterium. Inappreciable amounts of the isotope were found to be present in the methyl groups of tissue choline and creatine after 11 days. The relationship of methyl-donating ability to chemical structure is discussed.

OXIDATION OF PARENTERALLY ADMINISTERED C^{14}-LABELED TRIPALMITIN EMULSIONS. S. R. Lerner, I. L. Chaikoff, C. Entenman, and W. G. Dauben (Univ. California, Berkeley). *Science 109,* 13(1949). Further evidence that parenterally administered emulsified fat pursues a normal metabolic path was provided by the finding that about 50% of the injected C^{14}-labeled fatty acids recovered in the liver had been incorporated into phospholipids at the end of 24 hours.

THE SOLUBILITY OF ZINC SOAPS IN ORGANIC SOLVENTS. E. P. Martin and R. C. Pink (Queen's Univ., Belfast). *J. Chem. Soc. 1948,* 1750-5. The solubility of zinc soaps in organic solvents has been found to increase abruptly at a critical temperature. This increase is a result of mesomorphic changes which occur in the solid soaps. Solution occurs at the critical temperature when solvent molecules penetrate between the hydrocarbon chains of the soap lattice. The similarity between the structure of the metal soaps and materials of the high-polymer class is pointed out.

PROPERTIES OF SYSTEMS OF CALCIUM STEARATE AND CETANE AS DEDUCED FROM X-RAY DIFFRACTION PATTERNS. R. D. Vold and M. J. Vold (Univ. So. California, Los Angeles). *J. Phys. & Colloid Chem. 52,* 1424-44(1948). Ca stearate is inert towards cetane at room temperature and at 100°C. Gels of Ca stearate in cetane prepared by quenching from more elevated temperatures differ from one another in the degree of perfection of molecular orientation in crystallites and in crystallite size, or alternatively in degree of undercooling of high-temperature phases. The observed differences fall into groups according to the composition of the samples and can be used to infer the phase state of the system at the elevated temperature from which quenching occurred. At 130°C. at least one anisotropic liquid crystalline phase is formed which has no counterpart in the solvent-free system. The crystal lattice of Ca stearate in gels of the soap in cetane is highly imperfect, the extent of the imperfection or, conversely, degree of crystallinity, depending on the manner of preparation of the gel. It is suggested that greater stability is to be associated with a higher degree of perfection of individual crystallites in this particular system. It has been established that small amounts of water in gels of Ca stearate and cetane act to form Ca stearate monohydrate. The enhanced stability of the hydrous gels may be associated with the greater degree of crystallinity of the hydrate.

USE OF ALUMINUM SOAPS AND OTHER FUEL THICKENERS IN GELLING GASOLINES. W. H. C. Rueggeberg (Army Chem. Center, Maryland). *J. Phys. & Colloid Chem. 52,* 1444-60(1948). Sodium stearate would not give a satisfactory product with incendiary fuels. Stearic acid, however, when dissolved in the incendiary liquid, produced excellent gels after the addition of NaOH dissolved in 85% (or purer) alcohol. SOD 122, a product of the Standard Oil Company of New Jersey, was the most promising gel of this type. Aluminum soap thickeners consist of either aluminum salts of the saturated soap-forming fatty acids having 8-14 C atoms, an unsaturated soap-forming fatty acid, or a carboxylic acid containing a carbocyclic ring (e.g., naphthenic acid), or a mixture of these. Napalm, the Al soap of an oleic, naphthenic, and coconut fatty acid mixture, falls into this class of thickeners. A review of this substance, from the standpoint of chemistry, manufacture, stability, effect of moisture, gasoline quality, etc., is presented. In lieu of soaps, natural and synthetic rubber as well as resins such as the polyacrylates can be used as thickeners, yielding, however, gel-products possessing properties somewhat different in their characteristics from those of the soap-thickened fuels.

RHEOLOGICAL PROPERTIES OF INCENDIARY GELS. L. Finkelstein (Army Chem. Center, Maryland). *J. Phys. & Colloid Chem. 52,* 1460-70(1948). The Gardner mobilometer was the only instrument found generally satisfactory for testing and evaluating Napalm-gasoline gels, but it did not prove applicable to other incendiary fillings. The correlation between the Gardner and falling-ball consistencies is sufficiently precise to justify use of the latter method for control of the viscosities of flame thrower fuels in the field. The penetrometer designed for grease testing was applied to methacrylate gels with limited success. Extremely soft gels, while distinguishable from medium or stiff gels, were outside the range of the instrument. In the medium range the penetrometer could not differentiate with sufficient precision between satisfactory and unsatisfactory gels. The only instrument that has been found satisfactory for the evaluation, characterization, and specification for methacrylate incendiary gels has been the torsiometer. The method developed for using the torsiometer appears adequate for characterizing quantitatively the elasticity and consistency of such incendiary gels.

