ABC Report for June 30, 1948, Covers Six-Month Period

AS A MEMBER of the Audit Bureau of Circulations since 1947, the Journal of the American Oil Chemists' Society issues each six months a publisher's statement indicating various sworn details about its circulation. Of the information contained in the report for May, 1948, as the selected month the most interesting to members of the Society might be the geographical breakdown and the analysis by occupation. It will be noted that the subscribers are divided between domestic and foreign and are slightly under the numbers of the Society membership, which is shown as "Assn. Subs."

PERIOD ENDING JUNE 30, 1948

10. BUSINESS ANALYSIS OF SUBSCRIPTIONS based on May, 1948, issue:

Classification by Business & Industry	Mail Subs.	Term Bulk Subs.	Assn. Subs.	TOTAL	%	Classification by Title & Occupation 1 Corps., Companies & Officials	2 Plant Operating Executives	3 Research Directors, Chemists & Chemical Engineers in Research & Control	4 Sales & Advertising Personnel	5 Industrial Libraries	6 Unclassified
I. Manufacturers or Processors of:											
(a) Animal & Fish Fats & Oils	20	10	52	91	3.90	15	24	44	4	4	
(b) Vegetable Fats & Oils	40	27	273	340	14.56	32	131	165	5	4	3
(c) Drying & Paint Oils	31	1	89	121	5.18	21	15	71	9	5	
(d) Vitamin Oils	9	1	19	29	1.24	5	7	10	2	5	
(e) Margarine	2		16	18	0.77	1	9	7	1		
(f) Soaps & Glycerine	40	2	98	140	6.00	27	33	73	2	5	
(g) Fatty Acids	6	1	42	49	2.10	6	14	23	6		
(h) Animal, Fish, Vegetable Fats & Oils	33		116	149	6.38	24	20	91	10	2	2
(i) Vegetable Fats & Oils, Drying & Paint Oils	6		28	34	1.46	9	5	15	3	2	
(j) Vegetable Fats & Oils, Soap & Glycerine	5		53	58	2.48	5	15	37	1		
(k) Vegetable Fats & Oils, Margarine	2		27	29	1.24		5	24			
(l) Other Combinations of (a to g)	47	1	107	155	6.64	14	29	94	5	8	5
(m) Other Food Products	8		21	29	1.24	5	2	20	1	1	
	253	43	941	1,242	53.19	164	309	674	49	36	10
II. (a) Independent Laboratories, Consulting Chemists, Government	54	1	233	288	12.34						
(b) Commissioned Officers in Armed Forces	None		None	None	None						
III. Faculty, Universities, Colleges, Technical Institutions	91	3	66	160	6.85						
IV. Allied Societies & Public Libraries	21		6	27	1.16						
V. Miscellaneous	110	6	165	281	12.03						
VI. Unclassified	200	33	104	337	14.43						
TOTAL	734	86	1,515	2,335	100.00						
Foreign				836							
TOTAL				3,171							

11. NET PAID CIRCULATION INCLUDING BULK BY STATES based on May, 1948, issue:

NOTE—Total circulation of this issue was 2.32% greater than average total circulation for period.

State	Mail Subs.
Maine	
New Hampshire	
Vermont	1
Massachusetts	80
Rhode Island	8
Connecticut	28
New England	117
New York	277
New Jersey	189
Pennsylvania	125
Middle Atlantic	591
Delaware	21
Maryland	28
District of Columbia	30
Virginia	18
West Virginia	1
North Carolina	6
South Carolina	8
Georgia	43
Florida	9
South Atlantic	164
Ohio	180
Indiana	57
Illinois	321
Michigan	53
Wisconsin	38
East North Central	649
Kentucky	20
Tennessee	55
Alabama	14
Mississippi	18
East South Central	107
Minnesota	72
Iowa	52
Missouri	53
North Dakota	2
South Dakota	1
Nebraska	11
Kansas	14
West North Central	205
Arkansas	13
Louisiana	63
Oklahoma	17
Texas	131
West South Central	224
Montana	1
Idaho	1
Wyoming	
Colorado	4
New Mexico	2
Arizona	3
Utah	1
Nevada	
Mountain	12
Washington	16
Oregon	9
California	153
Pacific	178
Unclassified	
United States	2,247
U. S. Territories	9
Canada	79
Foreign	836
Miscellaneous	
Military Service—Destination unknown	
Grand Total	3,171

Cottonseed History

AN historical account of technical developments and research on cottonseed was given before the National Cotton Congress in Dallas, Tex., on July 23, 1948, by M. K. Thornton, extension agricultural chemist, A. & M. College of Texas. A condensation follows.

