

was improved by the addition of Cu and Ni sulfates to Na_2CO_3 solution to insure the uninterrupted precipitation of Cu and Ni salts from an alkaline medium. This process cut by 20-30% the expenditure of metals used in hydrogenation of oils. (*C. A.* 48, 11816)

Soybeans are not in surplus. T. A. Hieronymus (Dept. Agricultural Economics, College of Agr., Univ. Illinois, Urbana, Ill.). *Soybean Digest* 15(1), 10-11(1954). The relative and absolute consumption of cottonseed and soybean oils are discussed in terms of government support programs for the seeds and oils. Ways to develop the potentially large export market for soybean oil are outlined.

The rheology of fats: a review. G. W. Scott Blair (National Inst. for Res. in Dairying, Shinfield, Reading). *J. Sci. Food Agr.* 5, 401-5(1954). The lack of quantitative information on the rheology of fats and the need for such data are discussed. The discussion is divided into brief sections on physiological considerations; empirical tests and fundamental considerations on the spreading properties of fats; the miscibility, creaming and shortness of fats; and interpretation of tests. 40 references.

Ricinoleic acid conversion process. V. E. Haury (half to Simco, Inc.). *U. S.* 2,693,480. Ricinoleic acid, esters or amides are heated with water and $\text{Ca}(\text{OH})_2$ at 225° to 350°C. The products contain 2-octanone, 2-octanol, *omega*-hydroxydecanoic acid and sebacic acid.

Mono-N-fatty citramides. K. R. Eilar (General Mills, Inc.). *U. S.* 2,693,490. A process is described for the preparation of $\text{MOOCCH}_2\text{C}(\text{OH})(\text{COOM})\text{CH}_2\text{CONR}'\text{R}$ in which R is a C_{5-22} aliphatic hydrocarbon, R' is H or R, and M is ammonium or alkali metal.

Process for the decomposition of unsaturated fatty acids. W. Stein and H. Hartmann (Henkel and Cie., G. m. b. H.). *U. S.* 2,694,081. Alkali metal salts of unsaturated higher fatty acids are heated with caustic alkalies in the presence of cadmium.

Method of continuously refining fatty oils with an inorganic acid. F. T. Palmqvist (Aktiebolaget Separator). *U. S.* 2,694,082. In a continuous process, a stream of oil is passed successively through (1) a decolorizing step of short duration wherein an inorganic acid is finely dispersed through the oil while the temperature is held lower than that which would cause substantial side reaction between oil and acid; (2) a step of longer duration wherein this mixture is passed through a quiescent zone so as to permit agglomeration of an acid sludge which may be partially removed by centrifugation; (3) addition of salt or weak acid to neutralize the remaining acid sludge and inorganic acid; and (4) centrifugation to remove neutralization products.

Apparatus for separating butterfat from milk. V. O. Goument. *U. S.* 2,694,520. Description of an apparatus which includes at least two centrifugal stages.

Fat-containing base for food products and method of making same. F. E. Robinson and W. F. Bronson (Wilson and Co., Inc.). *U. S.* 2,694,643. Fat particles are encased in a coating made of a homogeneous mixture of edible sugar and gelatin. The coating is soluble in cold water. The product is dry to the touch, free flowing, and readily dispersible.

Analytical control in oil refining. M. Naudet. *Revue Française des Corps Gras* 1, 319-330(1954). A laboratory procedure is described for determining the material balance and the purity of the refined product from the alkali-refining of vegetable oils. A sample of not less than 2 grams of the unrefined oil is dissolved in 50 ml. of chloroform and the solution is passed through a column of 20 grams of "Prolabo" alumina completely wetted with chloroform. The column is eluted with 200 ml. of the solvent, the filtrate evaporated and the residue dried to constant weight. This residue represents the glycerides present in the oil. In order to determine the size of the sample to be used on the column, the free acidity of the oil is determined and 1 to 1.5% of the weight of the sample is added to this value to account for the other non-glycerides present. The sample should not contain more than 350 milligrams of total non-glycerides. For oils containing large quantities of non-glycerides the amounts of adsorbent and solvent must be increased in order that a sample of at least 2 grams may be taken. Oils containing carotenoids must be passed through a mixed adsorbent of activated carbon and alumina since the carotenoids inhibit the retention of non-glycerides. With drying oils it is essential that the separation on the column be effected in an atmosphere of nitrogen. In the same manner the glycerides are determined on the refined oil since any soaps

present are held up on the column as are other non-glycerides. The entrained glycerides in the foots can be determined directly by dissolving a weighted sample of the cake in a mixture of petroleum ether and ethanol, neutralizing any free acids and adding sufficient water to dilute the alcohol to 50%. The glycerides remain in the petroleum ether layer and can be recovered therefrom. Other entrained fats such as those in the wash water from the refining can be determined by evaporating the water under vacuum, acidifying and separating the glycerides chromatographically. From the above procedures glyceride losses from entrainment and saponification of the oil during refining can be calculated. The purity of the product with respect to soaps and other non-glycerides also can be determined. Examples of the applications of such material balances to plant operations are discussed.