Polar-type rust inhibitors. Methods of testing the rust-inhibition properties of polar compounds in oils. H. R. Baker, D. T. Jones, and W. A. Zisman (Naval Res. Lab., Washington, D. C.). *Ind. & Eng. Chem. 41,* 137-44(1949). The turbine oil rusting test, the static water drop corrosion test, and the fog cabinet corrosion test are described and recommended; the latter 2 being new. Data are given on the results of these tests on about 150 different types of inhibitors and inhibited fluids. Their significance is discussed, and recommendations are made for their application. Finally, the stability of rust-inhibited fluids is discussed, and the present limitations of the low temperature solubility and long term storage properties are outlined. The necessity is stressed for more research on the colloidal properties of nonaqueous fluids. Most of the dust inhibitors tested are fatty acid derivatives.

The electrical behavior of dodecylammonium chloride in water-organic solvent systems. A. W. Ralston and D. N. Eggenberger (Armour & Co., Chicago). *J. Phys. & Colloid Chem. 52,* 1494-1503 (1948). The concentration of dodecylammonium chloride at the critical point is materially increased by the addition of acetone, acetonitrile, or methanol. Small additions of ethanol decrease the critical concentration; however, larger additions bring about a substantial increase. The addition of these solvents to aqueous solutions of dodecylammonium chloride at concentrations below the critical point of the amine salt lowers the critical conductance. Additions to concentrations beyond the critical point materially raise the equivalent conductance, maximum values being attained. The positions of these maxima are dependent on the concentration of amine salt and the nature of the organic added. These results have been interpreted as evidencing a transition of the dodecylammonium chloride from a colloidal to an ordinary electrolyte.

PATENTS

Rendering. F. E. Deatherage (Kroger Grocery & Baking Co., Hamilton, County, Ohio). *U. S. 2,456,684.* Rendering animal tissue is by heat in the presence of alkali and separation is by centrifuges. Advantages are greater stability of product because of low rendering temperatures and operations are semi-continuous.

Fat antioxidant. J. R. Shipner (The Cudahy Pkg. Co.). *U. S. 2,457,741.* Extract of leaves and stems of *Larrea divaricata* is used.

Stabilized fat. P. Gyorgy *et al.* (Wyeth, Inc., Philadelphia, Pa.). *U. S. 2,456,937.* An antioxidant comprises a non-toxic, effective proportion of an organic sulfhydryl compound and at least about 1% by weight of water.

Stabilization of fats and oils. M. F. Gribbins (E. I. duPont de Nemours & Co.). *U. S. 2,457,227.* The process for inhibiting the rancidity of oils, fats, and waxes containing metals comprises heating the compound with a mixture of thiodipropionic acid and the dilauryl ester thereof and thereafter separating the precipitated metal by filtration.

Isomerization of edible fats. W. E. Eipper (Philadelphia, Pa.). *U. S. 2,456,691.* Food fats are isomerized to increase their melting points by a process where solutions of fats and nitrous acid are mixed at 10-40° and the isomerized fat is recovered.

1,2-epoxides and process for their preparation. D. Swern and G. N. Billen (U.S.A.). *U. S. 2,457,328.* 1,2-epoxytetradecane and 1,2-epoxyoctadecane yield water-insoluble polymers which are useful as addition agents to lubricants for the purpose of improving the viscosity index.

Polymers of 9,10-epoxyoctadecanol. D. Swern and G. N. Billen (U.S.A.). *U. S. 2,457,329.* The products obtainable by polymerization of 9,10-epoxyoctadecanols are stable toward hydrolysis and possess properties which render them useful as plasticisers, as components of cosmetics and creams, and as viscosity index improving agents for lubricants.

Copper fungicides. A. A. Nikitin (Tenn. Copper Co., New York, N. Y.). *U. S. 2,456,727.* A copper fungicide contains a major proportion of basic copper sulphate together with 1-10% alumina and 0.5-3.5% fatty acid soap.

