LOOKING INTO THE FUTURE*

By GEORGE G. KOLAR

AS YOU HAVE BEEN informed, tonight I am in the role of clairvoyant and soothsayer. I wish to add that in this capacity I speak as an individual and not as president or in behalf of the SOCIETY. I consider this a very challenging role and yet one with its compensations.

Before departing into the realm of Nostredamus, I would like to point out the hazards besetting this road and the pitfalls that scientists far superior to me have fallen into when branching out into this field.

It was in the early part of the century that a most distinguished scientist, Dr. Newcomb, thought he could foresee in the future well enough to proclaim that man would never fly. A few weeks later on a cold December day in 1903 the Wright brothers made their now famous ascent. Also, there was that other scientist, Osborne Reynolds, who stated in the 1880's that electricity had little future because a mile or so from its source, it would lose half its power. So we should remember that foresight has physical as well as historical limitations.

We all recognize that we are living in times of change and that it is impossible for any company to continue to market products without making modifications for even a short period of time. Year-end reports from many of the leading pharmaceutical and cosmetic companies recite the fact that 60 to 80 per cent of their volume today is on items that were not in their lines five years ago. Further, it is anticipated that our population in 20 years will increase by about a third, or 63 million people. This alone means a much greater potential for the sale of cosmetics. Add to this the increasing purchasing power of all families and you can recognize that there will be more business for the concern and chemist who develops products with the thought of an expanding market.

Before proceeding on my actual prophesies of new products, first, I think I should read to you, once again, the definition of the term cosmetic as stated in the Federal Food, Drug & Cosmetic Act. "The term 'cosmetic' means, (1) articles intended to be rubbed, poured, sprinkled, or sprayed on, introduced into, or otherwise applied to the human body or any part thereof for cleansing, beautifying, promoting attractiveness, or altering the appearance, and (2) articles intended for use as a component of any such articles, except that such term shall not include soap."

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I want this clarified at the outset because it is my firm conviction that many cosmetics of the future, developed and produced by you people here, are going to fall in that category specified as "introduced into" for "altering the appearance."

Now, further study of the Act, will show the value of having had attorneys, these movers of words, develop these definitions to encompass the many categories of those products of the future. For it also states under the term "drug" as follows, "articles intended for use in the diagnosis, cure, mitigation, *treatment or prevention* of disease in man. . . *and intended to affect the structure or any function of the body of man*, etc."

As you will see from my ensuing remarks, these products which I prophesy will be considered under these definitions, both drugs and cosmetics.

I might add at this juncture that we have been launched into this era of which I speak for some time without, I think, giving proper recognition to it.

The early forerunners have been the depilatories, the antiperspirants and more recently the "hormone creams" and thioglycolate waving lotions.

Is it any wonder that, as Paul Lauffer (1) has pointed out in THE JOURNAL OF THE SOCIETY OF COSMETIC CHEMISTS, of the first 170 articles published in our JOURNAL, the largest single category reported on dealt with the dermatological and biochemical aspects of the skin.

We cosmetic chemists can no longer be exclusively creators of "art" products. True, cosmetic science must always remain, as Dr. Evans (2) has said, "a handmaiden to cosmetic art" but we must now be more of a biochemist, dermatologist, toxicologist and above all a pharmacologist.

The changes taking place in Washington, D. C., give further emphasis to this. Now that the election is over, I think it can safely be said that regardless of what administration is in power, there is relentless movement toward greater regulation and policing. This to me is an observation that is very apparent and borne out this past year when a 15 per cent appropriations increase for the Food & Drug Administration for the fiscal year beginning July 1, 1956 was granted. The 15 per cent budget increase—the largest in many years for F.D.A.—ran the agency's appropriation to $6.7 million, an increase of $929,000. There are indications that F.D.A. is spending about three-fourths of this increase for hiring chemists and new field inspectors.

It is safe to assume that all certified dyes and colors will get a very thorough investigation. The conclusions to be reached from these findings will be made only through industry-government compromise.

