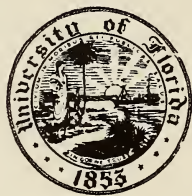


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THE SPICE HANDBOOK

Spices, Aromatic Seeds and Herbs

by

J. W. PARRY

National Spice Mills Company



1945

CHEMICAL PUBLISHING CO., INC.

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PREFACE

For almost a quarter of a century I have been associated with the manufacturing and distribution of foodstuffs, not the least being the milling and sale of spices. Few food commodities have the importance and usefulness possessed by spices and certainly none is as interesting. Yet, surprisingly few people are informed to any extent concerning them. Quite a number of food salesmen themselves, apart from an acquaintance with the more familiar spices, have but a very superficial knowledge of the barks, rhizomes, fruits, seeds and herbs which they find listed in their price books. Many salesmen and others have expressed to me their desire for a greater knowledge of the spices, aromatic seeds and herbs, asking where they may obtain an informative book on the subject. Books about spices, seeds and herbs suitable for this purpose are rare and I have not been able to help them in this respect. In an attempt to meet this need, as I have judged it to exist, I have written this handbook and I have tried to give in as orderly and concise a way as possible the information which my experience has shown is most wanted. Many photographs of the various subjects of study have been included to enable the reader to recognize the spice, seed or herb, quickly and definitely.

In the hope that this handbook might meet the requirements of the trade as fully as possible, information of general interest to the importer, buyer and miller has been compiled and included.

I am indebted to the Federal Security Agency, Food and Drug Administration, and the Department of Agriculture of the United States of America; to the director of Agriculture, Madras, India; to the director of Agriculture, Zanzibar, East Africa; to the director of Agriculture, Mexico; to the director of Agriculture, Jamaica, British West Indies, for the information I have obtained

10/2-4/45 W. C. C. C.

from their long and interesting letters. I desire also to acknowledge my appreciation and to express my thanks to Miss Elizabeth Ellen Brooks for her untiring efforts and valuable assistance in preparing this manuscript for publication.

J. W. PARRY

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INTRODUCTION

The word "spice" is magical and the romance of the spices is enchanting. Names like Zanzibar, Ceylon, Calicut, Java, and Moluccas are alluring and whet the appetite for stories of the lives and deeds of those intrepid navigators and fearless seamen who hundreds of years ago, spurred on by fabulous tales of paradisiacal Spice Islands, ventured out in small ships, setting their sails and courses into strange and terrifying seas. Those hazardous voyages, made in search of cloves and nutmegs, cinnamon and pepper, resulted in the opening up of new sea lanes and passages and led to the discovery of the new world. The story of the spices reaches down through the ages, past the voyages of discovery and the travels of the Venetian, into the lives and times of history's earliest civilizations. But interesting as it all is, I have not made the history of the various spices and the spice trade a subject of this book. That and the romantic stories associated with the aromatic plants will probably occupy my labors on another and future occasion.

As with history, much could be written on the botany of the aromatic plants. Long, detailed botanical descriptions could be given of propagation and cultivation, of roots, stems, leaves, flowers and fruits, of nutrition and reproduction, but I am of the opinion that those for whom this work is intended, although probably interested in such information, yet would find it of little use-value in their everyday business activities. I have, therefore, restricted such information to the common and botanical names of the plants and the families to which they belong and to as brief a description of each plant as the subject permits.

Classification

The classification of spices is a difficult matter and a controversial one in itself. An attempt might be made to divide the

aromatic plants into groups of rhizomes, barks, leaves and fruits (or seeds as they are generally termed) or into family groups as the botanist probably would do. To cover the principal aromatic plants mentioned in this book, the latter system would mean arranging them in fourteen family groups, as follows:

Family Cruciferae (Mustard family)	Mustard, white and black
“ Labiatae (Mint family)	Marjoram Mint Origanum Rosemary Sage Savory Sweet basil Thyme
“ Lauraceae (Laurel family)	Cinnamon Cassia Laurel leaves
“ Leguminosae (Pea family)	Fenugreek
“ Liliaceae (Lily family)	Garlic Onion
“ Magnoliaceae (Magnolia family)	Star Anise
“ Myristicaceae (Nutmeg family)	Nutmeg Mace
“ Myrtaceae (Myrtle family)	Allspice Cloves
“ Papaveraceae (Poppy family)	Poppy
“ Pedaliaceae (Sesamum family)	Sesame
“ Piperaceae (Pepper family)	Pepper, black and white

Family Solanaceae (Potato family)	Pepper, red Cayenne Chillies Paprika
“ Umbelliferae (Parsley or Carrot family)	Anise Caraway Celery Coriander Cumin Dill Fennel Parsley
“ Zingiberaceae (Ginger family)	Cardamom Ginger Turmeric

However, I believe this family grouping of the plants would convey little, if anything, to the reader untrained in botany and unfamiliar with botanical methods. To such a reader it could be confusing and perplexing. He probably would find it difficult to associate laurel leaves with cinnamon, cardamom with turmeric or understand the relationship of garlic to lilies or cayenne pepper to potatoes.

It seems to me, the best classification to adopt is one which agrees with the manner the aromatic plants are thought of in the trade everywhere, that is, spices, aromatic seeds, and herbs. This I have done and under spices, I have included allspice, cinnamon, cassia, cloves, ginger, mace, nutmeg, black and white pepper, red peppers (capsicum fruits including cayenne, chillies and paprika), and turmeric. Under aromatic seeds I have included anise, cardamom, caraway, celery, cumin, coriander, dill, fennel, fenugreek, mustard, poppy, sesame, and star anise. Under herbs I have included laurel leaves,* marjoram, mint, origanum,

* Laurel leaves belong to the sweet bay laurel tree *Laurus nobilis* which definitely does not belong to the above group of herbaceous plants but because laurel leaves are used for flavoring purposes in a similar manner to the leaves of sage, savory, etc., they have been included amongst the herbs. Laurel leaves are also known as bay leaves.

parsley, rosemary, sage, savory, sweet basil and thyme. Garlic and onion I have grouped alone. This system, I believe, is the most practical for the purpose in mind and I doubt that readers will quarrel with me about the matter. It should be pointed out that many of the seeds, so-called, are really dried fruits. For example, coriander "seed" is in fact the dried fruit of the plant. However, in business the merchants do not speak of coriander fruit, but coriander seed. So, seed it is!

Properties

The physical properties have been given as completely as possible but with the aid of as few botanical terms as each subject of study would permit, and all measurements are recorded in inches or parts of an inch. Not everybody is familiar with the metric system and in this country metric measurements are meaningless to a large number of people. The color, size and shape, appearance, aroma and taste given for the various spices, aromatic seeds, and herbs were arrived at as a result of a long and exacting study of representative samples by the author in his own laboratory. Macroscopical and microscopical observations were carefully recorded and all photographs and photomicrographs of the subjects are by the author. The number of seeds to the ounce and pound were arrived at by counting a number of the seeds considered representative of the lot, weighing them on the analytical balance and applying simple arithmetic.

Uses

Only the principal culinary and commercial foodstuff uses for the spices, seeds, and herbs are given in this book and these only in a general way. It must not be concluded that they exhaust the list of uses for which the spices, seeds, and herbs and their essential oils are employed. On the contrary, cook books are teeming with recipes, old and new, in which the principal flavoring ingredients are members of the spice family. Hundreds of available recipes for flavoring extracts and emulsions, beverages and liqueurs depend upon the spices or their essential oils. In

addition, a long list of medicinal, antiseptic and germicide, perfumery and cosmetic formulae exists in which the rich essential oils of the spices, aromatic seeds, and herbs are important constituents.