Research on hydrogenation inhibitors in the oil of olive husks. J. M. Moreno and F. R. Aberbe. *Oleagineux* 9, 697-702(1954). Tests were conducted on three samples of oil obtained by extraction with three different solvents: carbon disulfide, trichloroethylene and petroleum ether. To separate the inhibitors a 60 gram sample of the oil was dissolved in 60 grams of petroleum ether (boiling range 30-60°C.) and added to a column of 85 grams of activated silica (activity greater than 2 according to the Brockmann method). The column was developed to remove unadsorbed material and then dried with a current of hydrogen. The adsorbent was added to a flask containing a 3 to 1 solution of methanol-ether, the mixture shaken, allowed to stand for 24 hours and filtered. The solvent was evaporated from the filtrate to recover the fraction containing practically all of the inhibitors while evaporation of the solvent from the petroleum ether eluate from the column gave a yellow oil. Hydrogenations were carried out on crude oil, and on the oil percolated through the column. The inhibiting effects of the fractions eluted by the methanol-ether solution were studied by adding portions of it to 50 gram samples of olive oil. The oil eluted from the columns with petroleum ether hydrogenated more rapidly than the crude oil. The inhibitor fraction was found to contain sulfur (coming chiefly from the solvent), oxidized substances, oxidation products, glycerine, monoglycerides, fatty acids and resins extracted mainly by trichloroethylene. Of the fatty acids only the volatile short chain compounds had significant inhibiting effect on the rate of hydrogenation. Glycerine was an effective inhibitor at lower concentrations than the volatile acids while sulfur showed the greatest inhibiting power.

The deodorization of fatty materials. P. Merat. *Revue Française des Corps Gras* 1, 396-414(1954). The fundamental principles, equipment and conditions used in the deodorization of vegetable oils to be used in edible products are reviewed.

Fish and whale oils. P. Crèac'h. *Oleagineux* 9, 675-683(1954). The origin, general chemical characteristics including fatty acid composition, separation of the glycerides, development of acidity, changes resulting from oxidation during storage or as a result of enzymatic action and the use of antioxidants to prevent such changes are reviewed.

Study of the yields and losses in a solvent extraction factory. M. Helme. *Revue Française des Corps Gras* 1, 305-318(1954). The determination of solvent losses in vegetable oil extraction is discussed. Sample calculations for the determination of the efficiency of cooling systems and losses of solvent in the air, oil, press cake and water are given. Losses due to equipment leakage are determined by difference.

New techniques of analytical chemistry. Applications to oil processing. J. P. Wolff. *Revue Française des Corps Gras* 1, 331-338(1954). Recent advances in the analysis of vegetable oils generally have resulted from the application of physico-chemical methods. The uses of chromatography, counter-current extraction, ultra-violet and infra-red spectrophotometry and polarography in the analysis of vegetable oils are discussed.

• Biology and Nutrition

F. A. Kummerow, Abstractor
Joseph McLaughlin, Jr., Abstractor

Dietary fat, work, and growth. A. B. L. Beznák (Univ. of Birmingham, England). *Experientia*. Suppl. 1, *Present Problems in Nutrition Research* 1952, 230-8 (Pub. 1953). The growth of inactive rats on a low-vitamin B₁ diet is proportional to the fat content of the diet. When the fat is reduced to 3% growth becomes stunted. Forced exercise causes resumption of growth

in the low-fat diet group and slowing of growth in the high-fat groups. On return to inactive life, growth increases in all the groups. (*C. A.* 48, 4651)

The mechanism of the hydrolysis of glycerides by pancreatic lipase. B. Borgström (Univ. Lund, Sweden). *Acta Chem. Scand.* 7, 557-8 (1953) (in English). By studying the course of the *in vitro* hydrolysis of long-chain triglycerides by rat pancreatic lipase, it was found that the formed monoglycerides are predominantly of the 2-configuration. The chromic acid oxidation (Bergström, *C. A.* 41, 1278) gave definite evidence that the diglyceride formed is the 1,2-isomer. A method for distinguishing 1,2-diglycerides from 1,3-diglycerides is given. (*C. A.* 48, 7670)

