VOL. 18, NO. 8 AUGUST 1963

Food-Drug-Cosmetic Law JOURNAL

A COMMERCE CLEARING HOUSE PUBLICATION
PUBLISHED IN ASSOCIATION WITH THE FOOD LAW INSTITUTE, INC.

The editorial policy of this JOURNAL is to record the progress of the law in the field of food, drugs and cosmetics, and to provide a constructive discussion of it, according to the highest professional standards. The FOOD DRUG COSMETIC LAW JOURNAL is the only forum for current discussion of such law and it renders an important public service, for it is an invaluable means (1) to create a better knowledge and understanding of food, drug and cosmetic law, (2) to promote its due operation and development and thus (3) to effectuate its great remedial purposes. In short: While this law receives normal legal, administrative and judicial consideration, there remains a basic need for its appropriate study as a fundamental law of the land; the JOURNAL is designed to satisfy that need. The editorial policy also is to allow frank discussion of food-drug-cosmetic issues. The views stated are those of the contributors and not necessarily those of the publishers. On this basis, contributions and comments are invited.

The FOOD DRUG COSMETIC LAW JOURNAL is published monthly by Commerce Clearing House, Inc. Subscription price: $20 per year. Single copies are $2 each. Editorial and business offices, 4025 W. Peterson Ave., Chicago 46, Ill. Printed in United States of America.

August, 1963
Volume 18 • Number 8

Second-class postage paid at Chicago, Illinois.

FOOD DRUG COSMETIC LAW JOURNAL

Table of Contents . . . . . August, 1963

VOLUME 18 NUMBER 8

REPORTS

TO THE READER

Research.—"In our complex age, with advancements in science, and with the application of new scientific developments in the food and drug industries, it is essential that we learn to deal with these complex problems not only from the standpoint of production and utilization, but also from the standpoint of evaluation of safety, utility and effectiveness in the interest of the consumers of food and drug products. It is clear that an effective research program is a vital factor in the enforcement of regulations that pertain to the production, standardization and distribution of foods." This remark of *Oral L. Kline,* Assistant Commissioner for Science for FDA, is found in a paper entitled "Research—A Vital Factor in a Food Regulatory Program," which begins on page 429. Mr. Kline presented the paper at the fiftieth anniversary celebration of the National Canners Association Research Laboratories.

Quackery.—The vice president of the National Better Business Bureau addressed the Connecticut State Congress on Medical Quackery on the subject of quackery and the medical profession's responsibility to the consumer in that area. *Irving Ladimer* discussed the responsibility of the professional person who provides scientific and other data, which may be used in advertisements to the consuming public, because he believes "that rigorous self-discipline at this stage and an appreciation of the scientific, ethical and even legal implications by men of medicine may help considerably in preventing the deception, distortion, and just plain confusion which confront the public every day in promotions of certain health products and programs." It is his belief that an active, positive program of self-regulation, professional responsibility and governmental control must be followed if the public is to be protected from such frauds. Mr. Ladimer's comments on this much-discussed subject begin on page 436.

Role of the Government Laboratory.—*Robert S. Roe,* Director of the Bureau of Biological and Physical Sciences, Food and Drug Administration, suggests that FDA and all other similar government regulatory agencies should have a scientific staff of recognized stature, leadership and expertise in its field. In his opinion, our key scientists should personally know and be known by the leading scientists in their fields and this means participation in and contributions to the meetings and programs of scientific societies.

Many regulatory and law enforcement functions of government are very much dependent upon scientific activities; hence, the laboratories of the FBI, and Bureau of Narcotics and the Customs service. The administration of the meat and poultry inspection services of the Department of Agriculture, the licensing of important vaccines and antitoxins by the Public Health Service, and the administration of the Food,

Drug and Cosmetic Act by the FDA obviously require sound scientific bases.

"It seems to me that laboratories of agencies such as FDA should be in a position to provide the standard for judgment of the adequacy and validity of the scientific data which they are called upon to use," Mr. Roe says. "There are occasions where outside consultants and advisory committees should be employed, but there is no substitute for a vigorous, high-grade scientific staff within the organization."

This paper, found at page 453, was presented at the Research and Engineering Roundtable at Brookings Institute.

Refinement of Analytical Methods.— In this article at page 459, *Henry Fischbach,* Director of the Division of Food, Bureau of Biological and Physical Sciences, Food and Drug Administration, discusses not only the troublesome problems but also the benefits derived from better methods. He emphasizes that highly refined methodology is a major key in monitoring the safe application of useful, potent chemicals. Mr. Fischbach states, "While more seseitive methodology, occasionally, will raise disturbing problems for industry and government, these tools will also provide the means by which the scientist can maintain a broad, practical surveillance over air, water, soils and food supplies. Such vigilance implements the governmental safeguards, which exist in specific areas such as pesticidal usage on raw agricultural products. It affords even greater assurance of healthful food supplies, in the midst of continued efforts toward higher productivity, to match unprecedented demands of expanding populations." This paper was delivered at a symposium of the Food Protection Committee, National Academy of Sciences, National Research Council, in Washington, D. C.

Control of Foodborne Salmonellae.— In this informative article on page 469, *Glenn G. Slocum,* associated with the Division of Microbiology of the Food and Drug Administration, Department of Health, Education and Welfare, reports on the need for improved systems for epidemiological investigation. Annual summaries of specific disease categories by the National Office of Vital Statistics show a steady rise in the number of cases of salmonellosis. Mr. Slocum considers the Salmonella Surveillance Program initiated in 1962 by the Communicable Disease Center, Public Health Service, an important step in the direction of control measures. Also helpful in eliminating the salmonellae; approprations for the current year to provide for the appointment of one bacteriologist to initiate work in this area; elimination of reservoirs in domestic food animals. This paper was presented at the meeting of the American Public Health Association in Miami, Florida.

Vol. 18, No. 8 August, 1963

Food·Drug·Cosmetic Law
Journal

Research—A Vital Factor in a Food Regulatory Program

By ORAL L. KLINE

Mr. Kline, the Assistant Commissioner for Science for the Food and Drug Administration, Presented This Paper at the Fiftieth Anniversary Celebration of the National Canners Association Research Laboratories on May 22, 1963, in Washington, D. C.

IT IS A PRIVILEGE to have a part in paying tribute to the National Canners Association Laboratories on this Fiftieth Anniversary. We note with pride that the organization at this advanced age is in good health. One wonders whether or not this state of optimum nutrition is the result of association with the right kinds of foods. In any case, this organization has flourished and has been extremely useful not only to the canning industry but to those organizations with which it has developed an admirable state of cooperation.

The keynote of this cooperation, of course, is scientific research. In our complex age, with advancements in science, and with the application of new scientific developments in the food and drug industries, it is essential that we learn to deal with these complex problems not only from the standpoint of production and utilization, but also from the standpoint of evaluation of safety, utility and effectiveness in the interest of the consumers of food and drug products. It is clear that an effective research program is a vital factor in the enforcement of regulations that pertain to the production, standardization and distribution of foods.

I would like to take particular note here of the fine cooperation that has existed between the canning industry and its association and the Food and Drug Administration. This began even before

there was a National Canners Association Laboratory. In a large cooperative experiment begun about 1910 to answer the question of whether tin and iron in canned foods were hazards, we had the unification of effort on the part of the can manufacturers, the food canners, and the old Bureau of Chemistry of the Department of Agriculture. In this cooperative effort, large numbers of packs of a variety of foods were prepared and examined annually over a period of several years to produce information that culminated in a report demonstrating clearly that tin and iron in canned foods were not poisonous and that this was not a serious problem. During this extensive cooperative effort, it became quite apparent to the canned foods industry that well-equipped laboratories, capable of carrying out the kinds of complex methodology involved in the demonstration of safety and in working out the details of improvement of technology and quality of canned foods, were essential to the service of the canning industry. This was an important factor, I am sure, in the formation of this laboratory service.

Cooperation with the old Bureau of Chemistry, which at that time was responsible for enforcement of the Pure Food and Drug Law, was further in evidence in the appointment of Dr. Bigelow, then assistant chief of the Bureau of Chemistry, as the first director of the laboratory. Further example of the cooperation at the scientific and investigational level between this laboratory and the Food and Drug Administration was related to the development of acceptable standards of quality under the McNary-Mapes Amendment of 1930. The NCA was the first to overcome an obstructionist attitude in the application of this amendment to standards of quality, and it was soon learned that the required labeling of foods as substandard eliminated such foods from the market and improved the general quality of the canned food supply. In the investigational effort to provide objective tests to determine quality, the chemists of the National Canners Association Laboratories and of the Food and Drug Administration joined forces in their broad inspection program. Through this cooperation, standards of acceptable quality were formulated.

What are the problems that we face today that are directly related to the food canning process? Perhaps the most immediate has to do with the concern over pesticide residue contamination of our food supply. You are all aware of the report to the President

submitted in recent days by a special committee assigned to evaluate the pesticide contamination from a total environmental standpoint. Recommendations for further research suggest that additional research needs to be accomplished in several areas. With respect to food pesticide residues, we have established approximately 2,500 tolerance on 130 chemicals. These tolerances have been based on some knowledge of the toxicity of each of these compounds learned from pharmacological experimentation. In the preparation of food for canning, there is a legal requirement that such foods be treated in a manner to reduce residues so far as possible. In a very preliminary evaluation of the residue content of canned foods, it is quite clear that in the preparation for canning, considerable reduction of the pesticide residue content can be and is being accomplished. Although more information is desirable, the indications are that canned foods contribute only to a very small degree to the pesticide residue content of our food supply.

The Food and Drug Administration has as a program for this fiscal year the analysis of 25,000 food samples for pesticide residue content. This constitutes a sampling of approximately 1 per cent of the raw agricultural product shipments that move across state lines each year. As of May 1, our program of examination of this large sampling is on schedule. Nearly 200 of our chemists are spending full time on this analytical program. The results of these analyses will give us a basis for determining whether the coverage should be increased and will tell us whether there are certain geographical areas or certain classes of foods that may be of lesser importance in the program.

Also, we have developed considerable improvement in methodology during this extensive effort to the point that in the continuation of the program next year, our analytical data will provide more quantitative information. Research and methodology pertaining to pesticide residues has developed rapidly in many laboratories in this country. It has been through the best kind of cooperation that we have been able to establish to such a remarkable degree the chemistry and in some cases the metabolic fate of these compounds and methods of extraction and identification in their measurement. The newer instrumentation has given us the tools for the rapid advances that have been made.