Petroleum demulsifier. M. Savoy (The Pure Oil Co.). *U. S. 2,457,735.* Water-in-oil emulsions can be broken by treatment with small amounts of alkali metal salts and ammonium salts of sulfonated mono- and dicyclic terpenes.

Grease composition. R. L. Merker (U. S. Navy). *U. S. 2,456,642.* The grease composition comprises lithium stearate, dimethyl silicone, and di-2-ethylhexyl azelate.

Grease. J. F. McGrogan (The Atlantic Refy. Co.). *U. S. 2,457,586.* The grease contains mineral oil, Ca soap, and lead soap of lower fatty acid.

Grease. P. R. McCarthy (Gulf Res. & Development Co.). *U. S. 2,457,582.* This is a mineral oil composition thickened with Na and Zn soap.

Fatty acid esters of polyoxyalkylene diols. H. R. Fife and W. J. Toussaint (Carbide & Carbon Chems. Corp.). *U. S. 2,457,139.* These are used as low temperature lubricants.

Drying Oils

Edited by
ROBERT E. BEAL

Paints from soybean oil. A. J. Lewis (Northern Regional Research Laboratory, Peoria, Illinois). *Soybean Digest 9,* No. 3, 16-7(1949). The preparation and properties of varnishes, paint primers, and exterior paints from soybean oil are described. Addition of a small amount of lime to a soybean paint eliminates residual tack thereby minimizing dirt pickup during the drying period and retarding film deterioration.

TALL OIL. F. J. Herman. *Centraal Inst. Materiaal Onderzoek, Afdel. Verf., Circ. 44,* 8 pp.(1948). The isolation, constitution, refining, fractionation, and chemical changes of tall oil are reviewed with respect to its use in the paint industry. (*Chem. Abs. 42,* 5219.)

DIRECTIONS FOR THE ANALYSIS OF TALL OIL. Commissie Chemische Analysemethoden. *Centraal Inst. Materiaal Onderzoek, Afdel. Verf. Circ. 45,* 3 pp. (1948). Analysis of the unsaponifiable matter and resin and fatty acids by the titrimetric A.S.T.M. method is not accurate while the gravimetric method of Kappelmeier is satisfactory. Esterified tall oil must be completely saponified and then evaporated to dryness before the analysis is made. (*Chem. Abs. 42,* 5220.)

THE OXIDATION OF UNSATURATED FATTY ESTERS. H. A. Bockenoogen (Lab. N. V. Oliefabrieken T. Duyvis, Jz., Koogaan de Zaan). *Chem. Weekblad 43,* 796-8 (1947). Research during the period 1938-1947 is summarized. (*Chem. Abs. 42,* 5243.)

THE CHEMISTRY OF THE DEHYDRATION OF CASTOR OIL. C. P. A. Kappelmeier. *Paint, Oil, Chem. Rev. 112,* No. 22, 36-40(1948); cf. *J. Am. Oil Chem. Soc. 25,* 150(1948).

DRYING OF LINSEED OIL PAINT. H. Posner and D. G. Nicholson (Univ. of Pittsburgh, Pittsburgh, Pa.). *Paint, Oil, Chem. Rev. 112,* No. 2, 15-16, 28, 30, 32 (1949). Films of linseed oil pigmented with TiO_2 absorbed oxygen faster under visible light toward the blue end of the spectrum than under visible red light. The addition of Co drier did not influence the relative effect of light wave length. The oxygen absorption rate of films, with drier added, decreased with age of the paint but became practically constant when the paint had aged 160 hours.

FURTHER DEVELOPMENTS IN STYRENE COPOLYMERS. F. Armitage, D. H. Hewitt, and J. J. Sleightholme. *J. Oil & Colour Chemists' Assoc. 31,* 437-50(1949). The properties of a styrene-drying oil copolymer may be controlled by the selection of a solvent carrier for the reaction. Thus dipentene causes a low average molecular weight product to be formed while xylol has the opposite effect. Dehydrated castor oil (25), styrene (25), and dipentene (50) are reacted to form a stable, medium viscosity solution which, with suitable driers added, gives a film equal to a tung oil-phenolic varnish in its resistance to boiling water after three days' air drying. The substitution of xylol for part of the dipentene increases the drying rate of the product while the complete substitution of xylol results in gel formation and the product separates into two layers. The reaction product of frosting oils and styrene with dipentene as reaction carrier is very slow drying but it stoves well. Substitution of xylol for part of the dipentene results in a faster drying polymer. CCl_4, which has an effect similar to that of dipentene, produces relatively short chain polymers terminated by Cl. The reaction is thought to be controlled therefore by the concentration of free, reaction-terminating radicals present in the reaction zone. Several facts are advanced to support the view that the styrene-drying oil product is a true copolymer and not a polystyrene dispersion: free polystyrene cannot be recovered from the product, the styreneated product is more difficultly saponifiable than the bodied oil, the reactants decrease in unsaturation as the reaction proceeds, and the reaction progresses faster with a conjugated oil than with a nonconjugated oil.