Adulteration

The adulteration of foodstuffs is a deplorable matter but thanks to the far-reaching and effective pure food laws now existing, the evil has been considerably lessened. Food products entering the country must conform to government standards and food inspectors keep a vigilant eye on the movement of all such goods. Foodstuffs manufactured within the country must also conform to regulations and there is probably not a day when an inspector has not taken from the shelf of the retailer some item for analysis. Such work in the public interest is to be highly commended and the officials responsible for the enforcement of our food laws should have the full cooperation of all food manufacturers. The American Spice Trade Association and the Canadian Spice Association have taken a very definite and thorough interest in such matters and are recognized for this and for their efforts to create protective measures against unscrupulous exporters abroad and to discourage unsavory business practices amongst their fraternity at home. Reputable spice-millers, and they are in the majority, frown upon all forms of adulteration. However, the adulteration of spices has not been wholly eliminated and in the text I have given mention to the matter and indicated the more common adulterants for each spice, seed, or herb considered liable to adulteration. The list of adulterants is not a short one and because those who are determined to evade the pure food laws and ignore the practices of fair business men are always seeking the perfect (in their opinion) adulterant, it shall probably never be complete.

Adulteration must be distinguished from the legitimate compounding of spices. Many buyers seek compound goods and as long as spices are compounded in conformity with government regulations, labelled and sold as compound goods in the manner

prescribed by law, then there can be nothing wrong legally or morally on the part of the seller.

Grinding

Under this heading, I have merely mentioned the degree of fineness which experience has shown the spice, seed or herb should possess in the ground state. The degrees mentioned meet the general requirements of consumers although every grinder of spices will meet with the occasional request for a finer or coarser mesh.

Considerable progress has been made in grinding machinery since the days when the stone mill was in general use. The grinding principal of the stone mill is indeed a very old one and for certain manufacturing processes its fine grinding effectiveness is as yet unsurpassed. Stone mills are employed for the fine grinding of grains, paints, pastes, etc., but they are rarely found in modern spice-grinding plants. Today spices are ground with the aid of hammer mills, attrition mills, roller mills, limited mills, pulverizers and other mechanical grinding equipment. Efficient knife cutters are available to reduce barks and roots to the right size for grinding. Modern mechanical sifters are used to bring the ground products to the different degrees of fineness required. Shrinkage in milling has also been considerably lessened. Modern grinding machines have practically eliminated loss of spice by preventing the escape of the finely ground product so general under old methods with faulty or poorly constructed machinery in use. Today no efficient management will tolerate such a condition causing, as it does, a loss of profit on the one hand and employee unrest on the other because of resultant unpleasant working conditions. With modern appliances, these faults are very largely overcome.

The all-important volatile oil content of spices, aromatic seeds, and herbs must be conserved, and cool, efficient milling is necessary if loss is to be avoided.

Shrinkage in grinding is an important factor and one which

must have the attention of the spice miller. If it cannot be eliminated entirely, then it must be reduced to its lowest figure and always allowed for in cost accounting. Competition in pre-war times was very keen and undoubtedly will be again if our economic system follows its previous bent when the present world conflict is over, therefore, the spice miller must pay attention to the elimination of waste and loss of every kind if he wishes to succeed. Not cheap labor and inefficient machinery, but efficient, contented employees and modern, dust-proof, cool, efficient machinery is the way to success.

Packing

The method of packing and weight of packages vary for many spices according to the requirements of the markets for which they are intended. For example, Zanzibar cloves are packed in bales of 140 to 145 pounds for the U.S.A. market, in bales of 140 pounds for the London market, and in bales of 175 and 195 pounds for the Calcutta market. The cloves are packed in bales made of raffia-like matting imported from Lamu and if the cargo is likely to be transshipped, the bales are each covered with sacking. In this book, I have given the customary weight and style of package for the various products as I have seen them received in my experience. It should be pointed out, however, that the weight of packages contained in different shipments of the same products have been found to vary a few pounds either way.

Starch

Because starch is an important factor in the identification of some spices and because it serves as a guide to the identification of mixtures, compounds and adulterants, I have prepared photomicrographs of spice and cereal starches. The examination of a ground spice for starch is a simple matter and can be conducted by any individual possessing or having access to a microscope. High power is not necessary, a magnification of 250 diameters

being required at most. The whole spice should be ground fine enough to pass through a mesh 74 sieve. If the ground spice as received for examination is not fine enough, a small sample can be further pounded in the mortar and sieved. A very small quantity of the ground spice is placed in the center of an ordinary 3-inch microscope slide. To this, one or two drops of water are added and a cover glass then lowered carefully in place over the whole. It very often helps to "rub" the sample a little and it is my opinion that this process is best carried out by applying gentle pressure with the finger to the cover glass moving it in a to-and-fro or circular manner while the slide is held firmly in the other hand. To avoid breaking the cover glass, the operation must be carried out with care. When the sample is sufficiently treated, if it should be necessary, remove the cover glass, clean and replace. Polarized light is not essential to the recognition of the starches, however, where a microscope is so fitted it permits a study of the detail which is otherwise impossible. The photomicrographs in this book are of subjects treated as above without polarized light.

Essential Oil

In addition to the fact that they are the basis of the flavor of the spices, seeds, and herbs themselves, the essential oils contained in the various parts of these aromatic plants are of tremendous commercial importance. These volatile oils are put to numerous uses including the manufacture of imitation spices, essences, medicinal preparations, perfumery and cosmetics. Many of them are powerful germicides, as for example, the oils of cloves, cinnamon and thyme. Most of the oils possess some anti-septic value. The properties of the various essential oils of the spices are given in this book together with the quantity percentage yielded by the plants under the most favorable conditions. As readers well know, the word volatile indicates that the oil vaporizes of its own accord at ordinary temperatures, therefore, ground spices must be properly packed and kept covered to preserve their quality and flavor.

Pure Food Laws

Extracts from the pure food laws of the United States of America and the Dominion of Canada have been given in order that readers may familiarize themselves with the more important requirements of the respective countries. Because the economic interests of the two nations are closely associated and because many of the products of the one land find markets in the other, spice distributors should be informed with regard to regulations covering the standards, manufacturing, packing and sale of foodstuffs. Those readers who wish to obtain copies of the food and drug regulations may do so by applying to the respective governments directly.

The United States food standards given in the text are those of the U. S. Department of Agriculture, Food and Drug Administrations, Service and Regulatory Announcements, Food and Drug No. 2 (Fifth Revision) November, 1936, compiled under the Provisions of the Food and Drugs Act of 1906. This act has been superseded by the Federal Food, Drug and Cosmetic Act of 1938. The standards, therefore, are only used in an advisory capacity pending the adoption of new standards by the government under the provisions of the act of 1938. I am informed in a letter received from the Federal Security Agency, Food and Drug Administration, Washington, D. C., that "if herbs are recognized in the United States Pharmacopoeia, the National Formulary, or the Homeopathic Pharmacopoeia, they must comply with the standards for purity, quality, and strength as set forth in these official compendia." It may be concluded that these remarks apply to all spices, aromatic seeds and herbs offered for sale in the whole or ground form to the public of the United States of America.

Spice Trade Associations

The American Spice Trade Association, now established for many years, came into being as the result of an earnest desire on the part of grinders, importers and brokers to establish among

themselves a basis of trading that would be equitable to all concerned.

