absence of the adulterant. The *n*, I value, and Maumené value are of most use. B. C. A.

Production of high-grade feeding oil from pilchards and similar fish. H. N. Brocklesby and B. E. Bailey. Biol. Board Can., *Bull.* No. 46, 8 pp. (1935); cf. *C. A.* 28, 3607^6.—Nutritive values, production and stability of pilchard oil are discussed. In general air and light are detrimental to stability. Antioxidants which are non-toxic such as maleic acid have a marked effect on O absorption. As little as 0.001% maleic acid will double the inductive period.

E. SCHERUBEL.

PATENTS

Treatment of Oils and Fats. Wilhelm Gensecke (to Am. Lurgi Corp.) U. S. 2,003,076. May 28. Refined and neutralized oil or fat is heated to 280° C. for sufficient time to bleach same, and directly thereafter distilling off the free fatty acids formed in a vacuum with the aid of an inert gas.

Extracting fatty oils. Hugh E. J. Peake and Ellerman's Arracan Rice & Trading Co. Brit. 421,049, Dec. 10, 1934. Oil is extd. from animal or vegetable cellular materials, *e. g.*, nuts, sesame seeds, by comminuting, treating with up to 15% of a liquid that is miscible with the oil but not with H_2O, *e. g.*, peanut or a hydrocarbon oil and with 30% or more of H_2O and removing the mixt. of liquid and extd. oil that rises to the surface. The ground material may be heated before treatment and the H_2O may be heated and may contain a dissolved salt to increase its sp. gr. Further oil may be extd. by passing hot air through the residual mash or by fermentation with the aid of, *e. g.*, diastase, with, if desired, simultaneous passage of (hot) air through the mass. Oil that remains after such treatment may be pressed out.

Oil extraction. Zdenko Metzl. Fr. 777,291, Feb. 15, 1935. Materials rich in oil are extd. in 2 distinct phases, a preliminary rapid extn. or extns. and the normal extn.

Heating steam for purifying oil by the action of impinging jets. Maurice M. Durkee (to A. E. Staley Mfg. Co.). U. S. 2,000,277, May 7. App. and various details of operation are described.

Emulsifying ingredients in continuous mayonnaise manufacture. Thomas M. Rector (to Best Foods, Inc.). U. S. 2,000,645-6, May 7. Various details of app. are described and of an operation in which a flowable mixt. contg. only egg yolk, spices and water, and a vegetable oil, may be fed at suitably proportioned rates to an emulsifying app. to form a thick stable emulsion which is then dild. with vinegar.

ABSTRACTS

Soaps

Edited by **M. L. SHEELY**

The Colloid-Chemical Basis of Detergents and Washing. W. Prosch, Z. f. angew, Chemie, April 27, 1935, page 243. Langmuir, Harkins, Perrin, etc., from their investigations on the spreading of oil over liquid surfaces and the arrangements of the molecules in thin soap-like films, arrived at the conclusion that the characteristic properties of soap are due to its polar properties. Soaps contain inactive methyl groups and active, water-soluble groups such as COOH, SO_2OH. If these two are too close together as in acetic acid, or too far apart as in behenic acid, colloidal solutions are not obtained. The colloidal properties thus increase at first with increasing length of carbon chain. From viscosity, surface tension, protective action, gel formation, etc., Zsigmondy showed that soap characteristics are present from caprylic acid onwards. From stearic acid onwards the decreasing solubility causes a diminution of the favorable properties. All detergents at present known dissolve to colloidal solutions; resin soaps, although good frothing agents, are poor detergents, and their solutions are optically empty and pass through ultra-filters.

Indilute solutions and at high temperatures, soap solutions consist of soap dissolved in water, but at high concentrations and low temperatures they are of water dissolved in the soap, gel-formation representing the transition of the one type of solution to the other. The coagulation of soap by salts is represented by Fischer as a mutual approach of the salt particles as the concentration increases. When they come into actual contact the salt solution becomes the continuous, external phase and the soap the discontinuous, internal phase; the specifically lighter soap then rises to the surface.

McBain, from researches on electrical conductivity and osmotic pressure, arrived at the concept of the ionic micelle, consisting of neutral particles laden with dissociation and hydrolysis products.

The detergent action of soaps may be said to depend on (1) chemical action, (2) emulsifying power, (3) wetting power, (4) absorption and peptization, and (5) electrical effects.

The chemical effect is prominent only where the soap, by its slightly alkaline character, takes up acid dirt, such as fatty acids or perspiration. The emulsifying power of soap was first emphasized by Donnan. Harkins and Beeman explain the stability of the emulsions on the assumption that the hydrocarbon residue of the soap is directed towards the disperse, oil phase, the polar—COONa group—towards the aqueous phase. Hillyer observed the connection between detergent action and wetting power in 1903. Haller (1931) pointed out that a reduction in surface tension may be beneficial to the wetting in some cases, but in others an increase in this value may take place. The special wetting agents introduced for the textile industry ex-

ABSTRACTS

Soaps

Edited by **M. L. SHEELY**

emplify the enhancement of this property at the expense of others. Absorption and peptization phenomena also play a part in detergent action; it may be mentioned here that the power of a soap solution to absorb dirt is not proportional to its capacity for frothing, and that the detergent action of a soap solution shows a maximum at a certain concentration. Electrical effects may also come into play.

