Perfume distilling operation, from a 15th century woodcut [2]

COSMETIC USAGE of fats and oils dates back to the dawn of history. The ancient Egyptians are reported to have used fatty-type hair cosmetics and wrinkle removers consisting of oil, wax, incense, and cypress berries. From early times, olive oil has been used extensively for cosmetic purposes. Through the 17th, 18th, and 19th centuries, lard, mutton tallow, and essential oils were ingredients of practically all pomades and ointments used for the skin and hair. There are historical references to the use of almond paste for beautifying purposes and to use of a creamy cleanser made from chocolate (cacao butter) and vanilla.

With the tremendous advance of chemical technology in recent years, the cosmetic industry has indeed become a sizeable segment of the U. S. economy. Last year, the retail sales of cosmetics preparations (exclusive of toilet soaps) rose past the two billion dollar mark. Cosmetic sales have doubled in the decade since 1952, the first year that they exceeded one billion dollars (*Chemical Week*, April 27, 1963, p. 50). A brief review of the diversity of lipid products used in cosmetic preparations will indicate the impressive role of the fats and oils industry as a supplier of ingredients for the cosmetic industry.

Table I illustrates the wide variety of materials which are useful in only one type of cosmetic application. It will be recognized immediately that by far the majority of these substances are lipid products either obtained directly from natural sources or derived therefrom by chemical modification. In addition to their softening or soothing action on the skin, many of these materials possess other properties which make them useful in a wide variety of other cosmetic preparations. Although the petroleum derivatives are, in some instances, equally as suitable as those of animal or vegetable origin, there are many applications wherein only fat and oil products possess the requisite properties.

TABLE I

Oil-Soluble Emollients [1]

1.	Wax esters: lanolin, spermaceti, beeswax.
2.	Steroid alcohols: cholesterol and other lanolin alcohols.
3.	Fatty alcohols: lauryl, cetyl, oleyl, and stearyl alcohols.
4.	Triglyceride esters: animal and vegetable fats and oils.
5.	Phospholipids: lecithin and aphalin.
6.	Polyhydric alcohol esters: mono- and di- fatty esters of ethylene glycol, diethylene glycol, polyethylene glycols, propylene glycol, glycerol, sorbitol, sorbitan, mannitol, pentaerythritol, polyoxyethylene sorbitol, and polyoxyethylene sorbitan.
7.	Fatty alcohol ethers: cetyl, stearyl, and oleyl ethers of ethylene oxide polymers.
8.	Alkyl fatty esters: methyl, isopropyl, and butyl esters of fatty acids.
9.	Hydrocarbon oils and waxes: mineral oil, petrolatum and paraffin.
10.	Hydrophilic lanolin derivatives: polyoxyethylene sorbitol lanolin . . . and polyxoyethylene lanolin derivatives . . .
11.	Hydrophilic beeswax derivatives: polyoxyethylene sorbitol beeswax . . .
12.	Silicone oils . . .

[1] Sagarin, Cosmetics-Science and Technology, Interscience Publishers, New York, 1957, p. 102.

[2] Courtesy, *American Perfumer and Cosmetics.*

Lanolin is probably one of the most well-known cosmetic ingredients. Aside from its contribution of emolliency, it imparts to cosmetic lotions or creams a certain richness of appearance characterized by sheen. It also acts as an auxiliary emulsifier or emulsion stabilizer, and it contributes to the "feel" of the cosmetic when applied.

Beeswax in certain water-in-oil emulsions is indispensable for its emulsifying activity. It too imparts a characteristic "look" and "feel." Spermaceti is of value as an emulsion stabilizer and thickening agent. It also gives a smooth "after-feel" upon application of the cosmetic.

The glycerides are valuable not only in their tri-ester form, for the monoglycerides are certainly old stand-bys in the formulation of creams and lotions.

The fatty alcohols, depending upon their chain length, are used for feel, stabilizing, and viscosity control of creams and lotions. They also find use as conditioning agents in shampoos.