What with the present methods of certification, I can only see a decrease in the number of dyes available to the cosmetic chemist as decertification procedures increase. This August the Second Circuit Court handed down a decision upholding the F.D.A. ruling of 1955 which last November banned

the use of FD&C Oranges Nos. 1 and 2 and Red No. 32 in foods and drugs, though not in the manufacture of cosmetics. Already work is under way investigating the safety of many certified dyes for the cosmetic industry. It has been reported of 15 food colors studied by F.D.A. so far, only five have not manifested "some deleterious effects on experimental animals." Further, studies on four of these—FD&C Blues 1 and 2, Green 2 and Violet 1—have not been completed. The only dye found so far to be definitely nontoxic has been FD&C Yellow 5. It has been stated that seven dyes are "being intensively examined"—FD&C Reds 2, 3, and 4, and Yellow 1, 3, 4 and 6. A report said, "The evidence available indicates that deletion of some of these from the list of certified colors may be justifiable."

A great deal has been said in the past campaign about the need to help small business. Both parties were very much in favor of small business. In fact, it became apparent that all candidates, besides being for God, Mother and Country, should also include small business. On the other hand, for the past few years, a big battle has been fought in the Food Section on chemical additives, and this battle is not being fought by small business. I doubt that anyone will concede that there is not going to be further legislation on this subject requiring a great wealth of product testing prior to introduction of a finished product for general sales purposes.

The general outline of the food chemical additive bill is based on the New Drug Application procedure in the drug section of the law. F.D.A. must determine the safety of an additive in relation to its "conditions of intended use" which gives it the right to consider the particular food or class of foods in which it is to be used, the quantity to be used and the manner in which it is to be used.

You can rest assured that after this food additive bill has been passed, and it is up for action this coming February, cosmetics will take their turn. What form such legislation will take is a moot question. Whether it will appear as a modification of the Delaney bill or the bill proposed by Priest remains to be seen. Many of you present here will no doubt have your day in court before this is settled.

Here again, I do not wish to state my personal preferences on this subject but just to observe that I believe we are in for more regulation and policing. How far this will go I leave to the Titans of our Industry to determine.

My sole point is to make our members aware of these future problems so they can better prepare for this day. You and your company are going to do product testing in the future to an extent that has not been done before—and believe me, this is costly work.

Inflation has long since reached the guinea-pig world, and student subjects now wear more expensive patches than they did a few years ago.

Our industry, at least in the past, has been largely one of small businesses. The rule of thumb for our industry is that if over 250 people are employed

by your company, you are considered Big Business. Not having read the *Wall Street Journal* today, I do not know the exact number we have in cosmetics, but it is not too many and some of those companies that do have over 250 employees do not consider themselves Big Business.

Therefore, with these regulations to come, you can imagine the load that will be carried by you, the cosmetic chemist, when comes time to introduce new items in your company's line. This will be so unless much more favorable legislation is forthcoming than is shaping up on food additives.

Now that we have solved the problems of State, I would like to give my impression of developments, by way of product changes, based on current research, that will take place in cosmetics—some very soon—some at a much later date.

By research, I also wish to pay attention to that which will influence us through the channels of merchandising and sales. Products will be produced to fit certain needs and specifications set by the merchandising and sales department to a greater degree in the future. Whereas some of you may look with disdain on some of the work that has been reported from motivation research studies, with apologies to Drew Pearson, I predict that this type of work will make for more product salability even if you question the superiority of the product.

This will be particularly true in the fragrance field. How much more superior fragrances can become I leave to those artists that are with us. Certainly with the synthesis of ambergris—rhodinol among others—and the developments to be made in the next few years, more uniform, stable products should result.

The skin, being that organ which we cosmetic chemists are most concerned with, will naturally receive the greatest attention. For this reason products for the treatment of the skin will show the greatest progress and improvement.

Already we are seeing a revolution in cleansing formulations. The old mineral oil—borax—beeswax cold cream formulations are losing their popularity to the emulsions utilizing nonionic emulsifiers and even the tried and true soap bars have their days numbered. As soaps have lost the battle in cleansing fabrics, so will they lose out to the detergent bars for skin cleansing. Bland, neutral or slightly acid products will make for healthier, more attractive skins and aid in the treatment of adolescent skin problems.

Methods of preventing defatting and skin irritation will be overcome by the synthesis and selection of proper surfactants.