Results of Other Studies

In other studies, the ultimate goal of a long-range FDA research program on staphylococcal food poisoning has been the detection of the agent in food products. The problem has been attacked successfully using serological methods and has resulted in: (1) the identification of two types of enterotoxin, one of which predominates in food poisoning outbreaks in the United States, (2) simplified procedures for determining the ability of staphylococci to produce these poisons, and (3) finally, methods for the detection of trace amounts of the enterotoxins in foods. The serological procedure used in these studies is a modification of a gel diffusion test in which the toxin and its antibody form precipitates which can be identified by comparison with reference lines of precipitation. The reaction takes place in a thin film of agar in which lines of precipitation are formed as a result of diffusion of toxin and antibody toward each other from localized sites. The most recent development in this research is our ability to prepare extracts from meat containing the enterotoxin which are further purified in ion exchange columns to give a solution that can be tested by the diffusion technique. Application of the test to other food materials is still under study.

Experiments with Mold

For a long time, the food industry has been alert to contamination of foods with molds. Such contamination is regarded as an indication of an inferior quality that is not suitable for food use. Recent events have emphasized the importance of attention to mold contamination of our food supply. About a year and a half ago we were informed by the Department of Agriculture of an outbreak of a disease affecting young turkeys in England. At that time we thought there was a connection between this disease and the "chick edema factor" which our laboratories have been studying for a number of years. The British soon discovered, however, that the causative factor was a metabolite of a mold, *Aspergillus flavus* Link which had grown on peanuts imported from Africa. Arrangements were made to obtain some of the cultures which we grew under our conditions. We were able to reproduce the disease syndromes described by the British as well as to grow the molds on a number of different strains as substrates.

The cultures grown on wheat were found to produce rather potent material, readily purified by our capable chemists, who then

were able to make a preparation shown by biological test to contain about 50 per cent of crude aflatoxin. We learned that workers at Massachusetts Institute of Technology also were attempting to isolate the components of aflatoxin to determine their structure. They had obtained only milligram amounts and we had available gram quantities. We furnished this group approximately 200 milligrams of our relatively potent preparation and within about six weeks of concerted effort utilizing nuclear magnetic resonance and a few check syntheses, the MIT group were able to announce the structure of aflatoxin B and G as difuranocoumarin compounds.

We think this demonstrates remarkable cooperation among laboratories: The Central Veterinary Laboratory at Weybridge, which furnished the culture; Food and Drug Administration laboratory at Washington, which performed the preliminary isolation; and Department of Nutrition and Food Science of MIT at Cambridge, which did the final purification and identification.

During this time we also initiated a survey of the low grade peanuts utilized for animal feed in this country as well as collecting samples of moldy grains that our inspectors might encounter. We are pleased to note that of several dozen samples so far examined, we have not yet encountered the presence of the toxin. We are continuing our analysis of samples as well as research into the development of relatively rapid chemical methods for the identification of aflatoxin.

This work also suggests an entirely new area of investigation of other potential toxic agents produced by molds. Perhaps a number of unexplained epidemics among animals may be attributed to this type of contamination.

Research Projects

Limited time does not permit me to develop further examples of our research projects which are developing in several subject areas. In nutrition, for example, studies of trace minerals that have nutritive value reveal interrelationships and antagonisms. These are studied in model systems using the red blood cell of humans and animals to determine the conditions of adsorption through cell membranes. Results are used in designing further animal studies. In pharmacology we have the development of new methods for measuring safety of food additives by determining effects of a specific compound injected into the incubating chick embryo and noting effects

upon its development. In food research there are studies of changes in the composition of fats resulting from prolonged heating. These go to the isolation and measurement of the urea filtrate fatty acids and their effects in animal metabolism. In pharmaceutical chemistry we are concerned with the identification and structure of known compounds through comparison of their spectral absorption curves with standard curves of known compounds. Mechanized procedures permit a large number of comparisons to be made in a few minutes. It is important that our research program be broad in scope in view of the great variety of enforcement problems with which we must deal.

The status of the research program of the Food and Drug Administration has been markedly improved in recent years with an increase in financial support for this purpose. Although in its beginnings the Food and Drug Administration was an enforcement organization with attached analytical laboratories, it was soon recognized that scientific development and methodology were essential to the enforcement process. Over the years we have been striving for an integrated operation in which the research and the control scientists, working side by side, contribute to each other's effectiveness.

Strong Research Program Urged

Last fall, a Citizens Advisory Committee, after a lengthy review of the structure and function of the Food and Drug Administration submitted a report in which the scientific aspects were evaluated. This also emphasized the need for a strong research program which would be effective in providing leadership in methodology and in the determination of safety and effectiveness of the great variety of compounds that come within the purview of the Food, Drug and Cosmetic Act. Such a scientific organization has been developed, and is being enlarged. In it, long term projects are carried out with continuity to a final conclusion. We also have a group of scientists involved in development and improvement of methodology on a relatively short term project basis who can be called upon for assistance when emergency situations and outbreaks occur that require immediate scientific staff attention. We must have sufficient staff to apply new methods in a program of validation by application of procedures to a variety of sample situations.

The knowledge derived from this program is then put to use in the major part of our analytical effort throughout our 18 district laboratories. Such a scientific organization must be closely asso-

ciated with and must be an integral part of the enforcement program. Knowledge of new problems must flow freely from the grass roots experience in the day-to-day sample analyses, and from the experience and knowledge of the enforcement officers. Scientific information produced must be made available and useful to the enforcement officers who deal daily with the industry and the public. Our scientific organization has been developed from the application of these aims and does provide the basis for anticipating new scientific developments and for determining the hazards that may result from new technology. It also provides the scientific progress needed in maintaining an up-to-date analytical program for our enforcement purposes.

We have learned well that research is truly a vital factor in a food regulatory program. The National Canners Association Laboratories have clearly demonstrated that research is a vital factor in the development of sound food production and processing programs. We look forward with interest and satisfaction to another 50 years of effectively working together. **[The End]**

BAN OF ORAL ANTIBIOTIC COMBINATIONS FOR COLD RELIEF PROPOSED

The Food and Drug Administration has proposed to amend the antibiotic regulations by banning the use of oral penicillin or chlortetracycline in combination with analgesic substances, decongestants, antihistaminics, or caffeine for use in the relief of symptoms and prevention of complications of the common cold and other acute upper respiratory infections.

The proposal seeks to: (1) amend the antibiotic regulations wherever necessary by deleting from the list of systemic oral drugs acceptable for certification those that contain an antibiotic in combination with an analgesic substance or decongestant or an antihistaminic or caffeine; (2) deny the request that the antibiotic regulations be amended to provide for the certification of tablets and of syrups of tetracycline hydrochloride, analgesic substances, an antihistaminic, and a decongestant; and (3) initiate proceedings under the provisions of Section 505(e) of the Federal Food, Drug and Cosmetic Act or regulatory actions as needed to remove from the market combinations intended for systemic use of any antimicrobial agent with analgesics, antihistaminics, decongestants, or caffeine.

The proposal is based on the recommendations of a panel of medical experts which concluded that there is no acceptable evidence that any antibiotic is of any value in the treatment of the common cold or of any other upper respiratory viral infection, and that antibiotics are of no value in preventing bacterial complications in patients with common colds who are otherwise healthy.

Objections to this proposal must be filed before September 16, 1963.

Quackery and the Consumer—Responsibility of the Medical Profession

By IRVING LADIMER

The Author Is Vice President of the National Better Business Bureau, Inc., New York. The Address Was Delivered Before the Connecticut State Congress on Medical Quackery in Berlin, Connecticut on September 26, 1962.

SINCE THIS IS MY DEBUT as a representative of the National Better Business Bureau, I ask permission to raise issues and problems rather than to answer questions. In fact, I have not yet completed the 100 days customarily allowed for the honeymoon after marriage to a new responsibility. So, I am short in experience, but perhaps long in conception.

Since I have already made some adroit disclaimers, may I add that I wish to discuss not so much the effect of quackery on the consumer but the responsibility of the professional person who provides data, scientific and otherwise, which may eventuate in some form as advertisements to the general public. I have therefore subtitled this paper "Responsibility of the Medical Profession." In other words, I am going to the origin of many of the presentations which reach us as consumers and potential consumers, because I believe that rigorous self-discipline at this stage and an appreciation of the scientific, ethical and even legal implications by men of medicine may help considerably in preventing the deception, distortion, and just plain confusion which confront the public every day in promotions of certain health products and programs.

The Better Business Philosophy

I should like to start with some explanations, some history and definitions.

First, let me describe the purpose and function of the Better Business Bureau movement in the United States, which has provided a half century of service. We now have a network consisting of the National Bureau and well over 100 local Bureaus in major cities, united through the Association of Better Business Bureaus.

The cornerstone of the Better Business Bureau structure, which had its origin in vigilance committees to detect and eliminate improper business activity, is self-regulation. This method can help control abuse while advertising is planned or proposed, thus preventing possible harm to the public and to competition. The most effective work, therefore, is often done before the claim is exposed. The Better Business Bureaus are independent, nonprofit organizations, established and maintained by business firms, including media, to protect themselves and the public from selling practices and advertising which are unfair, misleading or fraudulent. Their purpose is to sustain and strengthen public confidence in business through accurate and fair advertising. All reasonable means are used to discourage practices which impair the honest and effective seller-buyer relationships. This philosophy of enlightened self-interest rests on the willingness of business to discipline itself and to employ professional support in the public interest.

The Bureaus are in the unique and fortunate position of not having to charge for their services. Any responsible question is given fair consideration and a responsible answer, based on information that may be made public with respect to a business firm, its products, services and method of operation. In effect, this function of inquiry and review has been delegated to the Bureaus by industry and the public, as a systematic and efficient service for all. The Bureaus seek voluntary cooperation; they are in no sense law enforcement agencies, nor do they hold any official standing as a governmental unit at any level. Their prestige and influence are based on the completeness, fairness and accuracy of the data provided and the logic in their analysis of the facts obtained from authoritative sources.

There is a basic difference between Bureau procedures and those of government agencies which include enforcement of laws prohibiting false, deceptive or fraudulent advertising and supervision of labeling of food, drugs, devices and cosmetics. As an agency premised

on voluntary self-regulation, we hold that the advertiser should prove his claims before making them. Government, on the other hand, must assume the burden of legally proving that the advertising is false, misleading or otherwise contrary to statute. It is, therefore, in many respects held to a narrower field of activity. Bureau activity considers business performance, consumer effect and ethical propriety, as well as legal sufficiency.

The National Better Business Bureau is the agency for nationwide or regional business and shares its information with local Bureaus. In addition to case service, as described, it often serves as focal point for cooperative efforts in specific fields. In 1961, 100,000 requests for information were answered, of which about 7,000 came from advertising media—newspapers, magazines and broadcasting units for the most part. I am constrained, if not necessarily pleased, to say that requests relating to drug and cosmetic advertising were among the most frequent.

