RADIOCARBON DATES—(*Continued*)

No.	Sample	Age (yr)
	a survival of *Homo neandertalensis* in that region until about 30,000 yr ago. The large difference between the dates W-97 and W-86 indicate erosion or a change in the rate of deposition.	
	W-98: 6.5- to 7.3-ft depth (collector's reference letter: B_1). Undisturbed traces of a primitive "Neolithic"—presumably food-producing—culture; the first of this kind in the area.	6800 ± 350
	W-89: 7.3- to 8.0-ft depth (C). Evolved blade industry; microlithic and other culture elements new to area. No traces of pottery or other definite indications of Neolithic, yet this culture may be ancestral to true Neolithic and shows less resemblance to the industries immediately underlying.	7300 ± 300
	W-104: 9.4- to 10.0-ft depth (F). Evolved blade and burin industry, essentially upper Paleolithic in character.	10,600 ± 400
	W-97: 11.2- to 12.0-ft depth (I). Industry approximately as for W-104.	12,300 ± 350
	W-86: 15.5- to 16.0-ft depth (N_2). This sample came from small hearth containing insufficient archeologic material for a cultural diagnosis. The hearth occurs immediately below a suspected disconformity, immediately above which occur the earliest remains indicating a blade and burin industry in this section. Since a percentage of the specimens show exceptional degree of chemical weathering, it is likely that they were deposited at a period when little or no sedimentation was taking place at this locality in the cave.	28,500 ± 800
	W-85: 19.0- to 19.7-ft depth (O_2). Hearth deposit associated with true Mousteroid (Levalloiso-Mousterian) industry.	34,000 ± 2,800 (or possibly Older)
W-93	*Poggenwisch, Holstein, Germany*: Calcareous lake deposit (gyttja) from a glacial kettle 15 km northeast of Hamburg, between Meiendorf and Ahrensburg. The deposit should date an Upper Paleolithic culture of reindeer hunters, somewhat younger than that of the Meiendorf type locality, and should be of "Older Dryas" age. Expected age 15,000 yr or possibly older. Collected by A. Rust, Ahrensburg, and obtained through H. L. Movius, Jr., Harvard University.	15,150 ± 350

References and Notes

* Publication authorized by the director, U.S. Geological Survey.

1. H. E. Suess, *Science* **120**, 5 (1954).
2. W. F. Libby, *Radiocarbon dating* (Univ. of Chicago Press, Chicago, 1952).
3. H. Craig, *J. Geol.* **62**, 115 (1954).
4. In particular, we are indebted to Dr. Flint for samples 33, 35, 37, 44, 45, 46, 47, 50, 57, 58, 59, 61, 64, 65, 66, 67, 68, 69, 71, 79, 83, 88, 91, 92, 93, 96, 100.

Purity and Adequacy of Foods*

Robert R. Williams

Research Corporation, New York 17

THE Federal Food and Drug Administration is the agency responsible for enforcing the Food, Drug and Cosmetic Act of 1938, as it was for the preceding law enacted in 1906. It is of prime significance from the standpoint of public relations that each of these laws in turn have often been referred to in common parlance as the "Pure Food Law."

It has been my good fortune to have enjoyed a personal acquaintance with every person who has so far held the position of Commissioner of Food and Drugs. They have been men of varied temperaments, interests, and professional trainings, yet we are fortunate that all of them have been persons of highest integrity with a genuine zeal for protecting the public against both deliberate frauds and confusion of counsel. The needs of the country have, of course, changed with the progress of industry and of public understanding of the need for safeguarding the food supply.

At the time of Harvey Wiley's initiation, a considerable practice of food adulteration and sophistication had grown up, and the zeal of a reformer was required to attack it—sometimes fanatical zeal. However, American food industry as a whole was quick

to recognize that a sanely administered pure food law would not only protect the public but also safeguard the best elements of industry against unscrupulous competion by the worst elements. Relations between food industry and food officials have grown steadily more cordial and for years have presented an unusual degree of harmony between the policeman and the policed. This has been invaluable in making food law effective and would have been impossible if the breath of scandal and corruption had ever entered the Food and Drug Administration service.