Previous to its inception, there was lack of uniformity of business rules and no co-ordination of effort to improve qualities and to solve the problems raised by the Federal Pure Food Law. Little had been done to better the relations between importers and users.

Every member may take pride in the changes which the Association has brought about. Awkward, long-drawn out, costly disputes no longer occur. The arbitration machinery settles differences justly and with dispatch.

The standard contracts clearly define responsibilities and privileges, making buying and selling clean-cut, and as free from misunderstanding as possible.

The arbitration procedure of The American Spice Trade Association is considered by various government bodies and commercial organizations as the most highly developed system in the country. It is one of the few organizations which combines all elements of the trade in one Association, and in this lies its strength.

Mutually advantageous correspondence with foreign suppliers has brought about a world-wide knowledge of the standards under which the Federal Food, Drug and Cosmetic Act is enforced. A constant exchange of views regarding standards of purity and other vital matters is carried on with various chambers of commerce in the East.

Nothing is so conducive to satisfactory trading, especially when it is of an international character, as reciprocal understanding concerning ideas, customs, business methods, standards, settlement of disputes and other elements of trade.

The Association has committees at work for the purpose of protecting its members, stabilizing and enhancing the spice business, adjusting controversies and fostering friendships in the trade.

It is constantly on the watch for state and national legislation or regulations affecting grinder and importer, and represents them before commissions and other bodies having same in charge.

It is educative to the grinder concerning modern cost methods and management, eliminating wastes and selling and manufacturing.*

The Canadian Spice Association recently formed for similar reasons promises to be a progressive and important factor in the life of the Canadian industry. They have as yet adopted no standard contracts although I understand the matter is in mind. They are at present occupied in the matter of regulating the industry in conformity with wartime requirements, rendering the fullest assistance to the Dominion government. They are fully aware of the needs of the industry and are considering plans for the present and post-war welfare of the members.

Copies of the standard contracts of the American Spice Trade Association are here reproduced for the benefit of those actively associated with the trade.

Distance and Time

Where is Soerabaja? How many nautical miles distant is Zanzibar from New York? What time is it now in Ceylon? How many times these questions crop up in the spice trader's office and how often the answers are not available! When transacting business with exporters abroad cables must be sent, voyage time must be computed along with other matters. To meet this need, I have compiled a list of the more important places abroad from where the various spice products are obtained, giving latitude and longitude, distance in nautical miles to the important North American seaports, and the time required to make the voyage. A table of difference in clock time is also included. Names of ports and countries are given in accordance with pre-war geographical knowledge.

* *Spice Manual and Directory*, 1943, American Spice Trade Association, p. 15.

PART 1

EXTRACTS FROM THE
PURE FOOD LAWS
AND REGULATIONS
OF UNITED STATES OF AMERICA
AND
DOMINION OF CANADA

CHAPTER 1

PURE FOOD LAWS, REGULATIONS AND STANDARDS OF THE UNITED STATES OF AMERICA

The U.S. food standards given in the text are those of the United States Department of Agriculture, Food and Drug Administrations, Service and Regulatory Announcements, Food and Drug No. 2 (Fifth Revision) November, 1936 compiled under the provisions of the Food and Drugs Act of 1906, but it must be pointed out that this act has been superseded by the Federal Food, Drug, and Cosmetic Act of 1938 and the Administration has discontinued the distribution of Food and Drugs, No. 2. Many of the standards given in F. D. No. 2 have been superseded by standards promulgated in connection with the enforcement of the act of 1938 but *in the case of edible spices, those given in F. D. No. 2 are being used in an advisory capacity until standards are adopted under the present law.** The standards given in F. D. No. 2 are "standards of identity and are not to be confused with standards of quality or grade." The term "dried" refers to the air-dried product and the term "starch" refers to starch as determined by the official diastase method.

For the sake of brevity, the United States' food standards are referred to in the text as F. D. No. 2, U.S.A.

Extracts From United States Food Laws and Regulations

(U. S. A.) Federal Security Agency, Food and Drug Administration, Service and Regulatory Announcements, Food,

* Correspondence, Food and Drug Administration, Washington, D. C., October 1, 1943.

Drug, and Cosmetic No. 1 Revision 1, issued August, 1939, revised August, 1941.

Definitions and Standards for Food, Chapter IV

Page 11. "Sec. 401. Whenever in the judgment of the Administrator such action will promote honesty and fair dealing in the interest of consumers, he shall promulgate regulations fixing and establishing for any food, under its common or usual name so far as practicable, a reasonable definition and standard of identity, a reasonable standard of quality, and/or reasonable standards of fill of container. In prescribing any standard of fill of container, the Administrator shall give due consideration to the natural shrinkage in storage and in transit of fresh natural food and to need for the necessary packing and protective material. In prescribing a definition and standard of identity for any food or class of food in which optional ingredients are permitted, the Administrator shall, for the purpose of promoting honesty and fair dealing in the interest of consumers, designate the optional ingredients which shall be named on the label."

Page 12. "Sec. 402. A food shall be deemed to be adulterated:

(a) (1) If it bears or contains any poisonous or deleterious substance which may render it injurious to health; but in case the substance is not an added substance such food shall not be considered adulterated under this clause if the quantity of such substance in such food does not ordinarily render it injurious to health; or (2) if it bears or contains any added poisonous or added deleterious substance which is unsafe within the meaning of section 406; or (3) if it consists in whole or in part of any filthy, putrid, or decomposed substance, or if it is otherwise unfit for food; or (4) if it has been prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health; or (5) if it is, in whole or in part, the product of a diseased animal or of an animal which has died otherwise than by slaughter; or (6) if its container is composed, in whole or in part, of any poisonous or deleterious substance which may render the contents injurious to health.

(b) (1) If any valuable constituent has been in whole or in part omitted or abstracted therefrom; or (2) if any substance has been substituted wholly or in part therefor; or (3) if damage or inferiority has been concealed in any manner; or (4) if any substance has been added thereto or mixed or packed therewith so as to increase its bulk or weight, or reduce its quality or strength, or make it appear better or of greater value than it is.

(c) If it bears or contains a coal-tar color other than one from a batch that has been certified in accordance with regulations as provided by section 406."

Page 12. "Sec. 403. A food shall be deemed to be misbranded:

(a) If its labeling is false or misleading in any particular.

(b) If it is offered for sale under the name of another food.

(c) If it is an imitation of another food, unless its label bears, in type of uniform size and prominence, the word "imitation" and, immediately thereafter, the name of the food imitated.

(d) If its container is so made, formed, or filled as to be misleading.

(e) If in package form unless it bears a label containing (1) the name and place of business of the manufacturer, packer, or distributor; and (2) an accurate statement of the quantity of the contents in terms of weight, measure, or numerical count: Provided, that under clause (2) of this paragraph reasonable variations shall be permitted, and exemptions as to small packages shall be established, by regulations prescribed by the Administrator.

(f) If any word, statement, or other information required by or under authority of this Act to appear on the label or labeling is not prominently placed thereon with such conspicuousness (as compared with other words, statements, designs, or devices, in the labeling) and in such terms as to render it likely to be read and understood by the ordinary individual under customary conditions of purchase and use.