The Food, Drug and Cosmetic Division of the NBBB is mainly concerned with advertising of services, processes, products and devices in the health areas. Here, false, fraudulent and highly exaggerated claims may result in inappropriate self-treatment with worthless products. Misrepresentation may lead to delays in obtaining necessary and competent medical treatment, causing injury to health, as well as to the pocketbook. Although this Division does not maintain its own laboratories or other facilities for testing, it is served by a panel of medical consultants, who render opinions without charge (and even without the benefit of citation). We also enjoy the cooperation of organized medicine, professional societies and voluntary health organizations.

We do not enter into the doctor-patient relationship or, for that matter, into professional relationships. We are self-limited to representations which affect the public directly, although we also see the professional as a member of the public. Although this Division appreciates the role of the physician, it also recognizes, as does the medical profession, the place of self-medication. Our basic role is to protect the public against deceptive advertising of proprietaries.

Quack, Quack

To create and maintain an honest, open market, certain excesses of advertising which accompanied the vigorous, bold and even reckless growth of American enterprise had to be curbed. Not surprisingly,

the first and most compelling outcries were leveled against the sharp and conniving and, regrettably, successful minority of health hucksters who "took" the public for worthless pills, elixirs, secret formulas and pseudo-scientific claptrap of all kinds. American quackery dates back, at least in legal recognition, to 1630 when Nicholas Knopp of Massachusetts Bay was punished for vending as a cure for scurvy "a water of no worth or value . . . sold at a very dear rate." This was done relatively quietly, before the era of exaggeration by broadside and pamphlet, the flamboyant newspaper ad and the deceptive package.

Many of you are doubtless familiar with the Tractorea or Perkinean rage that swept our country at the turn of the 19th century. James Harvey Young in "The Toadstool Millionaires,"[1] a social history of patent medicines before federal regulation, describes the promotions of Elisha Perkins and his son, Benjamin, who gulled patient and physician alike, with the marvels of so-called tractors, a pair of three-inch metal rods adroitly applied, one colored gold, the other silver. These allegedly drew out the noxious electric fluid, effecting cures in every limb and quarter. Perkins was initially successful in enlisting business, the clergy, medical professors and doctors, particularly the Connecticut Medical Society to whom he first announced his hardwares. He was actually invited, although not a physician, to address the Society in 1796.

In all fairness to your Society, let it be said that they reconsidered during the year, and instead condemned the "miserable remains of animal magnetism" and resolved to expel any member using them. Young comments, "It has been suggested that certain stalwart physicians in the Connecticut Medical Society and some members of the faculty at Yale were greatly shocked by the galvanizing trumpery that had arisen in their midst. From this sense of outrage, at least in part, was to come the founding of the Yale Medical School. This unintended result may be viewed as the most lasting legacy of Dr. Perkins' metallic tractors."[1]

Before we laugh too unrestrainedly at the absurdity of such notions and the gullibility of Homo more or less sapiens, recall that any diversion from the wretched purgatives, cathartics and other violent medicine practiced by the recognized profession at the time would

[1] Young, James Harvey, *The Toadstool Millionaires,* Princeton University Press, Princeton, New Jersey (1961).

have been welcome. And Benjamin Rusk's influence for strong physic and for bleeding, even though questioned, still held such an authoritative command on the profession that common sense and experience could not upset it.

And lest we too quickly sigh and say this is over, may I remind you that only three months ago the FDA seized a quantity of so-called electronic machines, titled "Micro-dynameters." These machines, like their less complicated but equally promising ancestors were reputed to be able to diagnose practically anything. The sober description of the FDA suggests that at best they measured perspiration by simple string galvanometry—at $600 to $875 a piece. I presume the payments were sweated out of the patient.

These are scandalous but, in administrative operation, simple matters, since the fraud is apparent at once and instant exposure indicated. A recent book on bee venom as a cure for arthritis, the conflicting claims in the name of cholesterol and safflower, the offhand or apparent acceptance of shotgun vitamin-mineral compounds and food supplements, the host of alleged energizers, vitalizers and pep pills and their opposite numbers among so-called sedatives, tranquilizers and relaxants (all non-habit forming, of course) present far graver problems especially to those of us who must depend on scientific medical reports of a specific nature before rendering an opinion which may in effect kill or sell pills, powders, pastes and other preparations.

To my knowledge, there is no single definition of quackery. A dictionary may explain it as practice by one who is not qualified, that is a pretender to medical skill or experience, who for questionable or improper motives promotes remedies and cures for diseases and for other conditions which he knows or should know cannot be helped by what he has to offer. Such fraud implies knowledge and dishonest intent, but in fact the effect on the consumer is the same whether the perpetration is willful and knowing or inadvertent and careless. As Miss Russ rightly asked, "Do consumers care whether something is not technically a fraud within the narrow confines of the law if they have been deceived into purchasing a product because of false or misleading advertising claims?"[2]

Experts report that today medical quackery is a billion-dollar racket, operated by educated, sophisticated men, adept at jumping

[2] Russ, Maye, A., "Faith, Fraud and Folly," *Association of Food and Drug Officials of United States* 24, 55-66, April 1960.

through legal loopholes and gaining specious support for medical claims. The captivating chronicle, *The Nuts Among the Berries,* says that over a half a billion dollars goes for food remedies and 350 million for needless vitamins and over 100 million more for weight-reduction schemes and products.[3]

Why Quackery?

I see three major problems or areas with which we ought to deal.

First, there are the schemes to make money, grafting on the gullibility of the public. Here we have outright pickpockets who use indirection to reach the savings of our people. These unscrupulous dealers have no purpose other than to take what they can, preferably as quickly as they can. The only condition they seek to relieve is an overweight bankroll.

A recent example of an advertising deception in 1961 exposed by the Bureau was the sale of concentrated sea water, allegedly helpful to persons suffering from arthritis, cancer, diabetes and other illnesses. The Bureau's bulletin helped to stop advertising and, therefore, to stop sales. The FDA proceeded to seize a number of the sea-water preparations based on false labeling. Add to this the food fads which attribute properties of health and vigor to kelp, parsley, wheat germ, molasses and the host of so-called natural products. Add also the devices for weight reducing such as plastic garments, exercisers, vibrators and the accompanying laxative, dehydration drugs and alleged appetite depressants. The vast majority of the public as well as organizations such as those represented here recognize that such utterly useless materials touted as aids should not be sold or purchased, but there are still many who fall for the fakeries—and these are entitled to protection given only by truth.

Far more difficult is the second area of concern. These are proposals, honestly or evidently honestly proposed, to relieve serious conditions of nutrition, arthritic disease, forms of cancer, nervous disorder and perhaps to improve or sustain various sensory conditions such as seeing and hearing. Frequently, questionable and perhaps injurious regimes with or without specific products cannot be properly distinguished and reasonably differentiated from potentially valuable treatment and honest research. Legitimate investigation, as we all

[3] Deutsch, Ronald M., *The Nuts Among the Berries,* Ballantine Books, New York, 1961.

know, often has its origin in a struggle among a variety of possibilities to arrive at a right solution. Sometimes, a solution is not found, but the concept cannot thereby be condemned. These theories and ideas are offered not infrequently by physicians of high standing and repute and by organizations sincerely attempting to help, but also, unfortunately, by others who see a good thing in trading on the misery and the pain of countless individuals who suffer from disease, or who think they suffer from disease. None of us wants to impede or obstruct medical progress by dampening the possibilities of honest research and experimentation. Medicine and science generally, although basically future-oriented, has not been kind to innovation.[4]

We must try to keep the line between that which science offers today as possible and probable and that which is not. Speaking from my years of interest and experience in the field of human experimentation, I am the first to say that I consider it, if not unlawful, certainly unethical to use the human being first as an unknowing subject or as an unwitting patient in a doctor's office. Of course, he may validly volunteer to participate in an organized clinical test or investigation.[5] We must be extremely careful to be sure before we pontificate that there is no basis for a claim. We are all too familiar with the instances of attempts considered wrong or stupid, later realized as right and appropriate. The need to advance knowledge through research on untried drugs and procedures and to practice proper conservatism in the care of patients presents medicine and, in turn, all of us with this difficult dilemma.

Third, we are confronted with problems of a different order. This is a field bordering medicine, but which medicine is forced to enter. I refer to the variety of products and notions and methods and schemes which relate to appearance, social acceptability and perhaps even economic potential. The quests for beauty, virility, sexual attractiveness are not solely vanity problems to be dismissed by scoffing at the puffing of cosmetic advertisers. In our society, these are equally significant. A recent French government ruling includes lipstick as an essential in determining living costs. And, in our country, we have long recognized the deep importance of cosmetic treatment and surgery. They go deeply to the goals and values of our way of life which literally demands these attributes for marriage, raising a fam-

[4] Barber, Bernard, "Resistance by Scientists to Scientific Discovery," *Science* 134, 596-602, September 1961.

[5] Ladimer, Irving, S. J. D., "May Physicians Experiment?" *International Record of Medicine* 72, 585-98, October 1959.

ily, holding a job, making friends, and demonstrating an interest in the world around us.

It was always thus, I am told. But with greater freedom today and less demand on our time and energy solely to survive, this concern is elevated to an almost frenetic and constant pursuit. Not infrequently, this pursuit leads to significant health hazards. The squeeze to a sylph-like figure often thins into malnutrition. Our intense desire to look healthy and tan may yield to overexposure, possibly the beginnings of skin cancer. Insistence on health foods and diets may tear us down, rather than build us up. Our attempts to get hair when we don't have it and to remove it when we do, not only may relieve us of the pence in our pockets but of whatever good looks we may have. The loss is, therefore, not only time and money but health, physical and emotional. There may be a considerable invasion of the inner security and peace that we today so significantly need.

In summary, we may regard quackery in the health area in its broadest sense as a social phenomenon employing questionable or disputable claims as a method of selling to the public. A campaign against quackery, so defined, is best prepared by understanding the bases or origins of such phenomena. From my analysis, they would appear to spring first from obvious frauds, perpetrated to push a product by evading or shading the truth. Second, there is the promotion not substantiated by science in theory or performance, but likewise not disproved, and therefore subject to question. Third, there is the appeal to beauty, well-being and social grace which on surface appears no more than reasonable self-gratification but which may impair physical and emotional health.

The Care and Nurture of the Quack

Why is it that despite a more sophisticated consumer, a more alert profession, a host of federal and state agencies regulating advertising, labeling and communication and a stronger structure of self-regulation that deception and bilking of the public continues? Most of the crude and tawdry forms of advertising have disappeared and the circus-type of appeal has given way to references to medical endorsement. But, the fundamental come-on, although more subtle, still enchants, captivates and ultimately ensnares.