The products that may be synthesized from the natural lipid products are legion. The following discussion merely illustrates the wide variety of fatty derivatives available today. The oversight of any manufacturer's products is unintentional.

Upon sulfonation, the glycerides become detergents. Although the use of these materials in shampoos may recently have declined to some extent, there is certainly still an active interest in this area. Acetylation of the monoglycerides yields products which have attractive features in emulsion stabilization. Depending upon the alkyl group, the acetylated products have interesting solvency features which may be useful in the formulation of skin cleansers.

Probably the most common chemical modification of the glyceride molecule is saponification. From this reaction is obtained glycerol and the fatty acids. Glycerol is certainly an old-timer in the cosmetic field as evidenced by the age-old "glycerin and rose water" formula for the treatment of skin chapping. Glycerol has its place in many present-day formulations in which it is a necessary ingredient for emulsion stability or for its solubilization properties. Although conflicting opinions have recently

(Continued on page 10)

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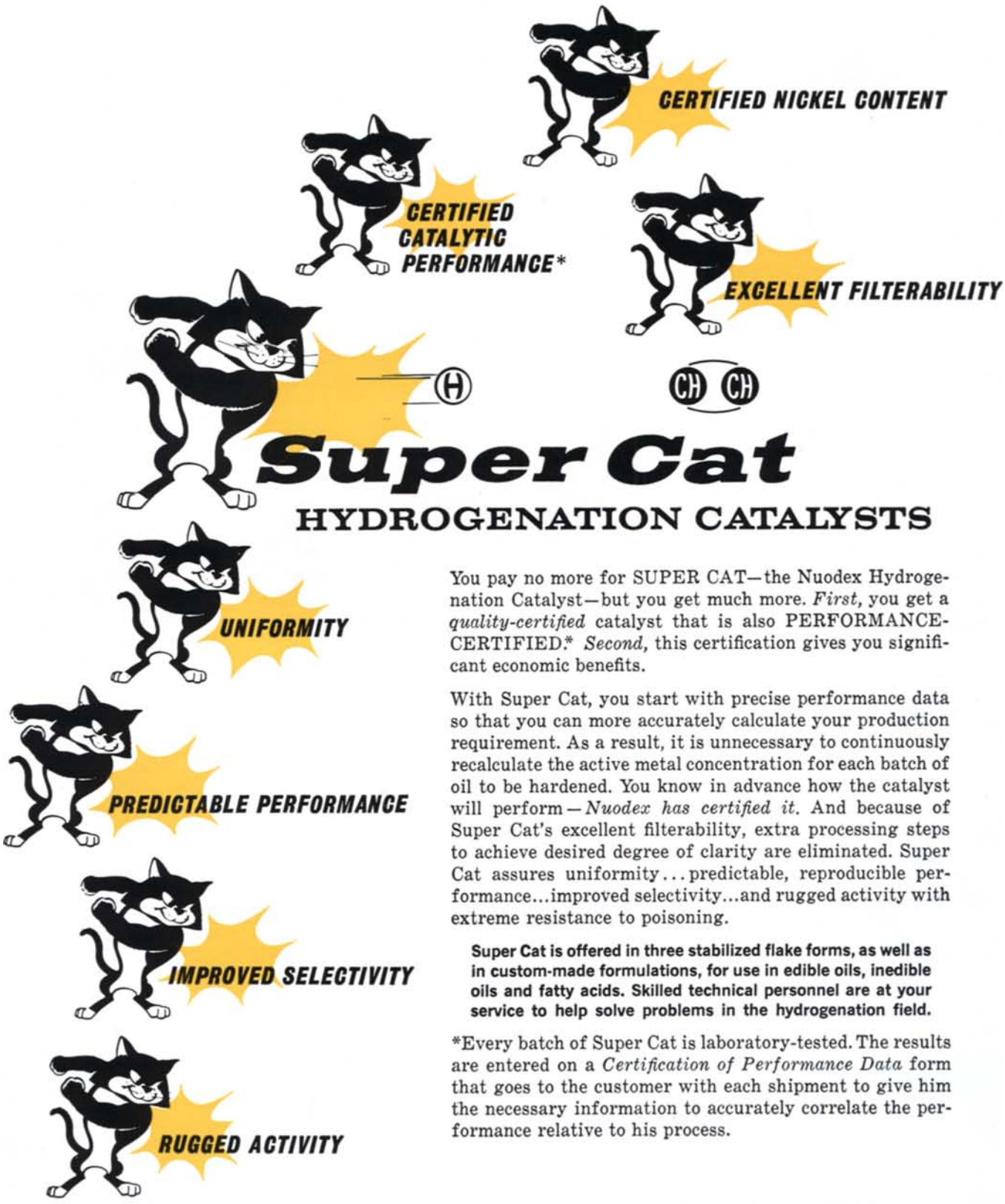