(g) If it purports to be or is represented as a food for which a definition and standard of identity has been prescribed by regulations as provided by section 401, unless (1) it conforms to such definition and standard, and (2) its label bears the name of

the food specified in the definition and standard, and, insofar as may be required by such regulations, the common names of optional ingredients (other than spices, flavoring, and coloring) present in such food:

Regulation Under Sec. 403 (g) of Federal Food, Drug, and Cosmetic Act

By order of the Federal Security Administrator, dated July 16, 1943, the following new regulation is added to the regulations for the enforcement of the Federal Food, Drug, and Cosmetic Act:

Regulation. (2.13) Conformity to definitions and standards of identity. In the following conditions, among others, a food does not conform to the definition and standard of identity therefor:

(a) If it contains an ingredient for which no provision is made in such definition and standard;

(b) If it fails to contain any one or more ingredients required by such definition and standard;

(c) If the quantity of any ingredient or component fails to conform to the limitation, if any, prescribed therefor by such definition and standard.

(h) If it purports to be or is represented as—

(1) a food for which a standard of quality has been prescribed by regulations as provided by section 401, and its quality falls below such standard, unless its label bears, in such manner and form as such regulations specify, a statement that it falls below such standard; or

(2) a food for which a standard or standards of fill of container have been prescribed by regulations as provided by section 401, and it falls below the standard of fill of container thereto, unless its label bears, in such manner and form as such regulations specify, a statement that it falls below such standard.

(i) If it is not subject to the provisions of paragraph (g) of this section unless its label bears (1) the common or usual name of the food, if any there be, and (2) in case it is fabricated from

two or more ingredients, the common or usual name of each such ingredient; except that spices, flavorings, and colorings, other than those sold as such, may be designated as spices, flavorings, and colorings, without naming each: Provided, that, to the extent that compliance with the requirements of clause (2) of this paragraph is impracticable, or results in deception or unfair competition, exemptions shall be established by regulations promulgated by the Administrator.

(j) If it purports to be or is represented for special dietary uses, unless its label bears such information concerning its vitamin, mineral, and other dietary properties as the Administrator determines to be, and by regulations prescribes as, necessary in order fully to inform purchasers as to its value for such uses.

(k) If it bears or contains any artificial flavoring, artificial coloring, or chemical preservative, unless it bears labeling stating that fact: Provided, that to the extent that compliance with the requirements of this paragraph is impracticable, exemptions shall be established by regulations promulgated by the Administrator. The provisions of this paragraph and paragraphs (g) and (i) with respect to artificial coloring shall not apply in the case of butter, cheese, or ice cream."

Tolerances for Poisonous Ingredients in Food and Certification of Coal-Tar Colors for Food

Page 19. "Sec. 406. (a) Any poisonous or deleterious substance added to any food, except where such substance is required in the production thereof or cannot be avoided by good manufacturing practice shall be deemed to be unsafe for purposes of the application of clause (2) of section 402 (a); but when such substance is so required or cannot be so avoided, the Administrator shall promulgate regulations limiting the quantity therein or thereon to such extent as he finds necessary for the protection of public health, and any quantity exceeding the limits so fixed shall also be deemed to be unsafe for purposes of the application of clause (2) of section 402 (a). While such a regulation is in effect limiting the quantity of any such substance in the case of

any food, such food shall not, by reason of bearing or containing any added amount of such substance, be considered to be adulterated within the meaning of clause (1) of section 402 (a). In determining the quantity of such added substance to be tolerated in or on different articles of food the Administrator shall take into account the extent to which the use of such substance is required or cannot be avoided in the production of each such article, and the other ways in which the consumer may be affected by the same or other poisonous or deleterious substances.

(b) The Administrator shall promulgate regulations providing for the listing of coal-tar colors which are harmless and suitable for use in food and for the certification of batches of such colors, with or without harmless diluents."

Imports and Exports, Chapter VIII

Page 42. "Sec. 801. (a) The Secretary of the Treasury shall deliver to the Federal Security Administrator, upon his request, samples of food, drugs, devices, and cosmetics which are being imported or offered for import into the United States, giving notice thereof to the owner or consignee, who may appear before the Federal Security Administrator and have the right to introduce testimony. If it appears from the examination of such samples or otherwise that (1) such article has been manufactured, processed, or packed under insanitary conditions, or (2) such article is forbidden or restricted in sale in the country in which it was produced or from which it was exported, or (3) such article is adulterated, misbranded, or in violation of section 505, then such article shall be refused admission. This paragraph shall not be construed to prohibit the admission of narcotic drugs the importation of which is permitted under section 2 of the Act of May 26, 1922, as amended (U.S.C., 1934 edition, title 21, sec. 173).

(b) The Secretary of the Treasury shall refuse delivery to the consignee and shall cause the destruction of any such article refused admission, unless such article is exported by the consignee within three months from the date of notice of such refusal.

under such regulations as the Secretary of the Treasury may prescribe: Provided, that the Secretary of the Treasury may deliver to the consignee any such article pending examination and decision in the matter on execution of a bond as liquidated damages for the amount of the full invoice value thereof together with the duty thereon and on refusing for any cause to return such article or any part thereof to the custody of the Secretary of the Treasury when demanded for the purpose of excluding it from the country or for any other purpose, such consignee shall forfeit the full amount of the bond as liquidated damages."

Page 49. "(c) All charges for storage, cartage, and labor on any article which is refused admission or delivery shall be paid by the owner or consignee and in default of such payment shall constitute a lien against any future importations made by such owner or consignee.

(d) A food, drug, device, or cosmetic intended for export shall not be deemed to be adulterated or misbranded under this Act if it (1) accords to the specifications of the foreign purchaser, (2) is not in conflict with the laws of the country to which it is intended for export, and (3) is labeled on the outside of the shipping package to show that it is intended for export. But if such article is sold or offered for sale in domestic commerce, this subsection shall not exempt it from any of the provisions of this Act."

CHAPTER 2

PURE FOOD LAWS, REGULATIONS AND STANDARDS OF THE DOMINION OF CANADA

The Canadian food standards given in the text are extracts from the Office Consolidation of the Regulations under the Food and Drugs Act, made by Order in Council: 6th October, 1942, P.C. 9056 and the following amending Order in Council: 3rd December, 1942, P.C. 10993, Department of Pensions and National Health, Ottawa, Canada.

For the sake of brevity, the Dominion of Canada food standards are referred to in the text as F. D. Canada.

Extracts From Canadian Food Laws and Regulations

(Canada) Office Consolidation of the Regulations under the Food and Drugs Act, Department of Pensions and National Health, Ottawa, Dominion of Canada, 1942.

Page 10. "Sec. VI. Limits of Variability of Net Contents.

The following variations from the quantity of the contents marked on the package shall be allowed except in cases where it is stated in terms of minimum weight, measure or count.

(i) Discrepancies due exclusively to errors in weighing, measuring or counting which occur in packing conducted in compliance with good commercial practice.

(ii) Discrepancies due exclusively to differences in the capacity of bottles and similar containers resulting solely from unavoidable difficulties in manufacturing such bottles or containers so as to be of uniform capacity: provided that no greater tolerance shall be allowed, in case of bottles or similar containers which, be-

cause of their design, cannot be made of approximate uniform capacity than is allowed in case of bottles or similar containers which can be manufactured so as to be of approximate uniform capacity.

(iii) Discrepancies in weight or measure, due exclusively to differences in atmospheric conditions in various places, and which unavoidably result from the ordinary and customary exposure of the packages to evaporation or to the absorption of water.

Discrepancies under clauses (i) and (ii) of this section shall be as often above as below the marked quantity. The reasonableness of discrepancies under paragraph (iii) of this section shall be determined on the facts in each case."

Page 11. "Sec. VIII. Disposal of Import Shipments of Food or Drugs Refused Entry under Section 10 of the Act.