There are several explanations. Fundamentally, the explanation is simple. First and foremost, of course, is the average consumer's pitiable lack of scientific knowledge in most matters pertaining to

health. Add to this a general inability to accept the fact that there are certain diseases for which no cure is yet known to medical science; the perpetual search for the "fountain of youth" which seems to permeate our society; the eagerness of the afflicted to believe promises of the quick, easy, "miracle" remedy; the naive belief that if something is printed "it must be true!"; that advertising claims must be true or media would not permit them, or the government would prohibit them; the fact that some media assume little responsibility for protecting their audiences from fraud by questioning copy claims; and we have a climate in which false, deceptive or fraudulent promotions flourish.[6]

Secondly, there is the problem of prompt and effective enforcement of the federal laws which prohibit false, deceptive, or fraudulent advertising and labeling of foods, drugs, devices and cosmetics. Responsibility is divided among three agencies. The Post Office Department is empowered to bar use of the mails to those who seek to obtain money through the mail for fraudulently advertised products. The FDA acts against false or misleading labeling of foods, drugs, devices and cosmetics. The Federal Trade Commission has primary responsibility for the regulation of false and misleading advertising (other than labeling, although advertising materials may sometimes be used in such a manner as to become labeling).

In addition to the difficulties of proof of statutory violation and divided jurisdictions not only among federal agencies but national and local agencies as well, there are open areas where no government agency has clear power or jurisdiction, such as expressions of opinion (as in the case of faith healers and health books) not associated with product promotion, and the frustration of time. It is not only the simple factor of time to investigate, notify, prosecute, adjudge and establish compliance, running into months and years, but the ingenuity of firms in obtaining legal delays and in effecting changes in business operations. And during this period, an entrepreneur may sweep the country with the challenged advertising through direct mail appeals or media willing to accept it.

Commissioner Larrick of the FDA concedes that we may have oversold the country on the extent and effectiveness of government control. The new powers to be assumed by the FDA, in the period which may well become known as A. T. (after thalidomide), may tend to strengthen the public conviction that everything on the market must

[6] See footnote 2.

somehow be O.K., if not approved, at least not dangerous. They do not realize that the laws extend to fairly limited areas. Even the advertiser who has been rebuked or ordered to cease and desist feels he is in the clear, so long as he is not tailed by a federal officer. There will never be a sufficiently large staff to watch each dereliction, so we cannot wholly substitute—even if we chose to—government policing for consumer vigilance and self-regulation.

Finally, as Dr. Herbert Ratner has said, "America is the most over-medicated, most over-operated, and most over-inoculated country in the world. It is also the most anxiety-ridden country with regard to health."[7] "We make health an end in itself," not simply a means to do our work and to enjoy living. Assuming the truth of this charge, it is obvious that every new (and we certainly are addicted to the new) medical messiah will quickly recruit disciples and converts. Eager converts are as likely to be as uncritical in their acceptance as the persuaders are in their promises.

Professional Awareness

I have recited these problems and restated some of the reasons for the current situation not because you are unaware of them but because, as guardians of the public trust, professionals have a responsibility at least for cutting such troubles down to manageable proportions. Specifically, we at NBBB try to see that advertising in the health, food, cosmetic areas is accurate and truthful. It is our job to seek substantiation of claims by scientific proof. We are not interested officially in niceties and proprieties with elegance and the puffery, but with what is most essential: accuracy and honesty in detail and in total import.

In this field, it is not easy to determine what is based on scientific proof or to evaluate what is proffered as such. Although we proceed by asking the advertiser to submit supporting evidence, we do not immediately write a critical report if we get no response or one lacking substance, but try independently to arrive at the facts. We are frankly more pleased to find a basis for honest sale and to provide suggestions for fair copy than to have to negotiate to a stalemate or rejection. We, therefore, must turn largely to the medical profession for help in this respect. We look to you to provide data, to help evaluate what is submitted and to suggest further inquiry.

[7] Ratner, Herbert, M.D., in Medicine, an interview by Donald McDonald with Herbert Ratner (one of a series of interviews on the American character), Fund for the Republic, Center for the Study of Democratic Institutions, 1962.

The Troubles with Doctors

Since the medical profession, as individual physicians and through its academic and scientific societies, has generally requested the right to express views on the worth, efficacy, safety and proper use of diagnostic and treatment modalities, we, like others, have referred our problems to them. We are pleased to do so. We know that advertisers are leaning toward such support, rather than the testimony of baseball players, and actors and housewives in order to convince the public.

It is, therefore, appropriate to outline some of the difficulties or experiences we have had in trying to ascertain that which can be considered scientifically supported.

The "Scientific" Paper

To get at the basis of a claim, we look for the results of a clinical test, preferably as reported and published in a recognized scientific journal, either furnished to us or otherwise obtained. We are frequently astounded to find that reports of clinical tests in scientific journals turn out to be little more than abbreviated opinions signed by an M.D. A paper submitted described in three sentences, without any other data, the alleged results of an examination of a sample of 20 patients before and after use of a health device, concluding "all but one stated he was improved." It may well be that such an opinion represents a summary of extensive work, properly controlled, but how can we be certain? And how can we be certain that absence of a comment on proper use, side-effects or qualifications constitutes assurance that there is no problem? A good study deserves a good paper in a reputable medium. The profession expects this and so do we.

The "Professional" Investigator

Then there is the professional investigator. I refer here not to the honorable calling of scientist, requested to render an expert opinion, but to the "professional" apparently always available for a study which someone wants him to do, whether or not he is qualified. I do not add "at a price" because I know that some evidently are interested in fame (such as it is) not fortune. I feel that just as in my field of law, or in any other profession, it is practically impossible for one person to be able to do everything. Even if he is familiar with scientific method, he is just not able to cover the large variety of subject matter, techniques and other necessaries required in perform-

ing adequate scientific studies. Yet, we have noted names which occur repeatedly and with increasing frequency on papers which are claimed to be independent studies. Sometimes these men are hired as consultants directly by drug or other firms, sometimes through so-called independent research or testing laboratories or they advertise themselves, contrary to ethical standards. This is of little consequence. The ubiquitous eminent physician should be questioned even if qualified, simply because we cannot conceivably be all and always, yet care for patients or conduct serious long-term studies.

One physician advertised for more than 30 years as a medical consultant in all fields. This character was described in some detail at the National Congress on Medical Quackery about a year ago. In some ads, he claimed to have just the evidence needed to support drug claims based on a survey of American or foreign literature. He also offers services in handling labeling, writing articles or brochures and ads with professional appeal. His advertising has included products available under "exclusive license" ranging from soporifics, arthritic drugs, reducing aids, athlete's foot remedies to hay fever cures and ulcer remedies. He has operated as a member of a team with other physicians who pass around the clinical testing much as a medicine ball is tossed around a circle.

The "House" Doctor

After repeatedly requesting clinical data in support of a claim for a new feminine hygiene product, we finally received a set of papers and references, all cited to local medical journals. The investigations were all conducted by men who had been granted stock options in the manufacturing house. Another instance involved the president of a sea water concern who was a physician and endorsed the claims.

Although this company doctor may be honest and straightforward, is it not possible to be free from influence and, if free, to convince others? As a physician, he is both vulnerable and suspect. While doctors, like others, may invest in or even control business firms, their ability to render objective scientific reports on leading products of the firm is so diminished that they devalue themselves and the products they endorse.

Rigged Research

Dr. Kenneth Milstead, Deputy Director of the FDA's Bureau of Enforcement, calls attention to an area of quackery which he terms

"repulsive and abhorrent to all scientists." He cites two problems: (1)"tailored studies," which generally consists of a few uncontrolled observations on a few patients, later described by the advertiser as "clinically tested" or scientifically supported; and (2) predetermined results, wherein the physician does not actually test or fixes his tests to come up with the desired answer. These are, according to Milstead, the ultimate in quackery, representing man's worst meanness to his fellow man.[8]

Incompetent Research

Almost as reprehensible as the tailored trial or the cooked-up clinical study is the outright incompetent or inadequate study. The medical man who conducts poorly designed research, or employs faulty design or selects a biased sample or fails to account for side effects, qualifications, lost cases or exceptions, or who misuses statistics and, finally, who draws questionable conclusions from data may be honest but is just as blameworthy as the scientist scoundrel.

A recent Canadian researcher assessed the methods and techniques of 103 studies published in the Canadian Medical Association Journal and the Canadian Journal of Public Health.[9] He found that in 17.5 per cent of the articles, terms or system of classifications were not explicit; in 90 per cent, sampling was inadequate or inapplicable; as to controls, 35 per cent had none, 13 per cent were inadequate, 25 per cent were well controlled and 27 per cent were studies where controls were inapplicable; in respect to statistics and their use, over 57 per cent used inappropriate methods or required additional analysis; and, finally, in the derivation of conclusions, 42 per cent of the articles contained flaws of inference, particularly in assigning causal relationships.

While these articles represent the sins of our neighbors, I doubt that we Americans can cast stones. It is likely that our published scientific reports suffer to a similar degree. At the NBBB, we have had to write for explanations of differences between samples originally selected and those reported, of omission of controls; of use of averages rather than distributions where the spread was evidently significant, for bases of conclusions on ridiculously small universes and

[8] Milstead, Kenneth L., "The Food and Drug Administration's Program Against Quackery," speech delivered to Yonkers Academy of Medicine, Yonkers, New York, May 16, 1962 (processed).

[9] Badgley, Robin F., "An Assessment of Research Methods in 103 Scientific Articles from two Canadian Medical Journals," *Canadian Medical Association Journal* 85, 246-250, July 29, 1961.

for rationales supporting alleged cause-effect propositions. These are technical problems, not necessarily misunderstandings of scientific method. But I was astounded to find that some advertisers (and perhaps their medical consultants) apparently honestly argued that trials of one drug could apply to another which they specifically said was different, that results achieved by a high-powered air purifier could be ascribed to a smaller, less powerful model, that the known properties of one ingredient could be attributed to a mixture or compound without further test; and that increased efficacy or "power" would naturally follow in all cases from increased dosage in a straightline relationship. All this, mind you, in a slow summer period of two months.

Journal Responsibility

That such papers are published gives one pause. Medical journals, held out to the hallmark of "research," regrettably become inadvertent co-promoters of quackery, when they permit their pages to be filled with questionable or spurious reports. Yet, these journals, either because of interest in advertising, reprint sales or perhaps sheer incompetence or lack of time on the part of editors, allow such things as: a paper comparing an alleged new over-the-counter item with a prescription drug, although no prescription drug was used in the tests; a paper signed by doctors who turned out to have no medical degree; a paper based on a test presumably prepared by the author but in fact done by another; a paper with references to a product claimed to be the same as that under study but in fact different; and numerous papers without identification of samples, method of selecting subjects and, of course, conclusions based on statistics not given or improperly computed.

I must conclude here that although not all journals are lax in screening, there are enough cases to warrant much closer scrutiny.