Fat metabolism in human subjects. J. R. Chipault (Univ. of Minnesota, Austin). *Hormel Inst., Univ. Minnesota Ann. Rept.* 1951 52, 20-5. Terramycin effectively repressed the increase in saturated acids and the corresponding decrease in oleic acid observed during incubation of stool-triolein samples. Gram-negative bacilli, streptococci, and clostridia population of incubated stool samples decreased when either triolein or Terramycin alone was used but not when both were added to the samples. Olive oil, as well as triolein, gave rise to high lipide excretion when ingested unmixed with the diet, but when olive oil was mixed with the dextrimaltose, protolysate, and metamucil of the diet before ingestion, lipide excretion was normal. (*C. A.* 48, 4649-50)

The oil and meal from Sabalo (*Prochilodus lineatus*) in nutrition. R. R. Brenner. *Industria y quim.* (Buenos Aires) 15, 182-5 (1953). The chemical composition and physical constants of the oil of Sábalo and the content of amino acids, vitamins, minerals, and fats of the meal prepared from this fish are reviewed. (*C. A.* 48, 7811)

The utilization of vitamin A. II. Utilization of vitamin A palmitate. G. C. Esh and Sukhamoy Bhattacharya (Bengal Immunity Research Inst., Calcutta). *Indian J. Physiol. and Allied Sci.* 7, 153-7 (1953). Vitamin A palmitate (720 I.U.), dispersed in peanut oil, ethyl oleate, and aq. solutions of Tween 20 and Tween 60, was fed to vitamin A-deficient rats to study the effect of feeding massive doses of the vitamin on liver storage. The highest liver storage was observed from the aq. medium. Storage was enhanced when the peanut oil or ethyl oleate carrier was fortified with antioxidants such as lecithin, tocopherol or propyl gallate. Storage of vitamin A was higher for the palmitate than for the acetate ester.

Fats of blood in hyperthyroidism. G. Facchini (Univ. Bologna, Italy), and P. Vannini. *Endocrinol. o sci. costitut.* 21, 88-105 (1952). In 21 patients, in comparison with normal subjects of the same age, lower values of total blood lipides, lower neutral fats, lower cholesterol (especially the free fraction) and some increase in phosphatides were found. (*C. A.* 48, 7760)

Determination of free, ester, and total cholesterol without saponification. S. L. Kanter, J. R. Goodman, and Jane Yarborough (Brentwood Neuropsych. Hosp. Veterans Admin. Center, Los Angeles, Calif.). *J. Lab. Clin. Med.* 40, 303-12 (1952). A rapid and accurate method for the determination of total, ester, and free cholesterol is described. Temperature control and individual timing is eliminated by using a filter of 540 μ to measure the developed color. The use of cholesterol acetate as a reference standard eliminates saponification. (*C. A.* 48, 11535)

Fecal fat on an essentially fat-free diet. G. T. Lewis and Helen C. Partin (Med. Research Foundation of Dade County, Miami, Fla.). *J. Lab. Clin. Med.* 44, 91-3 (1954). The total ether-soluble material was determined in the 24-hr. stool specimens of 3 human adults on a nutritionally adequate diet containing a maximum of 25 mg. of fatty acid/day. Daily excretion of lipide approximated 2 g. (varied from 0.13 to 5.4 g./day). Fecal lipide was thought to arise from the intestinal mucosa. (*C. A.* 48, 11585)

The effects of eating and of sham feeding upon the absorption of vitamin A palmitate in man. A. I. Mendeloff (Washington Univ., St. Louis, Mo.). *J. Clin. Invest.* 33, 1015-21 (1954). Normal fasting subjects may demonstrate no rise in serum vitamin A following ingestion of a test dose of vitamin A palmitate in corn oil. Feeding of a meal 2 hrs. after the test dose activates the mechanism whereby vitamin A palmitate enters the blood stream. Studies in normal and gastrectomized subjects, with and without eating, cast doubt that the mechanism is intraluminal. The lacteals may be activated in some way by eating so that they expel their vitamin A content into the blood stream. Sham feeding is almost as effective as eating in this activation. (*C. A.* 48, 11588)

Dynamics of carbohydrates and fat in tubers of *Cyperus esculentus* during vegetation, storage, and sprouting. A. A. Mikul'skii and E. V. Teplit'skaya (Botan. Garden, Acad. Sci. Ukr. S. S. R., Kiev). *Doklady Akad. Nauk S. S. S. R.* 95, 681-4 (1954). Sprouting of the tubers of this plant is accompanied by a considerable drop in dry matter weight owing to utilization of sucrose, starch, and fat. Sucrose is utilized first, followed by the fat content. (*C. A.* 48, 8281)