The proper treatment for diminishing the effects of aging of the skin will be furthered by work being done by the dermatologists such as have reported in our JOURNAL. The protective features of cosmetics will be increased by barriers that are esthetically desirable. Current products with silicones are

but forerunners to the use of the organo functional silanes which by their reactive nature will be much more effective with fewer of the undesirable properties.

A better understanding of the role of lipoids, vitamins and hormones will allow for greater and more effective usage. Greater concentrations of products containing hormones will be possible by the use of vehicles which will keep all physiological activity at a local level, thereby giving more beneficial cosmetic results.

Allergic sensitization will be cut to a minimum by either the incorporation of antihistamine products or other compounds developed in the pharmaceutical trade for such treatment. This work incidentally will develop more specific methods for evaluation of the irritating potentials of cosmetics.

Once again resorting to cosmetics which will be classified as drugs, there is little doubt, regardless of the current block on the over-the-counter sales of cortisone, that such materials and particularly antibiotics will play an ever-increasing role in cosmetic creams. Such topically applied products will be extremely effective due to the vehicles limiting their absorption to the upper layers of the skin. No systemic activity will thereby result.

These more active germicidal products will further aid in the remedy of skin diseases. Also, we undoubtedly are moving into an era of more beautiful women. Dietary knowledge will ease the work of the cosmetic chemist. Better hygiene, nourishment and medical attention will prevent the development of the poor skin of years past.

Many persons have problems of hyper-pigmentation. These, too, will be solved. Already we know of the action of the monobenzylether of hydroquinone (3). This compound, while effective in preventing the formation of melanin, has been often found troublesome in creating allergic dermatitis. I am confident that through the investigation of the physiology of skin pigmentation, other agents will be found that are innocuous. However, here again, it is possible that a base may be devised to offset any allergic sensitization.

Another effective product for the prevention of hyperpigmentation was reported in the *Journal of Investigative Dermatology* (4). This article states that the use of 8-methoxy psoralen taken internally shows evidence of regulation in skin tanning. Our Mrs. Veronica Conley in *Today's Health* (5) has pointed out the toxic side effects of this drug which is extracted from the Egyptian plant—Ammi Majus Linn. Here again, we have a lead toward the development of a cosmetic product, classified also as a drug, that, if applied topically in the proper vehicle, would offer a new basic improvement.

It is interesting to note that oral administration of the drug decreases the erythemic response of the skin to ultraviolet rays whereas topical use increases the reaction.

This year, as you know, Dr. Walter Shelley was awarded our SOCIETY'S Second $1000 Special Award. This is good evidence of the regard we hold for deodorant-antiperspirant work. Surely with such basic work being accomplished, we are in for some new approaches to an age-old problem. More effective, longer lasting bactericidal agents will be developed. Shelley has shown that by the use of neomycin (6), antibiotics can be incorporated giving longer deodorant activity. It may be that such products can be formulated also into bathing compounds thereby giving more effective deodorization than that presently achieved by hexachlorophene and soap. Ion exchange resins also offer opportunity for further study.

A great deal of basic work is being done on the problem of antiperspirants. It is my hope that soon we will have published some good method that our industry can use for the evaluation of such products. Surely this will appear in the not too distant future, and we will then be able to measure on a controlled basis the comparative value of the many new salts being introduced. It would appear that polyvalent metallic salts have reached the optimum level of astringent activity. If this be so, possibly it would be well to give further study to the use of anticholinergic drugs reviewed by Kalish (7) and Klarmann (8). Properly compounded in a base limiting the area of activity, a new approach to arresting the excretion of perspiration is achieved by the control of the nerves which activate the sweat glands.

Now that we have dealt with the physiologically active ingredients and their relations to skin treatment and care, I would like to add a few thoughts regarding the field of cosmetics which to date has been the "bread and butter" end of our industry. I speak specifically of make-up.

Recently, July 31, 1956, to be exact, I was interested in reading in a United Press article (9) that I was not the only one concerned with the problem of how women will look in the future. Reading further, my suspicions were confirmed, it was stated that our fellow member, "Dr. Joseph Schultz envisions the day when a boy will fall for a girl because of her green hair and blue lips. Maybe her complexion will be orange, etc. Dr. Schultz, President of Lanolin Plus, also believes women someday may wear semi-permanent makeup, which would last indefinitely. It would make them easier to look at in the morning."