Health Books and Lectures

Reference to publications cannot be concluded without remarking on the spate of so-called health books and health lectures to the general public. Written by physicians as well as laymen, they can and do create as much havoc as specious specifics for this disease. Erwin DiCyan recently wrote of "tainted books" in this field, describing among others health fads and nature food volumes, dietary remedies such as vinegar or molasses for all kinds of disease, promotions of

natural remedies such as candle wax, baking soda and water for all manner of ailments.[10]

Books employed as labels and held to be labeling for products are clearly subject to federal statutes, as in the recent celebrated case of "Calories Don't Count" by Dr. Taller. But others, equally pernicious, may live on as expressions of free speech. Whether or not government agencies or bodies concerned with self-regulation such as NBBB can or should move against books as against products is an open issue, but it is clearly within the realm of the medical fraternity to criticize them vigorously and to stand as strong witness to professionals and to the ordinary reader against instances of misleading advice and information. The same holds true for the health lecturer and healer—who fog the air with misty ideas and half-truths. Those who are in fact licensed physicians or dentists can be read out of the profession by the vigilant members and those who are not can be denounced in other ways. Dr. Lasagna comments that the effects of certain medical writings by or about doctors have already "seriously impaired patient-doctor relationships."[11]

Consultants for Sale

I wish to call attention, in nearing the end, to the case of the medical consultant who does not fulfill his obligation to himself, his client and thus to the public who relies on both. Recently, we came across a brochure replete with reference to the work of a well-established nutritionist who, on inquiry, was the paid consultant to the vitamin distributor. Both acknowledged the relationship, but the consultant evidently hadn't been consulted for months, although he had regularly cashed his check. He admitted that he had not seen the copy quoting him, was unaware that sales representatives were to be taught about his formulation and plainly "had not kept in touch" although he was, by contract, responsible for all scientific matters including advertising of claims. Likewise, the firm did not call on him or even indicate that copy had been developed. We trust this is not typical but we suspect that all too often a name is bought and the expertise is not. Responsibility rests on all parties to see to it that science is used, not abused.

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[10] DiCyan, Erwin, "Tainted Books," Monthly Bulletin of DiCyan and Brown, No. 114, April 1962, also restated as "Printed Words Can Be Dangerous to Health," *New Medical Materia* 39, August 1962.

[11] Lasagna, Louis, M.D., *The Doctors' Dilemmas,* Harper & Brothers, New York, 1962.

Responsibility for Follow-Through

Finally, we reach one of the least discussed problems, but one of outstanding significance: that is, the responsibility of the reliable investigator who is honestly interested in making a serious contribution to see that the interpretation given to his work in advertising and in any other disclosure is accurate and is presented as intended. All too often, the carefully documented study of a reputable man finds itself in syncopated print with dots and dashes, or presented in extracts, far from the meaning of the basic and original context. These are not necessarily wrong; they may simply be inept, inappropriate, or unable to constitute an understandable whole.

It is my strong opinion that physicians and other scientists who recognize that their work may be quoted and used have the further responsibility of insisting and insuring that quotation and use is proper. It is true that many physicians who write for journals have no way of knowing who will pick up papers, who will use quotes and will cite references. On the other hand, it is also true (and this applies to a large majority of physicians when they are in fact testing a product or process under grant or contract) that many are in position legally, ethically, and professionally, to require that they have the right to check and clear before their papers or summaries are issued to the public. Perhaps this will impose a great burden. They will have to review how eager advertisers and copy writers and promoters use the medical word as the basis for the selling word. Nevertheless, unless they exert this responsibility, unless they recapture the right and power so many have surrendered, we will have to turn to them again and again for the basic research which should have been cleared in the first place. Our reliance, after all, must be based on experience. Those who now prepare clinical papers on products for the people should follow through so that the scientific expression retains integrity.

Effect on the Consumer

Before closing, I will confess that I asked myself whether these criticisms were warranted. Can't we rely on the consumer? It is said that if the consumer is consistently misled or swayed from side to side like a spectator at a tennis match by unscrupulous promotion and misrepresentation, if he is regularly defrauded, he will simply stop buying, except when he has to. We also like to believe that when good quality is placed alongside shoddy material, the choice will always be for the former. These statements unfortunately partake of

as much hope as fact. I used to believe this, but I know better. This is not to say that I am cynical, but I really do not believe that quackery is self-defeating or that intelligent judgment will prevail.

I conclude rather that active, positive programs of self-regulation, professional responsibility and governmental control in proper proportion must be vigorously pursued in the public interest. Perhaps in time the lion will lie down with the lamb but right now the lamb needs the shelter of the shepherd and the fold.

Therefore, I would like to restate the general position of the National Better Business Bureau and my own as well: that self-regulation, self-control and discipline is the way in which business and the professions can reduce the fleecing of the public as well as avoid criticism and the likelihood of outside restraint. Self-regulation is not as invidious or difficult as it appears. For the medical profession, of course, the concept of a practical code of ethics is virtually as old as medicine itself. A further application of the code to protect and enhance the use of scientific studies for the general public should be a welcome addition and a proper duty. If we at the Bureau are expected as partners with you, to protect the public from either the outright quacks and frauds or the well-intentioned practitioners we should be able to look to you, the profession, for the right word, the honest word, the properly interpreted word. If this is not forthcoming, you will have far less occasion to blame what occurs on others. After all, when the mirror is turned, you are the others. **[The End]**

NEW DRUG APPROVALS PUBLISHED

The Food and Drug Administration has begun publication of listings of new drugs approved as safe and effective under the Kefauver-Harris Amendments of 1962. Under the 1938 law, clearances of new drugs were based on review of safety data submitted by drug manufacturers. If the research data were adequate to support a conclusion that the drug would be safe when used as directed, the manufacturer's application was declared effective. Under that law, there was no government approval of drugs. However, under the 1962 amendments, clearance of a new drug requires a conclusion by the FDA from the submitted medical data that the drug is both safe and effective, and the government formally approves the drug for distribution for interstate commerce.

The listings are for the information of the medical and dental professions, veterinarians, and pharmacists, but are not intended to advise the professions or the public about the use of the drugs. The official lists contain two classifications of drugs: those approved for human use, and those approved for veterinary use. The list for human use appears at FOOD DRUG COSMETIC LAW REPORTS, ¶ 72,800, while the veterinary listing is found at ¶ 72,820 of the REPORTS.

The Role of the Government Laboratory

By ROBERT S. ROE

This Paper Was Presented at the Research and Engineering Roundtable at Brookings Institute on December 6, 1962. Mr. Roe Is Director of the Bureau of Biological and Physical Sciences, Food and Drug Administration.

REVIEW OF THE SCIENTIFIC ACTIVITIES of government shows that there is not just one role, but many roles for the government laboratory. Yet there are certain needs and attributes that are common to all government laboratories.

The scientific budgets of the Defense Department, Atomic Energy Commission, and National Aeronautics and Space Administration emphasize research and development—military weaponry and equipment, radioactivity applications, development of new fundamental knowledge and engineering applications for space exploration. These vast programs are carried out in large part through grants and contracts, as well as in government laboratories.

Recognition of the value of planned, coordinated research in investigation of diseases and means of treatment has produced the outstanding research facility, National Institutes of Health. Here, too, expanding budgets and programs make extensive use of collaborating laboratories and investigators through grants and contracts.

This relatively recent development of large-scale contract and grant work has affected the entire scientific community.

The vast scope and importance of these activities and programs now involve and influence a large proportion of the scientific talent and facilities available.

There are many scientific units in government—like that of the FDA—that have a tradition and long history. These are the centers of scientific work and the source of scientific advice for the agencies they serve.

These scientific groups are of fundamental importance to public health and welfare, protection and development of our natural re-

sources, and the promotion of agriculture, industry and commerce. The Agricultural Research Service of the Department of Agriculture maintains laboratories investigating farm animal and crop diseases and their control, pest control, and in its Regional Research and Development laboratories studies with respect to better utilization of agricultural products. The Fish and Wildlife Service in its work in fisheries development, the Geological Survey, the Public Health Service laboratories at the Communicable Disease Center in Atlanta, and the Taft Sanitary Engineering Center in Cincinnati are other examples.

Many Agencies Depend on Scientific Activities

Many regulatory and law enforcement functions of government are very much dependent upon scientific activities. Hence, the laboratories of the FBI, the Bureau of Narcotics and the Customs Service. The administration of the meat and poultry inspection services of the Department of Agriculture, the licensing of important vaccines and antitoxins by the Public Health Service, and the administration of the Food, Drug and Cosmetic Act by the Food and Drug Administration obviously require sound scientific bases.

My own experience in government has been entirely with the Food and Drug Administration and its predecessor organizations. The mission of FDA is the administration and enforcement of several consumer-protection laws, the principal one being the Federal Food, Drug and Cosmetic Act. I shall direct my remarks to the scientific activities required in connection with regulatory activity, particularly with respect to the role played by the scientific staff of the Food and Drug Administration—at least my concept of the scope and the character of the scientific work, particularly the laboratory research. Similar considerations may be applicable, at least in part, to many, but perhaps not to all, other government laboratories involved in regulatory and service work. Occasionally the annoying question is posed as to why FDA is conducting research programs and undertaking scientific investigations that do not seem to have immediate application to the current law enforcement activities. Questioners appear to understand the reason for laboratories in which to analyze samples of foods, drugs and cosmetics to determine whether the samples are adulterated or misbranded in violation of the statute, but they don't see the need for scientific investigations and research beyond the development and improvement of immediately required methods of analysis.

Broad Spectrum of Research Is Essential

The administration of food and drug regulatory laws has required a scientific basis from the very beginning with the enactment of the first federal law in 1906. But the rapid scientific advances and the technological applications of new knowledge in recent decades have had a tremendous impact in the areas of our responsibility in foods, drugs and related products. The rate of scientific discovery and translation into new technology increases the need for extensive scientific work in depth. The present scientific era has introduced new environmental hazards some of which involve our foods and drugs. The vast array of new synthetic chemicals never before introduced in our environment, new products, new processes, and new packaging materials present new problems of scientific complexity. The seemingly simple matter of developing an analytical method for a particular chemical compound may require some rather fundamental research into the basic chemistry and a study of interfering substances before a practical reliable method for law enforcement work can be designed. A broad spectrum of research is, in my judgment, essential to provide the scientific expertise that is necessary in developing the policies, regulatory programs, the methods of analysis, the interpretation of analyses and the evaluation of all of the scientific facts.

Let me give a few illustrations of what I mean. The law provides for the establishment of standards of identity for food whenever such action will promote honesty and fair dealing in the interest of consumers. Such standards are important to consumers, manufacturers and the enforcement agency. They are essential in maintaining the integrity of staple and other important foods. They serve to condemn certain types of debasement and hence prevent unfair competition. They provide important yardsticks for the enforcement agency in evaluating market samples. All these things are true if the standards are scientifically sound and if adequate methods of analysis are available. The scientific and technological facts are the essential foundation for sound, effective, enforceable standards. To obtain such facts is one of the responsibilities of the scientists of the FDA. This may require studies on the composition of natural products to determine the normal range of constituents, the seasonal and geographical variations. It may require some basic research on the chemistry of constituents before methods of analysis can be devised. It may involve studies of the effects of manufacturing processes and new technological applications.