The problem of devising a simple method for determining the detergent power of a given soap has still to be solved; an actual washing under controlled conditions forms the only criterion at present.

The detergent action of soaps is enhanced by the addition of alkaline salts, and an optimum effect has been found at pH 10.7. Soda, sodium phosphate, and water-glass are typical salts employed for this purpose; the buffering effect of the soap prevents the alkalinity from increasing to a dangerous value. (*Pharmaceuticals and Cosmetics,* page 61, June 1935.)

Determination of Perborate in Soap Powder. J. R. N. van Kregten, Chem. Weekblad, 32, 81-3 (1935). About 5 g. soap powder is placed in a separating funnel with 30 cc. 2 N H_2SO_4; 100 cc. H_2O and 10 cc. $CHCl_3$ are then added. After the contents of the funnel are shaken and the $CHCl_3$ solution containing the fat acids is removed, the aqueous liquid is treated with 20 cc. 2 N H_2SO_4 and titrated with $KMnO_4$; an iodometric method is less suitable. (C. A. 29, 10, 3543, May 20, 1935).

PATENTS

Soaps, Fatty Acids. British 423,279, Feb. 10, 1934. Fairweather, H. D. C., 65, Chancery Lane, London—(Colgate-Palmolive-Peet Company, Chicago, U. S. A.). Soap is made from the oxidation products of petroleum, by saponifying the products with alkali in the absence of water, and then agitating the molten anhydrous soap in a closed vessel, while passing in a current of steam, carbon dioxide or vapors of toluene or xylene, and finally removing the unsaponified materials. The crude saponification products of hydroxy acids and lactones are thereby transformed into unsaturated acids by the elimination of the elements of water. Sodium hydroxide or carbonate or potash is used in a small excess as saponifying agent, and the crude product is heated in a closed vessel, such as a still, to about 300° to 350° C., with rapid agitation generated by a current of steam, to prevent local overheating. Mechanical agitation may also be employed, and also reduced pressures. The current of steam removes unsaponifiable materials such as unchanged petroleum, tars and partially oxidized bodies, leaving a white odorless soap. Animal or vegetable fats or oils may be added to the crude saponified product to produce mixed soaps. (*The Industrial Chemist,* XI, 125, 246, June, 1935.)

Distillation of Fatty Acids. U. S. 1.988,997, April 23, 1935. Lucius M. Tolman (to New Process Refining Corporation). A continuously flowing stream of the stock is rapidly heated to about 200-315° and then is introduced into an enlarged distilling zone under subatmospheric pressure in which it is treated with steam counter-currents so as to produce a temperature of about 190-285° at the vapor outlet of the distilling zone; the steam and fatty acid vapors are withdrawn at this temperature and the unvaporized residue is continuously and separately removed from the distilling zone at a temperature of about 285-400° without allowing any substantial accumulation in the distilling zone. Apparatus is described. U. S. 1,998,998 relates to a process in which the stock may be preliminarily heated to about 315° under 20 lb. or more superatmospheric pressure, and then charged into a tower in which a vacuum of at least 20 inches Hg is maintained and from which volatilized fatty acids are removed. Apparatus and various details of procedure are described. (C. A. 29, 12, 4198, June 20, 1935.)

Floating Soap. German 611,045, March 21, 1935 (Cl. 23e. 2). J. G. Mouson & Company. Hugo Kröper, inventor.) A small proportion of Si is incorporated into hot curd soap, whereby bubbles of H are formed in the soap. The formation of blisters on the surface of the cooled soap may be avoided by addition of a concentrated solution of casein, pectin, tragacanth or like material. (C. A. 29, 12, 4198, June 20, 1935.)

Soap Powder. U. S. 1,999,184, April 30, 1935. Careton Ellis (to Standard Oil Development Company). A mixture of fatty acids containing approximately 10 to 18 C atoms and derived by the oxidation of mineral hydrocarbon waxes or petroleum is heated and stirred with a substantially dry alkali saponification agent such as K_2CO_3 or Na_2CO_3. (C. A. 29, 12, 4198, June 20, 1935.)

Perborate Soap Powders. U. S. 2,004,670 has been granted to Lever Brothers, Ltd., Port Sunlight, England, covering an improvement in perborate soap powders in which loss of oxygen from such a powder containing sodium silicate is greatly decreased by the addition of a magnesium salt. (*Soap,* XI, 7, 39, July, 1935.)

WHO WHAT WHERE WHEN ?