Cottonseed was recognized as a potential source of meal and oil before the advent of the cotton gin in 1793. Many factors operated against the development of an oil industry at that time, one of which was the lack of sufficient commercial seed. With the development of the cotton gin, seed became plentiful and many patents relating to processing were granted. Several mills were built in the early years of the 19th century, but until the linter, huller, and separator were developed during the period 1850-1860, they were mostly unsuccessful. Continued development of the early equipment has given us dustless linters, dustless cake mills, improved rolls, cookers, and hydraulic and screw presses.

The first successful cottonseed mill was built in Natchez, Mississippi.

A linter was built about 1852 that is the basis for our modern machines. One of our chemists went to France in 1856 to learn how cottonseed oil was being used by the French. When he returned, he began to refine cottonseed oil for use as a substitute and adulterant for olive oil.

One of the milling problems encountered was the short lint on the seed. Linters, hullers, and separators were invented and placed on the market from about 1850 through 1870. The number of mills increased rapidly following the Civil War. The oil at first was the most useful material in the seed. The oil was used largely for making soap or for adulterating other fats, the hulls for fuel, the cake for fertilizer.

A method for deodorizing cottonseed oil and removing the oxidized flavor was perfected around the turn of the century. It was in this series of investigations that David Wesson and David Schwartz made their great contributions to the cottonseed industry although they did not originate this method of purifying oil. Deodorization of the oil as we know it today is the result of continuing experiment and research. This deodorized oil soon replaced olive oil and finally took over the market. Winterizing was developed in the laboratories about this time and high grade salad oils were brought on the market. The solid portion frozen out during the winterizing process was used for the making of cooking fats and oleo.

Two Frenchmen working with hydrogen and various catalysts in 1895 found that they could alter the structure of certain unsaturated compounds. Cottonseed technologists soon adapted this process to the cottonseed industry, and today we have a wide range of hardened cottonseed oils for use as cooked fat and numerous other products of value.

Technologists for the packing houses had developed a table spread from the soft fats of cattle and hogs by a process of deodorization that was finding a market as a substitute for butter. Vegetable oil chemists began to adopt their techniques and made

table spreads from cottonseed oil by proper blending with other materials.

Cottonseed meal and cake processed in the early days went into fertilizer. Some feed was made from the seed for cattle during the 1860's, but it was not until sometime in the 70's that any considerable amount was utilized for this purpose in the United States. Most of the cake and meal made was shipped to England and other European countries. Various experiment stations and large feeders began to develop the value of cake and meal in various feeding experiments. Virtually all of the cake now produced is used in this country as stock feed.

Research men recently discovered that hulls might be used as a source of a high grade bleaching carbon for use in cottonseed oil refining and other industries. Hulls yield furfural, which is used in the plastics industry and in refining lubricating oil. A rare sugar named xylose has been extracted from the hulls. The residue after these extractions is a high grade cellulose suitable for making rayon and numerous other products.

It has been found that the more rapidly the cooking meats are heated the better is the quality of the oil. Many other close adjustments must be made in the time of adding the moisture to the cooking meats, the temperature of the water when added to the meats, the length of time of cooking and the temperature at which the meats are finished before going to the press.

Research workers at the University of Tennessee have developed a pressure cooker that will turn out a high quality cake and a maximum yield of oil consistent with cost. Regardless of the quality of the press work, however, from 5% to 7% of the oil is left in cake from the hydraulic press. When oil is high in price, this becomes quite an item.

Europeans have used solvent extraction for a number of years to remove the maximum amount of oil possible. Much research has also been done in this country on solvent extraction of cottonseed. Wesson and others used petroleum solvent under both low and high pressure between 1910 and 1925. These processes work satisfactorily so far as the amount of oil extracted per ton is concerned, but mechanical difficulties, solvent losses, and cost of operation often bar the way to both industry and the research worker, however. This field has been reopened during the past few years. The high price of oil with improved techniques, equipment, and solvents has brought renewed interest in the solvent extraction process.

Because of the low temperatures used in the solvent process, the protein of the seed is not altered. The resulting cake lends itself to extraction of the protein for making plastics. When the laboratory worker has learned to produce thread, plastic board, and other plastics from cottonseed protein, the solvent process will really come into its own.

Herbert Fineberg has been appointed chief chemist of the GLYCO PRODUCTS COMPANY INC., Brooklyn, N. Y., and Natrium, W. Va.