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1964 New Orleans Spring Meeting Moves into High Gear

R. T. O'Connor

With the Minneapolis Meeting already a past chapter in the history of AOCS, plans for the 55th Annual Meeting at New Orleans, La., April 19–22, 1964, move into high gear under the able leadership of R. T. O'Connor, General Chairman.

An interesting and informative Technical Program is already being prepared. In addition, a program for the ladies, a golf tournament, plant trips and other activities will be included in the plans. JAOCS will keep you advised on details as the program unfolds.

The following Committee Chairmen have been announced:

F. C. Magne
Golf

R. M. Persell
Treasurer

W. S. Singleton
Hotel Reservations

C. L. Hoffpauir
Vice Chairman

Joseph Pominsky
AOCS Liason

W. A. Pons, Jr.
Hotel Arrangements

H. P. Dupuy
Technical Program

L. E. Brown
Entertainment

J. P. Hughes
Publicity

N. B. Knoepfler
Registration

World Fat Congress to Meet in Hamburg this Month

DGF, IASC, AIS, IFSCC, IFMA to Participate

On the occasion of its 10th Anniversary, the International Society for Fat Research (ISF), together with the Deutsche Gesellschaft für Fettwissenschaft (DGF), will hold the First World Fat Congress, Oct. 12–18, 1964, in Hamburg, Germany, according to an announcement by ISF President H. P. Kaufmann (1954). Other participating associations include: International Association of Seed Crushers (IASC), Association Internationale de la Savonnerie et de la Détergence (AIS), International Federation of the Societies of Cosmetic-Chemists (IFSCC), and International Federation of Margarine Associations (IFMA).

Lectures, grouped in eight sections, will cover the whole field of fats and oils and their products:

1) Oil-seed cultivation, technology of vegetable and animal oils and fats; 2) Fundamental research and analysis (general methods); 3) Fats and foodstuffs (butter, margarine, edible oils, etc.); 4) Biochemistry and clinical biology of fats; 5) Soaps and detergents; 6) Fats and fatty acids in organic surface coatings; 7) Cosmetic science; and 8) Miscellaneous applications.

Chemists, engineers, biologists, physicians, cosmetic specialists, and others interested in the above subjects are cordially invited to participate. For further information, write to DGF, Geschäftsstelle, Lortzingstrasse 10, 44 Münster/Westf., Germany.

• *Names in the News*

L. G. Jenness (1934) has announced his retirement from the Kennecott Copper Corp., Sept. 1, where he had served as its Vice President. He will be engaged in a consulting practice in New York City.

Jack Levy (1962) has been appointed Manager of Market Research and Development for Nopco Chemical Co., Newark, N. J. He was formerly Director of their Technical Service Laboratories, and brings to his new assignment an extensive background on surface active agents and their uses in industrial processes.

L. S. Milazzo has been appointed General Manager of Cat-Chem Corp., according to an announcement by S. N. Milazzo (1948), the corporation's President. Mr. Milazzo was formerly Plant Manager of the Titanium-Zinconium Corp.