Role of the nature of dietary lipides in the action of excess cholesterol on the behavior of the white rat. Reproductive function. Jeanine Raulin. *Arch. sci. physiol.* 8, 1-26 (1954). Excess cholesterol did not affect the reproductive capacity of females raised on a fat-free diet. It improved lactation in mother rats raised and maintained on a diet in which the fat component was lard and lipides of low iodine value. It produced variable toxic effects when cholesterol was associated with unsaturated lipides. When these lipides were triglycerides, reproduction was defective but still possible, but in the form of free fatty acids, reproduction was totally inhibited. (*C. A.* 48, 8892)

The lipide production phase of food yeast. M. P. Steinberg (Univ. Illinois, Urbana). *Univ. Microfilms* (Ann Arbor, Mich.) *Publ. No.* 6014, 107 pp.; *Dissertation Abstracts* 13, 953-4 (1953).

Origin of fat in starch grains. I. N. Sveshnikova (K. A. Timiryazev Inst. Plant Physiol., Acad. Sci. U. S. S. R., Moscow). *Doklady Akad. Nauk S. S. S. R.* 95, 889-92 (1954). Cytological analysis showed formation of fat in the ripening seeds of plants such as iris and mustard, as well as sunflower; this occurs within the starch grains present in the seeds. (*C. A.* 48, 8881)

Feeding experiments with synthetic fatty acids. K. Thomas and G. Weitzel. *Experientia*, Suppl. 1, *Present Problems in Nutrition Research* 1952, 125-42 (Pub. 1953). A review with references.

Fat tolerance in subjects with atherosclerosis: heparin effects upon lipemia, lipoproteins and gamma globulin. A. Woldow, J. E. Chapman, and J. M. Evans (George Washington Univ., Washington, D. C.) *Am. Heart J.* 47, 568-79 (1954). Three hours after a fat meal precipitable lipoproteins and lipemia were higher in subjects with coronary heart disease than in normal subjects. Five hours after the meal the lipemia and lipoprotein levels approached fasting levels in the normal but not in the coronary subjects. Intravenous heparin accelerated the lipemia clearing in normal subjects and initiated clearing in the coronary subjects. Thus, a deficiency of heparin or of heparin-like substance may be associated with abnormal fat transport. Heparin also reduced the blood γ -globulin concentration, both *in vivo* and *in vitro*, suggesting that a heparin-globulin reaction may be involved in lipemia clearing and that a globulin aids in maintaining normal physical and chemical distribution of neutral fats. (*C. A.* 48, 7722)

Nutritive value of milk, factors affecting the nutritive value of cow's milk. J. N. Bixby, A. J. Bosch, C. A. Elvehjem, and A. M. Swanson (Depts. of Biochem. and Dairy and Food Industries, College of Ag., U. of Wisconsin, Madison). *J. Agr. and Food Chem.* 2, 978-82 (1954). Experiments were conducted with albino rats to study the effect of season, pasteurization, further heat treatment, and other modifications upon the nutritive value of cow's milk. Weanling rats maintained on a cow's milk diet for 6 weeks grew well, and females maintained a longer period of time reproduced and lactated normally through three generations. No seasonal variation was observed in the nutritive value of raw, pasteurized, or homogenized milk, and neither pasteurization nor homogenization had an adverse effect upon its nutritive value when growth, reproduction, and lactation performance were used as the criteria of measurement. Young rats, however, maintained on a mineralized cow milk diet had a tendency to accumulate excess fat in their livers. This fatty liver condition was found to be directly related to the butterfat content of the milk diet, but was not related to season, pasteurization, or a deficiency of lipotropic factors.

Effect of feeding soybeans on blood plasma carotene and vitamin A of dairy calves. M. F. Ellmore and J. C. Shaw (Dairy Dept., Maryland Ag. Experiment Station, College Park). *J. Dairy Sci.* 37, 1269-72 (1954). In all cases in which the concentrate ration contained 30% soybeans, either cooked or raw, and the carotene intake was 32 γ per pound of body weight, the plasma vitamin A levels of the calves were much lower than those in the control animals and lower than would be considered safe. The data indicated that a minimum of approximately 64 γ of carotene per pound of body weight was needed to provide a safe margin for young calves when soybeans make up as much

as 30% of the ration. The blood plasma vitamin A was also depressed by the feeding of soybeans when vitamin A was provided in the form of vitamin A ester. Thyroprotein did not prevent the depression of plasma vitamin A caused by the feeding of soybeans.

