



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
ORGANISATION DES NATIONS UNIES POUR L'ALIMENTATION ET L'AGRICULTURE
ORGANIZACION DE LAS NACIONES UNIDAS PARA LA AGRICULTURA Y LA ALIMENTACION
00100 Rome, Via delle Terme di Caracalla. Cables: FOODAGRI, Rome. Tel. 5797



WORLD HEALTH ORGANIZATION
ORGANISATION MONDIALE DE LA SANTÉ
1211 Genève, 27 Avenue Appia. Câbles: UNISANTÉ, Genève. Tél. 34 60 61

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME
CODEX ALIMENTARIUS COMMISSION
Eleventh Session 1976

REPORT OF THE ELEVENTH SESSION
OF THE
CODEX COMMITTEE ON FOOD HYGIENE

Washington, D.C., USA
10-14 June 1974

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INTRODUCTION

1. The Eleventh Session of the Codex Committee on Food Hygiene was held in the Main Conference Room, Department of State, in Washington, D.C., from 10 to 14 June 1974. The session was attended by representatives and observers of 26 countries and observers from one international organization (see Appendix 1 for List of Participants).

2. The participants were welcomed on behalf of the Government of the United States by Dr. J. C. Olson, Jr., Chairman of the Committee and by Dr. Virgil Wodicka, Director of the Bureau of Foods of the Food and Drug Administration and Codex Co-Coordinator for the United States.

ELECTION OF RAPPORTEUR

3. The Committee appointed Mr. E. Spencer Garrett (U.S.A.) as Rapporteur of the Session.

ADOPTION OF THE AGENDA

4. The Committee adopted the provisional agenda with minor amendments. Item 3(g) was deferred until discussion of item 12 and new items 3(i) Codex Committee on Processed Meat Products and 3(j) Joint ECE/Codex Alimentarius Group of Experts on Standardization of Fruit Juices were added.

CODEX COMMITTEE ON COCOA PRODUCTS AND CHOCOLATE (ALINORM 74/10)

5. The Committee endorsed a minor revision of subsection 6.1. With regard to subsection 6.3, it was pointed out that there was no provision for harmful microorganisms, in particular Salmonella was mentioned. It was, however, pointed out that pathogens in general should be covered as well as those microorganisms which produce toxins. The Committee, therefore, endorsed the inclusion of the following sentence as subsection 6.4: "When tested by appropriate methods of sampling and analysis, the products shall be free of pathogenic microorganisms."

6. The Committee endorsed a minor revision of subsection 6.1 and the hygiene provisions for the following standards;

II. Draft Standard for Cocoa (Cacao) Beans, Cocoa (Cacao) Nib, Cocoa (Cacao) Mass, Cocoa Press Cake and Cocoa Dust (Cocoa Fines), for use in the Manufacture of Cocoa and Chocolate (Step 8).

III. Draft Standard for Cocoa Butters (Step 7).

IV. Draft Standard for Chocolate (Step 7).

V. Draft Standard for Cocoa Powder (Cocoa) and Sweetened Cocoa Powder (Sweetened Cocoa) (Step 7)

The Hygiene Provisions in these standards read as follows:

6. HYGIENE

6.1 It is recommended that the products covered by the provisions of this standard be prepared in accordance with the appropriate sections of the Recommended International Code of Hygienic Practice-General Principles of Food Hygiene (Ref. No. CAC/RCP 1-1969).

6.2 To the extent possible in good manufacturing practice, the products shall be free from objectionable matter.

6.3 When tested by appropriate methods of sampling and examination, the products shall not contain any substances originating from microorganisms in amounts which may represent a hazard to health.

6.4 When tested by appropriate methods of sampling and analysis, the products shall be free of pathogenic microorganisms."

CODEX COMMITTEE ON EDIBLE ICES (ALINORM 74/11)

7. The Committee noted that the Codex Committee on Edible Ices had begun with the elaboration of a Proposed Draft Standard for Edible Ices and Ice Mixes. It further noted that in the future it may be requested to elaborate a Code of Hygienic Practice for Edible Ices and Ice Mixes. The Delegation of the United Kingdom referred to the report of the Committee (ALINORM 74/11, para 16) and stated that in their opinion there was considerable need for hygienic provisions for raw materials (e.g., nuts, fruits, etc.). The Committee agreed to bring this matter to the attention of the Codex Committee on Edible Ices.

CODEX COMMITTEE ON FISH AND FISHERY PRODUCTS (ALINORM 74/18A)

8. Under subsection 5.4, there was some discussion as to whether the Committee's previous decision to remove the word "all" from the text should stand because it recognized that there was a practical difficulty in ensuring the destruction of "all" spores of Clostridium botulinum in a canned food product (ALINORM 74/13, para 18). The Delegation of Canada pointed out that "all" in this sense was relative only to methods of analysis and, therefore, could be retained. Several other delegations agreed with this point of view and the Committee agreed that "all" should remain in the text.

9. It was also queried whether the figure for pH, with regard to low acid canned foods, should be increased from 4.5 to 4.6. The Delegation of the United States confirmed that many years of experience had shown that pH defined in this manner allowed a good margin of safety. The Committee therefore agreed to change the figure to 4.6. It was also agreed that these changes should be introduced into the relevant provision for Table Olives and to other low acid canned products.

10. The Committee re-endorsed the hygiene provisions for the various standards listed below:

<u>Title</u>	<u>Document/Appendix</u>	<u>Step</u>
Canned Tuna and Bonito in Water or Oil	ALINORM 74/18 Appendix II	8
Canned Crab	ALINORM 74/18A Appendix V	7
Quick Frozen Fillets of Hake*	ALINORM 74/18 Appendix V	5
Quick Frozen Fillets of Flat Fish*	ALINORM 74/18A Appendix II	7
Quick Frozen Shrimps or Prawns**	ALINORM 74/18A Appendix III	5

* This standard only contains provision 5.1.

** This standard does not contain provision 5.4; 5.3 is for heat-treated products only.

The Hygiene Provisions in these standards read as follows:

"5. HYGIENE

5.1 It is recommended that the product(s) covered by the provisions of this standard be prepared in accordance with the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969) (and the hygiene provisions of the Code of Practice for Shrimps and Prawns - (Quick Frozen Shrimps and Prawns)).

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

5.3 When tested by appropriate methods of sampling and examination, the (heat-treated - Quick Frozen Shrimps and Prawns) product:

- a. shall be free from microorganisms capable of development under normal conditions of storage; and
- (a. shall not contain any pathogenic microorganisms; and - (Quick Frozen Shrimps and Prawns).)
- b. shall not contain any substances originating from microorganisms in amounts which may represent a hazard to health (which may be toxic - amended 1973 Food Hygiene Committee).

5.4 Products with an equilibrium pH above 4.6 shall have received a processing treatment sufficient to destroy all spores of Clostridium botulinum unless growth of surviving spores is permanently prevented by product characteristics other than pH."

11. The representative of the FAO Division of Fisheries informed the Committee about the progress of various (combined) codes of practice which presently are being drafted by the FAO Division of Fisheries for submission to the Codex Committee on Fish and Fishery Products and contain both technological and hygienic provisions.

In 1973, the following codes of practice were elaborated and submitted to the Codex Committee on Fish and Fishery Products:

1. Draft Code of Practice for Fresh Fish
2. Draft Code of Practice for Canned Fishery Products

In 1974, FAO will submit an additional three drafts, namely:

1. Draft Code of Practice for Frozen Fish
2. Draft Code of Practice for Shrimps and Prawns
3. Draft Code of Practice for Smoked Fish

The following drafts are currently being elaborated:

1. Draft Code of Practice for Lobsters; and
2. Draft Code of Practice for Salted Fish

These two drafts will be dealt with by the 1974 Government Consultation on Codes of Practice for Fish and Fishery Products, 24-26 September, Rome.

CODEX COMMITTEE ON PROCESSED FRUITS AND VEGETABLES (ALINORM 74/20)

12. The Committee endorsed the hygiene provisions for the Proposed Draft Standard for Canned Mature Processed Peas (ALINORM 74/20, Appendix X - Step 5). The Committee discussed the amendment of paragraph 5.4 (Canned Mature Processed Peas - ALINORM 74/20 - X) in relation to canned peas and other products and concluded that in order to allow for the possible development of new canned processed pea products with product characteristics which permanently prevent the growth of Clostridium botulinum, the original paragraphs should be modified to provide for this possibility. The Committee also felt that this modification could be extended to other codes where appropriate.

The Hygiene Provisions in this standard are as follow:

"5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared in accordance with the Recommended International Code of Hygienic Practice for Canned Fruit and Vegetable Products (Ref. No. CAC/RCP 2-1969).

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

5.3 When tested by appropriate methods of sampling and examination, the product:

- a. shall be free from microorganisms capable of development under normal conditions of storage; and
- b. shall not contain any substances originating from microorganisms in amounts which may represent a hazard to health.

5.4 Products with an equilibrium pH above 4.6 shall have received a processing treatment sufficient to destroy all spores of Clostridium botulinum unless growth of surviving spores is permanently prevented by product characteristics other than pH.

13. The Committee also deleted the phrase "recommended by the Codex Alimentarius Commission" in subsection 5(b).1 from the Draft Standards for Canned Mandarin Oranges (ALINORM 74/20, Appendix VII - Step 8) and Raisins (Alinorm 74/20, Appendix VI - Step 8).

14. The Committee noted that subsection 5.3(b) in the Draft Standard for Canned Fruit Cocktail (ALINORM 76/20, Appendix II - Step 8) had been

amended by the Codex Committee on Processed Fruits and Vegetables at its Eleventh Session in accordance with the decision of the Committee at its Tenth Session. The amended text reads as follows:

5.3(b) shall not contain any substances originating from microorganisms in amounts which may represent a hazard to health."

CODEX COMMITTEE ON PROCESSED MEAT PRODUCTS (ALINORM 74/16)

15. The Committee renumbered the subsections 5.4, 5.5, and 5.6 in the Draft Standard for Canned Corned Beef to read 5.2.3, 5.2(4).5, and 5.2.5, respectively, and to thus bring them into line with the other Draft Standards for Processed Meat Products.

JOINT ECE/CODEX ALIMENTARIUS GROUP OF EXPERTS ON STANDARDIZATION OF FRUIT JUICES

16. The Committee took note of paragraph 45 of Alinorm 74/14 relating to the Draft Standard for Sweetened Concentrated Labrusca Type Grape Juice Preserved Exclusively by Physical Means.

REPORT OF WHO ACTIVITIES RELATING TO FOOD HYGIENE

17. The Committee was informed on current and planned activities of WHO relating to Food Hygiene since the last session of the Codex Committee on Food Hygiene. These included the convening of a study group on Sampling and Examination of Food, an Expert Committee on Fish and Shellfish Hygiene and an Inter-Regional Conference on Foodborne Disease and Food Hygiene. In addition, the WHO Food Virology Programme adopted an edge-notched card retrieval system, regional courses were held in food microbiology and a new international food monitoring programme was initiated.

18. With regard to future work, a consultation on microbiological standardization of food has been planned for February 1975 with the object of making recommendations on microbiological limits for foods, including sampling techniques and methods of examination for intergovernmental consideration in the Codex Committee on Food Hygiene.

19. With regard to Food Control/Food Sanitation, WHO will conduct a survey (1974) of existing codes and ordinances for the control of food establishments. The subsequent report will, in addition, contain an outline Model Code which will be considered by a subsequent FAO/WHO meeting.

20. With regard to Food Additives and Contaminants, a Joint FAO/WHO Conference on Food Additives and Contaminants was convened. Furthermore, the WHO Expert Committee on Pesticide Residues has met jointly with the FAO Working Party of Experts on Pesticide Residues to evaluate toxicological and related data on a number of pesticides.

21. A fuller description of these activities will be presented to the Twentieth Session of the Executive Committee and to the Tenth Session of the Codex Alimentarius Commission.

CONSIDERATION AT STEP 7 OF THE DRAFT CODE OF HYGIENIC PRACTICE FOR POULTRY PROCESSING

22. The Representative of the EEC, attending the meeting in the status of observer, presented a statement in which he pointed out that the EEC member states could not take a final stand at the moment on the Draft Code as they were bound by a Council Directive of February 1971, currently undergoing modification, which was already being implemented gradually and was due to be fully effective by 1976. He further pointed out that the Community would continue to participate in a positive manner in the work of the Committee with a view to making an effective contribution to the development of workable Codes.

SECTION I - SCOPE

23. The Committee agreed to change the scope of the Code to include chilled or frozen animals by rewording the first sentence of the Scope section to read:

"This Code is concerned with all poultry, poultry carcasses, poultry parts, or other edible materials thereof which have not yet been treated in any way to ensure their preservation, except that they may have been chilled or frozen and are intended for human consumption, whether by direct sale as such or through further processing."

24. The Committee also agreed that the actual intention of the Code was that it should also apply to transport between the slaughterhouse and processing plants, or any other premises, and, therefore, substituted the phrase "all such" for the word "the" which appeared as the penultimate word of the Scope Section.

SECTION II - DEFINITIONS

25. The phrase "live or slaughtered" in the definition of "poultry" was considered by the Committee to be unnecessary as it was agreed that the word "poultry" applied to both, and was, therefore, deleted.

26. The Committee agreed that the definition of "carcase" was inadequate in terms of the various possible product styles and redefined the definition of carcase as follows:

"means the whole body of a bird after stunning, bleeding, plucking and eviscerating. However, removal of the kidneys, of the legs at the tarsus, or of the head is optional."

The Committee also noted the Argentine comment pointing out the difference among Spanish speaking peoples of the word "menudillos". The Committee instructed the Secretariat to place the word "menudos" in brackets after the word "menudillos" in the Spanish text.

SECTION III - RAW MATERIAL REQUIREMENTS

27. The Committee agreed that Section III A(1) of the General Principles was of singular importance and should be repeated for emphasis in the Draft Code. The Committee deleted, however, the reference from the General Principles relating to heat-treated products which reads as follows:

"...particularly those products that may be consumed without heat treatment..."

28. The Committee considered the practicability of more stringent requirements for segregation and handling of inedible materials and agreed that, concerning raw materials, refuse rooms and storage facilities, they "should be emptied and thoroughly cleaned and disinfected at least once daily". It was further decided to strengthen the provisions of the Code dealing with inedible materials in Section IV C - Hygienic Operating Requirements (see para 42).

29. The Committee considered the possibility of cross contamination of birds during processing by workers dealing with live birds, feeding stuffs, or unfit materials. The Committee agreed to add a sentence at the end of Section III B(2)(b) to preclude such a possibility and relocate this subsection to Section IV D(1)(a) since it dealt with "operating practices and production requirements".

30. The advisability of subjecting all aspects of a poultry processing plant (which are partially covered by Section III B and C) to veterinary supervision was proposed by the Delegation of the United Kingdom and was discussed at some length. The Delegation of the Federal Republic of Germany specifically indicated that such action was not only desirable but necessary. Other delegations, however, pointed out that from a hygienic point of view, some activities, such as the delivery and preparation of birds for slaughtering, could be accomplished in an acceptable fashion by qualified personnel not under direct veterinary supervision, and, in their opinion, these requirements more appropriately belonged in Section IV C - "Hygienic Operating Requirements". The Committee agreed to amend Section IV C to allow for certain sanitary operations to be provided by qualified personnel not under veterinary supervision. It, however, agreed that such operations would have to be in accordance with the requirements of the official agency having jurisdiction. The Committee also agreed that ante- and post-mortem inspections should be under direct veterinary supervision (see paras 42 and 44).

31. The Delegation of Poland requested the inclusion in the Draft Code of a requirement that all deliveries of birds to a plant should be accompanied by an official health certificate. The Committee decided that although this proposal had some merit, for the time being, because of practical difficulties in compliance, it should not be included in the Code. Ante and post mortem inspection served as a better control measure. The Committee further noted that the matter had been discussed at length during previous sessions and the decision was made not to consider such matters as outlined in the Note to Section III A.

32. In addition to a thorough cleaning, the Committee decided to include a disinfection provision for conveyances and crates for transporting live birds.

SECTION IV - PLANT FACILITIES AND OPERATING REQUIREMENTS

33. The Committee took note of the proposal of Argentina, in their written comments, to require that areas not covered by hard paved surfaces should have a natural ground cover. However, the Committee decided that the present text was adequate in providing for dust control.