Problems Concerned with Frozen Food

The effects of the new technology in providing in the supermarkets throughout our country frozen seafood, fruits and vegetables at all seasons is well-known to all. These developments present new problems for FDA. Are the frozen fish fillets the choice variety that they are labeled or has some less desirable fish been substituted to the economic advantage of the shipper and disadvantage of the consumer? This posed a problem only recently solved by laboratory studies on the electrophoresis of proteins. Extracts of fish fillets in starch gel media yield electrophoretic patterns that are species specific and enable differentiation of closely related species.

Bacteriological studies in connection with a broad survey of frozen foods—particularly, the ready-to-serve items—have been undertaken to develop means of correlating bacterial contamination with factory sanitation and plant practices.

Isolated reports in the scientific literature some years ago suggested changes in nutritive values of fats and oils subjected to prolonged heating. There were even suggestions that such treatment might produce toxic substances. Increasing use of deep-fat frying in food production and the development of increasing numbers of new emulsifying additives consisting in part of fatty acids indicated to us the need for immediate study and evaluation of this situation. For several years we have had a small research team delving into this problem, and contributing to the accumulating information and knowledge along with other laboratories.

This research background contributed substantially to the resolution of the "chick edema disease" which devastated poultry flocks in widely separated areas. The causative agent proved to be a highly toxic substance in the fatty constituent of a commercial "high calorie" poultry feed. This research also has enabled formulation of specifications to rule out toxic fatty acids from food additive emulsifiers.

Problem of Pesticide Chemical Residue

A current "best seller" has evoked great interest and not a little hysteria among the public. I refer to *Silent Spring* which depicts some of the real and potential hazards from misuse of or careless application of pesticide chemicals. This was no revelation to the FDA or to scientists generally. What the book fails to do is to explain adequately the benefits of pesticides and the efforts that have been made and are being made to protect the public health.

Pesticide chemical residues in food are a problem for the FDA scientists. We have the responsibility of establishing safe tolerances for residues in food and for providing the methods to enforce such tolerances. The company that seeks a tolerance for its chemical must present information concerning the identity of the substance, the residues that will result from its use and results of toxicological studies. Our scientists must evaluate these data and among the questions they must answer are these: Has the identity of the pesticide been established? Is the chemistry complete, for example, are we sure that the residues that will remain in food are the same as the chemical added, or have there been oxidation or metabolic changes? Have the data established the safety of the proposed uses? Safety data may include long-term chronic feeding tests in laboratory animals with accompanying pathological examination of tissues, metabolism studies and biochemical procedures, such as enzyme studies. Are methods of analysis adequate to enable enforcement of the tolerance or other type of regulation proposed?

The scientists assigned to evaluate the data in a petition proposing a tolerance for a pesticide chemical and to advise the Commissioner as to the safety of the proposed tolerance must be at least as knowledgeable as the industry scientists who prepared the data. Our chemists must know whether the reactions described are reasonable and scientifically sound for the class of compounds involved—whether the methods and procedures employed in the investigations are appropriate and adequate to support the conclusions presented. They can know only to the extent that they are actively engaged in similar research and in the application of the methods, procedures and instrumentation involved—or are members of a scientific team engaged in such research. Our pharmacologists and biochemists who must interpret and evaluate the toxicity data derived from animal feeding tests, metabolic studies, enzyme and other biochemical procedures, and the pathologists who interpret the histology and pathology must be actively engaged in studies and research in these fields.

Research programs utilizing modern instrumentation and techniques, such as chromatography, UV&IR spectrophotometry, tissue culture, neutron activation analysis and X-ray spectrophotometry, are essential in other areas of our responsibility, for instance, the evaluation of drugs and pharmaceuticals, cosmetics, nutritional claims with respect to proteins, fats and vitamins. All these and many others

involve complex technical problems. Perhaps these examples will serve to illustrate the scope of our responsibilities.

Suggestions

Now, I do not mean to suggest that all of the scientific and technical information about foods and drugs, the chemistry and toxicology of additives, the bacteriology of food poisoning, and the methods of analysis necessary in the administration of the Food, Drug and Cosmetic Act should or could be acquired in the laboratories of the FDA. Much of this will come from research in laboratories all over the world. But I do suggest that FDA and all other similar government regulatory agencies must have a scientific staff of recognized stature, leadership and expertise in its field. This can be realized only when adequate opportunities and facilities are provided for conducting significant, challenging, meaningful scientific work in our own laboratories. Our key scientists should personally know and be known by the leading scientists in their fields and this means participation in and contributions to the meetings and programs of scientific societies.

It seems to me that laboratories of agencies such as FDA should be in position to provide the standard for judgment of the adequacy and validity of the scientific data which they are called upon to use. It also appears that even the large agencies supporting vast contract and grants programs particularly need to maintain the standard of leadership and judgment within their own agencies.

There are occasions—even in regulatory agencies—where outside consultants and advisory committees should be employed. There also are problems that to advantage can be contracted out in preference to in-house assignment. But there is no substitute for a vigorous, high-grade scientific staff within the organization as the responsible source of scientific and technical expertise. **[The End]**

FDA-FLI TO HOLD ANNUAL CONFERENCE

Plans are progressing for the Seventh Annual Conference of the Food and Drug Administration and The Food Law Institute to be held on Monday, December 2, in Washington, D. C., according to the president of The Institute, Franklin M. Depew. A highlight of this year's conference will be a dinner in honor of the FDA and celebrating the Twenty-fifth Anniversary of the enactment of the Federal Food, Drug and Cosmetic Act.

Problems Stemming from the Refinement of Analytical Methods

By HENRY FISCHBACH

Mr. Fischbach Delivered This Paper at a Symposium of the Food Protection Committee, National Academy of Sciences, National Research Council, in Washington, D. C. on November 29, 1962. He Is Director of the Division of Food, Bureau of Biological and Physical Sciences, Food and Drug Administration.

ALTHOUGH THE ASSIGNED TOPIC may imply that refined analytical methodology results only in worrisome problems, I intend to discuss not only the troublesome problems but also the benefits derived from better methods. To me, refined analytical methodology means improved precision, accuracy, characterization, sensitivity, or any combination of these attributes. Refined analytical tools for monitoring our vast food supplies have assumed a major role in the daily interplay of new technological developments and the increased abundance of safe, wholesome and nutritious foods. One of the prime factors in this affluence has been the safe use of pesticides.

The scientific developments of the past two decades have introduced significant changes in our environment, some of which pose difficult scientific and social problems. Pesticides have contributed to this change in environment, along with products from inefficient smokestacks, exhaust pipes and the nuclear fission wastes of the atomic age.

The potential public health hazards associated with pesticides have been recognized in scientific circles and have been the subject of discussion at meetings and of studies by committees of scientific societies. They were the subject of inquiry by a Select Committee established by the House of Representatives of the Congress in 1950. As some of you know, this committee held hearings over a two-year period, receiving testimony from scientists in universities, government and industry. The committee rendered extensive reports and recommended legislation to regulate those uses of chemicals that might place residues in foods. Congress acted on these recommenda-

tions and enacted, in 1954, the Pesticide Amendment to the Federal Food, Drug and Cosmetic Act. The purpose of the new amendment as revealed in the enacting clauses was to require the testing of chemicals for safety before they were used in ways that would result in residues, in or on foods. The amendment made a fundamental change, in that it placed the burden of proof to establish safety on the proponents for the use of the chemicals. This change, however, has not eliminated or reduced the work of the government enforcement agency. On the contrary, the responsibility and work have been markedly increased as the Food and Drug Administration must evaluate the protocols submitted by petitioners, appraise the validity and soundness of the safety tests, and issue regulations establishing safe tolerances—all within specified time limits.

Over 2,400 Legal Tolerances Established

Since 1954, over 2,400 separate legal tolerances, involving more than 125 different pesticides, have been established under this authority. As many of you know, a numerical tolerance is not established unless a method of analysis is available to enforce it. Where a numerical tolerance has been established there should be no confusion. Clearly, a line has been set which differentiates between a legal and an illegal residue. In some areas tolerances have been set at levels as low as 0.1 part per million. Obviously, highly sensitive methodology is necessary to monitor such regulations.

An Important Part of Today's Technological Advances

Although analytical chemistry may have had its origin in detached scientific curiosity, it has obviously become an essential part of present-day technological advances. The impact of the Pesticide Amendment, and later the Food Additives Amendment, on the scientific community, and particularly on analytical chemistry, is somewhat unique. Never before has a government statute, in this country or anywhere else in the world, specifically demanded adequate methodology for monitoring foods prior to the actual marketing of such products. The analytical procedure need not be chemical in nature. For example, the fly bioassay technique has had some value in the pesticide field. However, it has been our experience, in the recent past, that the main techniques capable of meeting the requirements of accuracy, precision and high sensitivity have involved the physicochemical tools of the chemist.

Troublesome problems can arise when refined analytical techniques reveal tiny residues which stem from the use of a pesticide under a "no residue" registration of the United States Department of Agriculture or a zero regulation of the Food and Drug Administration. Another vexing problem can arise, when highly sensitive methodology uncovers tiny inadvertent residues from environmental background. As most of you know, a manufacturer may obtain a "no residue" registration from the Department of Agriculture if he presents convincing data which show that under the recommended conditions of use the pesticide will be useful and will leave no residue. On occasion, the Food and Drug Administration issues zero tolerance regulations. Most of you are familiar with the conditions under which such tolerances are established. I discussed the various circumstances leading to such a regulation at the spring meeting of the American Chemical Society. Without dwelling on these points let us consider the meaning of "no residue" or "zero." It is the concept, or misconception, of zero which I believe has led to confusion in some of the troublesome problems.

Except in mathematics the scientist does not use zero in an absolute sense. Zero is frequently used to indicate that nothing was detected within the sensitivity of the method. Many scientists prefer the symbol ($<$) "less than" rather than zero. The less-than symbol has the attribute of denoting the limiting sensitivity of the method used. Most of the scientific community today acknowledge the fact that the physical scientist, if need be, can detect in our environment the tiniest amounts of any stable chemical which has had continued widespread use in this country or elsewhere. The mere ban of a stable substance in one country would lessen the amount in the environment, but theoretically it could still be detected in that country, as long as there continued to be significant use of the particular substance any place else in the world. Such data are of scientific interest and contribute to our knowledge. If the pharmacologist observes that such minute, finite values are considerably less than the safe legal tolerance levels for the chemical, then he may decide that these tiny analytical values are of "no pharmacological significance," or "nothing," or "zero." In response to inquiries concerning a specific pesticidal use, the Food and Drug Administration for several years has informally defined the level of sensitivity of a method, deemed adequate to show compliance with a zero tolerance or a no residue registration. Such consideration generally requires much greater

sensitivity in the methodology than that associated with the finite tolerance in pesticide regulations.