A. R. Baldwin (1944), Editor of *JAOCS,* has been elected Vice President by the Board of Directors of Cargill, Inc., having served previously as Director of Research. Dr. Baldwin has served the Society both as Vice President and President, and actively contributed to many of its standing committees. He was also the recipient of the fourth Alton E. Bailey Award this spring by the North Central Section for his outstanding contributions to the industry.

U.C.L.A. Announces Two Programs in Gas Chromatography

Two independent programs in Gas Chromatography, will be held at the University of Calif., Los Angeles, jointly sponsored by the Department of Chemistry, Engineering Extension, and Physical Sciences Extension, with R. L. Pecsok, Professor of Chemistry, as Coordinator. Attendance at both programs will be limited, with selection on a first-come, first-served basis.

An Advanced Research Conference will highlight a week, Feb. 3–7, 1964, with discussion on Progress in Gas Chromatography. On the conference program for Feb. 3–4 are: J. H. Purnell, University of Cambridge; C. N. Reilley, University of North Carolina; Paul Boyer, University of California; J. C. Sternberg, Beckman Instruments, Inc., and E. C. Horning (1960), Baylor University.

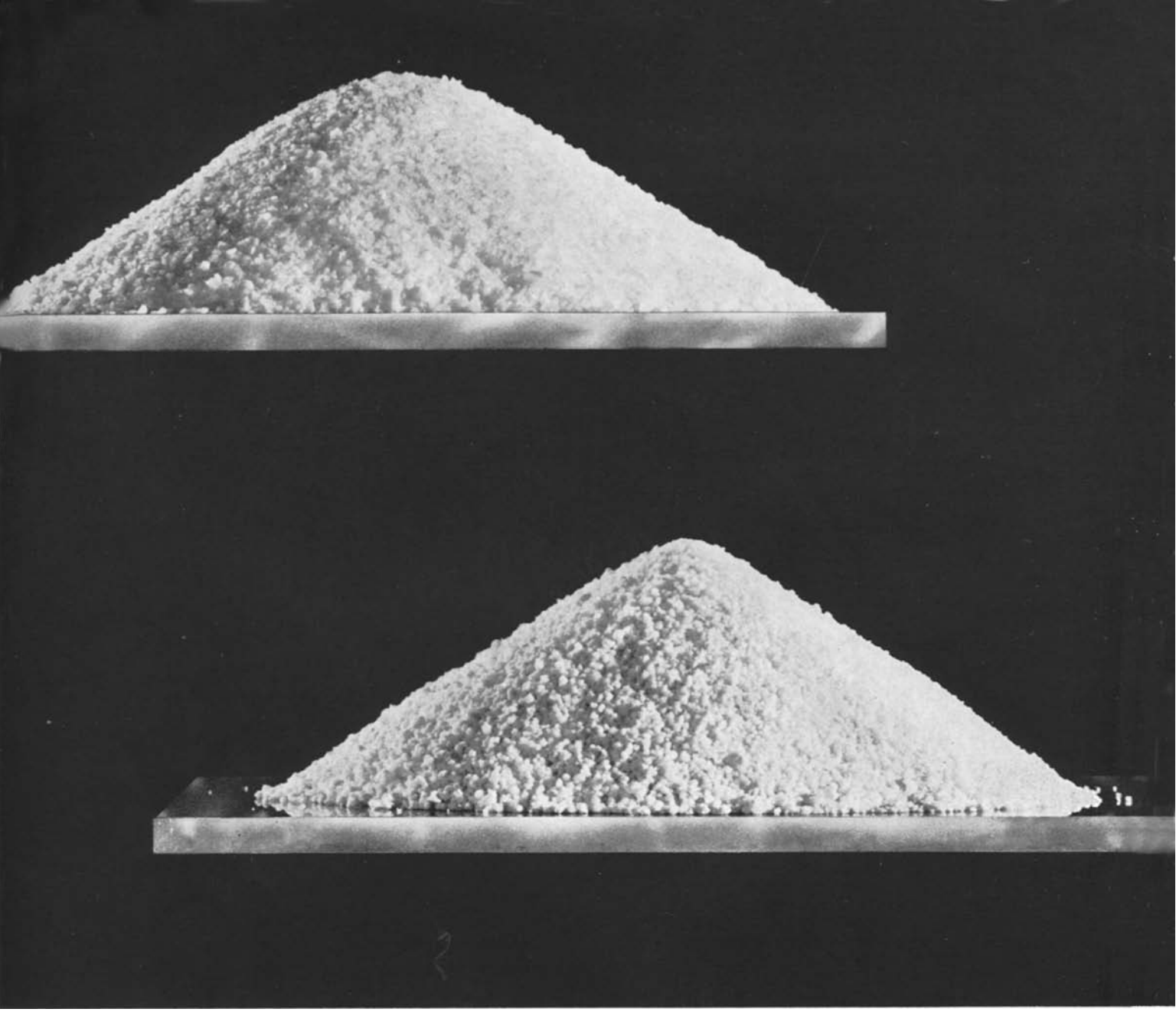
The sixth Short Course in Fundamental Principles of Gas Chromatography will be held Feb. 5–7. This intensive three-day course is presented in response to many requests from industry and is an updated version of the very successful previous courses. Its primary aim is to instruct personnel from industry, although it may be of equal value to persons in academic or government laboratories. The approach will be non-mathematical, stressing theory only to the extent necessary to understand the practical aspects and to obtain optimum results. Lectures will be given by J. H. Purnell; E. M. Wilson, Aerojet-General Corp.; C. N. Reilley; Nathaniel Brenner, Perkin-Elmer Corp.; J. C. Sternberg; R. L. Pecsok; D. T. Sawyer, University of California; and K. P. Dimick (1957), Wilkens Instrument & Research, Inc.