34. The Delegation of the Federal Republic of Germany requested the deletion of the provision for woodwork in plants. After considerable discussion, the Committee agreed that woodwork should preferably not be used in plants, but where it was unavoidable, its use should be kept to a minimum.

35. The Committee agreed to the proposal from the Delegation of France that subsection IV A(3)(b) dealing with water supplies should be amended to provide for routine microbiological and chemical testing.

36. The Committee further agreed to amend subsection IV A(3)(h) to require that hand-washing facilities in workrooms should not be capable of being operated by hand.

EQUIPMENT AND UTENSILS

37. The Committee took note of the necessity for providing in workrooms suitable and easily accessible equipment for the cleaning and disinfecting of hand tools by means of hot water, and amended subsection IV B(2) accordingly.

38. Particular attention was given to possible hygienic hazards associated with the use of scalding tanks. The Committee decided to emphasize that particular care should be exercised in the use of scalding tanks so that possible hygienic risks are minimized and amended subsection IV B(5)(a) accordingly.

39. The Committee deliberated at some length concerning the potential hygienic hazards possibly associated with "spin chillers". It was pointed out by some delegations that subjecting poultry carcasses to a common water bath could allow cross contamination.

40. Other delegations felt, however, that potential hygienic hazards may not be of the magnitude once feared and that considerable research in this area is currently under way. Preliminary data from such research indicates that "spin chillers" even appear to play an important role in reducing Salmonella contamination and further suggested that any regulations specifically forbidding the use of "spin chillers" should be held in abeyance until there is sufficient scientific and technical information available upon which to base such a decision.

41. The Committee therefore agreed to amend subsection IV B(5)(f) to allow for the use of "spin chillers" or other processes of chilling in common tanks where such was not prohibited by national legislation provided that the equipment met the approval of the official agency having jurisdiction.

HYGIENIC OPERATING REQUIREMENTS

42. The Committee agreed to amend subsection IV C(1)(a) to require that the operations for sanitary maintenance of the plant, facilities, and premises be under the supervision of a qualified person approved by the official agency having jurisdiction.

43. The Committee decided that subsection IV C(1)(e) needed modification so that it would be clear that the provisions of the Code did not allow for the processing of undressed poultry.

OPERATING PRACTICES AND PRODUCTION REQUIREMENTS

44. The Committee decided that it was essential that ante-mortem and post-mortem inspections be conducted under veterinary supervision and amended subsection IV D(1)(a) accordingly. Also, the Committee expanded subsection IV D(1)(b) to recommend that any unfit poultry or poultry suspected of disease be separated to prevent the spread of disease and disposed of by a method approved by the official agency having jurisdiction.

45. The Committee discussed at some length the various time/temperature parameters employed in "cutting up" carcasses. It was decided to amend subsection IV D(3)(b)(i) to allow for cutting up before cooling to 4°C (39°F), provided that it was carried out within one hour of slaughter and immediately followed by reduction of the temperature of the carcass parts to 4°C (39°F) or less. Alternatively, where cutting up takes place after cooling to 4°C (39°F), the internal temperature of the carcass and parts should not be allowed to exceed 10°C (50°F).

46. The Committee agreed to amend subsection IV D(3)(b)(iv) to require that processed poultry storage areas and transportation facilities be maintained at a temperature of 4°C (39°F) or less.

END-PRODUCT SPECIFICATIONS

47. The Committee agreed with a proposal suggested by the Delegation of France that only appropriate methods should be used for sampling and analysis to determine compliance with the end-product specifications, and amended Section V accordingly. The Committee also agreed that the end-product specifications should preclude undesirable residues such as hydrogen peroxide, colouring materials, antibiotics, preservatives, tenderizers, and flavouring substances, and added a subsection to this effect.

PERSONNEL HEALTH

48. The Delegation of the Federal Republic of Germany proposed that provision for medical examination of personnel should be added to the Draft Code as well as to future Codes which may come before the Committee. The general consensus of the Committee was that the matter may have merit but that such a provision was far reaching and would be difficult to apply due to the legal requirements of various countries. Furthermore, the Committee agreed that at present the recommendation in the Draft Code should go no further than stating the General Principles requirements. The Delegation of the Federal Republic of Germany also drew attention to the references to medical examination of personnel in the Draft Code of Hygienic Practice for Fresh Meat. Some delegations considered that such a provision would present difficulties due to the legal requirements in their countries. The representative of WHO informed the Committee that this question was under consideration by WHO and the Committee agreed to await the outcome of these discussions. The Delegation of Denmark reserved its position on this matter.

49. It was also discussed whether the provisions regarding transport should be further amplified, but, after some consideration, it was concluded that there was no concurrence for this proposal.

STATUS OF THE CODE

50. A consensus was reached within the Committee to advance the Draft Code of Hygienic Practice for Poultry Processing to Step 8 of the Procedure for submission to the Eleventh Session of the Codex Alimentarius Commission.

RECONSIDERATION AT STEP 7 OF THE DRAFT CODE OF HYGIENIC PRACTICE FOR EGG PRODUCTS

51. The Committee considered the above-mentioned Draft Code as contained in the document Alinorm 74/13, Appendix II, and government comments thereon as contained in document CX/FH 74/5. The following were the main points arising from the Committee's consideration of the above Draft Code.

SCOPE

52. It was pointed out that the word "hen" is synonymous with "chicken" in some countries for egg-laying birds and the Committee, therefore, agreed to supplement the word "chicken" with the word "hen" in parenthesis throughout the text.

DEFINITIONS

53. The definition for "eggs" was modified to read: "eggs mean eggs (in shell) of domesticated chickens (hens)".

RAW MATERIAL REQUIREMENTS

54. In order to avoid possible misunderstanding, it was agreed to substitute the word "product" by the word "eggs" throughout the text, whenever it was found to be necessary.

55. There was some overlapping of the provisions in subsection B(3), "Sanitary Techniques", and it was agreed that substantial rewording was needed to overcome the repetition with regard to provisions for the handling and storage of eggs. The revised version is contained in Appendix III to this Report. Concerning subsection 6, "Storage of Eggs on the Farm", it was pointed out that the present provisions for humidity of 70-90% increased the danger of mould spoilage and the Committee, therefore, agreed to reduce the upper limit to 85%.

EQUIPMENT AND UTENSILS

56. With regard to the materials recommended for manufacturing containers for use in the conveying of eggs in the breaking rooms, which included "plastic material", it was pointed out that in some plastics, such as PVC (polyvinyl chloride), migration could occur into the eggs and the Committee agreed to confine the use of plastics only to approved materials.

PLANT FACILITIES AND OPERATING REQUIREMENTS

Hygienic Operating Requirements

57. There was some discussion on the extent to which the efficiency and frequency of cleaning and disinfecting of plants, facilities, and premises were provided for in the present text. Some delegations felt that there might be a carry-over of residual disinfectants if final rinsing was not efficient, though it was pointed out that some disinfectants such as the iodophores did not need rinsing. The Committee agreed to retain the present text. However, the Delegations of the Federal Republic of Germany and the Netherlands reserved their positions on the matter of "disinfecting prior to commencing the day's work".

OPERATING PRACTICES AND PRODUCTION REQUIREMENTS

58. There was some discussion on the acceptance criteria for the subsection IV D 1 entitled "Raw Material Handling." It was agreed, first of all, that the title "Raw Material" was not sufficiently specific and it was amended to read "Eggs and Other Raw Materials." It was further pointed out that, as it stood at present, the subsection did not differentiate between eggs containing toxic substances and those containing other materials which could be segregated by normal plant procedures. The paragraph was therefore amended accordingly.

BREAKING BY CRUSHING

59. The Delegation of Australia explained to the Committee that breaking by crushing, as practised in some countries, was a sophisticated technology employing electronic scanning and other automatic devices and was quite hygienic. It was further pointed out, however, that such equipment must be operated by personnel skilled in the particular technology. The Committee agreed to a rewording of subsection IV D(4)(b) to take into account the selectivity of the apparatus to preclude unfit eggs from entering the process.

CHILLING

60. Modifications to the provisions of this subsection (IV D 4(d)) for liquid egg products were proposed since it was pointed out that continuous operation frequently required holding time in a balance tank before pasteurization and that, in this case, the product should be chilled rapidly to an acceptable temperature. In addition, storage for longer periods prior to pasteurization should be foreseen. The subsection was therefore modified to reflect the conclusions of the discussion and the revised text appears in Appendix III to this Report.

PASTEURIZATION

61. Subsection IV D 4(e) concerning the pasteurization of liquid egg products was also revised.

DRYING

62. The Committee agreed to substitute for the term "de-sugaring" the words "glucose removal" where it occurred in the text as it was felt that this was a more accurate description for what was intended.

PACKING, COOLING, AND FREEZING

63. It was pointed out that a storage temperature "not exceeding -18°C" was inadvisable since there was evidence that a temperature below -15°C brought about irreversible changes in the physical characteristics of egg yolk. The Committee agreed to delete the precise temperature provision and to substitute a phrase which would provide for a temperature giving adequate protection to the product.

TRANSPORTATION OF LIQUID EGG PRODUCTS IN BULK

64. After some discussion, it was agreed to modify the cleaning provision for tankers, mobile containers, and pipes and to bring it into line with that already accepted for subsection IV C(1)(e), Sanitary Maintenance of Plants, Facilities and Premises. The Delegation of the Federal Republic of Germany reserved its position with regard to disinfection prior to re-use of equipment in subsections IV C(1)(b), IV D(6)(ii) and IV D 6(iv).

THE ALPHA-AMYLASE TEST

65. The Delegation of Italy drew the attention of the Committee to an alternative method for the titration of alpha-Amylase based on plate assay techniques, which may have advantages over existing methods in that large numbers of samples can be processed to give presumptive results in 2 hours and conclusive results in 18 hours. The Committee expressed interest in the method and agreed to await journal publication of the method for future possible consideration.

STATUS OF THE CODE

66. Two delegations expressed doubts on the advisability of advancing the Code; the Committee, however, agreed to advance the Code to Step 8 for consideration by the Commission at its Eleventh Session to be held in early 1976.

CONSIDERATION OF FEASIBILITY OF ELABORATION OF STANDARD METHODOLOGY FOR DETECTION OF SALMONELLA IN EGGS

67. The Committee had before it document CX/FH 74/6 containing the Report of the Task Force set up at its Tenth Session (ALINORM 74/13, para 78), to elaborate an internationally acceptable method for detection of salmonella in eggs and egg products.

68. In view of the fact that WHO has, in collaboration with FAO, recently initiated work for establishing international microbiological standards for various foods for inclusion into standards under elaboration within the FAO/WHO Food Standards Programme, no action was at this time taken with regard to the recommendation concerning Salmonella Methodology presented by the Task Force.

69. The Committee was informed that results of WHO-sponsored collaborative studies on the isolation of Salmonella from egg products would be available in time for use as background information at a planned FAO/WHO Consultation on Microbiological Standardization of Foods to be convened in February 1975. It was envisaged that this consultation would make recommendations on Salmonella methodology for consideration by the next session of the Codex Committee on Food Hygiene.

CONSIDERATION AT STEP 4 OF PROPOSED DRAFT CODE OF HYGIENIC PRACTICE FOR MOLLUSCAN SHELLFISH

70. The Committee had before it the above-mentioned Code for consideration at Step 4 as contained in document ALINORM 74/13, Appendix II, and government comments thereon as contained in document CX/FH 74/11. The following were the main points emerging from the Committee's consideration of the Proposed Draft Code. The revised text is contained in Appendix IV to this Report.

SCOPE

71. The possibility of broadening the Scope to include other molluscan shellfish such as motile species like scallops was again considered by the Committee. However, the Committee reiterated the position adopted at its last session (ALINORM 74/13, para 40) that the major concern for a Code of this nature related to the items of principal public health significance which are often consumed in the raw state, i.e., clams, cockles, mussels and oysters. The Committee agreed to amend Section 1 to avoid possible confusion on this point.

DEFINITIONS

72. The Committee agreed to modify certain definitions for purposes of clarity and to include a new definition relating to the use of the word "approved" meaning that any approved referenced practices in the Draft Code must conform with the requirements of the official agency having jurisdiction.

RAW MATERIAL REQUIREMENTS

73. The Committee agreed to delete subsection III A(3)(b) from the Draft Code since the requirements were adequately covered in subsection III A (3)(a).

74. The Committee preferred the alternative text as contained in subsection III B(4)(b), and therefore agreed to delete the first sentence of this subsection.

PLANT FACILITIES AND OTHER OPERATING REQUIREMENTS

75. The Committee deliberated on the necessity to ensure that plants and facilities were located on ground not subject to inundation by flood tides, and therefore agreed to amend subsection IV A(1) accordingly. The Committee also agreed to amend subsection IV A(2)(e) to ensure that waste disposal techniques did not pollute clean sea water, purification tanks, and approaches to the plant, as well as potable water supplies.

RELAYING AND PURIFICATION (DEPURATION) OF SHELL STOCK IN TANKS, FLOATS, AND RAFTS

76. The Committee agreed that "ozone" should be added to the examples of toxic substances possibly found in purification waters which should be forbidden in subsection IV D(2)(e).

77. The need to maintain relaying or purification water at an adequate level of aeration was recognized by the Committee, and subsection IV D (2)(f) was amended accordingly.

LABORATORY CONTROL PROCEDURES

78. The need for laboratory procedures to be standardized was recognized by the Committee and it was therefore agreed to amend subsection IV E(5) by adding the following sentence: "Laboratory procedures should be developed and standardized and microbiological and other criteria promulgated to ensure that shellfish are free from pathogenic organisms and do not contain toxins or toxic chemicals at levels that constitute a hazard to health."

CURRENT LABORATORY PROCEDURES AND STANDARDS

79. The Delegation of France submitted new procedures to take into account the differentiation of control procedures between the points of production

and places of sale in France, and the Committee included this information in the Proposed Section VI. Some delegations stated that in their opinion the Proposed Section VI of the Draft Code would have to be deleted at some future date because of the lack of sampling and compliance procedures and standardized methodology. The Committee agreed, however, to retain the information contained in the Proposed Section as an Annex to the Draft Code to be used as a source of reference for those countries which wish to develop control programmes.

STATUS OF THE CODE

80. The Committee decided to return the prepared Draft Code of Hygienic Practice for Molluscan Shellfish to Step 3 of the Procedure for a further round of government comments.

CONSIDERATION AT STEP 4 OF THE PROPOSED DRAFT CODE OF HYGIENIC PRACTICE FOR GROUND NUTS

81. The Committee had before it for consideration at Step 4 the above-mentioned proposed draft code as contained in document ALINORM 74/13, Appendix IV, and government comments thereon as contained in document CX/FH 74/7. The following were the main points emerging from the Committee's consideration of the proposed draft code.

82. The title of the Draft Code was changed to "Proposed Draft Code of Hygienic Practice for Peanuts (Groundnuts)". The Committee agreed that the new title more accurately covered the intent of the Draft Code since peanut products were not to be covered.

83. The Committee agreed that its review of the Draft Code was somewhat hampered since few comments were received by the author countries from producing countries, and, therefore, decided to limit deliberations to principal and significant points of Food Hygiene relative to the present Draft Code so that when the Code was redrafted (after receiving comments from producing countries) these points could be taken into consideration.

84. The Delegation of the United States recommended that the important issue of the proposed draft code related to possible Aflatoxin production in the ground nuts and that such moisture levels currently expressed in percentages should more appropriately be expressed as "Safe Moisture Levels" to be defined as water activity in the Definition Section of the text. The Delegation of Poland expressed concern that such a definition may not be understood at the farm or plant level in producing countries. The Committee agreed to add a definition of "Safe Moisture Levels" based on water activity but instructed the author countries, however, to correlate such a definition to a percentage of moisture.

85. For informational purposes, a copy of the Report of the Eighth Session of the Committee on Commodity Problems, Intergovernmental Group on Oilseeds, Oils and Fats (FAO/CCP:OF 74/4) concerning the problems of Aflatoxins in oilseeds and oilcakes was made available to the delegations.

STATUS OF THE CODE

86. The Committee agreed to retain the Proposed Draft Code at Step 4 for further consideration at its next session and further agreed that the document should be redrafted by the author countries in the light of the written comments received and the comments made at the present session.