Cottonseed meal in poultry feed, a distinctive yolk component in the fresh eggs of hens fed gossypol. C. R. Grau, E. Allen, M. Nagumo, C. L. Woronick, and P. A. Zweigart (Dept. of Poultry Husbandry, U. of Calif., Davis and Berkeley). *J. Agr. and Food Chem.*, 2, 982-86 (1954). Cottonseed meal is a desirable protein concentrate, but it is not now used in rations for laying hens because the gossypol it contains has an adverse effect on egg quality, particularly of stored eggs. In this study an attempt was made to fractionate yolks of normal and "gossypol" eggs to discover differences between them. It was found that yolks of hens fed gossypol contain a yellow component not extractable by acetone, but soluble in 3 to 1 hexane-acetone. Although the amount of this component, estimated by its absorbance at 400 m μ , was related directly to the level of gossypol fed, its absorption spectrum was different from that of gossypol. Quantitative estimation of the egg yolk component will serve as a convenient measure of biologically active gossypol.

C¹⁴-cholesterol. VI. Biliary end-products of cholesterol metabolism. M. D. Siperstein, F. M. Harold, I. L. Chaikoff, and W. G. Dauber (School of Medicine, and the Dept. of Chem., Univ. of California, Berkeley). *J. Biol. Chem.* 210, 181-91 (1954). A method for the paper chromatographic separation of the bile acids was described. The end-products of cholesterol metabolism in the rat were studied with this procedure. During the first 7 hours following the injection of cholesterol-4-C¹⁴, radioactivity was visible only in taurochenodesoxycholic and lithocholic acids and sometimes in an unidentified compound designated here as Compound Y. The possibility that lithocholic and chenodesoxycholic acids were intermediate in the conversion of cholesterol to cholic acid was discussed.

The rat as a test animal in evaluating artificial human milk for infants. P. Roine, H. Gyllenberg, M. Rossander, R. Vuokila (Dept. of Nutritional Chem., Univ. of Helsinki, Finland). *Nature* 174, 519 (1954). The effect of the hexametaphosphate-lactose-milk on the pH of the feces was probably due both to changes in the curdling properties of casein in the stomach and its absorption in the intestines, and to alterations in the composition of the intestinal flora. Further investigations into these questions and into the applicability of such milk formulations as food for young infants are in progress.

Effects of various diets on the diurnal patterns of blood plasma lipides of dairy calves. H. A. Ramsey, G. H. Wise, S. B. Tove, and R. K. Waugh (Dept. of Animal Industry, North Carolina State College, Raleigh). *J. Dairy Sci.* 37, 1357-67 (1954). The effects of semi-synthetic diets containing different fats (hydrogenated cottonseed oil or milk fat) and carbohydrates (lactose or glucose) on the diurnal patterns of various blood plasma lipides (Allen's "plasma fat," total lipides, total cholesterol and lipide phosphorus) and blood sugar of dairy calves were determined. Of the patterns studied, differences in dietary fat were reflected only in trends of "plasma fat" and only during the first 5 hours after feeding. "Plasma fat" of calves fed the milk-fat diets decreased until the third hour and plateaued to the fifth hour, whereas that of calves fed the hydrogenated cottonseed-oil diets increased to a peak by the second hour and declined to the fifth hour.

The role of diet in the management of atherosclerosis. *Nutrition Reviews* 12, 325-28 (1954). Recent clinical and experimental studies in the field of atherosclerosis have excited interest in the possibility that the elevated serum lipides sometimes associated with this disease in man may be lowered by dietary means. If control of serum lipides through dietary management, in turn, could be shown to influence favorably the course of such serious manifestations of atherosclerosis as coronary heart disease, it would be of great importance to practitioners of medicine and public health.

Dietary fat and liver necrosis. *Nutrition Reviews* 12, 312-13 (1954). There seemed little doubt from these results that the inclusion of a small amount of fat enhanced the neerogenicity of diets low in sulfur-containing amino acids and α -tocopherol. The livers showed fatty infiltration and diffuse fibrosis. This was particularly marked when the high fat diets were fed. Excessive fat deposition was prevented by methionine but aggravated by cystine.

Butyrate as a precursor of milk constituents in the intact dairy cow. M. Kleiber, A. L. Black, Mary A. Brown, J. Luick, C. F.