Fee for the two-day conference is $25.00, and for the three-day course $100.00. Additional information and application blanks may be obtained by phoning or writing H. L. Tallman, Physical Sciences Extension, Room 6532 Engineering Bldg., University of California, Los Angeles 24, Calif. (272-8911, extension 3121).

Amendment to Official Referee Chemists List

Please refer to the Official 1963–64 Referee Chemists List, published on page 46 of the September issue of *JAOCS,* and add the following, under the heading, *Certificates reading on fatty oils:*

E. C. Brinkley, Coastal Laboratories, Galena Park, Texas.



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Looking Forward by Looking Backward

CONSIDERABLE IMPORTANCE is likely to be attached to the September and subsequent bean crop reports. Maybe we can learn something by looking backward. The August bean estimate was a bit higher than expected, and caused some selling in new crop bean futures. It did not cause heavy selling, and the market did not stay down, for a combination of reasons, of which these are some:

1) Prices are 30¢ off the highs and at recent lows were about 20¢ over the Illinois loan. In view of the fairly close supply/demand balance, 20¢ over the Illinois loan is obviously much nearer to loan-created version of intrinsic value than is 50¢ over.
2) Many traders are still bullish on beans because they feel that the hot dry June, not relieved until July 1st, almost *had* to produce some crop damage, to an extent not yet realized. This line of reasoning is in contrast to published studies by the University of Illinois indicating that perfect bean weather is as follows:
   a) below normal moisture through all of June
   b) abundant rainfall in July, especially late July
   c) normal rainfall first half of August
   d) above average rainfall last-half-August and first-half-September
   e) cooler than an average temperatures in July and early August

It appears to me that weather this year was almost exactly in line with these "ideal" conditions. Bean yields have probably increased in the heavy producing north portions of the belt between compilation of the August report and the September report because of cool showery weather.

3) Slightly smaller than expected corn yields should imply less than ideal bean yields. This ignores the same University of Illinois study showing that optimum corn condition requires below average moisture only through the first half of June and wet thereafter, whereas we were dry through all of June. Also it ignores the fact that in the 64 crop-report-to-report changes from 1950–51 through 1962–63 corn and bean yields moved in opposite directions 28 times, indicating that the relationship of some month up-down corn changes to up-down bean changes is hardly more than random.
4) Crop observers probably have a bias toward estimat- high yield prospects when fields are lush and green than later on when harvest yields become available. This ignores history, see table which implies that if there is any August bias it is to be conservative rather than optimistic.