One must hasten to deny, however, that there are no disputes or dissensions. The food industry presents very large and diversified interests, and the multiplicity of opportunities for conflict is great. Hence, sharp litigation often occurs in the courts, and charges of bureaucracy are not infrequently made. Thousands of other questions are, however, successfully settled out of court in reasoned adjustments.

The Food and Nutrition Board of the National Research Council had a very different genesis. It came into being in 1940 in the midst of a period of very active research in the field of nutrition. This research had made it clear that the nutritional needs of man, contrary to earlier accepted opinion, are actually very complex. Pronounced nutritional diseases, such as beriberi, pellagra, rickets, scurvy, and xeropthalmia, occurring by accident throughout the world, through misfortunate food habits or restrictions, were clearly due to substances lacking in certain dietaries. For the first time, we knew what the deficiencies were, and it was abundantly clear that it is easy to go wrong in choosing one's food even though no question of toxic impurities is involved. The chief emphasis of the Food and Nutrition Board has, accordingly, been on adequacy of food from the nutritional standpoint.

In spite of this contrast of approach, fruitful cooperation has developed between the Food Administration and the Board. This cooperation began at the time of the Board's birth when the Administration announced hearings on vitaminized white flour, out of which grew what we now know as enriched flour. While a reading of the Food, Drug and Cosmetic Act of 1938 makes it clear that protection of public health is a primary purpose of the law, most of its specific provisions are aimed against economic debasements, deliberate or accidental contaminations, or fraudulent misrepresentations of foods. There are many passages of the law that appear to attach greater importance to protection of the pocketbook rather than of physiological well-being. Other passages appear to imply that if the consumer knows what he is getting he is adequately protected. Protection against his own ignorance of his needs is not specifically provided.

A narrow view of its responsibilities might easily have led the Administration to disavow responsibility for helping to make the prevailing diet more adequate. The position might well have been taken that the Administration's sole job is to insure that the food supply is pure and not misrepresented with regard to identity or quality. To that fact that a broader view was taken is due the developing use of the law to insure that food is adequate as well.

In its earlier years the Board was content to follow the legal advice of the Administration on how its good purposes might be made effective. With increasing experience in food policy questions, the Board has come to appreciate ever more fully that pious pronouncements of aims are often quite ineffective and that a resourceful Board must not rely solely on public education but must also make use of the power of the law where it is applicable.

The Board has aimed throughout its history to avoid the role of ardent and overzealous reformer. Despite an occasional minor slip in judgment, the Board has, as a whole, kept in mind that its pronouncements are likely to be misused for ulterior purposes by parties that have special interests to serve. It has been careful to work with the Food and Drug Administration and with the Council on Foods of the American Medical Association wherever the aims and duties of these organizations may approach or overlap those of the Board.

An early declaration of the Board of 1 October 1941 setting forth its policy with respect to what foods should be fortified with what nutrients and in what amounts was useful to the Food and Drug Administration as a basis of its Statement of Policy on these matters in July 1943. In brief, the position of the Board was to encourage the fortification of refined cereals and corn meal with thiamine, riboflavin, niacin, and iron; of milk with vitamin D, of oleomargarine with vitamin A, of table salt with iodine, all in specified moderate amounts; and to withhold approval of other fortifications until need for them was demonstrated. It is felt that a substantial contribution was thus made to avoid a runaway practice of "pepping up" of foods in general by addition of synthetics.

It has been evident for years that Standards of Identity for Foods fixed by the Administration under the law may often affect the performance of purposes that the Board holds wise from the standpoint of food policy. From the standpoint of the Administration, standards are issued after due process when, in the judgment of the Administration, "honesty and fair dealing in the interest of the consumer" will be promoted thereby. Standards often facilitate the enforcement of the law, since it usually is simpler to ascertain and to prove in court that there is a deviation from standard than to prove that the feature in question is deleterious to health or deceptive in nature.