Baxter, and B. M. Tolbert (College of Ag., Univ. of California, Davis). *J. Biol. Chem.* 210, 239-47 (1954). Intact normal dairy cows were injected with sodium butyrate-1-C¹⁴ and -2-C¹⁴ in single doses ranging from 7 to 12 μ c. of C¹⁴ per kilo of body weight. The relative rate of oxidation of the carboxyl carbon of butyrate appeared to be between that of acetate and that of propionate, and the relative oxidation rate of the carbon in the 2 position of the molecule nearly the same for butyrate as for acetate and propionate.

Action of squalene upon carcinogenic hydrocarbons. H. Sobel and Jessie Marmorston (Institute for Medical Research, Cedars of Lebanon Hospital, Los Angeles 29, Calif.) *Nature* 174, 553-54 (1954). Only 7 per cent of 7,12-dimethylbenz(a)anthracene could be recovered after exposure to squalene for one week at 37°C. Nothing could be recovered after the second week. In the case of 3-methylcholanthrene 30 per cent remained after the first week and only traces were found afterwards.

The carotene, carotenoid and chlorophyll contents of some Scottish seaweeds. E. C. Owen (Hannah Dairy Res. Inst., Kirkhill, Ayr.). *J. Sci. Food Agr.* 5, 449-53 (1954). Two species of Chlorophyceae (green algae), two Rhodophyceae (red algae), five Phaeophyceae (brown algae) and one dockweed were examined. Samples were saponified and extracted with ethanol and petroleum ether. Carotenoids in the extract were determined spectrophotometrically at 451 m μ . A portion of the extract was chromatographed over alumina; carotenes were eluted with 3% acetone in hexane and estimated spectrophotometrically. Total chlorophyll was determined by extraction of the plant material with methanol and determination of absorption in the red region of the spectrum. In the brown algae, carotene was usually more abundant than xanthophyll. Red and green algae contained less carotene than xanthophyll. It is concluded that the total contents of pigments vary with environmental conditions and that the amounts of carotenoids are related more nearly to the amount of chlorophyll than to the total dry substance.

Vitamin A ester composition and process of preparing vitamin A ester. W. E. Stieg and A. T. Nielsen (Chas. Pfizer and Co., Inc.). *U. S. 2,693,435*. Mixed edible oil fatty acid esters of vitamin A are obtained by contacting a lower alkanolic acid ester of vitamin A with an edible oil in the presence of an alkaline catalyst.

Lipid requirements of the larva of the housefly *Musca vicina* (Macq.) reared under non-aseptic conditions. P. H. Silverman and Z. H. Levinson (Med. Res. Labs., Medical Corps, Israel Defense Army). *Biochem. J.* 58, 291 (1954). The lipid requirements of the larvae of the housefly, *Musca vicina*, have been studied. The only lipid required is contained in the sterol fraction of the wheat-bran medium. This sterol was identified as sitosterol; however, cholesterol, cholesteryl acetate and cholest-4-en-3-one were found to produce the same biological activity as sitosterol. Cholestan-3-one does not replace cholesterol; moreover, it is an antagonist of the normal 'active' steroids, inhibiting growth and preventing pupation.

Studies on the lipids of *Musca vicina* (Macq.) during growth and metamorphosis. Z. H. Levinson and P. H. Silverman (Med. Res. Labs., Medical Corps, Israel Defense Army). *Biochem. J.* 58, 294 (1954). A study of the changes in the moisture and lipid content of the housefly during growth and metamorphosis is recorded. The lipid content of *M. vicina* rises in 7 days from 2.5 μ g. in the egg to 1225 μ g. in the late third-stage larva. Within 24 hours of the onset of pupation the fat content drops to 880 μ g. The 48 hour old mature pupa contains 714 μ g. fat of which, 2 days later, 294 μ g. can be recovered from the emergent housefly and 22 μ g. from the puparium. It appears that 400 μ g. of lipid is used in the first part of the pupation period and about 400 μ g. in the latter part. No appreciable change in the saponification number is observed during larval growth and pupation. The fat of the emergent housefly contains a significantly higher proportion of shorter-chain fatty acids. During larval growth, the fatty acids of the wheat-bran medium are laid down in their unsaturated state. With the onset of pupation they are saturated or broken down into shorter-chain fatty acids.

Changes in chemical composition during the development of "cholesterol fatty livers." Jessie H. Ridout, C. C. Lucas, Jean M. Patterson and C. H. Best (Banting and Best Dept. of Med. Res., Univ. of Toronto, Toronto 5, Can.). *Biochem. J.* 58, 297 (1954). The data presented shows that in female rats consuming a cholesterol-rich, hypolipotropic diet, the percentages of total lipids and of cholesteryl esters in the liver reach more or less limiting values within three weeks and then remain relatively constant throughout the period of observation (7 weeks).