HISTORY OF CHANGES FROM THE AUGUST BEAN REPORT

Change from/to	Aug./ Sept.	Aug./ Oct.	Aug./ Nov.	Aug./ Dec.	Aug./ Final
Unchanged*	1	2	1	0	2
Decrease	3	3	3	3	2
Increase	9	8	9	10	8
Average decrease %	5	11	12	11	10
Average increase %	4	7	3	6	9

* Change less than 1%.

In the last 12 complete crop years, i.e. through the "final-final," August was the low report seven times and the high report only twice.

5) The high residual errors of the past two years imply continuing high residuals, i.e. structural crop overestimations. Some observers are ascribing this to an acreage error they feel developed a couple of years ago when the USDA method of computing bean acreage was changed slightly. This might well be, although it still seems to me that a substantial portion of the 1961–62 residual was due to weathered in beans that were completely lost. The size of and reasons for the 1962–63 error are obscure but could be simply a question of failure of reporters to realize the full extent of late-season losses due to hot dry weather. We have not had much hot dry weather this season except in the mid-south where August is supposed to be hot and dry. This season then may reveal whether there is truly a basic error somewhere in the bean acre/yield estimate system. I'm inclined to doubt that there is a basic error.

All of this leads me to believe that barring a sudden shift to very unfavorable weather for the few remaining weeks of the growing season, or a complete breakdown in the above reasoning, longs in beans, soybean oil, and soybean meal can not expect much help from the crop reports. They also probably cannot expect help from subsequent monthly reports as there is a pronounced tendency for the crop estimates to drift slowly higher during the season. The first real sign of a structural overestimate cannot appear until the January stocks in all positions report. This means that short and intermediate term help must come from demand. This in turn almost surely means meal demand. Oil is in bad shape statistically, and is likely to worsen during early new crop, and probably has little or no chance of creating a major speculative buying wave.

Cottonseed oil on the other hand could gain some friends from a lower cotton crop estimate. The history of cotton crop estimates subsequent to August is that no trend is visible, indicating no particular observer bias in August. Cotton belt weather since compilation of the August crop report has been unfavorable in Arkansas, Tennessee, North Mississippi, Oklahoma and parts of Texas. It has been favorable in California, Arizona and, southern Mississippi. On balance it would appear that for the month losses more than offset gains and the September cotton report will probably be somewhat lower than the August, thus reducing further an already only middling-size crop. The August yield forecast was so high it would, under the best conditions, be a formidable figure to surpass.

Having wandered through some of the logical background we have to consider the illogical background. The latter is the reaction of the speculative element to the market situation. History implies that traders just love to be long beans and will flock to the buy side given any excuse. In this case, the excuse may turn out to be the USDA's consumption estimates. If the August "Fats and Oils Situation" is any indicator, subsequent issues of that publication will be beating the usual bullish tempo on the usual big tin drum. If traders accept all of the USDA's estimates, then analysis goes out the window and there is nothing whatever to be gained in looking forward by looking backward.

JAMES MCHALE
Merrill Lynch, Pierce, Fenner & Smith, Inc.

Cosmetics . . . .

(Continued from page 4)

been offered, it is still widely used for its humectant properties.

The fatty acids are incorporated directly into products for a wide variety of purposes. In some cases, no substitute has yet been found that functions as well both from a cost and a performance standpoint. Emulsions prepared with an excess of stearic acid and a base such as ethanolamine or sodium are widely marketed. The pearly sheen obtained by the use of fatty acids is extremely difficult to reproduce by any other means. Many, if not most, shave creams depend to a large extent on fatty acids for this performance. By varying the chain length of the fatty acid, it is possible to produce a wide range of different effects which alter the consistency, appearance, or performance of the product.