CONSIDERATION AT STEP 2 OF THE PROPOSED DRAFT CODE OF HYGIENIC PRACTICE FOR FROG LEGS

87. The Committee had before it for consideration at Step 2 the above-mentioned proposed draft code and government comments thereon as contained in document CX/FH 74/9.

88. The Committee agreed not to review the standard in detail at this stage but to have a brief discussion on the proposed draft in relation to major points of concern. Among the main points discussed were to modify some of the provisions under Hygienic Reporting Requirements with regard to stricter requirements for the exclusion of all animals from processing and storage areas, the obligations regarding personnel health and the disposal of sewage and waste water.

89. It was also questioned whether the physiological effects on frogs by immersion in brine was in fact anaesthesia or merely immobilization. Some delegations recommended that more humane methods of preparation might be considered, such as stunning.

END-PRODUCT SPECIFICATIONS

90. It was pointed out that several items under this heading, notably A, C, D, and F, seemed inappropriate and would be more properly located in other sections of the proposed draft code.

STATUS OF THE CODE

91. The Committee also noted that several countries had submitted written comments, and therefore decided that the author countries (Mexico and the United States) should redraft the proposed draft code in the light of these comments and those made during the meeting and that the revised document should be submitted through the Secretariat to governments for comment at Step 3 of the Procedure.

CONSIDERATION OF REVISED PAPER ON MICROBIOLOGICAL EXAMINATION OF LOW ACID, HEAT-PROCESSED, SHELF STABLE FOODS IN CANS, GLASS AND RETORTABLE POUCHES

92. The Committee had before it the above-mentioned revised paper as contained in document CX/FH 74/10. The Delegation of Canada, the author country of the paper, outlined its background.

93. It was pointed out that the paper was not intended for use as a control measure or as a Code but rather for use in the examination of low

acid canned goods of an unknown production history, and, therefore, the format as well as some provisions might not apply. The Committee agreed on the need for a code in this area, and therefore the Chairman appointed a Working Group to be composed from the Delegations of Canada (Chairman), the Netherlands, the United Kingdom and the United States to consider the development of a Code of Hygienic Practice for Low Acid Canned Foods which should include a consideration of the processing and hygienic control requirements as well as microbiological and other examinations which may be relevant to the protection of public health.

CONSIDERATION OF POSITION OF DRAFT CODE OF HYGIENIC PRACTICE FOR QUICK-FROZEN FRUITS, VEGETABLES AND THEIR JUICES

94. The Committee was reminded of the decision taken at its last session (ALINORM 74/13, paras 84 and 85) to formulate a recommendation to the Commission with regard to the future of the Code in view of the almost completed Draft Code of Practice for the Processing and Handling of Quick-Frozen Foods which was presently before the Commission for adoption at Step 8.

95. It was agreed to await the consideration by the Commission of the above-mentioned Code of Practice and to be guided by the resulting decision.

OTHER BUSINESS

96. The Committee was informed that a Proposed Draft Code of Hygienic Practice for Foods for Infants and Children was being elaborated by the Delegation of the Federal Republic of Germany in accordance with the wishes expressed by the Committee at its Tenth Session (ALINORM 74/13, paras 34 and 35). Delegations were asked to submit relevant suggestions directly to the Delegation of the Federal Republic of Germany.

97. The Committee also recalled the decision taken at its last session (ALINORM 74/13, paras 34 and 35) requesting the approval of the Commission with regard to revising the Recommended International Code of Practice - General Principles of Food Hygiene, and, in this connection, agreed that among the reasons for revising the Code were the following: The need to include provisions for, and/or clarify:

- (i) disposal of waste material
- (ii) medical examination of personnel
- (iii) identification of lots
- (iv) acceptance criteria (e.g., toxic material)
- (v) disinfection prior to working day
- (vi) the terms "sanitization" and "approved"

In addition, the Committee recognized the need for the incorporation of a number of terms into the basic document instead of repeating them in individual codes.

98. The Committee agreed that governments should be asked to send their comments and suggestions with regard to revising the General Principles of Food Hygiene to the Secretariat and that the Delegations of the Netherlands, the United Kingdom and the United States would be responsible for assembling the comments and preparing a working paper for consideration by the Committee at its Twelfth Session.

FUTURE WORK

99. The Delegation of France inquired whether the Committee felt it necessary to elaborate a Code of Hygienic Practice for Foods served in Long Distance Transport. The Committee was informed that the existing Guide to Hygiene in International Flight was currently being revised by WHO and was due to be completed in the autumn of 1974. It decided, therefore, not to pursue this matter any further.

DATE AND PLACE OF NEXT SESSION

100. The Committee noted that the Codex Committees on Food Hygiene, Processed Fruits and Vegetables, and Food Labelling had all been scheduled to take place in May 1975. It further noted that the Codex Committee on Food Labelling to be held in Ottawa had been tentatively scheduled to take place in the last week in May 1975. The Committee agreed that its Twelfth Session should take place in Washington, D.C. in May 1975.

I. SUMMARY STATUS OF WORK
(prepared by Secretariat)

Codes/Paper	Status Step	to be dealt with by	Document/ ALINORM-App.	Working papers for* next session
General Principles of Food Hygiene	9	Governments	CAC/RCP 1-1969	
Revision	2	12th FoHy		CX/FH 75/4
Canned Fruit and Vegetable Products	9	Governments	CAC/RCP 2-1969	
Dried Fruits	9	Governments	CAC/RCP 3-1969	
Desiccated Coconut	9	Governments	CAC/RCP 4/5-1971	
Dehydrated Fruits and Vegetables including Edible Fungi	9	Governments		
Tree Nuts	9	Governments	CAC/RCP 6-1972	
QF Fruits, Vegetables and their Juices (retained)	8	11th CAC		
Poultry Processing	8	11th CAC	ALI 76/13-II	
Egg Products	8	11th CAC	ALI 76/13-III	
Standard Methodology for the Detection of Salmonella in Eggs		12th FoHy		
Molluscan Shellfish	3	12th FoHy	ALI 76/13-IV	
Ground Nuts (retained)	4	12th FoHy		CX/FH 75/5
Frog Legs	3	12th FoHy		CX/FH 75/6
Low Acid Canned Foods	2	12th FoHy		CX/FH 75/7
Foods for Infants and Children	2	12th FoHy		CX/FH 75/8

* To be distributed in 1975

2. MATTERS OF SPECIFIC INTEREST TO OTHER COMMITTEES

Codex Committee	Paragraphs
- Cocoa Products and Chocolate	5, 6
- Edible Ices	7
- Fish and Fishery Products	8 - 11
- Joint IOOC/Codex Meeting on Table Olives	9
- Processed Fruits and Vegetables	12 - 14
- Processed Meat Products	15
- Fruit Juices	9, 16
- Meat Hygiene	48, 97 and 98
- Special Dietary Uses	96

LIST OF PARTICIPANTS

OFFICERS OF THE MEETING

Chairman

Dr. Joseph C. Olson
Director, Division of Microbiology
Bureau of Foods
Food and Drug Administration
Department of Health, Education
and Welfare
Washington, D.C. 20204

Rapporteur

Mr. E. Spencer Garrett
Laboratory Director
National Marine Fisheries Service
National Oceanic and Atmospheric
Administration
U.S. Department of Commerce
3209 Frederic Street
Pascagoula, Mississippi 39567

Food and Agriculture Organization
Representatives

Mr. J. M. Hutchinson
Food Control Officer
Joint FAO/WHO Food Standards Programme
Food and Agriculture Organization of
the United Nations
Via delle Terme di Caracalla
00100 Rome, Italy

Mr. Lawrie W. Jacobson
Food Standards Officer
Joint FAO/WHO Food Standards Programme
Food and Agriculture Organization of
the United Nations
Via delle Terme di Caracalla
00100 Rome, Italy

Food and Agriculture Organization
Representatives (cont'd)

Mr. Richard Garm
Fishery Technologist
Department of Fishery
Food and Agriculture Organization
of the United Nations
00100 Rome, Italy

World Health Organization
Representative

Dr. L. R. R. Reinius
Food Hygienist
Veterinary of Public Health
Division of Communicable Diseases
World Health Organization
1211 Geneva 27
Switzerland

APPENDIX I

-2-

MEMBER COUNTRIES

ARGENTINA

Delegate

Mr. Marcelo E. Huergo
Second Secretary
Embassy of the Argentine Republic
1600 New Hampshire Avenue, N.W.
Washington, D.C. 20009

AUSTRALIA

Head of Delegation

Mr. W. C. K. Hammer
Assistant Secretary
Department of Primary Industry
Canberra, Australia

Delegates

Dr. J. H. B. Christian
Associate Chief
Division of Food Research
Commonwealth Scientific and
Industrial Research Organization
Australian Scientific Liaison Office
P. O. Box 52
North Ryde, New South Wales 2113
Australia

Mr. S. W. C. Smith
Principal Chemist
Commonwealth Department of Health
P. O. Box 100
Woden, ACT 2606
Canberra, Australia

Dr. K. Doyle
Attaché (Veterinary)
Embassy of Australia
1601 Massachusetts Avenue N.W.,
Washington, D.C. 20036

BRAZIL

Head of Delegation

Mr. Luis Ivan Dias Campos
Director of the Division of
Inspection
Standardization and Classification
Ministry of Agriculture
Brasilia, D.F., Brazil

Delegates

Dr. C. R. T. de Almeida
Chief Meat Export Inspector
Meat Inspection Division
Ministry of Agriculture
Ed. Gilberto Salomao 13° Andar SCS
Brasilia, D.F., Brazil

Mr. Raul Taunay
Third Secretary
Brazilian Embassy
3006 Massachusetts Avenue, N.W.
Washington, D.C. 20008

BURUNDI

Delegates

Mr. Ignace Mageregere
Director of Laboratory and Health
Ministry of Public Health
P. O. Box 1820
Bujumbura, Burundi

Mr. Luc Sahabo
Director of the Veterinary
Laboratories
Ministry of Agriculture
P. O. Box 227
Bujumbura, Burundi

CANADA

Head of Delegation

Mr. Ilmar E. Erdman
 Evaluation Division
 National Health and Welfare
 Microbial Hazards Bureau
 Department of Health and Welfare
 Ottawa, Ontario, K1a, 0L2

Delegate

Mr. Geoffrey G. Anderson
 Assistant Director
 Inspection Branch, Fisheries
 Service
 Department of the Environment
 Ottawa, Ontario, Canada

CUBA

Delegates

Mr. Manuel Blanco Alvarez
 Chief, Department of Quality
 Control
 National Fisheries Institute
 72nd Street, 1916
 Havana, Cuba

Mr. Maximiliano Santana Lorenzo
 Director of Industry
 National Fisheries Institute
 Patrocinio 580
 Havana, Cuba

DENMARK

Delegate

Mr. K. Haaning
 Veterinarian
 Institute of Microbiology and
 Hygiene
 Bulowsvej 13
 DK, 1870 Copenhagen V, Denmark

FINLAND

Delegate

Dr. T. J. Salmi
 Chief of the Division of Food
 Hygiene
 Veterinary Department
 Ministry of Agriculture and
 Forestry
 Helsinki 17, Finland

FRANCE

Head of Delegation

Dr. Alice M. Caillet
 Doctor Inspector of Health
 Ministry of Public Health
 20 Bis, rue d'Estrees
 Paris 7^e, France

Delegates

Dr. Jean Gousset
 Veterinary Inspector
 Ministry of Agriculture
 5 rue E. Renan
 Issy les Moulineaux, France

Mrs. Suzy N. Rochize
 Inspecteur Divisionnaire SRF
 Ministere de l'Agriculture
 Paris 42 rue de Bougogne (7^e)
 France

GERMANY, FEDERAL REPUBLIC OF

Delegate

Dr. Klaus Gerigk
 Director and Professor
 Bundesgesundheitsamt
 D - 1000 Berlin 33
 Postfach
 Federal Republic of Germany

IRAN

Head of Delegation

Dr. Abass Khaledi
 Director for the Division of
 Agricultural Industries
 ISIRI
 P. O. Box 2937
 Tehran, Iran

Delegate

Mr. Mohammed Razi
 Director General of the Division
 for Supervision of Foodstuffs
 and Cosmetics
 Ministry of Health
 P. O. Box 2937
 Tehran, Iran

ITALY

Head of Delegation

Professor Giordano de Felip
 Research Microbiologist
 Public Health Institute
 Ministry of Health
 Viale Regina Elena
 Rome, Italy

Delegates

Dr. Giuseppe Porcelli
Chief Chemist
 Direzione Generale Degli
 Alimenti e Nutrizione
 Ministero della Sanità
 Palazzo Italia - EUR, Rome, Italy

Dr. Antonio Svaldi
 Ispettore Sezione
 Ministero Agricoltura
 Via XX Settembre
 Roma, Italy

KOREA, REPUBLIC OF

Head of Delegation

Mr. Chan-Hong Moon
 Director
 Division of Food Hygiene
 Ministry of Health and Social
 Affairs
 Seoul, Korea

Delegates

Mr. Sung Oh Shin
 Second Secretary
 Embassy of the Republic of Korea
 2320 Massachusetts Avenue, N.W.
 Washington, D. C. 20008

Mr. Han Mo Kim
 Fisheries Attache
 Embassy of the Republic of Korea
 2320 Massachusetts Avenue, N.W.
 Washington, D. C. 20008

THE LIBYAN ARAB REPUBLIC

Head of Delegation

Mr. Ali Fathi Shahawy
 Chief, Nutrition and Food
 Control Section
 Secretary General, National Food
 and Nutrition Council
 Ministry of Health
 P. O. Box 1583
 Tripoli, Libya

Delegates

Mr. Ramadan Musa Tayeb
 Chief, Health Education Section
 Ministry of Health
 P. O. Box 8368
 Tripoli, Libya

Delegates (cont.)

Mr. Fauzi Bashir Bedri
 Nutritionist
 Nutrition and Food Control Section
 Ministry of Health
 Tripoli, Libya

MEXICO

Head of Delegation

Mr. Armando Bejarano-Almada
 Department of International
 Standards
 Bureau of Standards
 Department of Industry and
 Commerce
 Mexico, D.F., Mexico

Delegate

Mr. Jose Rafael Campos A.
 Sub-Jefe Del Depto. de Industrias
 Agricolas
 Secretaria de Agricultura Y
 Ganaderia
 Escuela Nacional de Agricultura
 Chapingo, Mexico

NETHERLANDS

Head of Delegation

Dr. K. Büchli
 Public Health Officer
 Department of Public Health
 Dr. Reyerstraat 10
 Leidschendam, The Netherlands

Delegates

Mr. Arnold Parzer
 Second Secretary (Agriculture)
 Embassy of the Netherlands
 4200 Linnean Avenue, N.W.
 Washington, D.C. 20008

Delegates (Cont.)

Dr. M. van Schothorst
 Chief, Food Hygiene Laboratory
 National Institute of Public Health
 P. O. Box 1
 Bilthoven, The Netherlands

Adviser

Dr. Peter J. Anema
 Section Manager, Microbiology
 Unilever Research Laboratory
 P. O. Box 7
 Zevenaar, The Netherlands

NIGERIA

Head of Delegation

Dr. Muhammed Salahu
 Chief Veterinary Officer
 Nigerian Livestock and Meat
 Authority
 Ministry of Agriculture
 N.L.M.A.
 P. O. Box 479
 Kaduna, Nigeria

Delegate

Dr. A. O. Oyejola
 Senior Quality Inspector
 Nigerian Standards Organization
 Federal Ministry of Industries
 11 Kofo Abayomi Road
 Victoria Island
 Lagos, Nigeria

POLAND

Head of Delegation

Dr. J. Zaleski
 Director of the Department of
 Technology
 Ministry of Food Industry and
 Food Purchase
 Swietokrzyska 20 Str.
 Warsaw, Poland

Delegate (Cont.)