Whereas I do respect Dr. Schultz's opinion, particularly in relation to women, and I do defer to his sage advice and his methods for stimulating thought, I do not quite go this far. . . . Undoubtedly women as well as men will be more colorful, but I do not believe that in the foreseeable future there will be much change in the basic coloring patterns.

As with the other items for the skin that I mentioned, I believe the greatest changes will be in marketing products that are less irritating, more convenient to use with greater permanency of effect.

Lipsticks and make-up will be more permanent with greater coloring power and less irritation. Loose powder will be less messy and easier to apply.

Great strides will be made in eye make-up and more universal usage will result. It also will be easier to apply with less penalty for poor application. It will be longer lasting and smearproof in the presence of water and other cosmetic items. Here again, silicone compounds may solve a basic problem.

All such products will incorporate ingredients that can aid in the treatment of the skin with the other basic remedial items.

Nail lacquers will be further developed to eliminate the need for under and top coats. One coat will suffice and give superior wearing qualities without deleteriously affecting the nail. In fact, ingredients may be added that would condition the keratinaceous material to eliminate the splitting and breaking of the nail.

Many of the newer developments in cosmetic chemistry have been in the field of hair chemistry. Hair products comprise a major portion of the retail market and number products that were unknown to the industry 15 years ago.

It is doubtful that such far-reaching innovations changing the consumers' habits will present themselves such as home permanent waving did in the past, but the changes that will be forthcoming in techniques and product improvement will be tremendous. The abuse to which women's crowning glory has been subjected will undoubtedly be eased soon.

Improvements diminishing the degradation of the keratin will be accomplished. No longer will it be necessary to weaken the hair by excessively alkaline solutions to bleach or dye the hair. Dyes will be developed which by themselves or in combinations with palliative agents will be much less toxic. They will render obsolete the present twenty-four hour patch test.

The use of hair dyes will then be in greater favor due to the ease of application. Consumers will change their hair coloring with much the same frequency as they do with nail lacquers.

As with the skin, it is my belief that the study of the mechanism of pigmentation will disclose the method for the prevention of gray hair. Such a solution will most likely be solved by a product for internal consumption. But if its purpose is solely to "promote attractiveness" and has no other effect, does this make it less a cosmetic item?

Chemicals to curl and straighten the hair will likewise be developed that will not present the problem of over- or underprocessing. Work by Ghuysen (10) with proteolytic enzymes has already opened a new field for exploration. The problems of depilation or curling will be controlled by proper concentration, time and pH, but the activity will be so selective as to

remove the current problems. These improved depilating agents will open a new vista for the masculine market. This may be the method that will emancipate man from the use of razors.

The above statement relative to proteolytic enzymes is of course the approach by chemically active products but those types of products which condition hair by adsorption or adhesion will also improve. Film forming products will be of a more tenacious type and yet form a film that will not be apparent. These films will be more water- and vaporproof thereby guaranteeing a longer lasting hairdo, but they will be easily removed by specially developed detergent shampoos. These types of products will also be used by the male animal. This masculine market of course is also to be given your consideration. Marton (11) has recently disclosed that of the annual toiletries sales of $1,200,000,000, $275,000,000 were spent on toiletries for men of which 10 per cent was for after-shave lotions alone. Marton stated that the average male uses more perfume products than does the female. Here again, we are in for a terrific increased sales of cosmetics if only by the increased population and discounting the fact that a greater number of cosmetic items are being used more frequently by men.

Shampoos will be further developed to better condition the hair and leave it in a more manageable state. Also, they will be fungicidal and bactericidal in combatting those disorders of scalp, including dandruff, which are caused by such bodies. Here again, antibiotics will be well represented.

The lone factor for which I cannot wax enthusiastic in the immediate future is one in which many of us are most personally concerned, that is, hair growth, or better stated, the lack of it.