1. A certificate of analysis in appropriate form shall be sent to the Collector of National Revenue refusing entry under subsection 3 of section 10 of the Act.

2. The importer, where known, shall also receive due notice of the refusal of entry.

3. Any shipment of food or drug which has been refused Customs entry under authority of section 10 of the Act shall be held in Customs bond until arrangements for disposal have been completed.

4. If the goods are unclaimed, or refused to or by the importer, they shall be exported within three months of the date of refusal of entry, or they shall ipso facto be forfeited to the Crown, and may be disposed of as the Minister directs.

5. Goods may be released from Customs bond after compliance with certain conditions specified in writing and accepted by the consignee in each case. If the release is conditional upon the destruction of any portion of the shipment, the rest of the goods shall be held until this is done. If the goods are not properly conditioned within the period allowed, they shall be exported or destroyed.

6. The privilege of relabelling, cleaning or similarly renovating may be refused, if the importer, shipper, furnisher or manu-

facturer has been informed of the statutory violations in previous shipments.

7. When importations are shipped to another port for reconditioning or exportation, the goods shall be shipped under Customs carrier's manifest as a shipment in bond."

Page 12. "Division 1. Section I.

Labelling, Packaging, Advertising and Selling.

Part A. Foods and Drugs

1. Every article of food or drug in package form, sealed or put up by the manufacturer or producer thereof, shall be labelled.

2. The label may be an integral part of the package.

3. Foods and drugs with comon names shall be so designated in one or other or both of the official languages provided that no such name may be a combination of words taken directly from more than one language.

4. The common name of the article above referred to shall appear on the main panel of the main label.

5. In labelling, the name and address of the manufacturer or that of the person for whom the article is manufactured shall appear clearly and conspicuously with a statement as to whether such name is that of the manufacturer, the distributor or the person by whom the package is put up.

7. Lables and advertisements shall not make any reference either direct or indirect to the Act or to these regulations, unless such reference is a specific requirement of these regulations.

Part B. Foods

1. If the name of an ingredient is used in naming a compound or mixture, such ingredient shall constitute not less than fifty-one (51) per cent of the whole.

2. When the article is sold as a compound, a mixture, a substitute or an imitation, the appropriate word selected from these words shall appear on the main panel of the main label in type of the same size and visibility as the common name used, and as part of the same, and unless it be a compound or a mixture the

list of ingredients shall also be stated clearly and conspicuously.

3. In labelling any food product for which a distinctive name is used, the list of ingredients shall be stated clearly and conspicuously.

4. A distinctive name shall not give any false indication of origin, character, or place of manufacture, nor shall it lead the purchaser to suppose that it is any other food product.

5. When colour, or preservative, which requires label declaration or when artificial flavour is present, the appropriate declaration shall be made on the main panel of the main label in easily legible type with observance of any details specified elsewhere herein.

6. If any substitute for sugar which requires label declaration is used, the presence of such substitute shall be declared by name on the main panel of the main label in easily legible type.

7. Containers and wrappers in contact with food products shall not contain on their surfaces in contact with food products any lead, antimony, arsenic, zinc or copper, or any compounds thereof or any other poisonous or injurious substances. If the containers are made of tin plate, they shall be outside soldered, or if soldered inside, the solder used shall consist of pure tin only; and the plate in no place shall contain less than one hundred and thirteen (113) milligrams of tin on a piece five (5) centimeters square or one and eight-tenths (1.8) grains on a piece two (2) inches square.

This is equivalent to two (2) pounds of tin per base box; but it must be noted that the regulation requires not only a minimum weight of tin per base box, but that this tin shall be evenly distributed over the surface of the plate.

The inner coating of the containers shall be free of pin holes, blisters and cracks.

If the tin plate is lacquered, the lacquer shall completely cover the lined surface within the container and yield to the contents of the container no lead, antimony, arsenic, zinc or copper, or any compounds thereof, or any other poisonous or injurious substances.

Office Consolidation of Food and Drugs Act, Chapter 76 of the Revised Statutes of Canada, 1927, as Amended by Chapters 23 and 30 of the Statutes of 1930 and by Chapter 54 of the Statutes of 1934.

Adulteration

4. Food shall be deemed to be adulterated within the meaning of this Act,

- (a) if any substance has been mixed with it so as to reduce or lower or injuriously affect its quality or strength;
- (b) if any inferior or cheaper substance has been substituted wholly or in part for the article;
- (c) if any valuable constituent of the article has been wholly or in part abstracted;
- (d) if it consists wholly or in part of any diseased or putrid or rotten animal or vegetable substance, whether manufactured or not;
- (e) if it is obtained from a diseased animal, or from an animal fed upon unwholesome food;
- (f) if it contains any added poisonous ingredient, or any ingredient which may render it injurious to the health of the person consuming it, whether added with intent or otherwise; or
- (g) if its strength or purity falls below the standard, or its constituents are present in quantity not within the limits of variability fixed by the Governor in Council as hereinafter provided. 1920, c. 27, s. 3.

Misbranding

7. Food or drug shall be deemed to be misbranded within the meaning of this Act,

- (a) if it is an imitation of, or substitute for, or resembles in a manner likely to deceive, another article of food or drug under the name of which it is sold or offered or exposed for sale and is not plainly and conspicuously labelled so as to indicate its true character;

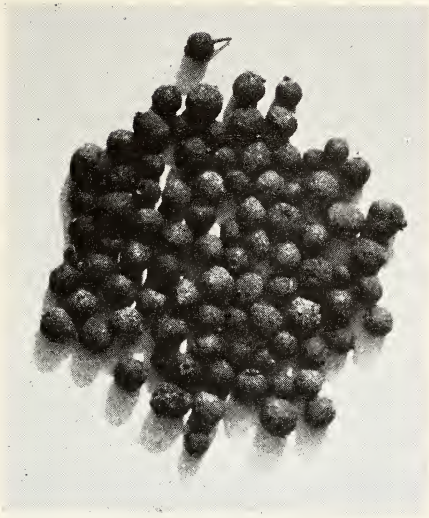
- (b) if it is stated to be the product of a place or a country of which it is not truly a product ;
 - (c) if it is sold or offered for sale by a name which belongs to another article ;
 - (d) if it is so coloured or coated, powdered or polished that damage is concealed, or if it is made to appear better or of greater value than it really is ;
 - (e) if false or exaggerated claims are made for it upon the label or otherwise ;
 - (f) if in package form, sealed by or put up by the manufacturer or producer, and bearing his name and address, the contents of each package are not conspicuously and correctly stated within limits of variability to be fixed by regulations as in this Act provided, in terms of weight, measure or number, upon the outside of the package ; provided that this paragraph shall not apply to packages the weight of which including the package and contents is under two ounces ; and that nothing in this section shall be taken to require the statement of weight, measure, or number upon containers or packages of standard size as provided by orders of the Governor in Council under the Meat and Canned Foods Act ;
 - (g) if it is not labelled in accordance with the requirements of this Act ;
 - (h) if the package containing it, or the label on the package, bears any statement, design or device regarding the ingredients or the substances contained therein, which statement, design or device is false or misleading in any particular ; or if the package is deceptive with respect to design ; construction or fill ; or
 - (i) if the package containing it, or the label on the package, bears the name of an individual or of a company, claimed to be the manufacturer or producer of the article, which individual or company is fictitious or non-existent. 1920, c. 27, s. 5 ; 1927, c. 56, ss. 3 and 4.
8. Every article of food which is a compound, mixture, imitation or substitute shall be plainly and correctly labelled as such.