Mr. Waclaw Orlowski
Chief, Fruits and Vegetables
Section
Quality Inspection Office
Ministry of Foreign Trade
Stepinska 9 Str.
Warsaw, Poland

SWEDEN

Delegate

Dr. Herbert Lundström
Chief Government Inspector
The National Food Administration
S-104 01 Stockholm, Sweden

SWITZERLAND

Head of Delegation

Dr. H. Schwab
Head of the Section of Bacteriology
Federal Health Service
Haslerstrasse 16
CH-30008 Bern, Switzerland

Delegate

Dr. J. C. de Man
Assistant Manager
Nestec
CH-1814 La Tour-de-Peilz
Switzerland

THAILAND

Head of Delegation

Professor Amara Bhumiratana
Director
Institute of Food Research and
Product Development
Technical Adviser
Thai Food Processors' Association
P. O. Box 4-170
Bangkok, Thailand

Delegate

Mrs. Rabieb Bhumiratana
Deputy Director
Department of Science
Rama 6, VI Street
Bangkok 4, Thailand

UNITED KINGDOM

Head of Delegation

Dr. A. D. Bostock
Senior Medical Officer
Department of Health and Social
Security
London SE1 6BY, England

Delegates

Mr. R. H. Goodhand
Government Veterinarian
Ministry of Agriculture,
Fisheries and Food
Government Offices
Leatherhead Road
Chessington, Surrey, England

Mr. T. B. Williamson
Assistant Secretary
Department of Health and Social
Security
London SE1 6BY, England

Dr. A. C. Baird-Parker
Scientific Adviser
Food Manufacturers' Federation
1/2 Castle Lane
Buckingham Gate
London SW1E 6DN, England

Mr. J. G. Wood
Executive (Scientific and Technical)
Food Manufacturers' Federation
1/2 Castle Lane
Buckingham Gate
London SW1E 6DN, England

UNITED STATES

Head of Delegation

Mr. William V. Eisenberg
Chief, Microanalytical Branch
(HFF-127)
Division of Microbiology
Food and Drug Administration
Washington, D. C. 20204

Delegates

Mr. James E. Brooker
Fishery Products Research and
Inspection Division
National Marine Fisheries Service
National Oceanic and Atmospheric
Administration
U. S. Department of Commerce
3300 Whitehaven Street, N.W.
Washington, D. C. 20235

Mr. Cleve B. Denny
Head, Bacteriological Section
National Canners Association
1139 20th Street, N.W.
Washington, D. C. 20036

Mr. Daniel A. Hunt
Assistant to the Director
Division of Shellfish Sanitation
Food and Drug Administration
Washington, D. C. 20204

Dr. Nino F. Insalata
Technical Center
General Foods Corporation
250 North Street
White Plains, New York 10625

Mr. George J. B. Murray
Meat and Poultry Inspection
U. S. Department of Agriculture
Washington, D. C. 20520

OBSERVER COUNTRIES

KOREA, DEMOCRATIC PEOPLE'S REPUBLIC

Mr. Kim Hyong Ik
 (Head of Delegation)
 Minister Plenipotentiary
 Permanent Observer's Office
 40 East 80th Street
 New York, New York 10021

Mr. Kim Chung Gol
 First Secretary
 Permanent Observer's Office
 40 East 80th Street
 New York, New York 10021

Mr. Chang Chol Su
 First Secretary
 Permanent Observer's Office
 40 East 80th Street
 New York, New York 10021

SOUTH AFRICA

Mr. P. J. A. Swart ,
 Agricultural Attache (Economic)
 Embassy of South Africa
 3051 Massachusetts Avenue, N.W.
 Washington, D. C. 20008

UNITED ARAB EMIRATES

Dr. Juma Bilal
 Deputy Director of Curative
 Department
 Ministry of Health
 P. O. Box 1853
 Dubai, United Arab Emirates

OBSERVER ORGANIZATION

EUROPEAN ECONOMIC COMMUNITY

Mr. Georges Adelbrecht
 Administrateur au Secrétariat
 Général
 du Conseil des Communautés Européennes
 170, rue de la Loi
 1040 Bruxelles, Belgium

Mr. M. B. Hogben
 Administrateur Principal
 Commission of the European Economic Community
 Direction générale de l'Agriculture
 200 rue de la Loi
 Bruxelles, Belgium

DRAFT CODE OF HYGIENIC PRACTICE FOR POULTRY PROCESSING
(Advanced to Step 8)

To be read in conjunction with the Recommended General Principles of Food Hygiene. Side-line portions indicate material which is particular to this Code of Hygienic Practice and therefore does not appear in the General Principles of Food Hygiene.

SECTION I - SCOPE

This Code is concerned with all poultry, poultry carcasses, poultry parts and other edible materials thereof which have not yet been treated in any way to ensure their preservation, except that they may have been chilled or frozen and are intended for human consumption, whether by direct sale as such or through further processing.

It applies to all premises in which poultry is slaughtered, packed, or otherwise handled in the course of preparation, and all premises in which poultry parts are processed, packed, or otherwise handled in the course of preparation. It also applies to conditions of transport from all such premises.

SECTION II - DEFINITIONS

"Poultry" means any domesticated bird including chickens, turkeys, ducks, geese, guinea-fowls, or pigeons.

"Carcase" means the whole body of a bird after stunning, bleeding, plucking and eviscerating. However, removal of the kidneys, of the legs at the tarsus, or of the head is optional.

"Giblets" means the liver from which the bile sac (gall bladder) has been removed, the heart with or without the pericardial sac and the gizzard from which the lining and contents have been removed and any other material considered as edible by the consuming country, provided that all such material has been properly trimmed and washed.

SECTION III - RAW MATERIAL REQUIREMENTS

A. Environmental Sanitation in Raw Food Material Production Areas

NOTE: - Recommendations in this Section are not designed to cover the very important questions of hygiene and disease control in poultry growing and rearing areas. These factors have a particular bearing on this code but are the responsibility of the official agency having jurisdiction.

- (1) Sanitary disposal of human and animal wastes. Adequate precautions should be taken to ensure that human and animal wastes are disposed of in such a manner as not to constitute a public health or hygienic hazard and extreme care should be taken to protect products from contamination with these wastes.

All droppings, litter, scrapings, etc, from cages, crates and vehicles should be removed at least once daily. Arrangements for the disposal of trade refuse should be approved by the appropriate official agency. A separate refuse room or other equally adequate storage facilities should be provided on the premises and should be emptied and thoroughly cleaned and disinfected at least once daily.

- (2) Pest and disease control. Where control measures are undertaken, treatment with chemical, biological, or physical agents should be done only in accordance with the recommendations of the appropriate official agency, by or under the direct supervision of personnel with a thorough understanding of the hazards involved, including the possibility of toxic residues being retained.

B. Sanitary Food Production

- (1) As in the General Principles of Food Hygiene.
- (2) Sanitary techniques. Any live poultry holding section and attendant processes such as egg collection should be quite separate from the slaughtering and poultry packing section. This applies particularly to the disposal of refuse and storage of poultry feeding stuffs.
- (3) Removal of obviously unfit materials. It is recommended that unfit birds should be segregated prior to delivery to the processing plant. Similarly, on arrival, unfit birds should be removed as soon as possible and segregated for disposal in an appropriate manner. Arrangements for removal and segregation should be approved by the official agency having jurisdiction.
- (4) Protection of product from contamination. Suitable precautions should be taken to protect the birds from being contaminated by animals, insects, vermin, other birds, chemical or microbiological contaminants or other objectionable substances during handling and holding.

C. Transportation

- (1) Facilities. Conveyances and crates for transporting the live birds from the production area should be adequate for the purpose intended and should be of such material and construction as will permit thorough cleaning and should be so cleaned, disinfected and maintained as not to constitute a source of contamination.

SECTION IV - PLANT, FACILITIES, AND OPERATING REQUIREMENTSA. Plant Registration, Construction and Layout

- (1) Registration. Plants should be approved and registered by the official agency having jurisdiction.
- (2) Location, size, and sanitary design
 - (a) As in the General Principles of Food Hygiene, Section IV A (1), with the addition of the following: Whether existing buildings are being adapted or new premises are being built, early consultation with the appropriate official agency is essential.

A proper work flow is necessary to secure good hygiene standards. An example of a suitable work flow with physical separation of the processes is illustrated in Fig. 1 (see Annex) which can be adapted according to requirements.

- (b) Roadways and yards. Roadways and yards in the immediate vicinity of and serving the premises should have a hard, paved surface which is suitable for wheeled traffic, and should have provision for thorough cleaning where necessary and adequate drainage.
- (c) Walls, ceilings, and floors. Walls should be finished to a smooth, non-absorbent, washable surface, be light in color, and the junction between walls and floor should be coved or splayed to facilitate cleaning. Ceilings should be so constructed and finished as to minimize condensation, mould development, flaking and the lodgement of dirt. Floors should be of durable, impervious non-slip material, free from cracks and open joints and laid to an even surface properly sloped to an adequate drainage system.

Buildings should preferably have lined roofs but where these are unlined they should be constructed and finished to minimize condensations, mould development, flaking, and dirt, in order to protect against contamination of the product.

(d) Woodwork, doors, and windows. Woodwork should preferably not be used. If its use is unavoidable it should be kept to a minimum, be of simple design, easy to clean, and be tight fitting to wall surfaces. Doors and jambs should, where necessary, be fitted on both sides with non-corroding metal or other suitable materials as a protection from impact damage, and doors where necessary should be fitted with self-closing devices. All external openings and doors and openable external windows should be equipped to exclude flying insects, where these present a problem. Windowsills should be splayed at an angle.

(3) Sanitary facilities and controls.

(a) As in the General Principles of Food Hygiene, but changing the words "raw materials" to read "birds".

(b) Water supply. An ample supply of both hot and cold water should be available of the potable quality referred to in the General Principles of Food Hygiene, Section IV, A (2) (b). The water used during the preparation, handling, packing and storing of poultry carcasses, poultry parts and other edible material should be potable. Samples of the water should be taken regularly and tested for conformity with bacteriological and chemical standards.

Where in-plant chlorination of water is used, the residual content of free chlorine should not exceed that authorized by the official agency having jurisdiction.

(c) and (d) As in the General Principles of Food Hygiene.

(e) Plumbing and Waste Disposal. As in the General Principles of Food Hygiene, with the addition of the following: Sumps or solid matter traps included in the drainage system within the plant should be emptied and cleaned frequently and at the end of every working day. Every inlet into the drainage system should be trapped and no drain ventilation pipe should open into any room.

Any internal open channelling should be rounded and of sufficient width to allow for easy cleaning, and of minimum efficient depth. Covering grids should be easily removable for cleaning. Channels should be flushed frequently during processing and thoroughly cleaned at least once daily.

(f) Lighting and ventilation. As in the General Principles of Food Hygiene, with the addition of the following: Lighting should have an overall intensity of not less than 325 Lux (30 foot candles), and in inspection areas this should be increased to not less than 540 Lux (50 foot candles), should not affect colours and be properly directed onto the bird.

- (g) As in the General Principles of Food Hygiene, Section IV A 2(g).
- (h) As in the General Principles of Food Hygiene, Section IV A 2(h), with the addition of the following: Handwashing facilities in workrooms should not be capable of being operated by hand.
- (i) Accommodation for clothing and footwear. Suitable and sufficient accommodation for keeping clothing and footwear not worn during working hours should be provided. Such accommodation should be separate from any processing room.

B. Equipment and Utensils

- (1) As in the General Principles of Food Hygiene.
- (2) As in the General Principles of Food Hygiene with the addition of the following. Suitable, easily-accessible equipment for the cleaning and disinfection of hand tools by means of hot water should be provided in workrooms.
- (3) Equipment and utensils used for condemned, inedible or contaminating materials should be so identified and should not be used for handling edible products. Processing equipment and utensils used for slaughtering and packing should be used for these purposes only.
- (4) Bleeding and blood collection. Bleeding equipment, including blood tunnels and blood containers, should be constructed of non-corrodable metal or other suitable material which is easy to clean. They should be thoroughly cleaned after major breaks during working periods and at the end of the day. Blood tunnels which are of solid wall construction should be properly tiled or otherwise smooth surfaced with impervious material, suitably drained, and of sufficient width and construction as to facilitate thorough cleaning. Metal tunnels should be fitted with side and head shields easily removable for cleaning and the base trough should have a suitable fall to a blood container which can be easily emptied and cleaned.
- (5) Processing Equipment
- (a) Scalding should preferably be carried out by more hygienic methods than by the use of scalding tanks. When scalding tanks continue to be used, particular care should be taken to ensure that hygienic standards are as good as possible. The rate of flow of water into these tanks should provide for a continuous replacement

of the water so as to protect against a build-up of contamination and preferably, where practicable, in such a way that the water flow should be in the opposite direction to that in which poultry is travelling, so that the scalded poultry is pulled out on that side of the scalding tank on which clean hot water enters the tank. Tanks should be emptied at regular intervals and at least once every working day. Scald agents where used should be approved by the official agency having jurisdiction.

- (b) Plucking machines should be designed to control the scatter of feathers as much as possible. The removal of feathers from the site should preferably take place continuously or as often as necessary, throughout the working day. Feathers should be stored in suitable clean containers which should be removed at least once daily. Feathers conveyed by continuous running water should be removed from the water which should preferably be run to waste.
- (c) Perforated metal drainage surfaces should be reversible for cleaning purposes.
- (d) Evisceration troughs should be constructed of stainless steel or other suitable material. The main water flow should be in the opposite direction to that in which carcasses are travelling so that the carcass arrives for cooling at the point where clean water enters the trough. Additionally, trickle jets of clean water should be provided along both sides of the trough, and supplies of running warm water should also be provided over the trough for hand rinsing. The troughs should be arranged to limit the travel of inedible material by the insertion of outlets and containers at strategic points in addition to the main outlet. The number and placing of the outlets should prevent build-up of material in the troughs and should be commensurate with the rate of flow of production, the design of equipment and other relevant variable factors. Particular attention should be paid to the provision of adequate outlets where the trough is longer than 10 metres.
- (e) Storage containers for inedible material should be leak proof, constructed of metal or other suitable impervious material which is easy to clean, and be covered with close-fitting lids. Where chutes or other continuous disposal methods are used they should be so constructed as to protect against contamination or offensive odours.
- (f) Premises where poultry carcasses, poultry parts, and other edible material are kept should have adequate refrigerated storage.

(g) Equipment used for chilling the carcasses and edible material should be constructed of stainless steel or other suitable material and should be so operated as to protect against the build-up of micro-organisms. Spin chillers and other processes of chilling in a common tank, when their use is not prohibited by national legislation, should be operated in accordance with the requirements established by the official agency having jurisdiction.

(h) Compounds used in spray or immersion freezing procedures should be acceptable to the appropriate official agency.

C. Hygienic Operating Requirements

(1) Sanitary maintenance of plant, facilities, and premises. As in the General Principles of Food Hygiene, with the addition of the following:

(a) These operations should be under the supervision of an appropriately qualified person, approved by the official agency having jurisdiction.

(b) Cleaning routine. Premises, equipment and utensils should be cleaned at frequent intervals during the day. They should be cleaned and disinfected, immediately and thoroughly, whenever circumstances demand it, such as when they have been in contact with diseased or infected materials. Additionally, they should be cleaned and disinfected at the end of each working day.

(c) The premises should be cleared of all live poultry at least once weekly to facilitate complete and thorough cleansing. Birds should normally be slaughtered within 24 hours of arrival and any water fed to them should be of potable quality.

(d) To avoid the risk of cross-contamination, blood and feathers should be kept away from the plucked poultry as they go on for the next stage of processing.

(e) Each process should be carried out in its own clearly defined area.

(f) Poultry which is received rough plucked for the next stage of processing, should be hung singly or arranged in single layers on racks or similar type of equipment.

(g) Feed in the crop and faecal material in the cloaca, should be removed by such means as will protect against contamination; for example, by suction.

- (h) Wax dipped poultry should be handled so that the set wax and removed feathers will fall into a suitable container. Only clean wax which has been stored in a clean place should be used for wax dipping. Feather separation sieves included in wax dipping machines should be removable and cleaned once daily. At the close of the working day reclaimed wax should be heated (a temperature of not less than 80°C (176°F) for a period of not less than 20 minutes, has been found to be effective), skimmed, washed, and filtered or passed through a centrifugal cleaning machine and afterwards stored in a clean place.
- (2), (3), (4), (5) As in the General Principles of Food Hygiene.
- (6) (a) All persons working in a food plant should maintain a high degree of personal cleanliness while on duty. Personnel working with live birds, feeding stuffs or unfit materials should not be permitted in other sections of the premises where poultry is being processed unless adequate cleansing measures are taken by such personnel to prevent contamination. Clothing including suitable headdress should be appropriate to the duties being performed and should be kept clean.
- (b) As in the General Principles of Food Hygiene.
- (c) Spitting, eating, chewing and the use of tobacco should be prohibited in food handling areas.
- (d), (e), (f) As in the General Principles of Food Hygiene.