The livers continue to increase abnormally in size at a constant rate and in this experiment were double the normal weight at the termination of the study.

Preventive and curative studies on the "cholesterol fatty liver" of rats. *Ibid.* 53, 301(1954). Crystalline cholesterol was added at different concentrations. The livers of rats fed these rations and of other rats fed similar rations containing various lipotropic supplements were analyzed for lipid content. At moderate intakes of cholesterol (0.2%) sufficient dietary choline or betaine were able to prevent the excessive deposition of both glycerides and cholesteryl esters. Vitamin B₁₂ exerted a considerable curative lipotropic action on the glycerides but much less on the cholesteryl ester fraction of liver lipids. Inositol was found to be without any appreciable lipotropic effect.

Effects of lipotropic substances on the cholesterol content of the serum of rats. *Ibid.* 53, 306(1954). Free and total cholesterol have been determined in the blood sera of young adult rats maintained on natural and on purified diets. The rats fed the stock ration showed 70 mg./100 ml. of which 12 mg./100 ml. are in the free form. The rats fed purified hypolipotropic diets showed a progressive drop in bound serum cholesterol as the experiment continued. In preventive studies choline and betaine maintained the serum cholesterol within the normal range but inositol was not effective. In curative studies choline, betaine and vitamin B₁₂ were effective but inositol was not effective.

Fatty acid and cholesterol synthesis rates in the intact rat. T. T. Hutchens, J. T. Van Bruggen and E. S. West (Dept. Biochem., Univ. of Oregon Med. School, Portland, Oregon.). *Arch. Biochem. Biophys.* 52, 261(1954). An approach to the determination of lipide synthesis rates in the individual intact rat using single tracer injection, short-term experiments is described. Use is made of respiratory C¹⁴O₂ data to evaluate the carbon flux through the precursor stages. Fatty acid and cholesterol synthesis rates determined in this manner are reported as mg. lipide synthesized/hr./100 g. animal weight for total animal, liver, and carcass of normal, chow-fed Sprague-Dawley rats in the postprandial, postabsorptive, and 18-hr. fasted states.

Intracellular distribution of vitamin A esterase activity in rat liver. J. Ganguly (Dept. Biochem. and Nutrition, Univ. of Southern California, L. A., Calif.). *Arch. Biochem. Biophys.* 52, 186(1954). Various cell fractions from livers of vitamin A-depleted rats were obtained by using the differential centrifugation technique. Their relative ability to hydrolyze vitamin A acetate was also studied. The activity was quantitatively localized in the microsomal fraction, whereas the nuclear, mitochondrial, and supernatant fractions were inactive.

Isolation of pentachloronaphthalene from cottonseed feed pellets. R. T. Blickenstaff and J. E. Callen (Miami Valley Labs., Procter & Gamble Co., Cincinnati, Ohio). *Anal. Chem.* 26, 1586 (1954). A method was needed to enable the determination of a possible contaminant, pentachloronaphthalene, in cottonseed feed pellets. The isolation was carried out by ether extraction of the pellets, saponification of the ether extract, chromatography on alumina of the unsaponified portion, liquid-liquid extractions of the chromatographic fraction containing chlorine, and crystallization of the main fraction from ethanol. The material obtained agreed with that of pentachloronaphthalene in its ultraviolet, infrared, x-ray diffraction patterns, chemical analyses, and melting behavior. As little as 8 p.p.m. of pentachloronaphthalene can be determined in cottonseed feed pellets.

• Drying Oils

Raymond Paschke, Abstractor

Copolymers of vinyl compounds, polyphenylether alcohols and unsaturated fatty acids. J. W. McNabb (American Can Company). *U. S.* 2,689,834. This describes an interpolymer of styrene and a polyester of dehydrated castor oil acids and an esterifiable glyceryl polyether of 2,2-bis(4-hydroxyphenyl) propane. The molecular weight is from 1400 to 1600.

Resins from cyclopentadiene glyceride oil styrene and alpha methyl styrene. W. K. Hoya (Pittsburgh Plate Glass Company). *U. S.* 2,689,233. A process using an organic peroxide catalyst.

Copolymers of conjugate and non-conjugate drying oils, cyclopentadiene and styrene. J. F. McKenna (Pittsburgh Plate Glass Company). *U. S.* 2,689,231. A new coating material is described. This consists of 5 to 30% of cyclopentadiene, 10

to 45% of styrene or similar compounds, of 15% to 50% of tung oil, and of the remainder which is a non-conjugated drying oil.