Increasingly refined analytical tools can raise another kind of "troublesome" problem. As man develops means to accumulate new data never before available to him because of method limitations, he may be confronted with new, perplexing problems. With techniques and instrumentation of greater selectivity and resolving power, it is not surprising that the scientific community from time to time will uncover an unanticipated by-product having its origin in the usage of a particular pesticide. The disclosure of an unsuspected toxic degradation product by more selective and discerning tools might result in rescinding a particular tolerance and cause a change in a previously "normal" practice. As many of you know, this has happened in the past. Undoubtedly, the adjustment to such a ruling was economically painful to the manufacturer and to some farmers; nevertheless, such action was in the best interest of consumer safety.

Let us now consider what I believe to be a significant benefit derived from refined analytical methods. New data, from highly sensitive tools, will furnish a keener insight into the happenings in our environment resulting, for example, from population growth, internal combustion engine, atomic power, detergents or pesticides. It is essential to pause and ponder the meaning of such new data within the framework of safeguarding the health of the nation as well as the health of other peoples to whom we may export. Timely data will allow for sober and deliberate considerations and, if necessary, a realistic opportunity to reverse trends of potential hazards. If advancements in refined methodology can keep pace with the great technological strides, then our obvious material advances can be evaluated in terms of their impact, if any, on our environment and to determine whether in fact a net gain for man has been achieved.

With tools of exquisite sensitivity and selectivity, cumulative data can be acquired from which scientists can maintain careful surveillance on the changing environment. For example, DDT has been, and is being, used world-wide. Periodic sampling and analysis of our three greatest diluents—the soils, water, including sea water, and the atmosphere—are highly desirable. With ultrasensitive techniques, trends of pesticide accumulation in these major diluents and, in turn, the effect on raw agricultural products can be followed and evaluated long before any actual hazard appears.

Average Diet of 19-Year-Old Boy Studied

Early in 1961, the Food and Drug Administration applied such a concept to a program for continuing surveillance over the strontium-90 and cesium-137 content of our foods. The average diet consumed by the 19-year-old boy was chosen simply because nutritional data indicated that the food consumption of this age group exceeded that of any other age group. This age group consumes 3.76 kilograms per day, of which approximately 35 per cent are contributed by liquids such as water, soft drinks, coffee, cocoa and tea. The daily intake for the "standard man" is 2.2 kilograms. The first sampling and analyses were done in the Washington area, at quarterly intervals beginning in May 1961. Later the cities of Atlanta, Minneapolis, San Francisco and St. Louis were added to the program.

The make-up of the diet is based on data developed by the United States Department of Agriculture and represents a selection of foods recommended by the Department's "Moderate Income Plan" as nutritionally adequate for the age group. A two-week diet was collected during each of the four seasons of 1961 and 1962, consisting of 82 food and beverage items and including processed and fresh foods of all types. Drinking water and snack foods were included in addition to the main meal items. The foods were prepared by dietitians in a manner which reflected the typical preparation which is normally followed by the housewife prior to serving. Although the primary purpose of the program was surveillance over radioactive substances, it was quickly apparent that these composite samples provided an excellent means for a practical and keener insight into pesticide residues in our total diet *as ingested.*

Highly Sensitive Techniques Used

Here was an opportunity to collect realistic data which would reflect the over-all effectiveness of governmental regulations, the adherence to the prescribed conditions of use, and the normal home preparation of food for the table. However, for the data to be fully meaningful it was obvious that highly sensitive techniques must be used. The data would be of very little value, for example, if they were derived from methodology that was limited to a sensitivity of one part per million. The pharmacologist would rightly be concerned by zero values which under such circumstances might be masking significant values at 0.5 part per million.

The total diet samples were analyzed for organophosphorus and chlorinated organic pesticides. Screening methods for organophosphorus insecticides are not yet as fully developed or as sensitive as those for the chlorinated organics. The present limiting sensitivity for the organic phosphate pesticides is ca 0.1 part per million whereas that for many of the chlorinated organics is a few parts per billion. Consequently, for this discussion on refined analytical methods I will refer only to the chlorinated organic pesticide data.

In the Washington area, a complete "market basket" of food sufficient for 14 days' subsistence was purchased from each of four supermarket outlets, processed for the table by professional dietitians of the Clinical Center of the National Institute of Health, and homogenized into a slurry from which samples were drawn. In May 1962 the sampling was expanded to encompass two supermarkets in each of the five previously mentioned cities. Although commodities were purchased in specific cities, obviously they originated in many different areas. Thus, from the standpoint of pesticide usage, the samples represented crops and practices throughout the country. Nevertheless, it should be recognized that the data shown in the accompanying table represent the early results in a continuing program.

The analyses on the samples of 1961, as well as on the February 1962 samples, are based on paper chromatography.[1] All data since then are derived from both paper chromatography and gas-liquid chromatography using a micro-coulometric detection unit.[2]

You will note that only a few of the pesticides appear in the table. Actually these total diet samples were screened for about 20 of the chlorinated organics and, for brevity, only those which were detected are listed in the table.

You will also note that the residues of chlorinated organic insecticides in all samples generally were very low compared with established tolerance levels.

Exceptions were the residues of dieldrin and heptachlor epoxide found in the May 1961 total diet samples. These results would indicate that one or more of the commodities comprising this group of samples may have had residues in excess of the tolerances for these insecticides.

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[1] Mills, P. A. "Collaborative Study of Certain Chlorinated Organic Pesticides in Dairy Products," *Journal of the Association of Official Agricultural Chemists* 44 (1961).

[2] Burke, J. A. and Johnson, L. Y. "Investigations in the Use of the Micro-Coulometric Gas Chromatograph for Pesticide Residue Analysis," *Journal of the Association of Official Agricultural Chemists* 45, 348 (1962).

Chlorinated Organic Insecticide Residues (PPM) in Total Diet Samples[1]

Date of Purchase	Sample No.	Place of Purchase	DDT	DDD	DDE	Dield-rin	Hepta-chlor Epoxide	Chlor-dane	Kelth-ane	Lind-ane
5/61	1	Washington, D. C.	0.013	–	T	0.050	0.025	–	–	–
	2	Washington, D. C.	0.013	–	T	0.075	0.013	–	–	–
	3	Washington, D. C.	0.013	–	T	0.025	0.025	–	–	–
	4	Washington, D. C.	0.010	–	–	–	–	–	–	–
8/61	5	Washington, D. C.	0.010	–	–	–	–	–	–	–
	6	Washington, D. C.	–	–	–	–	–	0.010	–	–
	7	Washington, D. C.	–	–	–	–	–	0.030	0.010	–
	8	Washington, D. C.	–	–	–	–	–	–	–	0.005
11/61	9	Washington, D. C.	0.020	0.010	–	–	–	–	–	0.005
	10	Washington, D. C.	0.020	0.010	–	–	–	–	–	0.010
	11	Washington, D. C.	0.010	0.010	–	–	–	–	–	T
	12	Washington, D. C.	0.020	0.005	–	–	–	–	–	0.010
2/62	13	Washington, D. C.	T	–	–	–	–	–	0.020	–
	14	Washington, D. C.	T	T	–	–	–	–	0.060	–
	15	Washington, D. C.	T	–	–	–	–	–	0.020	–
	16	Washington, D. C.	T	–	–	–	–	–	0.060	–
5/62	17	Baltimore	–	–	T	–	–	–	–	–
	18	Baltimore—dairy products	–	0.010	–	T	–	–	–	–
		Baltimore—meat, fish and eggs	0.100	0.100	0.065	–	0.001	–	–	0.046
		Baltimore—dry beans and nuts	–	0.010	–	–	–	–	–	–
		Baltimore—grain products	–	–	–	–	0.002	–	–	0.011

[1] T = Trace = Detectable but less than the lowest numerical value recorded in the column for the specific pesticide.

Note: – = none detected.

Chlorinated Organic Insecticide Residues (PPM) in Total Diet Samples[1]—Continued

Date of Purchase	Sample No.	Place of Purchase	DDT	DDD	DDE	Dield-rin	Hepta-chlor Epoxide	Chlor-dane	Kelth-ane	Lind-ane
5/62	18	Baltimore—fruits and tomatoes	0.006	0.006	T	–	–	–	–	0.006
		Baltimore—above ground vegetables	0.010	0.020	T	–	T	–	–	–
		Baltimore—root vegetables (except potatoes)	0.030	0.030	0.060	–	–	–	–	0.015
	19	Baltimore	0.010	0.010	0.020	–	0.010	–	–	0.002
	20	Atlanta	0.010	0.006	0.010	–	–	–	–	0.010
	21	Atlanta	0.010	T	T	–	–	–	–	0.006
	22	Minneapolis	0.020	–	–	–	–	–	–	0.010
	23	Minneapolis	0.010	T	T	–	–	–	–	0.010
	24	St. Louis	0.010	–	–	–	–	–	–	–
	25	St. Louis	0.008	0.007	0.022	–	–	–	–	0.002
	26	San Francisco	0.010	0.010	0.008	–	0.010	–	–	–
	27	San Francisco	0.015	0.010	0.016	–	–	–	–	0.010
8/62	28	Baltimore	T	0.008	–	–	–	–	–	0.002
	29	Baltimore—dairy products	–	–	–	–	0.004	–	–	–
		Baltimore—meat, fish and eggs	0.050	–	–	–	–	–	–	–
		Baltimore—dry beans and nuts	–	–	–	–	–	–	–	0.002

[1] T = Trace = Detectable but less than the lowest numerical value recorded in the column for the specific pesticide.

Note: – = none detected.

Chlorinated Organic Insecticide Residues (PPM) in Total Diet Samples[1]—Continued

Date of Purchase	Sample No.	Place of Purchase	DDT	DDD	DDE	Dield-rin	Hepta-chlor Epoxide	Chlor-dane	Kelth-ane	Lind-ane
8/62	29	Baltimore—grain products	0.020	T	–	–	–	–	–	0.011
		Baltimore—fruits and tomatoes[2]	0.040	–	0.010	–	–	–	–	0.005
		Baltimore—above ground vegetables	0.010	–	–	–	–	–	–	0.003
		Baltimore—root vegetables (except potatoes)	–	–	–	0.003	–	–	–	–
	30	Baltimore	–	–	–	–	–	–	–	0.002
	31	San Francisco	T	–	–	T	–	–	–	T
	32	San Francisco	–	–	–	–	–	–	–	0.004
	33	Atlanta	–	0.010	–	0.004	–	–	–	–
	34	Atlanta	0.016	0.002	0.002	–	–	–	–	0.002
	35	Minneapolis	–	–	T	–	–	–	–	0.002
	36	Minneapolis	–	–	–	0.003	–	–	–	0.003
	37	St. Louis	0.020	–	–	–	–	–	–	–
	38	St. Louis	0.012	0.002	0.002	0.004	–	–	–	0.002

[1] T = Trace = Detectable but less than the lowest numerical value recorded in the column for the specific pesticide.