D. Operating Practices and Production Requirements

- (1) Inspection and sorting
- (a) To protect against the risk of cross contamination, domesticated birds including chickens, turkeys, ducks, geese, guinea-fowl, or pigeons should be processed completely separate from one another either in time or place. Where the separation is one of time the processing areas should be cleaned thoroughly before the introduction of a different species of bird to the processing area. Workers employed with live birds, feeding-stuffs or unfit materials should not be permitted to work in parts of the premises where poultry is slaughtered or processed, unless adequate cleansing measures are taken by such personnel to prevent contamination.
- (b) In order to maintain good hygienic conditions and to prevent hazards to the consumer, all poultry should undergo ante-mortem and post-mortem inspections which should be carried out by the appropriate official agency, under veterinary supervision.

- (c) Independent of ante-mortem and post-mortem inspection procedures, it is recommended that unfit poultry or poultry suspected of disease be removed and segregated in order that they may be inspected by the official agency having jurisdiction and thereafter disposed of in an appropriate manner in order to prevent the spread of disease.
 - (d) Poultry carcasses, poultry parts and other normally edible materials found to be unfit for human consumption should be kept in a separate room and removed at least once a day. The room should be lockable and the carcasses, parts or other materials should be held there securely. Arrangements for such retention and for disposal generally should be approved by the official agency having jurisdiction.
- (2) Washing or Other Preparation. After evisceration and inspection carcasses should be washed.
- (3) Preparation and Processing.
- (a) As in the General Principles of Food Hygiene, Section IV. D.(4).
 - (b) Temperatures, and cooling and freezing procedures. Temperatures and procedures which are necessary for cooling and freezing carcasses and all edible portions thereof, should be in accordance with operating practices which ensure the prompt removal of the animal heat and preserve the condition and wholesomeness of the carcass and all edible portions thereof.
- (i) General cooling requirements. After preparation there should be no delay in cooling the carcass to an internal body temperature of 4°C (39°F) or less. Where cutting up takes place before cooling to 4°C (39°F), it should be carried out within one hour of slaughter, immediately after cutting the temperature of the parts should be reduced to 4°C (39°F) or less. Where cutting up takes place after cooling to 4°C (39°F), the internal temperature of the carcass and parts shall not be allowed to exceed 10°C (50°F).
- (ii) Cooling giblets. Giblets should be chilled to 4°C (39°F) or lower within 2 hours from the time they are removed from the bird.
- (iii) Refrigeration. The temperature in the storage area where non-frozen poultry carcasses, poultry parts and other edible materials are kept should be 4°C (39°F) or less. Poultry carcasses, poultry parts, and other edible material should be so stored that they are protected against deterioration and mould growth. They should be regularly inspected and dispatched in strict rotation. Cold rooms used for bulk storage should preferably be fitted with automatic defrosting equipment. Care should be taken to avoid the transference of dirt into the rooms. Non-frozen poultry carcasses, poultry parts and other edible material should be transported at 4°C (39°F) or less.

- (iv) Preservation by freezing. Carcasses, poultry parts, and other edible material which are intended for preservation by freezing, should be frozen as soon as possible and should not be held chilled for more than 72 hours.
- (v) Ice-pack containers. When poultry carcasses are ice-packed in barrels or other containers, they should preferably be wrapped in plastic or other suitable material to protect against contamination. The barrels and containers should be covered and should have an adequate number of drain holes to permit the water to drain out. Wooden barrels or containers should not be used for this purpose.
- (4) Packaging of finished product.
- (a) As in the General Principles of Food Hygiene, Section IV.D(5)(a).
- (b) Techniques. Packaging should be done under conditions that preclude the introduction of contamination into the product including separate wrapping of giblets.
- (5) Preservation of finished product. As in the General Principles of Food Hygiene, Section IV.D(6).
- (6) As in the General Principles of Food Hygiene, Section IV.D(7).
- E. Sanitation Control Programme. As in the General Principles of Food Hygiene.
- F. Laboratory Control Procedures. As in the General Principles of Food Hygiene.

SECTION V - END-PRODUCT SPECIFICATIONS

Appropriate methods should be used for sampling, analysis and determination to meet the following specifications:

- (1) To the extent possible in good manufacturing practice the product should be free from objectionable matter. Poultry carcasses, poultry parts and other edible materials should not contain residues of hydrogen peroxide, natural or artificial colouring matter, substances used to remove colour, antibiotics, preservatives, tenderizers, or flavouring substances.
- (2) The products should comply with the requirements set forth by the Codex Alimentarius Commission committees on pesticide residues and food additives contained in permitted lists or relevant Codex commodity standards.

Proposed Draft Code of Hygienic Practice for Egg Products
(Advanced to Step 8)

SECTION I - SCOPE

This Code of Practice is designed to:

- A. Prevent deterioration in the quality of eggs in shell intended for egg products.
- B. Provide guidance on the hygienic production, storage, packaging and transport of whole egg, egg albumen, egg yolk and other products consisting wholly or mainly of one or more of the constituents of egg, intended for human consumption.
- C. Provide guidance on hygienic practice relating to premises, equipment and personnel used or engaged in the production of these products.

Unless specifically stated otherwise, the word "Egg" in this Code relates to domesticated chickens (hens') eggs intended for processing as above. However, the principles of this code may be applied equally to eggs of other domesticated birds.

SECTION II - DEFINITIONS

"Approved" means approved by the official agency having jurisdiction.
"Egg" means eggs (in shell) of domesticated chickens (hens).

SECTION III - RAW MATERIAL REQUIREMENTS

- A. Environmental Sanitation in Production Areas
 - (1) Sanitary disposal of human and animal wastes. Adequate precautions should be taken to ensure that human and animal wastes are disposed of in such a manner as not to constitute a public health or hygienic hazard and extreme care should be taken to protect eggs from contamination with these wastes, particularly those eggs that may be consumed without heat treatment.
 - (2) Animal, plant pest and disease control. Treatment with chemical biological or physical agents should be done only in accordance

with the recommendations of the official agency having jurisdiction; by or under the direct supervision of personnel with a thorough understanding of the hazards involved, including the possibilities of toxic residues being retained by the product.

B. Production, Storage and Collection of Eggs on the Farm

- (1) Health of farm stock. Only eggs derived from healthy stock should be used in the production of egg products for human consumption.
- (2) Equipment and product containers. Equipment and egg containers should not constitute a hazard to health. Containers which are reused should be of such material and construction as will facilitate thorough cleaning, and should be so cleaned and maintained as not to constitute a source of contamination to the product.
- (3) Sanitary Techniques.
 - (a) Eggs should be collected as frequently as necessitated by the climatic conditions. Collecting twice a day has been found satisfactory. The eggs should be handled as little as possible. In particular, rough handling should be avoided.
 - (b) Throughout handling and storage it is essential that steps be taken to prevent:
 - (i) Contamination of the shell with dirt, bedding materials or by animals, insects, vermin, birds, chemical or microbiological contaminants or other objectionable substances.
 - (ii) Exposure to unfavorable temperatures.
 - (c) Cleaning. Eggs should not be cleaned on the farm. If, exceptionally, they are cleaned on the farm, this should be done only with the approval of the official agency having jurisdiction, which should be satisfied as to the method of cleaning employed including the time/temperature conditions of any washing process and the detergents/disinfectants used.
- (4) Removal of obviously unfit materials. Unfit eggs should be segregated during collection to the fullest extent practicable, and should be disposed of in such a place and such a manner as will prevent contamination of other eggs or water supplies.

- (5) Storage on the farm. Eggs should be stored in a cool room to which they should be taken immediately after collection. They should not be stacked or packed into boxes until they are cool, and the room should be kept free from strong smelling substances and odours. Eggs should be stored at such a temperature and relative humidity as will minimize deterioration having regard to local climatic conditions. Temperatures of 8° - 15°C (46-59°F) and relative humidities of 70% - 85% have been found satisfactory.

Thin-shelled or hair-cracked eggs should be carefully handled and packed in a separate container to prevent breakage before delivery to the breaking plant.

C. Transportation

- (1) Facilities. Conveyances for transporting eggs should be adequate for the purpose intended and should be of such material and construction as will permit thorough cleaning and should be so cleaned and maintained as not to constitute a source of contamination to the eggs.
- (2) Handling procedures. All handling procedures should be such as will prevent the eggs from being contaminated.

Eggs should be collected from the producers' premises and delivered to the processing plant as soon as possible, and be maintained during transport at such a temperature as will minimize deterioration having regard to local climatic conditions.

SECTION IV - PLANT, FACILITIES AND OPERATING REQUIREMENTS

A. Plant Construction and Layout

- (1) Location, size and sanitary design. The building and surrounding area should be such as can be kept reasonably free of objectionable odours, smoke, dust, or other contamination; should be of sufficient size for the purpose intended without crowding of equipment or personnel; should be of sound construction and kept in good repair; should be of such construction as to protect against the entrance and harbouring of insects or birds or vermin; and should be so designed as to permit easy and adequate cleaning.

The construction and layout of the processing premises should be such as to secure a regulated flow in the process from the arrival of the eggs at the premises to the finished product, and should provide for correct temperature conditions at all stages of the process.

- (2) Sanitary facilities and controls
- (a) Separation of processes. Areas where eggs and other raw materials are received or stored should be so separated from areas in which final product preparation or packaging is conducted as to preclude contamination of the finished product. Areas and compartments used for storage, manufacture or handling of edible products should be separate and distinct from those used for inedible materials. The food handling area should be completely separated from any part of the premises used as living quarters. Separate rooms should be provided for unpacking and washing of the eggs and for storing the finished product. Candling, breaking, pasteurizing and filling should be so separated as to protect against cross contamination.
- (b) Water supply. An ample supply of cold water should be available and an adequate supply of hot water where necessary. The water supply should be of potable quality. Standards of potability shall not be less than those contained in the latest edition of "International Standards for Drinking Water", World Health Organization.
- (c) Ice. Ice should be made from water of potable quality and should be manufactured, handled, stored and used, so as to protect it from contamination.
- (d) Auxiliary water supply. Where non-potable water is used - for such purposes as fire control - it must be carried in completely separate lines, identified preferably by colour and with no cross-connection or back-siphonage with the lines carrying potable water.
- (e) Plumbing and waste disposal. All plumbing and waste disposal lines (including sewer systems) must be large enough to carry peak loads. All lines must be watertight and have adequate traps and vents. Disposal of waste should be effected in such a manner as not to permit contamination of potable water supplies. The plumbing and the manner of waste disposal should be approved by the official agency having jurisdiction.
- Drainage systems which include solid matter traps should be designed so as to allow them to be emptied. When located within or immediately outside the plant, solid matter traps should be emptied and cleaned as necessary and in accordance with the requirements of the official agency having jurisdiction.
- (f) Lighting. Premises should be well lit. Light bulbs and fixtures suspended over food in any step of preparation should be of the

safety type or otherwise protected to prevent food contamination in the case of breakage. The illumination in any part of a workroom should be not less than 325 lux units (30 foot candles), and at points requiring close examination of the product they should be illuminated at an intensity of not less than 540 lux units (50 foot candles). Reflector filaments should be designed to allow easy dismantling, cleaning, and reassembling.

- (g) Ventilation. Premises should be well ventilated. Special attention should be given to the venting of areas and equipment producing excessive heat, steam, obnoxious fumes or vapours or contaminating aerosols. Good ventilation is important to prevent both condensation (which may drip into the product) and mold growth in overhead structure - which growth may fall into the food. Ventilation should be planned to allow for adequate changes of air and to ensure that the direction of air flow is never from a dirty area to a clean one.
- (h) Toilet-rooms and facilities. Adequate and convenient toilets should be provided and toilet areas should be equipped with self-closing doors. Toilet rooms should be well lit and ventilated and should not open directly into a food handling area. They should be kept in a sanitary condition at all times. There should be associated hand-washing facilities within the toilet area and notices should be posted requiring personnel to wash their hands after using the toilet.
- (i) Hand-washing facilities. Adequate and convenient facilities for employees to wash and dry their hands should be provided wherever the process demands. They should be in full view of the processing floor. Single-use towels are recommended, where practicable, but otherwise the method of drying should be approved by the official agency having jurisdiction. The facilities should be kept in a sanitary condition at all times.

B. Equipment and Utensils

- (1) Materials. All food contact surfaces should be smooth; free from pits, crevices and loose scale; non-toxic; unaffected by food products; and capable of withstanding repeated exposure to normal cleaning; and non-absorbent unless the nature of a particular and otherwise acceptable process renders the use of a surface, such as wood necessary.
- (2) Sanitary design, construction, and installation. Equipment and utensils should be so designed and constructed as will prevent hygienic hazards and permit easy and thorough cleaning. Stationary equipment should be installed in such a manner as will permit easy and thorough cleaning.

Wooden equipment should not be used in the breaking, pasteurizing, or filling rooms.

All pumps, pipes, vessels, and contact surfaces should be of stainless steel or other approved material.

Shell eggs moving into the breaking room should be conveyed in containers constructed of stainless steel, aluminum, approved plastic material, or in single-use trays. Breaking tables should be constructed of stainless steel, aluminum or plastic material. As far as practicable, plastic materials used for these purposes should be free from cracks and scratches and should be capable of withstanding the regular cleaning and disinfection process.

Machines and containers for liquid egg, should be of stainless steel or other suitable material and should be so constructed as to permit the ready elimination from the liquid egg supply of all the egg contents that are unfit for further processing.

Any device for the separation of egg yolk from egg white should be of approved sanitary design and construction.

Equipment and utensils used for inedible or contaminated materials should be so identified and should not be used for handling edible products.

C. Hygienic Operating Requirements.

(1) Sanitary maintenance of plants, facilities and premises

- (a) The building, equipment, utensils and all other physical facilities of the plant should be kept in good repair and should be kept clean and maintained in an orderly, sanitary condition. Waste materials should be frequently removed from the working area during plant operation and adequate waste receptacles should be provided. Detergents and disinfectants employed should be appropriate to the purpose and should be so used as to present no hazard to public health.
- (b) All equipment should be cleaned and disinfected at all major breaks in work periods, whenever necessary to remove contamination and at the end of the day's work. Disinfection should also be carried out before commencement of the day's work. Steam condensate should not be allowed to remain in any equipment. Between disinfection and work periods, equipment should be handled as little as possible.

- (c) Whenever the process is stopped for approximately 30 minutes or more all hand breaking equipment and easily removable parts of breaking machines should be cleaned and disinfected. At the same time the surfaces of breaking tables should be cleaned and liberally hosed with clean hot water.
- (d) Where "in-place" cleaning is carried out and inspection at the end of the day indicates defective "in-place" cleaning, the equipment should be dismantled and cleaned.
- (e) The final stage of cleaning and disinfecting should be a thorough rinse with hot water.

(2) Disposal of waste materials

Waste material, which includes empty shells and reject eggs, should be stored in such a manner as not to cause a nuisance from offensive odours, insects, birds or vermin. It should be removed regularly and frequently, and at least at the end of the day, from processing rooms either by means of suitable containers, conveyor belts or water troughs. In addition it should be removed from the premises daily. Immediately after emptying, receptacles and equipment used for storage and consolidation of waste material should be cleaned and disinfected, as also should the paved areas used for the storage of such waste receptacles.

- (3) Vermin Control. Effective measures should be taken to protect against the entrance into the premises and the harbourage on the premises of insects, rodents, birds or other vermin.
- (4) Exclusion of domestic animals. Dogs, cats and other domestic animals, should be excluded from areas where food is processed or stored.
- (5) Personnel health. Plant management should advise personnel that any person afflicted with infected wounds, sores, or any illness, notably diarrhoea, should immediately report to management. Management should take care to ensure that no person, while known to be affected with a disease capable of being transmitted through food, or known to be a carrier of such disease microorganisms, or while afflicted with infected wounds, sores, or any illness, is permitted to work in any area of a food plant in a capacity in which there is a likelihood of such person contaminating food or food-contact surfaces with pathogenic organisms.
- (6) Toxic substances. All rodenticides, fumigants, insecticides or other toxic substances should be stored in separate locked rooms or cabinets and handled only by properly trained personnel. They

should be used only by or under direct supervision of personnel with a thorough understanding of the hazards involved, including the possibility of contamination of the product.

(7) Personnel hygiene and food handling practices.

