A NEW ERA FOR COSMETIC CHEMISTRY

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IN THE past thirty-five years I have seen the cosmetic industry make tremendous progress in the volume of its business, in the variety of products offered, and in the quality of its merchandise. The very size of the SOCIETY OF COSMETIC CHEMISTS at the present time attests recognition on the part of cosmetic management that technical services are indispensable in developing and producing outstanding goods. The few small laboratories maintained by leaders in the industry thirty-five years ago have grown into scores of cosmetic laboratories, and technical staffs counted in the scores are no longer exceptional.

Still, as remarkable as such progress has been, I believe we are at the dawn of a new era in cosmetic technology. Great as has been the increase in volume of technical effort concentrated in our industry, most of that effort continues to be expended on control, development, and applied research. Very little time is spent in activity which by any stretch of the imagination can be called basic research.

The cosmetic industry is by no means alone in this situation. The United States pharmaceutical industry is spending about $268 million on research in 1962 (1), and the Federal government is spending about $850 million for research on medical and health problems (2). However, just this year a new drug came perilously close to being released for nationwide distribution before it was realized that it could produce serious deformities in the offspring of women who had used the drug in the early months of pregnancy. This near catastrophe had wide repercussions, and one result was the adoption of legislation which made more cumbersome the conditions for acceptance of a new drug. However, informed persons agree that the failure to predict the side-effects of this drug was not due to inadequate regulations nor to noncompliance with the regulations. It was due to the fact that nobody knows in sufficient detail how the differentiation of fetal tissues is controlled. In spite of the billion dollars a year spent on health research, this fundamental problem, and many other problems concerning the mechanisms of drug action, are getting little study and remain unsolved.

The general paucity of information on the effects of chemicals on physio-

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logical processes and structures was recently brought forcefully to the attention of the cosmetic industry. Manufacturers were directed to prove that the dyes they have been using, under the supervision of the U. S. Food and Drug Administration, for the last twenty-five years, are harmless and suitable for use in cosmetics. To prove this, they have been directed to use cumbersome, lengthy, and costly methods involving mass feeding of animals. Everyone agrees that such methods are primitive, and that the results are inconclusive. However, in the absence of any sound theory there is no alternative to such an empirical approach.

The drug and cosmetic industries are not alone in suffering the results of too little basic research. The federal budget for research and development was $9.6 billion in fiscal 1962, 11.4 billion in 1963, but there was increasing evidence that the very small percentage of this effort that had been expended on basic research was inadequate. The Department of Defense, for instance, tended to see its task as that of developing hardware and to leave basic research to the National Science Foundation. In general, short-term urgent needs tended to win out over possible gains to be expected over the long haul from basic research. The Office of Science and Technology was therefore set up in May, 1962, to coordinate and evaluate the research programs of all Government agencies. This Office is expected to increase the program of basic research (3).

Comment was recently made on the inadequacy of current Congressional machinery to determine the optimal allocation of funds for research (4). A move for reform of the legislative procedures governing such appropriations was said to have fairly substantial bipartisan support.

Each recent year has seen a rise in the total outlay for research in the United States. In fiscal 1961, public plus private expenditure for research and development was 2.78 per cent of the 1960 gross national product. Many leaders in the national research effort have pled for allocation of more funds for basic research, but it has been difficult to convince budget makers, public or private, that the long waits involved in reaping results from such research are justified. However, as National Science Foundation Director Alan Waterman pointed out (5), the money spent on basic research will in the long run lessen the total expenditure necessary to reach certain goals, for it will lessen the waste of diffuse and aimless exploration, unguided by adequate theory or principle.

Estimates of expenditures on basic research vary, since there is no generally accepted dividing line to determine which projects are basic. One report held that the chemical industry led all others in this respect, with basic research accounting for 11 per cent of the total 1960 expenditures of $1.067 billion for research and development (6). Another report, however, indicated that of the $1.2 billion R. and D. outlay by chemical industries in 1961, only about 4 per cent went for basic research (7). Total

R. and D. by all industrial firms in 1960 was $10.5 billion, of which 3.6 per cent went for basic research, according to the National Science Foundation (8).

Putting together various estimates, we may be justified in setting a figure of roughly $100 million a year as the current expenditure for basic research in the life sciences and another $100 million a year for other basic chemical research. The indications are that the volume of such basic research will continue to rise, as it has during the entire post-war period. As the volume of scientific literature expands, the problem of keeping abreast of it will become more acute. Every laboratory will need a staff of literature experts to screen out and condense the pertinent reports.

It is fortunate that the cosmetic industry can benefit from much of the data uncovered in today's large-scale research effort, for the $2 billion a year cosmetic business can support only a modest expenditure for research, in comparison with the stupendous figures mentioned above. We can, by alert attention to work in neighboring fields, uncover many ideas for use in solving our own problems.

Many signs point, however, to the likelihood of expanded programs of basic research within the laboratories of the cosmetic industry in the coming years. The continual demand for products of unique efficacy will best be met by intensive investigation to uncover new data not available from other sources. Many firms are learning that the best way to arrive at something really new is *via* serious work in their own laboratories. I predict that thirty-five years hence, barring nuclear catastrophe, research in the cosmetic industry will be on a scale surpassing that now in vogue in the drug and chemical industries.

Legislation which appears to be imminent threatens to seal the doom of the small cosmetic manufacturer. Such legislation would demand pretesting, control, and record keeping too formidable for any small company. Such increased technical overhead will be burdensome to manufacturers of all sizes, and may tempt some to seek relief by cutting their research budgets. The press of competition will, however, insure that research effort will soon resume its upward trend. Research personnel in the drug industry rose by 18 per cent during the two-year period 1960-1961 (9).

Possibly cooperative research into more scientific means of safety testing may be undertaken under the auspices of the Toilet Goods Association. This would be a natural extension of the services now rendered by the Scientific Director of T.G.A. in supervising the pharmacological testing of dyes and in issuing standards for methods of testing ingredients. Many other problems of common interest to cosmetic manufacturers could well be studied by similar cooperative methods, rather than by the duplicated efforts of many laboratories.

Most prophets agree that thirty-five years hence the population will include a much larger proportion of people in higher age groups than now. This should be the almost inevitable result of the billion-dollar a year study of health problems. One major goal of the cosmetic chemist is to develop products which will more effectively combat, counteract, or disguise the effects of age on the individual's appearance. When the problems of prolonging life have been largely solved, more effort can be concentrated on the means of preserving attractiveness in the later years.

The cosmetic chemist therefore has every reason to look upon the future with optimism. The trend appears to be toward more demand for cosmetic products, more insistence upon the novel and exclusive features which can best be perfected by basic research, and a general need for more technical services. A new era for cosmetic chemistry may well be dawning.

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