For purposes of exactitude, definitions and standards of identity for a food have grown very lengthy and detailed, especially in the case of composite foods containing several ingredients, such as bread and ice cream. Much criticism has been leveled at such detailed standards because they may exclude or limit the amounts of certain wholesome ingredients, matters which, in the opinion of some, should be left to the discretion and culinary skill of the manufacturer. The Commissioner of Foods and Drugs should not aspire

to be the chef of all the nation's kitchens, it is said.

The committee of which I am chairman was appointed to inquire into the extent to which the formulation of standards tends to inhibit research and development of new food products of merit. To the regret of everyone concerned, past hearings for the consideration of proposed food standards have sometimes been prolonged for many months at great expense both to the government and to affected industry. Accordingly, our committee has also had the duty to suggest means whereby standards can be set less expensively and more quickly and how their flexibility may be increased by facilitating their ready amendment in response to new developments.

Complete solutions are by no means at hand. The committee is convinced that standards are necessary for proper law enforcement, at least with respect to considerable number of foods. It believes that research and development in standardized foods is considerably handicapped by these standards and that procedures for making and demanding standards need to be shortened to achieve greater flexibility. Four principal recommendations have so far been made:

1) Food standards should be promulgated or amended without hearings, when in response to published proposals, no objection arises from interested parties. When objections are raised, the hearings should be limited to those matters to which objections have been made. Legislation to this effect is now under consideration in Congress with the approval in principle of the Administration, the Food Law Institute, and the Board. No serious opposition is foreseen (*1*).

2) Questions of safety of new chemical additives proposed for use in foods should be removed from the scope of hearings for standard-making purposes, and these questions should be settled by scientific inquiry rather than by quasi court procedures. Specific and satisfactory means for settling these questions of safety, apart from standard hearings, have not yet developed fully. Past experience has shown that these questions have in the past been among the most time-consuming aspects of food standards hearings and their elimination should expedite hearings greatly.

3) The scope of test marketing permits should be extended by Administrative regulation to include (i) new foods that deviate from standard other than through the introduction of a new ingredient, (ii) new foods that may be held "to purport to be" a standardized article through resemblance to same, even when identification with standard may be doubtful, (iii) extension of term of such permits until a new standard comprising the permitted article is promulgated. This recommendation appears to be acceptable in principle to the Administration, but no precise wording has as yet been endorsed (*2*).

4) Practical means should be set up whereby full representation of interested industry may be assured at prehearing discussions with the Administration concerning food-standard proposals that may be projected. By such discussions, it is hoped that hearings will be shortened greatly through focusing attention largely on matters remaining in dispute. The Administration feels some delicacy about selecting its advisors from industry lest they be regarded as "hand picked." Many food industries lack duly constituted bodies to represent them. Means to overcome these difficulties are under study.

As an experiment in this field an informal conference was organized under the auspices of the Food and Nutrition Board for discussion, between representatives of the Food and Drug Administration and of industries concerned, of the use of artificial sweeteners in canned fruits. Berton S. Clark, member of the Food and Nutrition Board and president of the Institute of Food Technologists, is chairman of the conference, which held a most successful meeting on 25 May that appears to promise a large measure of agreement.

The Board greatly values these opportunities to be of service both to the Administration and to food industry in reducing the burdens of law enforcement while fully maintaining the integrity of the law and its administration. Such collaboration at once renders more effective the guidance of food policy that the Board feels equipped to supply and at the same time gives practical experience to the Board in the exercise of its advisory function.

I forebear to discuss several other aspects of food law administration with which the Board is concerned. Notable in this field is the work of the Food Protection Committee, which seeks to furnish useful guidance in the control both of intentional additives to foods and the accidental contamination of foods with residues of pesticides and the like, so necessary to the success of modern agriculture. I do not feel qualified to discuss these aspects competently.

Notes

* Based on a paper presented in the symposium "Chemicals in foods," AAAS meeting, Boston, Mass., 29 Dec. 1953. The author is chairman of the Committee on Definitions and Standards of Identity for Foods, Food and Nutrition Board, National Research Council.

1. This legislation, known as the Hale Amendment, passed and was signed by the President on 15 Apr. 1954.
2. Regulation to this effect has since been published: *Federal Register* (28 Apr. 1954), p. 2469.