PATENTS

FRICTION ELEMENTS. W. A. Blume and R. E. Sparks (American Brake Shoe Co., New York, N.Y.). *U. S. 2,453,188.* Heat-polymerized linseed oil substantially free of oxidized oil, and finely divided S are intimately mixed to a viscous, tacky product which is completely soluble in petroleum thinner. The mixture is heated at 120°-140° until the S is dissolved but has not reacted, to form a bonding agent for friction elements.

WATER DISPERSIBLE COATING VEHICLE. G. E. Eilerman (Pittsburgh Plate Glass Co., Pittsburgh, Pa.). *U. S. 2,445,743.* The reaction product of glycerol, rosin, and linseed oil is treated with maleic anhydride at 200° for about one hour and this product hydrolyzed with water at 100°-130° and neutralized with a mixture of sodium silicate, NH_3, alkylol amines, and morpholine to form a water-emulsifiable, air drying coating composition.

DEHYDRATION OF HYDROXYLATED OILS. J. B. Rust (Montclair Research Corp. and Ellis-Foster Co.). *U. S. 2,456,996.* Castor oil is reacted with 0.2-10% of a mixture of boric and phosphoric acids in proportions to form boric phosphate, at 200°-300° to form a dehydrated oil.

FLEXIBLE WRINKLE FINISH AND PROCESS OF MAKING. W. A. Waldie (New Wrinkle, Inc., Wilmington, Del.). *U. S. 2,455,540.* A mixture of raw castor oil and at least an equal amount of dehydrated castor oil are heated to 410°-480°F., a drier catalyst is added, and heating continued at 520°-570°F. until the desired viscosity is obtained. The vehicle is pigmented, applied to a cotton base, air-dried and finally dried under infra-red to give a wrinkle finish oilcloth.

AIR DRY WRINKLE FINISH. W. A. Waldie (New Wrinkle, Inc.). *U. S. 2,455,541.* A short oil varnish made by heating tung or oiticica oil and an oil-soluble, rosin-modified phenolic resin at 500°-540°F. until homogeneous, and a drier obtained by heating Pb resinate, Co resinate, and a conjugated drying oil at 500°F. until homogeneous and adding hydrocarbon thinner at 350°F., are mixed in the proportion of 100 parts varnish and 30-130 parts of drier by volume to form an air drying wrinkle finish coating.

STYRENE-OIL SOLUBLE NATURAL RESIN-DRYING OIL INTERPOLYMER. J. A. Arvin and W. B. Gitchel (Sherwin-Williams Co., Cleveland, Ohio). *U. S. 2,457,768.* An interpolymer is formed of 5-35% drying oil, styrene, and a resin having an acid value of at least 30 by heating at 300°-550°F. The ratio of resin to styrene is between 1 and 9.

POLYMERIZABLE COMPOSITION. S. E. Glick (Monsanto Chemical Co., St. Louis, Mo.). *U. S. 2,457,657.* A composition for impregnating porous castings consists of 65-80 parts of styrene and 35-20 parts of an ethylene glycol-maleic acid-linseed oil acid polyester containing 40-50% linseed oil acids.

SYNTHETIC DRYING COMPOSITIONS. S. O. Greenlee (Devoe & Raynolds Co., Inc., Louisville, Ky.). *U. S. 2,456,408.* Drying compounds consisting of synthetic esters of polymeric polyhydric alcohols containing 3-20 OH groups esterified with alternate aliphatic fatty acid chains and aromatic nuclei and containing 6-20 double bonds per molecule in the fatty acid radicals are claimed.

Soap

Edited by
LENORE PETCHAFT

THE WETTING AGENTS AND THEIR APPLICATION TO PHARMACY. R. Berthet. *Pharm. Acta Helv. 22,* 23-45 (1947). A theoretical discussion with 37 references. (*Chem. Abs. 43,* 363.)