[2] Also contained 0.090 ppm perthane.

Note: – = none detected.

It is noteworthy, however, that all subsequent samples, including the commodity groups of May and August 1962, showed, at most, only traces of dieldrin and heptachlor epoxide.

From the results of the first two sampling periods we decided to request one of our district offices to collect sufficient material so that analyses could be made of several commodity groups which went into the make-up of the total diet. Later we hope to expand this program. These analyses will give us an opportunity to trace back the source of such values as the 0.075 part per million dieldrin which appeared for one of the total diet samples of May 1961.

The data for May and August 1962 include the findings for several commodity groupings. You will note that there is nothing much to observe in these values except that the over-all picture appears comforting within the sensitivity of the methodology. This is no reason for complacency. Such data, derived from selective and sensitive tools, demonstrate an additional means for maintaining a watchful eye on our food supplies. Here again more sensitive techniques would be desirable—not for the sake of looking more and more for less and less, but, rather, to provide earlier detection of very minute traces. Trends could be followed for years at levels of no pharmacological significance and thus allow even more time for thoughtful considerations of our changing environment. If questionable trends begin to develop, then there would be more time for sober deliberations, wise decisions and trend reversals, if needed, all within the calm atmosphere associated with residue levels of no pharmacological significance. Such data would furnish not only additional assurance to the present generations but would pass on to posterity a valuable legacy of information.

In conclusion, I would like to emphasize that in my opinion highly refined methodology is a major key in monitoring the safe application of useful, potent chemicals. While more sensitive methodology, occasionally, will raise disturbing problems for industry and government, these tools will also provide the means by which the scientist can maintain a broad, practical surveillance over air, water, soils and food supplies. Such vigilance implements the governmental safeguards, which exist in specific areas such as pesticidal usage on raw agricultural products. It affords even greater assurance of healthful food supplies, in the midst of continued efforts toward higher productivity, to match the unprecedented demands of expanding populations. **[The End]**

Control of Foodborne Salmonellae Under the Food, Drug and Cosmetic Act

By GLENN G. SLOCUM

The Author Is Associated with the Division of Microbiology of the Food and Drug Administration, Department of Health, Education and Welfare. This Paper Was Presented at the Meeting of the American Public Health Association in Miami, Florida, on October 17, 1962.

THE FEDERAL FOOD, DRUG AND COSMETIC ACT is an important instrument for the control of salmonellae in food products in interstate commerce.

Section 402(a) of the Federal Food, Drug and Cosmetic Act defines a food as adulterated if it bears or contains any poisonous or deleterious substance which may render it injurious to health;

> . . . if it consists in whole or in part of any filthy, putrid, or decomposed substance, or if it is otherwise unfit for food; if it has been prepared, packed or held under insanitary conditions whereby it may have become contaminated with filth or whereby it may have been rendered injurious to health; if it is in whole or in part, the product of a diseased animal or of an animal which has died otherwise than by slaughter. . . .

Provisions of Section 404

These are the general requirements of the Act on which the control of salmonellae in foods must be based. There are no requirements or regulations which specifically name the salmonellae or other pathogenic organisms, but Section 404 titled Emergency Permit Control provides:

> Whenever the Secretary finds after investigation that the distribution in interstate commerce of any class of food may, by reason of contamination with microorganisms during the manufacture, processing, or packing thereof in any locality, be injurious to health, and that such injurious nature cannot be adequately determined after such articles have entered interstate commerce, he then, and in such case only, shall promulgate regulations providing for the issuance . . . of permits to which shall be attached such conditions governing the manufacture, processing, or packing of such class of food, for such temporary period of time, as may be necessary to protect the public health; . . .

This procedure has not been invoked to date. Direct epidemiological implication of interstate food products in outbreaks of sal-

monellosis has been quite rare during the past 30 years in which the writer has been associated with FDA. In the past decade we have experienced four such outbreaks involving canned egg yolk powder for infants, a dry baby-formula product, yeast powder, and hollandaise sauce—all in interstate commerce. In these episodes, the *Salmonella*-infected foods were seized on charges that they contained poisonous or deleterious substances which may render them injurious to health.

Three additional outbreaks of salmonellosis are of interest: (1) the 1956 outbreak of typhoid fever in several midwestern states, (2) a nationwide outbreak of 325 known cases of *Salmonella reading* infections in 1957 and (3), in 1962, the occurrence of an unusual number of cases of *Salmonella hartford* infections in several states. These outbreaks appeared to have characteristics indicating possible interstate sources. Unfortunately, epidemiological studies failed to discover the origin of these episodes.

Need for Improved Systems for Epidemiological Investigation

The number of cases of foodborne salmonellosis reported during this period[1] has fluctuated widely from about 500 to 2,000 annually with an average of about 1,200 cases. However, the annual summaries of specific disease categories by the National Office of Vital Statistics show a rather steady rise in the number of cases of salmonellosis, excluding typhoid fever, from 882 in 1948 to 6,929 in 1960. It seems unlikely that this increase reflects solely better investigation and reporting and more probably indicates a true increase in the disease. The source of infection is rarely established in the majority of these cases and remains speculative. It appears logical to conclude that a large proportion of these cases are foodborne. Since it is generally recognized that the reporting of such diseases is grossly incomplete, it is evident that we need vastly improved systems for the epidemiological investigation and reporting of salmonellosis as a guide to the food products and establishments in need of application of control measures. The Salmonella Surveillance program initiated in 1962 by the Communicable Disease Center, Public Health Service, is an important step in that direction.

List of Food Commodities Containing Salmonellae Growing

The list of food commodities which have been shown to contain salmonellae is constantly growing as the scope of the search widens. Food derived from animal sources such as meat, poultry and egg

[1] Dauer, Carl C., *1960 Summary of Disease Outbreaks and a 10-Year Resume* *Public Health Reports* 76(10), pp. 915-924 (1961).

products lead the list. Meat and poultry products in interstate commerce are exempt from application of the Food, Drug and Cosmetic Act to the extent of application of the Meat Inspection and Poultry Products Inspection Acts, and generally are not receiving regulatory attention by FDA.

The experiences in England and Sweden with dried eggs imported for direct consumer use during World War II led to investigations demonstrating frequent infection of egg products with salmonellae. Although the presence of many *Salmonella* serotypes in frozen and dried eggs has been amply confirmed, sound epidemiological evidence implicating such products in outbreaks of salmonellosis in the United States has been slow in developing. More recent evidence from well-authenticated outbreaks in this country and others in England and Canada has led FDA to conclude that increased attention should be given to the problem since salmonellae in egg products must be regarded as poisonous or deleterious substances which may render the products injurious to health within the meaning of Section 402 (a)(1). We are embarking upon an active regulatory program to control traffic in frozen and dried products containing salmonellae.

Reports of outbreaks of salmonellosis in Australia and England traced to dried coconut led us to begin examination of import shipments about two years ago. Viable salmonellae were found in a substantial number of shipments which have been denied entry into the United States. We are not aware of cases of illness in this country traced to coconut.

Recently, we have started a program of routine testing for salmonellae of all food samples collected during sanitary inspections of food establishments. This program may reveal unsuspected food sources of salmonellae not previously revealed by epidemiological investigation of known outbreaks.

Food is defined in the Act as "articles used for food or drink for man or other animals. . . ." Animal feeds in interstate commerce are within the jurisdiction of the Act and we are concerned with the safety and health aspects of feeds and ingredients containing salmonellae. Since funds and facilities have not permitted direct study of the problem we have followed the work of other groups and individuals with avid interest. Appropriations for the current year provide for the appointment of one bacteriologist to initiate work in this area. Certainly we are convinced that the elimination of reservoirs in domestic food animals is an essential step in eliminating the ubiquitous salmonellae. **[The End]**

WASHINGTON

ACTION AND NEWS

In the Food and Drug Administration

August Food Seizures Report.—Improper storage, contamination and spoilage led to seizures of over 985 tons (1,968,200 pounds) of food during the month of July. Over 90,000 pounds of wheat containing seed wheat bearing a poisonous mercury compound are included in the total, as well as 35,600 pounds of sugar contaminated with arsenic and boron compounds as a result of a train wreck. Rodent-contaminated wheat (1,252,280 pounds) and insect-damaged coffee beans also accounted for large quantities. Decomposed eggs, fish and vegetables and insect-infested flour and peanuts were among other products seized.

Six seizures were made on pocketbook protection" charges.

Drug and Device Seizures.—Thirty federal court actions were instituted against adulterated drugs and devices and products falsely promoted for the diagnosis and treatment of diseases, or otherwise not properly labeled. Included in the actions were dietary supplements, drugs without mandatory labeling information or warning statements, new drugs without clearance, a medicated feed containing an uncertified antibiotic, injectable drugs below their labeled strength, defective prophylactics, and devices failing to bear adequate directions for use were included.

Cosmetic Seizures.—Seized on charges of false and misleading claims were a cosmetic cream and a lotion.

Hazardous Substances.—Actions were taken against a highly flammable cleaning fluid and a hazardous water repellent for failure to bear precautionary labeling required by the Federal Hazardous Substances Labeling Act.

Voluntary Actions by Industry.—Nearly 8,611 tons of unfit foods were voluntarily destroyed or denatured by the members of the food industry to prevent their consumption. Some of the largest voluntary actions involved 154 railcars and 30 truckloads of rodent-contaminated wheat which were converted into animal feed; 300,000 pounds (4 acres) of unharvested cabbage which had been sprayed by mistake with the pesticide Endrin instead of Dibrom, leaving a residue in excess of the permitted tolerance; and 26,750 pounds of fire-damaged confectionery products.

A total of $48,568 in retail selling price were removed from commercial channels. A distributor voluntarily recalled and destroyed $10,672 worth of his misbranded weight-reducing wafers. An investigational drug (44,000 tablets) without an effective New Drug Application, 25,600 vitamin tablets containing folic acid, and vitamins with a retail value of $2,313, suspected of sub-potency, were also voluntarily destroyed.

FOOD DRUG COSMETIC
LAW JOURNAL

PUBLISHED BY
COMMERCE CLEARING HOUSE, INC.
PUBLISHERS of TOPICAL LAW REPORTS
4025 W. PETERSON AVE., CHICAGO 46, ILL.
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SECOND CLASS POSTAGE
PAID AT CHICAGO, ILLINOIS

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