- (a) All persons working in a food plant should maintain a high degree of personal cleanliness while on duty. Clothing including suitable headdress should be appropriate to the duties being performed and should be kept clean.
- (b) Hands should be washed as often as necessary to conform to hygienic operating practices.
- (c) Spitting, eating, chewing and the use of tobacco should be prohibited in food handling areas.
- (d) All necessary precautions should be taken to prevent the contamination of the food product or ingredients with any foreign substance.
- (e) Minor cuts and abrasions on the hands should be appropriately treated and covered with a suitable waterproof dressing. Adequate first-aid facilities should be provided to meet these contingencies so that there is no contamination of the food.
- (f) Gloves used in food handling should be maintained in a clean, hygienic and sound condition; gloves should be made of an impermeable material except where their usage would be inappropriate or incompatible with the work involved.

D. Operating Practices and Production Requirements

(1) Eggs and other raw materials

Acceptance criteria. No eggs or other raw materials should be accepted by the plant if they are known to contain toxic substances. Eggs or other raw materials containing decomposed or extraneous material which will not be removed or reduced to acceptable levels by normal plant procedures of sorting or preparation, should also not be accepted.

- (2) Storage and handling of shell eggs. On receipt at the plant, eggs should be processed as soon as possible. Until they are processed, they should be stored in their cases in a cool clean room. The temperatures and relative humidities mentioned in Section III B 5 would be suitable. Cases should be stored in such a way as to permit cleaning underneath. Eggs should be unpacked in a room completely separated from the processing rooms. Egg outer cases should not be taken into the breaking room.

- (3) Inspection and sorting. Eggs should be candled before breaking, either at the plant or elsewhere if preferred, within a specified time approved by the official agency having jurisdiction. Dirty eggs should be cleaned before breaking out, using methods approved by the official agency having jurisdiction, including the time/temperature conditions and any detergent/sanitizer used.

Cracked eggs with shell membranes intact should be segregated in shallow containers constructed of suitable materials and should be carefully examined by experienced breakers before processing.

Cracked eggs with shell membranes broken should be dealt with as waste material, but if the breakage has occurred within the plant during candling or handling they should be segregated in a suitable receptacle used for this purpose only. Such eggs should be processed without delay.

Eggs should be candled before being passed into the breaking area. Where breaking by crushing is used, special care is necessary during candling to eliminate defective eggs.

To avoid cross contamination, eggs other than chicken eggs should be segregated and handled and processed separately at the end of the day's processing of chicken eggs. All equipment should be cleaned and sterilized before the processing of chicken eggs is resumed.

(4) Preparation and processing

- (a) Breaking-individually. Eggs should be broken either by hand or machine into cups or trays and each egg should be inspected for appearance and if possible for odour.

Egg substance having an abnormal odour or appearance should be rejected and removed, together with any contaminated breaking equipment. Such equipment should be cleaned and disinfected before being used again. After touching rejected egg, the breaker should immediately wash his hands with odourless soap/detergent in hot water.

Separation of egg yolk from egg white should be carried out in a hygienic manner.

Hygienic practices should be observed for the removal of shell fragments, and, where customarily removed, for blood spots and meat spots.

- (b) Breaking by crushing. Breaking by crushing, when authorized by the official agency having jurisdiction, should meet the following minimum requirements:

Bulk crushing machines used for breaking out eggs for the preparation of whole egg product should be of a suitable type and be so constructed and operated as to prevent unfit eggs from entering the liquid egg product. Eggs which have been washed prior to arrival at the breaking plant should not be used. The eggs should be processed within 24 hours of candling, provided that where the eggs are held under controlled temperature conditions so as to retard spoilage and the growth of microorganisms, they may be held for a period not exceeding 72 hours without re-candling.

The eggs should be conveyed on rollers of stainless steel or other suitable material through a hot water bath maintained at a minimum temperature of 60°C (140°F), rinsed under hot water sprays at a minimum temperature of 80°C (177°F) and afterwards air dried before being ejected on to a conveyor belt, constructed of suitable material, in the crushing section.

The eggs should be crushed to remove their contents, after which all shell fragments should be removed from the conveyor belt. At the end of each day's work the machines should be cleaned, scrubbed with a suitable disinfectant and rinsed with clean hot water.

- (c) Straining and collection. The liquid egg should be strained either by suitable strainers, centrifuges or other suitable equipment. If strainers are used a supply of clean disinfected stainless steel, monel, or other suitable strainers should be available to enable frequent changes to be made. If necessary, a clean, disinfected stainless steel or other suitable container should be used to collect liquid egg when strainers are being changed. This unstrained liquid egg should be returned immediately for straining.
- (d) Chilling. Where pasteurization does not immediately follow breaking, liquid egg products should be chilled rapidly in equipment capable of reducing the product temperature to 7°C (45°F). If the product is to be stored before pasteurization, storage should be in suitably insulated tanks for a period preferably not exceeding 24 hours and never exceeding 48 hours. Liquid egg yolk may be held at a temperature not exceeding 10°C (50°F) if storage is not to exceed a period of 8 hours.

If it is intended to store liquid egg products for more than 48 hours, they should be stored at temperatures below 0°C (32°F).

- 11 -

(e) Pasteurization.

- (i) Liquid egg products should preferably be pasteurized as part of a continuous process.
- (ii) All egg products should be subjected to a treatment approved by the official agency having jurisdiction as being a treatment which will destroy salmonellae.
- (iii) The raw liquid whole egg should be pasteurized by an approved process of heating at a temperature sufficiently high and for a time sufficiently long to ensure the destruction of Salmonella organisms, for example at a temperature of 64°C (148°F) for at least 2 1/2 minutes, or by other approved treatment which will give the same results.

The pasteurization of liquid albumen will and liquid egg yolk may require different time/temperature combinations.

- (iv) On completion of pasteurization, all liquid products should be immediately cooled to a temperature not exceeding 7°C (45°F).
- (v) The plate pasteurizing apparatus should include such devices as may be necessary to ensure a constant rate of flow of liquid egg, thermostatic control of the heating of the liquid egg, and the automatic diversion of flow of any liquid egg not sufficiently heated. The batch pasteurizing apparatus should include thermostatic controls and also a stirring mechanism to mix the liquid egg to be pasteurized to ensure uniformity of temperature.
- (vi) A continuous recording should be made of each pasteurization run, and charts showing pasteurization temperatures and times should be dated and kept available for inspection for at least one year.
- (vii) Dried egg products processed from liquid egg which has not been pasteurized beforehand should be subjected to an approved heat treatment process, for example the hot room process, in the dried form and preferably in the container, to destroy Salmonellae.
- (viii) The various products should be protected from contamination at all stages after pasteurization.

(f) Storage

- (i) Pasteurized liquid egg may be held in disinfected, insulated and covered tanks fitted with a low speed agitator and a thermometer, or in disinfected churns, provided that the temperature of the egg does not exceed 5°C (41°F) during the holding period.

(ii) Products which are sufficiently preserved to prevent deterioration, for example by salting or by sugaring, need not be chilled.

(g) Drying

(i) Glucose removal should, where applicable, be carried out prior to pasteurization by an approved method.

(ii) Drying should be carried out by an approved process. The drying plant used for the product should, where applicable, include a cyclone separation system in preference to the bag type separation.

(iii) The product should be continuously removed from the drying chamber, cooled, and packed as soon as possible into suitable containers. If the glucose has not been removed, the product should be stored at a temperature not exceeding 10°C (50°F).

(5) Packing, Cooling and Freezing

(a) Empty containers should be stored in a clean dry place and kept free from dust, vermin, insects and any foreign matter. They should not transmit to the product objectionable substances beyond limits acceptable to the official agency having jurisdiction and should provide appropriate protection from contamination. They should be inspected immediately before use to ensure they are in a clean and satisfactory condition. Prior to filling, containers should, where necessary, be disinfected by steam, hot air, hot water, a disinfectant, or any combination of these, but the container should be well drained before filling.

Only containers ready for immediate use should be kept in the filling room.

(b) The filling of containers should be a continuous process. The filled containers should be immediately sealed and taken either to the cooling room or to the freezing chamber without undue delay. Care should be taken during filling to avoid spillage and any excess egg should be removed.

(c) Containers should be stacked in these rooms so as to permit free circulation of air around the containers.

(d) The rate of freezing should be sufficient to prevent deterioration of the product and be completed within 24 hours of filling. The chilled product should be stored at a temperature not exceeding 5°C (41°F). After freezing, the product should be stored at a temperature which gives adequate protection to the product.

(6) Transportation of liquid egg products in bulk

- (i) Tanks or containers used for transporting liquid egg products should be constructed of stainless steel or other suitable material, and be designed to facilitate cleaning and adequate drainage. They should be refrigerated or sufficiently insulated to maintain the egg product at a temperature of not more than 5°C (41°F), and preferably should not be used for any other purpose.
- (ii) Pipes and connections used for the filling and discharge of the liquid egg products should be of suitable design and materials and should be cleaned and disinfected after use, and disinfected before re-use.
- (iii) Liquid egg products should not be discharged from a road tanker or mobile container into a vessel containing liquid egg products from a previous delivery.
- (iv) Tankers and mobile containers should be cleaned and disinfected as soon as practicable after emptying and disinfected before being re-filled. The final stage of cleaning and disinfecting should be a thorough rinse with hot water. Delivery of liquid egg products from the compartment of a tanker should be to one point only.

(7) Defrosting of frozen egg products

- (i) When frozen egg products are being defrosted, they should be brought to their liquid state as quickly as possible without causing deterioration, but with as little increase of the temperature of the product above 0°C (32°F) as possible.
- (ii) Defrosted egg products should be used immediately.

(8) Marking of containers

All containers should be so marked as to identify the place and date of manufacture of the product.

E. Sanitation Control Programme

It is desirable that each plant in its own interest designate a single individual, whose duties are preferably divorced from production, to be held responsible for the cleanliness of the plant. His staff should be a permanent part of the organization and should be well trained in the use of special cleaning tools, in methods of disassembling equipment for cleaning, and in the significance of contamination and the hazards involved. Critical areas, equipment and materials should be designated for specific attention as part of a permanent sanitation schedule.

F. Laboratory Control Procedures

Appropriate methods of sampling and microbiological examination may be utilized to ensure the absence of salmonellae from the product and to test for the effectiveness of time/temperature combinations or other means of pasteurization or for the possibility of post-pasteurization contamination.

The alpha amylase test, which has been found to be valuable as an immediate indication of the attainment of a specific time/temperature relationship, may be used as an index of this attainment.

In addition to any control by the official agency having jurisdiction, it is desirable that each plant in its own interest should have access to laboratory control of the sanitary quality of the products processed. Such control should reject all food that is unfit for human consumption.

SECTION V - END PRODUCT SPECIFICATIONS

Microbiological, chemical, physical or extraneous materials specifications may be required depending upon the nature of the product. Such specifications should include sampling procedures, analytical methodology, etc., as required for the particular product.

Where used as an indication of specific time/temperature relationships the alpha amylase test should be negative. The product should meet microbiological criteria which will be developed at a later date.

ANNEX I to
APPENDIX IIITHE ALPHA AMYLASE TEST

The alpha amylase test in relation to the heat treatment of whole egg is analogous to the phosphatase test which is used for testing the efficiency of the pasteurization of milk. It depends on the fact that heat destroys the alpha amylase activity in whole egg in proportion to the degree of heat treatment given.

The temperature and holding time for the pasteurization of bulked liquid egg is not less than 64°C (148°F) for two and a half minutes, a time and temperature combination which is lethal to Salmonella organisms.

When untreated whole egg is mixed with a starch solution the alpha amylase present degrades the starch so that the normal blue violet colouration which occurs when iodine and starch are mixed does not develop. The intensity of the blue violet colour varies inversely with the amount of alpha amylase present. The alpha amylase test is therefore a test of the degree of heat treatment given to the whole egg mixture when it is pasteurized, and provides evidence that a satisfactory time/temperature combination has, or has not, been reached.

This Annex is designed to help those who may be required to carry out the test on liquid whole egg.

THE TEST

1. The Examination of the Sample

The sample of liquid egg should be tested as soon as possible after receipt at the testing laboratory, but it must be allowed to come to room temperature immediately before the test.

If the sample of liquid egg has to be stored before testing it should be kept below 40°F (approximately 4.5°C) and later brought to room temperature before carrying out the test.

Any samples which show signs of decay, or evidence of deterioration, should not be tested.

A sample which contains any sugar, citric acid, or salt of citric acid, or any substance which contains sugar, citric acid or any such salt, should not be sent for testing as these substances interfere with the reaction.

2. Precautions

The following precautions must be taken:

- (a) distilled or de-ionized water must be used in the preparation of reagents or in the dilution of reactants;
- (b) contamination of liquid egg or reagents with saliva must be avoided;
- (c) all glassware must be clean and dry before use;
- (d) a fresh pipette must be used for each sample of liquid egg;
- (e) pipettes must not be contaminated with saliva;
- (f) in the event of a sample failing to pass the test, any glassware which has come into contact with the liquid egg must be sterilized and cleaned as laid down in Section 5.

3. Reagents to be used

- (a) Starch Solution. Different starches give a slight variation in performance which may affect both the shade and intensity of the colour that is produced. This variation does not in any way affect the basis of the test. The starch solution should be prepared as follows:

Weigh an amount of analytical reagent quality soluble starch equivalent to 0.70 g of dry starch. The moisture content of the starch should be determined by drying a sample at 100°C or 212°F for 16 hours, (or at 160°C or 320°F for one hour).

Mix this quantity of starch to a thin cream with cold water. Transfer the whole quantity of this cream to about 50 ml of boiling water, boil for one minute and cool by immersion in cold water. Add three drops of toluene and dilute with water to 100 ml in volumetric flask.

This solution must not be used if more than a fortnight old.

- (b) Solution of Iodine

- (i) For immediate use

Approximately milli-normal, as specified in the "British Pharmacopoeia" 1973, Appendix II-A.* This solution must be freshly made before use but may be made by dilution from a stronger solution with appropriate adjustment of potassium iodide concentration.

- (ii) Stronger stock solutions

The iodine solution can be made from 12.7 g of iodine dissolved in a solution of 25 g of potassium iodide in 30 ml of distilled water to give an approximate N/10 solution. The potassium iodide solution can be made from 335 g of potassium iodide dissolved and made up to 1 litre with distilled water. Immediately before the test 1 ml of each solution (iodine and potassium iodide) are mixed and made up to 100 ml with distilled water which give the approximate milli-normal solution for use.

- (c) Solution of trichloroacetic acid: 15 per cent weight in volume aqueous solution of trichloroacetic acid of analytical reagent quality.

4. Apparatus

The following may be used:

* Iodine 0.001 N

Iodine and potassium iodide dissolved in water to contain in 1000 ml the following quantities of I and KI: 0.1269 g I and 3.6 g KI

- (a) Graduated pipettes Grade B bulb 2 ml, 5 ml, and 10 ml, or Grade B bulb 2 ml and Grade A 10 ml straight-sided.
- (b) Grade B volumetric flasks of 100 ml and 1.000 ml capacity.
- (c) A 50 ml measuring cylinder.
- (d) Filter funnels of 3-4 in. diameter.
- (e) Whatman No. 12 fluted filter papers of 12.5 cm diameter or equivalent.
- (f) Wide neck conical flasks of 100 ml capacity and/or universal containers.
- (g) Test tubes approximately 7" X 1".
- (h) Burettes and automatic syringes may be used for measuring iodine, Trichloroacetic acid, and distilled water.
- (i) A water bath capable of maintaining at a temperature of $44^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$ ($111.2^{\circ}\text{F} \pm 0.9^{\circ}\text{F}$)

5. Cleaning and Care of Apparatus

The cleaning and care of apparatus is especially important.

- (a) After use all glassware should be rinsed in water and adhering egg washed off, if necessary with N/10 sodium hydroxide. The glassware must then be washed with chromic or dilute hydrochloric acid, followed by a thorough rinsing with water and distilled water.
- (b) Apparatus used for samples which have failed the test should be sterilized in a bactericidal solution of hypochlorite or carbolic acid before cleaning.
- (c) New glassware should be cleaned by soaking in chromic or dilute hydrochloric acid solution and then rinsed in warm water, rinsed in distilled water, and finally dried.
- (d) Glassware used for the test shall not be used for any other purpose and must be kept apart from all other apparatus in the laboratory.
- (e) Traces of egg, protein or detergent may cause false failure.