Flaxseed Crushers Face Difficulty

THE weekly news letter from Archer-Daniels-Midland Company of August 26, 1948, points out some of the difficulties now faced by the flaxseed crushers. Processors' contracts between the flaxseed crushers and the government called for a support price of $6 per bushel, Minneapolis basis, for No. 1 flaxseed. This contract was issued by Commodity Credit Corporation so that the marketing of the crop could be handled by the crushers and the producers be assured of receiving support price without the Commodity Credit Corporation doing the buying themselves. To protect the crushers the Commodity Credit Corporation agreed to purchase linseed oil at 26.7 cents per pound, f.o.b. mills, zone 1. This price was settled on the basis of a price of $65 per ton, bulk, Minneapolis, for linseed meal and provided a margin for the crushers' costs in carrying out their crushing program.

Since these contracts were signed the increase in cotton and the prospective very large soybean crop have caused a drop in the market for linseed and all oilseed meals. To quote from the news letter: "The value of the linseed oil in a bushel of flaxseed at the Commodity Credit Corporation support price (which is also the current market), plus the value of the linseed meal from a bushel of flaxseed at the current market, is about 14 cents per bushel below the $6 per bushel flaxseed price, plus production costs, the latter placed at a figure agreed upon by Commodity Credit Corporation and crushers. The figures placed the crushers in an impossible situation, with the only alternative either to amend the processor contract or, as a last resort, withdraw from the flaxseed market."

A meeting was arranged with Production and Marketing Administration officials and the crushers, and a proposal submitted by the crushers to assume a portion of this loss with the Commodity Credit Corporation assuming the remainder. This proposal was rejected by Commodity Credit Corporation and this Corporation has, according to the news letter, started to purchase flaxseed in the Minneapolis market at the support price with the reported intention of exporting this seed to European mills. The crushers opposed this procedure with the statement that "due to the action of the Commodity Credit Corporation in buying flaxseed with the intention of exporting their purchases, drying oil consumers are likely to be again far short of needed supplies although we have just produced the second largest flaxseed crop in our history."

The Chemical Plants division of BLAW-KNOX COMPANY has received a subcontract for engineering and procurement services on a new 500-ton per day soybean extraction plant to be erected at Decatur, Ill., for Spencer Kellogg and Sons inc. The large plant, expected to be completed in time for the 1949 crop, will produce toasted and cooled flakes as well as crude soybean oil.

Swift and Company Expands

OPERATIONS will begin this fall in a new Industrial Oil processing plant at Hammond, Ind., that will add new sources of glycerides and fatty acids to the industrial oil production of Swift and Company, according to E. A. Moss, vice president. The new plant is located on part of a 70-acre tract at 165th Street and Indianapolis Boulevard, which is being set aside by the company for further development of technical products facilities. Eight buildings and a tank farm are inclined in the construction.

This new construction will include units to carry out three processes, namely, solvent crystalization, solvent fractionation, and fat splitting. By these processes, integrally operated for the first time in this new plant, Swift and Company will produce improved industrial oil products of uniformity in quality, and in quantities sufficient to fill the requirements of mass production industries. At the same time, the company can more fully utilize the raw materials available from its many plants.

Products from the plant will provide raw materials to industries that manufacture such items as cosmetics and toilet creams, soaps, floor waxes and polish, linoleum, phonograph records, candles, shoe polish, rubber products, paint, textiles, wallpaper, printing inks, cleaning and waterproofing agents, leather dressing, buffing and lubricating compounds, wire drawing compounds, insecticides, and cutting oil.

Research into new and improved products and new uses for these products will be a vital part of the new operation and will be carried on in an experimental pilot plant. Research also will continue in Swift and Company's central research laboratories.

The present production of industrial oil by Swift and Company is obtained almost entirely from glycerides of animal origin. However, the new Hammond plant will also allow volume production of glycerides and fatty acids from vegetable and marine oils.

Swift and Company first engaged in the processing of industrial oil as a means of utilizing raw materials from its meat packing plants. As the business developed, it was necessary to expand this phase of the business in order to include a full line of products. Also, expansion has come about as a natural result of the company engaging in vegetable oil extraction and refining during past years.

The fat splitting unit in the new plant is a continuous hydrolosis unit constructed by the Blaw-Knox Company. This process is a continuous high temperature hydrolosis employing countercurrent reaction in a pressure tower with internal heat exchange. In the unit the fat is introduced into the splitting column at the bottom and water at the top. These two materials react countercurrently in the column at about 500°F. and 725 pounds per square inch pressure.

Heat exchange between fatty acid and water takes place in the top portion of the column and between fat and sweetwater in the lower portion. A rapid splitting takes place and the reaction products are continually removed—the fatty acids and a small quantity of water from the top of the column and the glycerine sweetwater from the bottom. The heat required to maintain the contents of the column at operating temperature is supplied by direct high pressure steam.