W. M. McConnell

W. M. McConnell has joined the Engineering Department of The Patterson Foundry & Machine Company to take charge of the drafting room. Mr. McConnell graduated from Carnegie Institute of Technology with a B.S. in Chemical Engineering and also has a professional degree of Chemical Engineer. He completed his studies at Columbia University taking special courses. Mr. McConnell gained considerable experience in the handling of process equipment and plant design while connected with the Koppers Company and the American Cyanamid & Chemical Corporation, and he brings another type of specialized experience to the rapidly growing engineering and experimental department of Pattersons.

Motor Maintenance

The Ohio Carbon Co., 12508 Berea Road, Lakewood, Ohio, announces that the demand for its recently-issued booklet, "The Brush Phase of Motor Maintenance," has necessitated a new edition. This is now available on request. It has been brought up to date by a series of illustrations showing the company's testing system for maintaining its standards of quality. Some additions and changes have also been made in the text matter.

Dr. Partridge at Hall Laboratories, Inc.

J. M. Hopwood, President, Hagan Corporation, Pittsburgh, has announced the appointment of Dr. Everett P. Partridge as director of research of Hall Laboratories, Inc. In this position, which he will assume on September 1, Dr. Partridge will be associated with Dr. Ralph E. Hall, the managing director of Hall Laboratories and his staff, with the scientific and technical specialists of Hagan Corporation, The Buromin Company, and Calgon, Inc., all of which are allied organizations, and also with the incumbents of the Industrial Fellowship on Calgonizing sustained by Calgon, Inc., at Mellon Institute of Industrial Research.

Dr. Partridge has distinguished himself during the past ten years by his researches on boiler-water problems. On completing his undergraduate course in chemical engineering at Syracuse University in 1925, he transferred to the University of Michigan, where—as Detroit Edison Fellow in chemical engineering under the direction of Professor Alfred H. White—he investigated the acid-treatment of zeolite-softened bicarbonate waters and the fundamental mechanism of boiler-scale formation, receiving the degrees of M. S. E. in 1926 and Ph. D. in 1928. At the conclusion of his graduate studies he was appointed associate editor of *Industrial and Engineering Chemistry*. While specializing in the study and reporting of industrial operations for this periodical, he also served on a part-time basis as research engineer of the Department of Engineering Research of the University of Michigan in connection with further studies of scale prevention, and prepared a monograph on the "Formation and Properties of Boiler Scale," which appeared in 1930 as bulletin 15 of this department. In the spring of 1931 he was appointed supervising engineer of the Non-metallic Minerals Experiment Station of the U. S. Bureau of Mines, maintained in cooperation with Rutgers University at New Brunswick, N. J. In this post he directed physico-chemical and chemical engineering research on the recovery of potassium salts and other industrial chemicals from polyhalite; the use of different forms of calcium sulfate as retarders for portland cement; and other problems in the beneficiation and utilization of non-metallic minerals. Independently he collaborated with Dr. Hans Goldschmidt in translating from the German Dr. Alfred Schack's important work, which was published in 1933 as "Industrial Heat Transfer," by John Wiley and Sons. Dr. Partridge returned to active research on boiler-water problems in 1933 as a result of a movement initiated by Hall Laboratories and later taken up by the Joint Research Committee for Boiler Feed Water Studies, as a cooperative investigation by the American Society of Mechanical Engineers and the U. S. Bureau of Mines. This investigation is proceeding at the present time. Dr. Partridge is now publishing a critical study of the literature on embrittlement serially in *Metals and Alloys*.

In addition to the publications mentioned, Dr. Partridge has written some twenty papers for various scientific and technical journals. He is a member of the American Chemical Society, the American Institute of Chemical Engineers, Sigma Xi, Tau Beta Pi, Phi Kappa Phi, and Alpha Chi Sigma.

As director of research of Hall Laboratories, Dr. Partride will continue his interest in boiler-water treatment in the processing of water for general industrial use.

Canada's Chemical Industry Continues to Expand

THAT Canada's chemical industry continued in 1934 the expansion registered in the preceding year is revealed in information received in the Commerce Department's Chemical Division. Preliminary figures issued by the Canadian Department of Trade and Commerce show that the output of chemicals and allied products in the Dominion during 1934 was valued at $105,568,000, an increase of approximately 14 per cent over 1933.

With the exception of soaps and cleaning preparations all branches of the industry shared in the increased production. The output of acids, alkalies and salts increased 28 per cent to a total value of $16,286,000 although there was no increase in the number of plants. A new alkali plant constructed during the year did not commence operation until the beginning of 1935. Fertilizer production advanced 26 per cent to $5,399,000; explosives, 23 per cent to $9,038,000, and paints, pigments and varnishes 17 per cent to $17,435,000, statistics show.

The number of Canadian plants producing chemicals and allied products increased from 696 in 1933 to 712 in 1934; capital employed advanced from $153,901,000 to $155,600,000; the average number of employes from 15,397 to 16,751; and the amount paid in wages increased from $18,739,000 to $20,764,000. Calcium chloride, trisodium phosphate, electrolytic hydrogen peroxide, and sulphur were among the chemicals manufactured in 1934 for the first time in Canada, the report states.