2. The words 'pure' or 'genuine' or words equivalent to these terms, shall not be used on the labels or in connection with such articles.

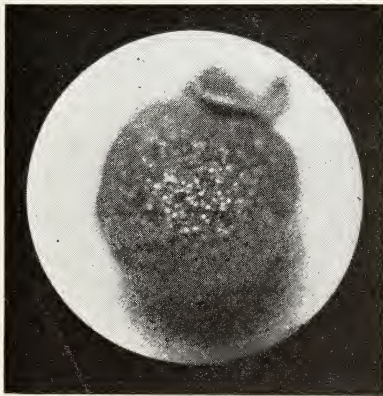
3. Such articles shall be so packed, marked or labelled as not to be likely to deceive any person with respect to their true nature. 1920, c. 27, s. 6."

PART 2

SPICES

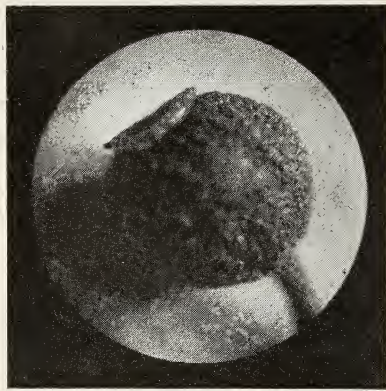


Jamaica Allspice



Jamaica Allspice x 7½

Showing Oil Cells



Jamaica Allspice x 7½
Note Calyx Remains and Oil Cells

CHAPTER 3

ALLSPICE

Also Known as Pimento, Jamaica Pimento, Jamaica Pepper

Plant: *Pimenta officinalis* Lindl.

Family: Myrtaceae.

Nativity and Cultivation: Native to West Indies and tropical America and abundantly cultivated in the West Indies. Allspice is also cultivated for export in Mexico but the Mexican product is larger than the Jamaica allspice berry and inferior in quality. In the United States, the Mexican berry must be described as Mexican allspice and not simply allspice. The properties of allspice given below refer only to the product of Jamaica.

Description: An evergreen tree of the myrtle family growing 25 to 30 feet high. The berries are picked when mature, but still green, and are sun-dried for six to ten days. The color of the berry changes during drying to a dark reddish-brown.

Properties of Jamaica Allspice: *Color:* Dark reddish-brown. *Size and Shape:* Varies in size from 3/16 to 1/4 of an inch in diameter. Shape, nearly globular.

Appearance: Dried, hard berry with rough surface due to numerous small protuberant oil cells which are clearly visible when the dried fruit is viewed under the low power of the microscope. Remains of style and calyx quite prominent. Each berry contains two deep brown, reniform seeds, separated by a very thin membrane.

Aroma and Taste: Fragrant, clove-like odor and a clove-like, strongly aromatic, pungent taste. The flavor is decidedly contained in the pericarp; the seeds themselves are not nearly as

aromatic nor as pungent. The seeds have a very slight nutty flavor.

Allspice is available whole or ground.

There are approximately 365 whole allspice to one ounce and approximately 5,840 to one pound.

The name allspice is given to the dried, unripe fruit because its flavor is said to resemble a combination of the spices cinnamon, nutmeg and cloves.

Exports of allspice from Jamaica for the year 1939 amounted to 8,044,544 pounds valued at £ 207,073 f.o.b. Due to the war, the exports of allspice fell off considerably as the following figures for 1941-42 show :

1941—3,246,994 lb. valued at £ 151,662 f.o.b.

1942—3,978,072 lb. valued at £ 379,633 f.o.b.*

Uses: Allspice finds extensive use in the culinary art as a flavoring agent for meats, gravies, relishes, fish dishes, pies, puddings, preserves, etc. It is employed in the manufacture of many commercial foodstuffs including meat sauces, catsup, pickles and fancy meats. It is an important ingredient of whole mixed pickling spice, and of many ground spice formulae, e.g., curry powder, mincemeat spice, pastry spice, and poultry dressing; frankfurter, Bologna, hamburger, and pork sausage seasonings.

Adulteration: Whole allspice does not lend itself easily to adulteration but ground allspice is sometimes found adulterated with clove stems, farinaceous and dried fruit products.

Grinding: Allspice should be ground fine enough to pass through a mesh 38 to 48 screen.

Packing: Allspice is exported from Jamaica in jute bags of 150 pounds average gross weight.

Starch: Allspice contains a small percentage of starch. The granules are small, uniform and nearly circular.

Essential Oil: Allspice yields 3 to 4.5% of volatile oil having the following properties: **

* Correspondence, Dept. of Science and Agriculture, Jamaica, Oct. 1943.

** *The Chemists' Year Book, 1944*, Altrincham, England, Sherratt and Hughes.

Specific gravity at 15°C.: 1.025–1.055

Optical rotation at 20°C.: 0 to -5°

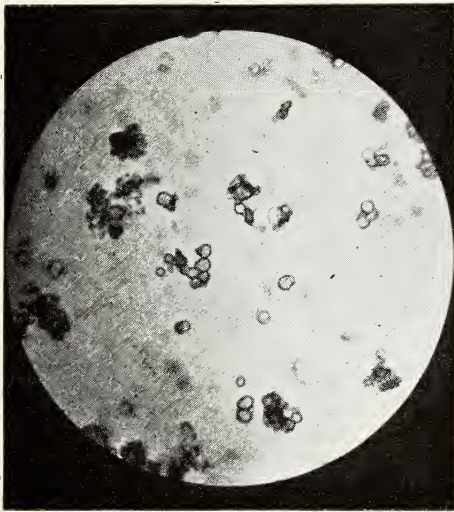
Refractive index at 25°C.: 1.525–1.535

Principal constituent: Eugenol (60–80%)

Solubility: 1 part in 2 parts of 70% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U.S.A. "*Allspice, Pimento*. The dried, nearly ripe fruit of *Pimenta officinalis* Lindl. It contains not less than 8 per cent of quercitannic acid (calculated from the total oxygen absorbed by the aqueous extract), not more than 25 per cent of crude fiber, not more than 6 per cent of total ash, nor more than 0.4 per cent of ash insoluble in hydrochloric acid."



Allspice Starch x 250

CHAPTER 4

CINNAMON

CEYLON CINNAMON

Plant: *Cinnamomum zeylanicum* Nees.

Family: Lauraceae.

Nativity and Cultivation: Native to Ceylon and the Malabar coast of India and cultivated in Ceylon.

Description: The cultivated tree is small and bushy with leathery, bright green, aromatic leaves. It is an evergreen belonging to the laurel family.



Ceylon Cinnamon Quills

Grade "0000"

Properties of Ceylon Cinnamon: Compound Quills, Grade "0000": *Color:* Yellowish-brown.

Size and Shape: From 36 to 42 inches long and approximately $\frac{3}{8}$ of an inch in diameter. Shape, cylindrical, compound quills.

Appearance: Smooth, thin, rolled bark with occasional scars. Fine, light-colored, wavy lines run lengthwise and are clearly visible.

Aroma and Taste: A pleasing, fragrant odor and a warm, sweet, aromatic taste.

Ceylon Cinnamon Quills

The production of cinnamon is an industry not so important to the island of Ceylon today as it was many years ago when the Portuguese went East in search of spices but it is, nevertheless, cultivated on scientific lines and is of importance, although in a lesser degree.

Many years ago, cinnamon gardens were in and around Colombo but, as the municipality spread, it was cultivated mainly in the southern part of the island, that is, between Colombo and Galle. Plantations are almost entirely in the hands of natives, and the cinnamon is brought by firms interested in the bark from native dealers in the Colombo market.