The fatty acids produced are light colored due to the brief reaction time and the absence of the effects of harsh catalysts. The percentage of split obtained is high and the unsaponifiable matter is kept at a minimum. Thus Swift will produce mixed and fractionated fatty acids of high quality now in demand by manufacturers of synthetic rubber, plastics, lubricating greases, synthetic resins, printing inks, soap, cosmetics, and numerous other products. The glycerine produced from the sweetwater will be used in products such as cellophane, flexible glue, and printing rollers.

The solvent fractionation process at Hammond is to be carried out in a unit being built by the M. W. Kellog Company employing their Solexol process recently introduced into the glyceride oil industry. The Solexol process employs propane as a solvent and operates at pressures sufficient to maintain the propane in a liquid state at temperatures below 206° F.

The process is a continuous liquid-liquid extraction whereby the liquid propane and fatty materials are passed countercurrently through a column with the temperature and pressure so controlled that a portion of the raw material is selectively taken up by the solvent and removed from the top of the column. The remainder of the feed stock, being insoluble, is removed from the bottom of the column along with small amounts of solvent. The overhead and bottom products are continually removed and stripped free of all solvent.

Decolorization, or solvent bleaching, is a specific example of solvent fractionation for which the Solexol process is extremely well adapted. For decolorization the temperature and pressure are so regulated that only a small portion of the feed stock is insoluble in the solvent. The removal of this portion, consisting primarily of color bodies, causes considerable bleaching of the glycerides or fatty acids which are taken up by the propane. This process will remove colors that normal refining and bleaching will not remove and with a much lower loss of product than that usually encountered by standard bleaching practice. Thus, by decolorization, the quality of numerous products can be improved.

By the other varied fractionations which can be carried out, drying oils, vitamin concentrates, and relatively pure fatty fractions of high quality can be produced for use in a wide variety of industries.

The third process, solvent crystalization or destearination, will be carried out in a unit also being constructed by the M. W. Kellogg Company. Solvent crystalization is a process for low temperature fractionation of fatty materials. In the unit being installed the feed stock is taken up with propane and the solution is then chilled until the higher melting fraction is crystalized. The slurry of crystalized fatty materials and liquid propane solution of the uncrystalized oil is then fed to a continuous filter where the fatty crystals are removed. The liquid and solid fractions are then stripped free of solvent.

By this process grease oils and grease stearines, red oil and stearic acid, and other fractionated fatty products can be obtained for widespread uses.

The same quality control system used on many of Swift's present products will be applied to the industrial oil program. This system consists of three main steps.

1. Specifications for each product will be drawn up by the research laboratories in conjunction with the production and sales departments involved. These specifications are based on the needs of the customer.
2. Each product will be tested by product control representatives of the research laboratories before it is shipped. The test results must match with the original specifications.
3. Product that does not conform with specifications will not be shipped.

Sales representatives in the field will be men who are trained in the chemistry and production of industrial oils. One of their chief functions will be to discuss with the customer his problems and needs and to relay this information to the research, production, and sales staffs. Thus by the work of this team customers will be supplied with products of maximum usefulness to their work.

The new Aminco-Stern Electrophoresis Apparatus, a complete electrophoresis laboratory measuring only 38 by 30 by 66 inches high, is announced by the AMERICAN INSTRUMENT COMPANY, INC., of Silver Spring, Md. Of great value for making electrophoretic, diffusion, adsorption, and refractive index measurements in the fields of medicine, clinical analysis, blood fractionation, biochemical research, physical chemistry, plant physiology, control analyses and others, the apparatus detects concentrations of 0.002% and measures concentrations of 0.01% and 2.5% simultaneously.

BLAW-KNOX COMPANY'S exhibit at the National Chemical Exposition to be held in Chicago, October 12-16, will emphasize the company's dual role as manufacturers of process equipment and as designers-builders of complete chemical plants, or any part thereof. A mechanical visualizer will illustrate the scope of the company's growing role in supplying equipment and engineering services to the expanding chemical inudstries.

STILLWELL AND GLADDING inc., located in the downtown section of New York City, is celebrating its 80th anniversary. The firm has devoted these years to the practice of general analytical and consulting chemistry. Well over 500,000 analysis jobs have been completed during these years of continuous activity. Stillwell and Gladding inc., is a member of the American Council of Commercial Laboratories, a group of 39 individual laboratories specializing in testing, research and inspection for every branch of American Industry.

Production of streptomycin, using a new process, is announced by the HEYDEN CHEMICAL CORPORATION at the plant near Princeton, N. J. The still-scarce antibiotic is being produced in a new unit of the plant especially designed for the purpose. The new unit contains the most modern streptomycin manufacturing equipment as well as spacious laboratories which will be used for all basic antibiotic research, including penicillin, streptomycin and other, lesser-known mold drugs.