6. Method of Carrying out the Test

Weigh out 15.0 g of sample of liquid egg into a 100 ml conical flask or universal container, or a 7" X 1" boiling tube can be used if stoppered.

Add 2.0 ml of the starch solution and mix thoroughly.

If the egg is at all viscous, it may be difficult to ensure that the egg and starch are properly mixed. As this is essential the egg and starch should be mixed as well as possible before, during and after incubation.

Place the mixture in the water bath for 30 minutes at $44^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$. Remove from the water bath, shake, and with the minimum of delay add 5 ml of this mixture to 5 ml of trichloroacetic acid solution contained in a conical flask, large test tube or universal container. Shake and mix thoroughly again. Add 15 ml water and shake and mix again.

Remove the suspended matter by filtration or centrifugation. Add 10 ml of the clear filtrate (after rejecting the first runnings), or the supernatant liquor, as the case may be, to 2 ml of the solution of iodine.

7. Interpretation

A standard Lovibond Comparator Disc 4/26 containing seven reference colour standards, and designed for use with a Special Purposes Comparator and 25 mm cells may be used for determining the colour.

There are many intershades between blue and violet and those on the standard disc indicate the likely range.

The sample shall be deemed to have passed the alpha amylase test if the filtrate, or liquor in the solution of iodine immediately turns a blue violet colour. For this purpose colours which are more blue-violet than No. 3 on the Standard Lovibond Comparator Disc 4/26, or of a comparable spectrophotometric standard, shall be taken as satisfactory. With 1 cm cells using a wave length of 585 m μ the comparable spectrophotometric standard, compared against water, has an optical density of 0.15.

For comparative test north light or fluorescence should be used.

When samples fail they should be retested immediately together with heated controls. When failures are confirmed samples should be examined for salmonellae.

PROPOSED DRAFT CODE OF HYGIENIC PRACTICE FOR MOLLUSCAN SHELLFISH
(Returned to Step 3)

To be read in conjunction with the Recommended General Principles of Food Hygiene. Side-lined portions indicate material which is particular to this Code of Hygienic Practice and therefore does not appear in the General Principles of Food Hygiene (CAC/RCP 1-1969)

SECTION I - SCOPE

This Code applies only to those bivalve molluscan shellfish commonly known as oysters, clams, mussels and cockles. These species are filter feeders, may be eaten raw or cooked, and are normally consumed whole including the viscera. The Code is concerned with sanitary requirements for the named species of shellfish intended for human consumption whether in the raw condition or destined for further processing.

SECTION II - DEFINITIONS

For the purpose of this Code:

1. Approved means approved by the official agency having jurisdiction.
2. Clean sea water means estuarine or marine waters which are free of pollution and toxic marine algae in amounts which will adversely affect the quality and/or safety of shellfish harvested from such waters.
3. Growing areas means all estuarine and marine areas used for the commercial production or the sports harvesting of shellfish either by natural growth or by aquaculture.
4. Heat shucking means the process of subjecting shellfish in the shell to any form of heat treatment, such as steam, hot water, or dry heat for a short period of time prior to shucking, to facilitate rapid removal of meat from the shell. Such treatment should not be considered as any part of a cooking process.
5. Pollution means agricultural, domestic, industrial and naturally occurring contaminants adversely affecting sea water quality. Thermal changes in sea water quality may also be considered as pollution.
6. Processed shellfish means shellfish which have been subjected to heat treatment and/or preservation by salt, acid, smoking, pickling, jelling or canning.
7. Purification (depuration) means the process of holding live, initially polluted shellstock for a period of time under approved, controlled conditions in natural or artificial sea water, which may be treated or

or untreated, in tanks, floats or rafts, thereby rendering the shellfish suitable for human consumption without further treatment.

8. Shucked shellfish means fresh or fresh frozen shellfish, which have not been subjected to any form of processing other than shucking, sorting, washing, packing and/or freezing before shipment to market.

9. Relaying means the removal of shellfish from a polluted growing area to an approved growing or holding area under the supervision of the agency having jurisdiction.

10. Shellfish means only those bivalve molluscs commonly known as oysters, clams, mussels and cockles.

11. Shellstock means live shellfish in the shell after harvesting from a growing area.

SECTION III - RAW MATERIAL REQUIREMENTS

A. Environmental Sanitation in Growing Areas

- (1) Sanitary disposal of human and animal wastes. Adequate precautions should be taken to ensure that shellfish growing areas are free from pollution capable of causing pollution of the shellfish and extreme care should be taken to protect the shellfish from contamination by any wastes. A clean area surrounding the shellfish growing areas should be established and the dumping of all wastes of agricultural, domestic or industrial origin, including wastes from private residences or boats should be prohibited. Precautions of this kind should be particularly strict when protecting from such sources of contamination, shellfish which are not intended for purification or heat processing.
- (2) Sanitary quality of water in shellfish growing areas
 - (a) Water over shellfish growing areas should conform to approved requirements as judged by tests for microorganisms, chemicals, toxins, and parasites.
 - (b) The health hazard potential to consumers of shellfish harvested from waters affected by sewage outfalls will vary according to the degree of sewage treatment, disease carrier rate within the population, tidal dilution and dispersion and other hydrographic or meteorological factors.
- (3) Surveys of shellfish growing areas
 - (a) Sanitary surveys of shellfish growing areas should be carried out at suitable intervals. They should take into account variations which may affect the level of pollution during the most unfavourable hydrographic and climatic conditions as influenced by rainfall, tides,

- winds, methods of sewage discharge, population variations and other local factors, since shellfish respond rapidly to an increase in the number of bacteria or viruses in their environment by accumulating these agents.
- (b) Surveys should be conducted to detect concentrations of toxic chemicals including agricultural chemicals, heavy metals, radioactive wastes, and other industrial chemicals and marine biotoxins such as paralytic shellfish poison in growing areas. In the evaluation of such data, the responsible control agency should take into account the ability of shellfish to accumulate toxic chemicals in their tissue in concentrations greater than the levels found in the surrounding water. FAO, WHO, or other international or national food standards may be used as a guide to acceptable levels.
 - (c) Areas known to be affected by blooms of toxic dinoflagellates should be monitored at appropriate seasons for the presence of marine biotoxins such as paralytic shellfish poison. The responsible control agency should have adequate administrative capability to close and effectively patrol affected areas when approved levels are exceeded in edible portions of shellfish meats.
- (4) Animal, plant pest and disease control

Where control measures are undertaken, treatment with chemical, biological or physical agents should be done only in accordance with the recommendations of the appropriate official agency, by or under the direct supervision of personnel with a thorough understanding of the hazards involved, including the possibility of toxic residues being retained by the shellfish.

B. Sanitary Harvesting and Food Protection

(1) Equipment and product containers

- (a) Equipment and product containers should not constitute a hazard to health. Containers which are re-used should be of such material and construction as will facilitate thorough cleaning, and should be so cleaned and maintained as not to constitute a source of contamination to the product.
- (b) Dredges and other catching equipment, decks, holds and containers which come into contact with shellstock should be capable of being well drained and easily cleaned.
- (c) Dredges and other catching equipment, decks, holds and containers which are contaminated from use in a polluted area should be cleaned and disinfected (sanitized) as recommended by the official agency having jurisdiction before being used for shellfish from an unpolluted area.

- (d) Holds for washed shellstock should be well ventilated. Containers (i.e. baskets, barrels and boxes) made of properly treated wood, plastic or metal should be in sound condition.
 - (e) Holds in which shellstock is held or containers should be so constructed that the shellstock is held above the floor level and drained so that the shellstock is not in contact with wash-down or bilge water, or shell fluid.
- (2) Sanitary techniques
- (a) Shellstock to be stored in sea water, tanks, floats or rafts should be harvested from and stored in an area acceptable to the official agency having jurisdiction.
 - (b) Soon after being harvested shellstock should be freed from excessive mud and weed by washing it with clean water under suitable pressure which should not be allowed to flow over shellfish already cleaned. The water should not be re-circulated.
 - (c) Shellstock held on boats should not come into contact with stagnant accumulated wash-down water or shellfluid.
 - (d) On removal from water, shellstock should not be subjected to extremes of heat or cold, nor should it be damaged as a result of excessive abrasion. This is particularly important for those shellstock which are to be subjected to purification. Whenever possible, storage at temperatures above 10°C (50°F) or below 2°C (35°F) and direct contact with ice or other cold surfaces should be avoided.
 - (e) If shellstock is to be re-immersed after harvest, the sea water quality should comply with the standards of the official agency having jurisdiction.
 - (f) Sea water or fresh water used for washing shellstock, equipment, decks, holds and containers should comply with standards of the official agency having jurisdiction.
- (3) Removal of obviously unfit materials
- (a) Shellfish which are dead, dying, permanently gaping or tainted should be removed from the catch as soon as possible.
 - (b) Shellfish which do not conform to approved sanitary standards and shellfish which are found in areas where the water quality does not conform to these standards should be segregated and condemned as unfit for human consumption unless they can be subjected to a process which renders them fit for human consumption to the satisfaction of the official agency. Such processes may include relaying into an area of approved water quality and/or purification in a tank, float or raft.

- (4) Protection of product from contamination
- (a) Suitable precautions should be taken to protect shellstock and those parts of the harvesting boat, catching equipment, containers and other equipment likely to come into contact with shellstock from being contaminated by polluted water, droppings from sea birds, footwear which has been in contact with faecal matter or by other polluted material.
 - (b) No animals should be allowed to enter or to live in any part of harvesting boats and establishments where shellstock is prepared, handled, packed or stored.
 - (c) Fuel, lubricating oils, chemicals used for the control of pests and other noxious chemicals should be stored away from shellstock and from containers and equipment likely to come into contact with shellstock.
 - (d) Wash-down pumps should draw water only from non-contaminated sea water and should not be connected directly or indirectly to the bilge or the toilet facilities.

C. Transportation

- (1) Conveyances. Conveyances for transporting the harvested shellstock from the growing area, place of harvest or storage should be adequate for the purpose intended and should be of such material and construction as will permit proper drainage and thorough cleaning. They should be so cleaned and maintained as not to constitute a source of contamination to the shellstock.
- (2) Handling procedures
 - (a) General
 - (i) During handling and transportation, shellstock should be held under hygienic conditions and should not come into contact with toxic and other substances which may render the meats unfit for human consumption. Shell washings should be drained from the shellstock containers.
 - (ii) During handling and transportation, shellstock should not be subjected to extremes of heat or cold. Special equipment, such as insulated containers and refrigeration equipment, should be used if prevailing temperatures and the time involved so require. For shipping, over extended periods of time, shellstock should be cooled to temperatures below 10°C (50°F); at no time should the temperature fall below 2°C (35°F). Shellstock should not be exposed to full sun or surfaces heated by the sun or come into direct contact with ice and other freezing surfaces, nor should it be held in closed containers with solid carbon dioxide.

- (b) Shellstock for relaying, storage in water and purification.
 - (i) At all times, shellstock intended for relaying, storage in water and purification should be handled and transported carefully to avoid damage to the shells and under conditions which will prevent death of the shellfish. Containers should not be dropped or subjected to excessive weights where there is a danger of damage occurring to the shells in the course of normal handling. The use of shallow rigid boxes, trays or baskets will minimize damage. The handling of shellstock in large bulk trays or baskets will minimize damage. The handling of shellstock in large bulk containers should be avoided.
 - (ii) The interval between harvesting and immersion in water for relaying, storage or purification should be kept as short as possible.
- (c) Shellstock for processing (excluding relaying, storage in water and purification)

The interval between final harvesting and processing should be kept as short as possible.

SECTION IV - PLANT FACILITIES AND OTHER OPERATING REQUIREMENTS

A. Plant Construction and Layout

- (1) Location, size and sanitary design. The building and surrounding area should be such as can be kept reasonably free of objectionable odours, smoke, dust, or other contamination; of sufficient size for the purpose intended without crowding of equipment or personnel; of sound construction and kept in good repair; of such construction as to protect against the entrance and harbouring of insects or birds or vermin; and so designed as to permit easy and adequate cleaning. The plant and particularly clean storage tanks and purification tanks should be located above the level of extreme spring tides and storm tides.
- (2) Sanitary facilities and controls
 - (a) Separation of processes. Areas where raw materials are received or stored should be so separated from areas in which final product preparation or packaging is conducted as to preclude contamination of the finished product. The shucking area should be physically separated from other processing areas. Areas and compartments used for storage, manufacture or handling of edible products should be separate and distinct from those used for inedible materials. The food handling area should be completely separated from any part of the premises used as living quarters.

- (b) Water supply. An ample supply of cold water should be available and an adequate supply of hot water where necessary. The water supply should be of potable quality. Standards of potability shall not be less than those contained in the latest edition of "International Standards for Drinking Water", World Health Organization.
- (c) Ice. Ice should be made from water of potable quality and should be manufactured, handled, stored and used, so as to protect it from contamination.
- (d) Auxiliary water supply. Where non-potable water is used - for such purposes as fire control - it must be carried in completely separate lines, identified preferably by colour and with no cross-connection or back-siphonage with the lines carrying potable water.
- (e) Plumbing and waste disposal. All plumbing and waste disposal lines (including sewer systems) must be large enough to carry peak loads. All lines must be watertight and have adequate traps and vents. Disposal of waste should be effected in such a manner as not to permit contamination of potable water supplies, clean sea water, purification tanks or approaches to the plant.
- (f) Lighting and ventilation. Premises should be well lit and ventilated. Special attention should be given to the venting of areas and equipment producing excessive heat, steam, obnoxious fumes or vapours, or contaminating aerosols. Good ventilation is important to prevent both condensation (which may drip into the product) and mold growth in overhead structures - which growth may fall into the food. Light bulbs and fixtures suspended over food in any step of preparation should be of the safety type or otherwise protected to prevent food contamination in the case of breakage.
- (g) Toilet-rooms and facilities. Adequate and convenient toilets should be provided and toilet areas should be equipped with self-closing doors. Toilet rooms should be well lit and ventilated and should not open directly into a food handling area. They should be kept in a sanitary condition at all times. There should be associated hand-washing facilities within the toilet area and notices should be posted requiring personnel to wash their hands after using the toilet.
- (h) Hand-washing facilities. Adequate and convenient facilities for employees to wash and dry their hands should be provided wherever the process demands. They should be in full view of the processing floor. Single-use towels are recommended, where practicable, but otherwise the method of drying should be approved by the official agency having jurisdiction.

B. Equipment and Utensils

- (1) Materials. All food contact surfaces should be smooth; free from pits, crevices and loose scale; non-toxic; unaffected by food

products; capable of withstanding repeated exposure to normal cleaning; and non-absorbent.

- (2) Sanitary design, construction and installation. Equipment and utensils should be so designed and constructed as will prevent hygienic hazards and permit easy and thorough cleaning. Stationary equipment should be installed in such a manner as will permit easy and thorough cleaning.
- (3) Equipment and utensils. Equipment and utensils used for inedible or contaminating materials should be so identified and should not be used for handling edible products. Equipment in contact with sea water in tanks, pumps, and the circulating system should be constructed of non-corrodible and non-toxic materials.

C. Hygienic Operating Requirements

- (1) (a) Sanitary maintenance of plant, facilities and premises. The building, equipment, utensils and all other physical facilities of the plant should be kept in good repair and should be kept clean and maintained in an orderly, sanitary condition. Waste materials should be frequently removed from the working area during plant operation and adequate waste receptacles should be provided. Detergents and disinfectants employed should be appropriate to the purpose and should be so used as to present no hazard to public health.
- (b) Tables, bowls, mincers, scales and other equipment used in the process of extracting and preparing the meats from shellfish should be scrub-washed or cleaned by an efficient mechanical process with hot water containing a suitable cleaning agent, rinsed with potable water and disinfected (**sanitized**) with a suitable disinfectant. Approved detergents and disinfectants should be employed and so used as to present no hazard to public health.
- (2) Vermin control. Effective measures should be taken to protect against the entrance into the premises and the harbourage on the premises of insects, rodents, birds or other vermin.
- (3) Exclusion of domestic animals. Dogs, cats and other domestic animals, should be excluded from areas where food is processed or stored.
- (4) Personnel health. Plant management should advise personnel that any person afflicted with infected wounds, sores, or any illness, notably diarrhoea, should immediately report to management. Management should take care to ensure that no person, while known to be affected with a disease capable of being transmitted through food, or known to be

a carrier of such disease microorganisms, or while afflicted with infected wounds, sores, or any illness, is permitted to work in any area of a food plant in a capacity in which there is a likelihood of such person contaminating food or food-contact surfaces with pathogenic organisms.