Heredity, at this stage, appears to be too great a factor to be overcome except by heroic measure such as studied by Hamilton (12). Whereas the hormonal approach may eventually overcome the heredity factors, this approach will best be left to the medical arts. I might cite a recent newspaper release concerning someone's purported injury due to the topical application of hormone substance. *The Milwaukee Journal* of Wednesday, October 31, 1956, indicated that a resident of that city had a one million dollar lawsuit against a scalp specialist due to "grossly negligent use of estrogen hormone" rubbed into his scalp. He said he had a bald spot. One of the "physical changes" which he cited was "enlargement of the breasts." This, he said, caused him embarrassment among fellow employees.

Those lesser number of cases where baldness results from diseases of the scalp will of course no longer be with us. Treatment by antibiotics and other improved fungicidal agents will suffice to eliminate this problem for the few.

The last segment of our field that I wish to concern myself with is that dealing with oral hygiene.

Here the pace has been so fast that it is difficult to prognosticate. Recent

expansion in the fluoridation program and improved diet has and will lessen the future problem of the toothpaste and mouthwash manufacturer. Reports in Evanston at the end of their eight and one-half year program show an over-all decrease of 64 per cent in the rate of decay in the permanent teeth of six-to-eight-year olds living in Evanston since birth. It has been stated that the day of the "miracle" ingredient in tooth pastes is over and that now the emphasis is on selling a good cleansing product.

If superior bactericides can augment this anticaries action, such products will of course be available. The oral hygienist will also find a quicker and more efficient product to remove the tartar from the discolored teeth.

The cosmetic chemist will do well to pay heed to the new developments in the packaging industry. The revolution that has taken place in the last decade, need not be recited.

Most of these improvements center on ease of application. The consumer is willing to pay a premium for convenience packaging. Increased sales of plastic containers, films and aerosols have created new industries.

The chemist will not be able to develop the product without considering the packaging material.

We will see more "one shot" use packages and more applicator type of containers and plastics of greater stability and unreactive properties. The fabulous growth of the use of aerosols is clearly noted by comparing sales of these items from 1951, 1954 and 1955. In 1951 total aerosol sales were 34.2 million cans of which roughly 10 per cent was for personal use. In 1954 this quantity reached 169.4 million cans of which 82.7 million were personal products. 1955 shows further increases—236.8 million cans of which 113.4 million were again personal products. It is conservatively estimated that sales in 1956 will be an additional 15 per cent over the 1955 figures. As you can see, this has opened a new field of specialization to the cosmetic chemist. It is encouraging to note the wealth of basic data that has been published in our JOURNAL by Root (13) and Reed (14).

The problems besetting this new industry are being attacked on a scientific basis. It is a far cry from the "trial and error" work done in the early days of cosmetic manufacture.

Up to now the greatest sales have been in cans. The close physical resemblance to beer cans has limited cosmetic sales.

However, the recent expanded production of plastic coated bottles has overcome this "package appeal" problem. The only drawback with this package is that the cost has withheld sales to the higher resale priced items such as colognes.

There have been new advances which will alter this situation.

The use of lower cost hydrocarbon propellents such as butane is one factor.

Heavier weight glass bottles will be produced that will adequately hold

lower pressures. This type of bottle plus the lower content, low-cost hydrocarbon propellents will then make available a moderate priced package.

Such a combination will thereby also eliminate the corrosion problem and the necessity of high alcoholic content. The way will be opened for higher water content products—therefore a wider range of cosmetics can then be packaged. A wetter spray will result and the cold shock of the initial spray will no longer be present.

It is doubtful that much reduction in valve cost can be expected but the new mechanical break-up valve offers the opportunity for a slight decrease and better atomization.

The many advantages of this aerosol container for the drug-cosmetic type of products that I have outlined are quite well presented in Root's paper (15) which appeared in *Aerosol Age* this year.

In closing, I would like to give my thoughts on the future of our SOCIETY.

I do feel we have excellent representation in our group of members in our industry. However, I do hope it will be possible for all of the new, young chemists—the recent graduates, to join with us and be active in the SOCIETY, to keep this larger organization vital and free from hardening of the arteries.

It is my hope, and I am sure my wishes will be fulfilled, that our SOCIETY will cooperate with European groups to perpetuate a greater exchange of information on an international basis. This can be done without any loss of identity. Both Robert A. Kramer and Maison G. deNavarre have been and are now exploring these possibilities with our fellow European chemists.

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