NEW DEVELOPMENTS IN ARMY SEA WATER LAUNDERING. T. H. Vaughn, E. F. Hill, C. E. Smith, and L. R. McCoy (Wyandotte Chemicals Corp., Wyandotte, Mich.) and J. E. Simpson (Office of the Quartermaster General, Washington, D. C.). *Ind. Eng. Chem. 41,* 112-9(1949). Laboratory detergency evaluation of the materials consisted of soil removal tests, whiteness retention tests, detergent concentration, pH variation, and temperature. Products found to be most effective by these tests were then used in full scale laundry operations with synthetic sea water. Four detergents were approved: the sodium salt of a fatty acid sulfonated amide, a polyalkyl ether condensate of fatty acids, an alkyl aryl polyether alcohol, and a polyethylene oxide derivative of sorbitol monooleate.

DETERMINATION OF SODIUM PYROPHOSPHATE AND TRIPOLYPHOSPHATE. W. R. Cals. *Can. Chem. Process Inds. 32,* 741-5(1948). Modifications of the methods of Bell and Gerber and Miles have been employed. Results from the 2 methods are good for rapid reasonably accurate pictures, both of the composition of commercial $Na_5P_3O_{10}$ and of some mixtures containing phosphates. Typical analyses are tabulated. (*Chem. Abs. 42,* 8709.)

NON-IONIC SURFACE ACTIVE AGENTS. Jack Dollinger (Glyco Products Co., Brooklyn, New York). *Soap Sanit. Chemicals 25,* No. 1, 37-9(1949). The properties and uses of the glycol and polyglycol esters of fatty acids are discussed. The uses of the products in the field of cosmetics, textiles, insecticidal sprays, and foods are outlined. A chart is included listing principal physical properties of the glycol fatty acid esters.

EFFECTIVE LABORATORY EVALUATION OF TEXTILE DETERGENCY. E. A. Leonard and A. R. Winch (Alexander Smith & Sons Carpet Co., Yonkers, New York). *Rayon Synthetic Textiles 30,* No. 1, 79-81, No. 2, 93-5(1949). A continuous-flow scouring process for raw wool stock adaptable for laboratory technique but which duplicates actual plant conditions is described. This method has the following advantages for test work: reproducibility and ease in varying soap and alkali concentrations.

THE TEMPERATURE DEPENDENCE OF CONDUCTIVITY AND CRITICAL CONCENTRATION OF TWO TYPICAL COLLOIDAL ELECTROLYTES. A. P. Brady and Harriette Huff (Stanford Research Institute, Stanford, Calif.). *J. Colloid Sci. 3,* 511-20(1948). Conductivity curves for aqueous solutions of two colloidal electrolytes, lauryl sulfonic acid and potassium laurate, were determined at 0°, 25°, 50°, 70°, and 90°C. The critical concentrations, as determined by conductivity, pass through a minimum in the neighborhood of room temperature. A comparison of the critical concentrations determined here with those detergents by other methods shows approximate agreement with all except those reported for refractive index of potassium laurate at elevated temperatures.

LIGHT SCATTERING IN SOAP SOLUTIONS. P. Debye (Cornell Univ., Ithaca, New York). *J. Colloid Sci. 3,* 407-9(1948). The molecular weight of dodecylamine-HCl micelles formed in aqueous solutions is 17,300, as found by the turbidimetric method. In a 0.046 M solution of NaCl the molecular weight is 37,200. The molecular weight and critical concentration for micelle formation vary with the Cl-ion concentration but are independent of the nature or valence of the cation. Other univalent anions can be substituted for Cl without changing the molecular weight or critical concentration. Other alkyl amine hydrochlorides of greater chain length have a smaller critical concentration for micelle formation and a greater number of single molecules in the micelle. From a consideration of the molecular and electrical energy of the micellar layers it is calculated that the fundamental molecular energy in a dodecylamine-HCl micelle is 25kT, which corresponds to the heat of vaporization of dodecane. The fundamental electrical energy is 2.1 kT, which is to be compared with a value of 2.8 kT calculated from the electrical charge and the effective dielectric constants. (*Chem. Abs. 43,* 20.)