The production of cinnamon is seasonal and affected by the monsoons, especially the south-west monsoon, which commences the end of May and normally proceeds until August. It is after the monsoon, when the heavy rains have fallen, that cinnamon is most prolific and it is necessary to have rain so that it can be rolled and prepared.*

Ceylon cinnamon inner bark is obtained from carefully selected shoots. Skilled peelers introduce the smaller rolls of bark into the larger rolls and then connect the compound pieces endwise to form the quills of commerce.

Ceylon cinnamon quills are graded according to color, quality, size and thickness of the bark. The various grades are identified by a series of zeros and numbers as follows:

“0000” “000” “00” “0” 1sts 2nds 3rds 4ths

the first mentioned grade being the finest and proceeding down the list to the fourths which, although rolled into quills, are somewhat rough.

In 1938 Ceylon exported approximately 2000 long tons of quills and approximately 350 long tons of chips.

* Communication of J. H. Vavasseur and Co., Ltd., Ceylon House, London, England.

Ceylon Cinnamon Quillings

Quillings are broken pieces of compound cinnamon quills of various grades. The pieces vary considerably in size, being about 2 to 6 or 8 inches in length and about $\frac{3}{8}$ to 1 inch in diameter. Many of the quillings are completely broken down resulting in many pieces of inner and outer quills being freely strewn in the bale.



Ceylon Cinnamon Quillings

For color and description of properties they may be compared with the sound Ceylon cinnamon quills except, of course, that pieces of all grades are found in any bale of quillings.

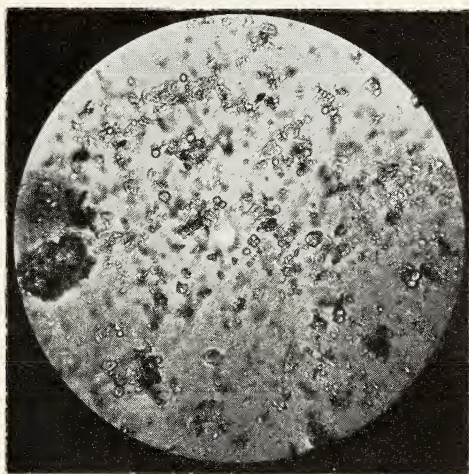


Ceylon Cinnamon Featherings

Ceylon Cinnamon Featherings

Featherings are short shavings and small pieces of bark left over in the processing of the inner bark into quills, although many pieces of bark found in any sample of featherings would look more at home amongst Ceylon ships.

Collectively, featherings present a shade darker color than the quills and a shade lighter than the chips. Featherings possess a better and fuller flavor than the chips.



Ceylon Cinnamon Starch x 250

Ceylon Cinnamon Chips

In the preparation of the inner bark which constitutes the cinnamon quills of commerce, the shoots from which the bark is obtained must be first carefully and thoroughly trimmed. The small pieces resulting from this process are not wasted but dried, baled, and sold as cinnamon chips.

The chips are, collectively, much darker in color than the inner bark of Ceylon cinnamon quills. An examination of individual pieces shows this coarse outer bark to be a grayish-brown on the outside and a light brown on the inside. Ceylon chips being

deficient in both aroma and taste are not to be compared with the quills for flavor.



Ceylon Cinnamon Chips

Uses: Ceylon cinnamon is employed for the flavoring of buns, cakes, pies, puddings, toast, etc. It is always in demand by the bakery trade.

Adulteration: Common adulterants of ground Ceylon cinnamon are ground fruit and nut shells, sugar, farinaceous and dried fruit products.

Grinding: Ceylon cinnamon should be cracked and ground fine enough to pass through a mesh 74 to 86 screen. The resultant powder is very fragrant and yellowish-brown in color.

Packing: Ceylon cinnamon quills are packed in cases or bales averaging 100 pounds net weight. Ceylon quillings are packed in bales averaging 95 $\frac{2}{3}$ pounds each. Ceylon featherings are packed in bales averaging 99 pounds each. Ceylon cinnamon chips are packed in bales weighing 280 pounds net, and also in bales averaging 222 pounds net.

Starch: Ceylon cinnamon bark contains starch similar to that found in cassia but smaller size. Two to four granules are often joined.

Essential Oil: Cinnamon bark yields 0.5 to 1% of volatile oil having the following properties:*

* *The Chemists' Year Book, 1944* (see p. 22).

Specific gravity at 15°C.: 0.943–1.040

Optical rotation at 20°C.: 0 to -3°

Refractive index at 25°C.: 1.528–1.591

Principal constituent: Cinnamic aldehyde (55–75%)

Solubility: 1 part in 3 parts of 70% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U.S.A. "CEYLON CINNAMON. The dried inner bark of cultivated varieties of *Cinnamomum zeylanicum* Nees."

CHAPTER 5

CASSIA

CHINA CASSIA

Plant: Cinnamomum Cassia Blume.

Family: Lauraceae.

Nativity and Cultivation: Native to China and Burma and cultivated in South China.

Description: An evergreen tree belonging to the laurel family.

Properties of China Cassia: *Color:* Reddish-brown.

Size and Shape: Thickness of bark approximately $\frac{1}{64}$ to $\frac{1}{16}$ of an inch, diameter of quills from about $\frac{3}{8}$ to $\frac{3}{4}$ of an inch and length of quills from about 12 to 24 inches.

Appearance: Bark thicker and coarser than that of Ceylon cinnamon. Frequent patches of rough, grayish cork.

Aroma and Taste: An agreeable odor, less fragrant than that of Ceylon cinnamon and a sweet, aromatic, pungent, somewhat astringent taste.

China cassia is available whole, broken or ground. Broken China cassia consists of the small pieces of bark resulting from the trimming, sorting, handling and packing of the quills. It is exported as select broken or extra broken cassia, according to quality and appearance.

SAIGON CASSIA

Plant: Cinnamomum Loureirii Nees.*

Family: Lauraceae.

Nativity and Cultivation: Native to China and cultivated in French Indo-China.

* According to *U. S. Dispensatory*, 23rd Ed., p. 321. Note that F. D. No. 2, U. S. A. says Saigon cassia is the bark of cultivated varieties of *Cinnamomum cassia* (L.) Blume.

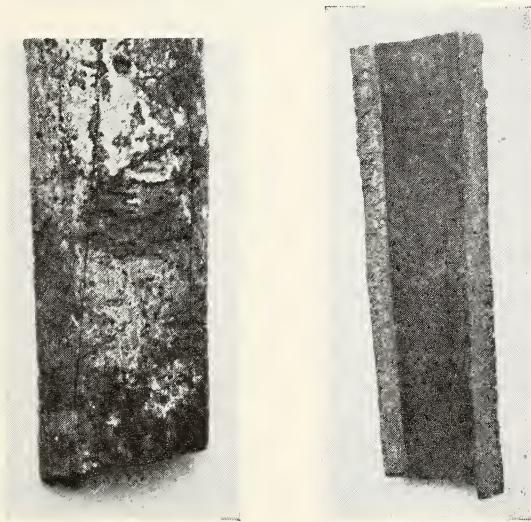


Saigon Cassia

(Medium and thin bark)

Properties of Saigon Cassia: *Color:* Grayish-brown.