It is well known that soap lends a certain characteristic feel to cleansing products. This desirable feel is one that has long been recognized and well accepted. It is difficult to duplicate with other agents. The disadvantage of soap lies in its limited hard-water tolerance, although the addition of lime-soap dispersants can be used to overcome this handicap. Despite the trend away from the use of soap in shampoos and in cleansing bars, this formulation technique is reviving interest in the use of soap in such products.

The fatty acids may be modified by esterification to produce the isopropyl esters. Very few ingredients can add the "slip" to a hand lotion that they can, without becoming prohibitive cost-wise or changing other characteristics of the product. Their solvent characteristics permit certain formulation "tricks" that are responsible for the success of some products. The isopropyl esters are not the only possible compounds, for many other esters have been prepared and submitted to the industry for evaluation. Some have found use as plasticizers in films such as hair sprays, others as modifiers of the application feel of products.

Esterification with varying amounts of ethylene oxide polymer further enhances the value of the fatty acids to the cosmetic industry. By varying the alkyl group and/or the length of the polyethoxy chain, products can be made for use in applications such as creme rinses, shampoos, hair sprays, etc. For example, in a creme rinse, this type of ester will modify viscosity, flow characteristics, and appearance of the formulation. It is possible to arrange a series of formulations varying only the ester component and thus determine the optimum composition to be used in a given application.

Further chemical modifications include amidification. Here again, a product is obtained for which no substitute has yet been found. The use of amides for foam stabilization and viscosity control of shampoos is almost obligatory. It is possible by varying the composition of the amide to formulate either a clear or an opaque shampoo.

Quaternization of alkylamines derived from fatty acids yields quaternary ammonium compounds. The alkyl group is at least partly responsible for the specific activity of these compounds. The octadecyl dimethyl benzylammonium compound is used for its substantivity effects, particularly in creme rinses. The C_{12}–C_{14} dimethyl benzylammonium compound is used for its antibacterial powers. Other variations of the attached groupings yield products which, when incorporated in creme rinses leave the hair with different feel characteristics. Two limitations on the use of these materials are their eye irritancy and apparent incompatibility with anionic surfactants. Each of these disadvantages, however, varies with the chemical composition of the quaternary and the way in which it is formulated. It is not inconceivable that one or both of these may be overcome by appropriate manipulation. Some fairly recent chemical modifications have been seen where the compatibility problem seems to have been overcome to some extent.

Esterification and ethoxylation reactions have been utilized to produce a whole host of surface-active agents. These represent a systematic approach to the complex area of emulsifiers and emulsion technology. Utilizing the sorbitol moiety as the backbone for esterification, a series ranging from very lipophilic to very hydrophilic has been prepared. This, as in the case of the ethoxylated esters of the fatty acids, permits systematic investigation of the possible types of emulsifiers or solubilizers to be used in any given application.

Another raw material with which much has been done is the fatty alcohols. Sulfonation yields the fatty alcohol sulfonates. Sodium lauryl sulfate is probably the ingredient most widely utilized in detergent applications. Here again, it is the alkyl chain which confers upon the compounds the properties requisite for use in the cosmetic industry. The alkyl aryl sulfonates are considered far too harsh for most uses. Variation of the fatty alcohol chain length produces interesting compounds, although for most uses the lauryl sulfate is the prime material. Variation of the base used in preparation also confers varying properties upon the molecule. The ethanolamine types, although slightly more expensive than the sodium salts, are most widely used, primarily because of their greater solubility and their desirable effect upon the cloud point of the finished product.

Etherification of the alcohol with ethylene oxide polymer results in a product that has better chemical stability than the esterified product. Although the chemical difference between the two is not great, definite differences become apparent when they are formulated. Thus, the etherified and ethoxylated compounds represent two different entities for evaluation in formulation work.

There are, of course, many more examples of lipid products which are used in the cosmetic field. Many new materials, such as the sugar esters and lanolin derivatives, are continually becoming available for evaluation and finding uses in various applications. Further developments in the cosmetic industry offer a tremendous potential outlet for the products of the fats and oils industry.