- (5) Toxic substances. All rodenticides, fumigants, insecticides or other toxic substances should be stored in separate locked rooms or cabinets and handled only by properly trained personnel. They should be used only by or under the direct supervision of personnel with a thorough understanding of the hazards involved, including the possibility of contamination of the product.
- (6) Personnel hygiene and food handling practices
 - (a) All persons working in a food plant should maintain a high degree of personal cleanliness while on duty. Clothing, including suitable headdress, should be appropriate to the duties being performed and should be kept clean.
 - (b) Hands should be washed as often as necessary to conform to hygienic operating practices.
 - (c) Spitting, eating, chewing and the use of tobacco should be prohibited in food handling areas.
 - (d) All necessary precautions should be taken to prevent the contamination of the food product or ingredients with any foreign substance.
 - (e) Minor cuts and abrasions on the hands should be appropriately treated and covered with a suitable waterproof dressing. Adequate first-aid facilities should be provided to meet these contingencies so that there is no contamination of the food. Personnel wearing dressing on wounds should not be permitted to work in direct contact with the product or food product surfaces.
 - (f) Gloves used in food handling should be maintained in a sound, clean and sanitary condition; gloves should be made of an impermeable material except where their usage would be inappropriate or incompatible with the work involved.

D. Operating Practices and Production Requirements

- (1) Acceptance criteria. Shellstock should not be accepted by the plant if known to contain decomposed, toxic, or extraneous substances which will not be removed to acceptable levels by normal plant procedures of sorting or preparation.
- (2) Relaying and purification (deuration) of shellstock in tanks, floats, and rafts.

- (a) Shellstock subjected to the purification process should not contain metallic ions, pesticides, or industrial wastes, in such quantities that it presents a health hazard to the consumer.
- (b) The process and the equipment used for purification should be approved by the official agency having jurisdiction.
- (c) Sea water for the tanks, or sea water where floats or rafts are used in purification should be clean and of a salinity approved by the official agency having jurisdiction. Where clean sea water is not available, a method of sanitizing the water which should be approved by the official agency having jurisdiction should be employed. Water used in purification tanks should be changed continuously or at suitable intervals.
- (d) Shellfish should not be weak or dead when placed in the purification plant. Surfaces of shells should be free from mud and soft commensal organisms.
- (e) Shellstock should be laid out at a density which will permit them to open and undergo natural purification. There should be no toxic substances in the water at levels that will prevent the shellfish from functioning properly. (e.g., chlorine, phenol, oxons).
- (f) The oxygen content of the water should be maintained at an adequate level by aeration, or by continuous replacement.
- (g) During the process of purification, the water temperatures should not be allowed to fall below the minimum at which purification can take place; high water temperature which adversely affects the pumping rate and the purification process should be avoided; tanks should be protected from the direct rays of the sun when necessary.
- (h) Equipment in contact with water, i.e., tanks, pumps, pipes or piping; other equipment should be constructed of non-porous, non-toxic materials. Copper, zinc, lead and their alloys should not be used in tanks, pumps or piping systems used in purification (depuration) processing.
- (i) To avoid the contamination of purified shellstock unpurified shellstock should not be immersed in the same tank.
- (j) Shellstock undergoing purification should remain immersed in approved, clean, sea water until it satisfies the sanitary requirements of the official agency having jurisdiction.
- (k) On removal from the purification system, shellstock should be washed with running fresh water or sea water meeting the standards of the official agency having jurisdiction, and handled in the same manner as clean, raw shellstock taken directly from a non-polluted area. Dead, dying, permanently gaping, or otherwise unwholesome shellfish should be removed.

- (1) When biologically feasible (some species such as the soft shell clam can not be relayed) shellstock may be relayed from polluted growing areas to areas approved for harvesting. Relaying operations should be strictly supervised by the official agency having jurisdiction to prevent contaminated shellstock from being diverted directly to the consumer market. Holding time in the approved area prior to harvest will be determined by the official agency according to species involved and local geographic or hydrographic conditions.
- (m) Complete records of harvest date and area, and length of time of relaying and purification should be maintained by the establishment for a period designated by the official agency having jurisdiction.
- (3) Storage of shellstock in sea water
 - (a) The process of storing shellstock in sea water tanks, basins, floats or rafts should be approved and a record of the origin of each lot of shellstock should be maintained.
 - (b) Sea water in the tanks, floats or rafts should be of a sanitary quality approved by the official agency having jurisdiction and should be of an adequate salinity to permit the shellfish to function normally. Optimum salinity will vary with species.
 - (c) During storage shellstock should be laid out at a density and under such conditions that will permit them to open and function normally.
 - (d) The oxygen content in sea water tanks should be maintained at an adequate level at all times.
 - (e) The temperature of the water in storage tanks should not be allowed to rise to such levels as to cause weakness of the shellstock. When high ambient temperatures are prevalent, tanks should be placed in a well ventilated building or away from the direct rays of the sun.
 - (f) Shellfish should be stored in sea water only for such time as they remain sound and active.
- (4) Washing, grading and packing of shellstock
 - (a) The outsides of the shells should be washed free of mud, and all soft adhering organisms should be removed. Hard adhering organisms should also be removed when possible. Care should be exercised not to chip lips of shells by vigorous washing.
 - (b) Bivalved shellfish having one cupped shell should, when necessary, be packed with the concave shell downwards in wooden or other rigid containers, flat surface at top to prevent dehydration from loss of shell liquor.

- (c) Shellfish to be eaten raw on the shell should be landed and packed for onward transmission as quickly as possible, so permitting them to reach the consumer in a sound, live condition.
 - (d) Shellfish which are dead, dying, permanently gaping, with broken shells, or otherwise unwholesome should not be passed for human consumption.
 - (e) Containers used for packing shellstock should be free from any materials which may contaminate the product. They should be cleaned and disinfected as recommended by the official agency having jurisdiction.
- (5) Washing, heat-shucking, and packing of shellstock
- (a) Shellstock intended for heat-shucking should be sound and practically free from adhering organisms; the outside of the shell should be thoroughly washed free from mud before processing.
 - (b) After heat-shucking, the removal of the shells and the washing of the meats should be carried out under hygienic conditions. Washing should be conducted under conditions which avoid soaking of the meats, minimizing water uptake. Consequently, washing or flowing time should not exceed the maximum time needed to cleanse adequately the shellfish meats. Unnecessary addition of water to the finished product reduces flavour and quality and should be avoided. Immediately after heat shucking the meats should be cooled rapidly to prevent spoilage. The water used for this purpose should be of potable quality, flowing continuously or frequently changed to maintain the meats at the lowest possible temperature.
 - (c) To prevent subsequent spoilage, washed meats should be refrigerated, preserved in salt, pickled, or immediately canned. Meats intended for human consumption soon after heat processing should be held under cool conditions suitable for the period between processing and consumption; meats not intended for early consumption should be stored at a temperature not exceeding 3°C (37°F).

(6) Preservation of raw or heat-treated shellfish

Preservation methods such as freezing, bottling, smoking, canning, pickling and jelling should conform to recommended practices of the official agency having jurisdiction of the specific product.

E. Laboratory Control Procedures

- (1) Laboratory facilities and technical personnel should be readily available to the official agency responsible for the sanitary control of the industry and should be capable of providing adequate laboratory support to the control agency.

- (2) The official agency having jurisdiction should take samples at suitable intervals of water from the growing area and of raw and processed shellfish which should be tested to ensure that they conform to the standards of the official agency having jurisdiction.
- (3) Tests of the waters from growing areas should, where necessary, include bacteriological, biological, physical, and chemical tests for evidence of faecal and chemical pollutants.
- (4) Tests of shellfish should include microbiological tests for faecal pollution and, where applicable, for spoilage. Biological tests should be made for biotoxins and faecal parasites and chemical and physical tests for other pollutants.
- (5) Checks should be made to confirm that processing methods comply with regulations laid down by the official agency having jurisdiction and that records are kept as required.

Laboratory procedures should be developed and standardized and microbiological and other criteria promulgated to ensure that shellfish are free from pathogenic organisms and do not contain toxins or toxic chemicals at levels that constitute a hazard to health.

F. Lot Identification

Each container should be embossed or otherwise permanently marked in code or in clear prior to shipment to market, so that as far as possible information regarding harvest area, date of harvest and shipper can be established in order to facilitate the identification of suspect areas in case of foodborne illness associated with contaminated shellfish.

SECTION V - END PRODUCT SPECIFICATIONS

- A. The products should comply with the requirements set forth by the Codex Commission on pesticide residues and food additives as contained in permitted lists of Codex Commodity Standards.
- B. When tested by appropriate methods of sampling and analysis, the products should either be free from objectionable matter or should meet approved sanitary standards for the presence of such matter.

PROPOSED ANNEX TO THE MOLLUSCAN SHELLFISH CODE -
CURRENT LABORATORY PROCEDURES AND STANDARDS

A. Denmark

Ten oysters sampled at random are examined individually:

- (1) Average of total plate count at 20°C for 5 days should not exceed 100,000/gm.
- (2) E. coli Type I must not be present in any of the 10 samples. The inoculation dose must be a minimum of 1/5 of a gram. Plating and identification take place in violet red-bile agar incubated 48 hours at 45°C. Verification by IMVIC tests is recommended.
- (3) Salmonella must not be present in any of the 10 samples. The inoculation dose must be a minimum of 1/5 of a gram. Enrichment for 24 and 48 hours followed by streaking on brilliant green agar or any other specific substrate.

The figures are tentative limits and apply to live oysters only.

B. France

1. Bacteriological Control at the Production Sites.

Bacteriological control of shellfish depends upon the determination of E. coli found in the flesh and fluid of a sample of five to ten shellfish.

2. Bacteriological Control at the Sales Points.

Control depends essentially on determination of E. coli and detection of Salmonella.

Preparation of Test Samples.

Five to 10 samples are drawn at random from each lot of shellfish. After washing, brushing and surface rinsing with alcohol, then drying, the meats are separated from the shells aseptically. The flesh and fluid of the mollusc are transferred to a sterile flask where it is finely and uniformly macerated. In the case of shellfish with little liquid, maceration is accomplished after mixing with equal parts of sterile peptone water diluent.

E. coli determination.

Presumptive test is conducted in brilliant green lactose bile broth distributed in fermentation tubes. The inoculums

represent 1.0 ml, 0.5 ml, 0.2 ml, and 0.1 ml of the macerated mollusc. Incubation is conducted at 30°C for 24-48 hours. Identification of E. coli is made according to Mackenzie, Taylor and Gilbert for each primary culture fermenting lactose with production of gas.

Proposed Bacteriological Standards of Quality.

- oysters and molluscs ordinarily eaten raw: less than 1 E. coli per ml.
- mussels and molluscs ordinarily eaten cooked: number of E. coli does not exceed 2 per ml.

Note: In order to determine the most probable number of E. coli, it is advisable not to limit inoculation to a single level.

Detection of Salmonella.

Twenty-five ml of macerated mollusc are transferred to a flask containing 100 ml of peptone water (40 grams/liter). After incubation for 6 hours at 37°C. for pre-enrichment, two aliquots of 25 ml are transferred to two flasks containing 225 ml of an enrichment mixture for Salmonella (Selenite or Tetrathionate); one is incubated at 43°C, the other at 37°C for 24-48 hours.

Isolation of Salmonellae is conducted according to the classical method.

- Proposed standard of safety: absence of Salmonella in 25 ml of sample (flesh plus fluid).

Note: It is planned to investigate the presence of Streptococci D.

C. Italy

Microbiological Control

Representative samples of growing area water or shellfish are collected at different points in the growing area. If the sample cannot be examined within 6 hours from time of sampling, it is quick frozen and held at -20°C. until examined. Unfrozen samples should be stored at 4°C until examined. Shellfish meats and shell liquor are combined for the examination. The total volume of the molluscs, consisting of 10 molluscs should be specified. The total volume of sample of shellfish is diluted to 200 ml using a sterile physiological solution.

Laboratory Procedure

The sample is homogenized in a mechanical mixer for 3 to 5 minutes at 10,000 RPM and filtered through sterile gauze. A 3 tube 3 dilution MPN procedure is used. Samples are inoculated into lactose broth and incubated at 37° for 48 hours.

All gas positive tubes are transferred to brilliant green lactose bile broth and tryptone broth. All subcultures are incubated at 44°C for 48 hours. The E. coli results are based upon gas positive tubes of BGLB and a positive test for indole production. Results are reported as E. coli MPN per 100 ml of sample.

Bacteriological Standards.

Approved Water.

An E. coli MPN of 2/100 ml shall not be exceeded in 90% of samples taken during one year. An E. coli MPN of 6/100 ml shall not be exceeded by more than 10% of samples taken during one year.

Shellfish from Approved Area.

An E. coli MPN of 160/100 ml of sample shall not be exceeded in 90% of samples during one year. An E. coli MPN of 500/100 ml sample shall not be exceeded in 10% of samples taken during one year.

Market Standard.

E. coli MPN shall not exceed 600/100 grams of sample.

Chemical Requirements.

Edible marine invertebrates must not contain substances of any nature or origin making them dangerous to public health or substances which may produce abnormal organoleptic characteristics, in greater quantity than that permitted for drinking water.

D. United Kingdom.

Control - An order made under the Public Health (Shellfish) Regulations may prohibit removal for sale for human consumption of all, or certain species of shellfish or may permit removal pending treatment in an approved manner, i.e., relaying in pure water, heat sterilization, purification in an approved installation.

Methods of analysis -

Shellfish growing water - Methods in current use for the examination of waters are the MacConkey Broth, 15 tube, three dilution MPN test (Department of Health 1957) and the membrane filtration technique using teepol lactose broth (Department of Health 1969). Counts of faecal coli in waters are made under various hydrographic conditions and seasons and the information obtained is used, in conjunction with observations on shellfish to make assessments about degree of faecal contamination. There are not standards used to assess the sanitary quality of shellfish growing waters.

Shellfish - Samples of 10 shellfish are taken at random and examined individually or pooled together. Dilutions equal to twice the volume of shellfish tissue are made with 0.1 percent peptone water and 1 ml aliquots of the resulting extract inoculated into roll tubes of the MacConkey Agar No. 3 (Reynolds and Wood, J. Appl. Bact. 19(1) 1956). Results are expressed as mean number of E. coli per ml of tissue based on the count of 10 replicate tubes.

The recommendations of Sherwood and Scott Thompson (1953), made after comparing the 44°C roll tube method with the Fishmonger's Company test, have been generally accepted by examining authorities.

<u>E. coli/ml tissue</u>	<u>Action taken</u>
0-2	
3-4	Sale permitted
5	
6-15	Temporary prohibition
16	Sale prohibited

At the present time, standards in current use are more stringent and shellfish from a particular source consistently containing more than 2 E. coli/ml are regarded with suspicion pending further samples or investigation.

E. United States.

Laboratory procedures used by the official agencies responsible for the sanitary control of shellfish in the United States are based upon the procedures outlined in Recommended Procedures for the Examination of Sea Water and Shellfish, 4th Edition, American Public Health Association, 1970. Current standards are as follow:

Growing area bacteriological standard.

The coliform median MPN of the water does not exceed 70 per 100 ml., and not more than 10 percent of the samples ordinarily exceed an MPN of 230 per 100 ml for a 5-tube decimal dilution test (or 330 per 100 ml, where the 3-tube decimal dilution test is used) in those portions of the area most probably exposed to faecal contamination during the most unfavorable hydrographic and pollution conditions.

Wholesale Market Standard.

Satisfactory. Fecal coliform density of not more than 230 MPN per 100 grams and 35°C plate count of not more than 500,000 per gram will be acceptable without question. This standard applies only to shellfish "certified" under the auspices of the National Shellfish Sanitation Program.

Conditional. Fecal coliform density of more than 230 MPN per 100 grams and/or 35°C plate count of more than 500,000 per gram will constitute a conditional sample and may be subject to rejection by the States shellfish regulatory authority.

Growing Area Standard for Paralytic Shellfish Poison.

If the paralytic shellfish poison content reaches 80 micrograms/100 grams of edible portions of raw shellfish meat, the area shall be closed to taking of the species of shellfish in which the poison has been found.