A NEW TYPE OF MICELLE: SOLUBILITY BY FILM PENETRATION. Wm. D. Harkins and Hans Oppenheimer. *J. Chem. Phys. 16,* 1000-2(1948). Earlier x-ray work showed that a *n*-long chain alcohol, amine, or other polar-nonpolar molecule can penetrate the film of a soap micelle without increasing its thickness: in some cases the micelle becomes slightly thinner. This phenomenon is entirely different from solubilization, in which the micelle is thickened by as much as 12A., since the solubilized hydrocarbon is located between the ends of the hydrocarbon chains, whereas the polar-nonpolar molecules line up with the soap molecules with their polar groups toward water. In solubilization the solubility increases with the length of the hydrocarbon chain of the colloidal electrolyte and decreases with the length of that of the hydrocarbon. This decrease is related to the decrease of activity of the hydrocarbon with chain length. In film penetration the solubility decreases rapidly with the length of the hydrocarbon chain of the alcohol, amine, etc., since in this case also the activity of the compound decreases rapidly with chain length. However, most of the relations are complex and there is evidence that molecular fitting enters, especially if the lengths of the soap chain and that of the polar-nonpolar-nonionic chain are not too different. Substances that enter the micelle by film penetration lower the critical micelle concentration, (CMC). The rate of lowering with film concentration increases very rapidly with the length of the molecule. Substances that enter by solubilization have little effect on the CMC. (*Chem. Abs. 43,* 21.)

ALUMINUM MONOLAURATE AND PROPOSED STRUCTURES FOR ALUMINUM SOAPS. Charles G. McGee (Stanford Univ., Calif.). *J. Am. Chem. Soc. 71,* 278-82(1949). The preparation and properties of aluminum mono-soaps have been described. It has been suggested that aluminum mono-soaps are polymers in which the repeating units are alumina octahedra joined by sharing edges with the carboxyl groups occupying the remaining positions. The structure of aluminum di-soaps has also been discussed. A polymer structure has been suggested in which alumina octahedra are joined by sharing two opposite corners, with carboxyl groups occupying the remaining four. An attempt has been made to correlate such a structure with the known properties of the di-soaps. Aluminum tri-soaps have likewise been discussed. Possible structures have been suggested.

INDUSTRIAL APPLICATIONS OF THE SODIUM SILICATES. Reynold C. Merrill (Philadelphia Quartz Company, Philadelphia, Pa.). *Ind. Eng. Chem. 41,* 339-42 (1949). The use of commercial sodium silicates as soap builders to prevent redeposition of soil, as a detergent in their own right and as such their applications in metal cleaning are reviewed.

PECULIAR PHOSPHATES. Everett P. Partridge. (Hall Laboratories, Inc., Pittsburgh, Pa.). *Chem. Eng. News 27,* 214-7(1949). The problem of molecular structure and nomenclature of the various complex phosphates is reviewed. The metaphosphates are discussed in detail and nomenclature suggested.

PATENTS

GLASS CLEANER. W. C. Gasgleff (The Drackett Co.). *Canadian 452,518.* A detergent composition for cleaning polished glass surfaces consists of an aqueous solution of 5-30% of 2-methyl-2,4-pentanediol, and a wetting agent of the alkylated sulfonate type.

RETARDING THE DEVELOPMENT OF RANCIDITY IN DETERGENTS. Lever Brothers & Unilever. ***British 574,504.*** Soap and nonsoapy detergents are treated to retard the development of rancidity in them by incorporating in the detergents up to 5% (based on the weight of the detergent) of an aliphatic or aromatic compound containing at least one trivalent N and at least 2 carboxyl groups connected to at least one of the N atoms through an aliphatic chain having not more than 4 C atoms, or a salt, ester or anhydride of such a compound. Among the stabilizing compounds which may be used are: nitrilotriacetic acid or ethylenediaminotetracetic acid, or their alkali metal salts. (*Chem. Abs. 43,* 886.)

CAKE DETERGENT. D. J. Leder (Canadian Industries, Ltd.). *Canadian 451,808.* A detergent composition in cake form consists of 85% by weight of a solid reaction product consisting of lauric acid containing at least 15 1,3-dioxolane groups, 10% sodium lauryl sulfate, and 5% water.

SOAP SHEET. J. H. Muise. *Canadian 452,240.* Two superimposed sheets of open unsized paper are made with a layer of soap interposed between them. The soap acts as a binder to hold the sheets together. When the combination is wet with water and rubbed, the paper disintegrates, the fibers are released and flow away with the water used to dissolve the soap.

NEW CONDENSATION PRODUCT. Soc. pour l'ind. chim. a Bale. *Swiss 221,923.* The condensation product of phenol with the reaction product of stearamide and 1,1-dichlorodimethyl ether is useful as a textile aid or intermediate. (*Chem. Abs. 43,* 886.)