Catalysis by complexes—drying of linseed oil. A. C. Zettlemoyer and R. R. Myers (Lehigh Univ.). *Ind. Eng. Chem.* 46, 2220(1954). In studying the use of metal complexes as drying catalysts for oleoresinous vehicles, cobalt was replaced by manganese and iron in conjunction with a suitable amine additive. In some cases manganese catalysis was improved to the point at which it was superior to cobalt catalysis; in general, the greatest improvement occurred with diamines or other difunctional amines possessing resonant structures and by certain amines of large steric requirements. Iron was susceptible to improvement by the same types of amines and to a greater extent in proportion to its original activity than was manganese. The finding that catalysis by manganese can be enhanced by relatively inexpensive compounds may constitute an important step in the development of a new drier technology.

Method of production of drying oils from kerosine hydroxy acids (acid esters). P. V. Serb-Serbin. *Byull. Obmenu Opyt. v Lakorasoch. Prom.* 1953(4), 18-22; *Referat. Zhur., Khim.* 1953, No. 7720. A synthetic drying oil was produced from ethylene glycol ethers and kerosine acid esters by first pre-heating them at 100-110° to remove moisture and volatile matter, followed by internal esterification at 150-225°. The process was accelerated by vacuum and also by blowing air or CO₂. Additional esterification of kerosine acid esters was carried out by adding 12-15% of ethylene glycol ethers or diethylene glycol at 150-80°. This addition was made in 2 or 3 steps while gradually raising the temperature to 225, 250, and 270°. The reaction was considered completed when the acid no. of the ester was 10-15. The degree of condensation of the ester was determined from the viscosity of its solution in a 1:1 mixture of solvent naphtha-xylene. Preliminary tests of the film-forming properties of this synthetic drying oil showed it to be suitable for inside and outside work. (*C. A.* 48, 11079)

Cooking of tung oil. H. Schroeder. *Ing. Chim.* 32, 198(1950). *Chem. Zentr.* 1951, I, 3569. Rapid heating to 280° and rapid cooling are recommended. Tung oil high in acid polymerizes more slowly than that low in acid. Alkyl phenol resins are especially suitable for cooking with oil. (*C. A.* 48, 11079)

Aluminum alcoholates—a new group of paint additives. J. Rinsl (Chemical Research Associates, Bernardsville, New Jersey). *Paint Varnish Production* 44(11), 70(1954). The preparation, the chemical properties, the application in paints, and the drying principle are discussed.

Epoxy resin esters in stoving finishes. A. G. North. *Paint Oil Colour J.* 126, 576(1954). The completely saturated esters based on lauric and hydrogenated castor fulfil color and non-gas-check requirements, but show reduced chemical resistance and toughness to the stage where they are not appreciably superior to normal alkyd resins, better adhesion being their only main advantage over alkyds. The semi-saturated types, represented by castor esters, have to some extent the faults of both saturated and unsaturated esters in that films are not very water and chemical resistant and also discolor to a certain extent. They can, however, sometimes provide a useful compromise. The unsaturated esters based on soya and sunflower acids provide the best alternative to D.C.O. esters in terms of economy and a greatly reduced gas-checking tendency without noticeable sacrifice in general film performance. They do not provide superior color retention, and at present the best answer for non-yellowing epoxy finishes is the pure epoxy resin, non-drying alkyd, melamine system.

Electronic explanation of catalysis of linseed oil drying. R. R. Myers and A. C. Zettlemoyer (National Printing Ink Res. Inst., Lehigh Univ., Bethlehem, Pa.). *Ind. Eng. Chem.* 46, 2223-25 (1954). A difference of opinion existed as to whether the rate determining step was the abstraction of hydrogen or the subsequent polymerization, presumably via free radicals. Regardless of which view was taken, the proposed electronic explanation of catalysis will apply. The reversible formation of covalent bonds could be pictured as taking place between a 3d electron of the metal and the free radical just as it has been depicted for molecular oxygen.

Condensation of resorcinol and m-cresol with tung oil. T. N. Mehta, C. V. N. Rao, D. B. Rishi and N. H. Mulik (Nagpur Univ.). *Paintindia* 4(5), 29(1954). Tung oil, the phenol and phosphoric acid catalyst were heated for four hours on the steam bath. The phenol added either at the ethylenic linkage or at the ester group. Resorcinol is less reactive than m-cresol.