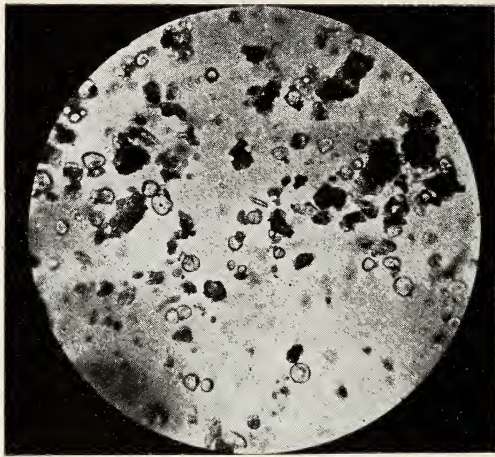
Size and Shape: The size of the quills and the thickness of the bark vary considerably, being from 6 to 12 inches in length, $\frac{3}{8}$ to $1\frac{1}{2}$ inches in diameter and $\frac{1}{32}$ to $\frac{1}{4}$ of an inch in thickness. Shape, double and single quills.



Saigon Cassia

An example of very thick bark, actual width at narrow end $\frac{15}{16}$ inches, thickness $\frac{1}{4}$ inch

Appearance: The thin bark is slightly rough and shows longitudinal wavy ridges, scars marking former branch joints and numerous wart-like protuberances. The thick bark is grayer than the thin and very rough with no wavy ridges.



Saigon Cassia Starch x 250

Aroma and Taste: An agreeable, aromatic odor and a very aromatic, pungent, sweet, slightly astringent taste. Saigon cassia has an excellent flavor.

Saigon cassia quills are graded according to the thickness of the bark: Thin, medium or thick.

Saigon cassia is available whole, broken or ground. Broken Saigon cassia consists of the small pieces of bark resulting from the trimming, sorting, handling and packing of the quills. It is graded No. 1 or No. 2 according to quality and appearance.

BATAVIA CASSIA

Plant: There seems to be some doubt about the species to which Batavia cassia belongs. It is probably derived from *Cinnamomum Burmanni* Blume.

Nativity and Cultivation: Probably native to the islands comprising the Dutch East Indies and cultivated in the Dutch East Indies.

Properties of Batavia Cassia: *Color:* Reddish-brown.

Size and Shape: The bark varies in thickness from $1/32$ to $3/16$ of an inch. The quills are about $1/2$ an inch in diameter



Batavia Cassia

and of various lengths. Samples examined were from 6 to 18 inches long. Shape, double quills.

Appearance: The bark is comparatively smooth. The quills of high grade Batavia cassia are of good appearance, straight and regular. The quills of inferior grades may be twisted and irregular. Scars marking former branch joints are seen but no wavy lines or ridges.

Aroma and Taste: An agreeable, aromatic odor and a sweet, pungent taste.

Batavia cassia quills are graded according to length, color and thickness of bark as follows: Fancy long stick, regular long stick, short stick.

Batavia cassia is available whole, broken, or ground.

Broken Batavia cassia consists of the small pieces of bark resulting from the trimming, sorting, handling and packing of the quills. It is graded No. 1 or No. 2, according to quality and appearance.

Uses, Etc., of China, Saigon and Batavia Cassia

Uses: The culinary uses for cassia include the flavoring of buns, cakes, pies, puddings, toast, etc. It is employed in the commercial manufacture of many foodstuffs and is in demand by bakers, confectioners, fruit canners and other food processors. Cracked cassia is an ingredient of whole mixed pickling spice. Cassia is a constituent of many ground spice formulae including pastry spice and mincemeat spice. It is included in some formulae for curry powder.

Adulteration: Unlike Ceylon cinnamon, there is wide opportunity for adulteration abroad by substitution with inferior qualities when bundling the various kinds of cassia. Such substitution is not easily detected and it would appear that there is little that the spice merchant can do other than confine his trading to exporters of sound reputation. Common adulterants of ground cassia are ground fruit stones and nut shells, farinaceous products, sugar, etc.

Grinding: China, Saigon and Batavia cassia should be cracked and ground fine enough to pass through a mesh 74 to 86 screen. China cassia when ground is light reddish-brown; Saigon cassia, thin bark, is a light brown and the thick bark is a dark, somewhat grayish, brown; Batavia cassia, thin bark, is a light, somewhat yellowish, brown and the medium thick bark is a shade darker in color.

Packing: China cassia is packed in bales of $66\frac{2}{3}$ and 112 pounds and broken China cassia in bales of 112 and 140 pounds net. Saigon cassia is packed in bales of $66\frac{2}{3}$ and $133\frac{1}{3}$ pounds and broken Saigon cassia in bales averaging 133 pounds net. Batavia cassia is packed in bales of 117 and 130 pounds.

Starch: All varieties of cassia contain starch. The granules are small and truncated at one end and they have a tendency to join in groups of two to four.

Essential Oil: Cassia yields from 0.5 to 2% of volatile oil having the following properties:*

* *The Chemists' Year Book, 1944* (see p. 22).

Specific gravity at 15°C.: 1.055–1.072

Optical rotation at 20°C.: +6 to —1°

Refractive index at 20°C.: 1.585–1.606

Principal constituent: Cinnamic aldehyde (75–90%)

Solubility: 1 part in 2 parts of 80% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U.S.A. "CINNAMON. The dried bark of cultivated varieties of *Cinnamomum zeylanicum* Nees or of *C. cassia* (L.) Blume, from which the outer layers may or may not have been removed. CEYLON CINNAMON. The dried inner bark of cultivated varieties of *Cinnamomum zeylanicum* Nees. SAIGON CINNAMON, CASSIA. The dried bark of cultivated varieties of *Cinnamomum cassia* (L.) Blume. GROUND CINNAMON, GROUND CASSIA. The powder made from cinnamon. It contains not more than 5 per cent of total ash, nor more than 2 per cent of ash insoluble in hydrochloric acid."

CASSIA BUDS

Cassia buds are the dried, unripe fruits of *Cinnamomum cassia* and *Cinnamomum Loureirii*.

Properties of Cassia Buds: *Color:* Grayish-brown.

Size and Shape: Cassia buds vary from about $\frac{1}{4}$ to $\frac{1}{2}$ an inch in length, the width at crown is about $\frac{3}{16}$ of an inch. The calyx without the seed is cup-like or could be likened to a wine glass including stem but not the bottom.

Appearance: The bud consists of a brown seed snugly secure within the calyx. The seed is quite smooth with only part of its upper surface visible. The calyx is wrinkled and very hard.

Aroma and Taste: Slight cinnamon-like odor and a sweet, warm, pungent taste akin to cassia bark.

There are approximately 400 complete, whole buds in one ounce and approximately 6,400 to one pound.

Packing: Cassia buds are packed in wooden cases weighing approximately 66 to 67 pounds net.



Cassia Buds

CHAPTER 6

CLOVES

Plant: *Caryophyllus aromaticus* L.

Family: Myrtaceae.

Nativity and Cultivation: Probably native to the Moluccas, or Spice Islands, an archipelago of the Dutch East Indies. Cultivated in Amboyna, Zanzibar, Madagascar, Pemba, Penang, Ceylon, India and British Malaya.



Clove Stems

Description: An evergreen tree from 20 to 40 feet or more in height. The general habit of growth of the tree is markedly erect. "The flowers are produced in either or both of two seasons July to October and November to January. They



Cloves

are borne in bunches of varying number at the ends of the twigs. The clove of commerce is the unopened bud. It is picked by hand when the base of the bud turns red. If left unpicked, the small petals open and expose a large number of stamens and a very small style. After fertilization, the inferior ovary swells to form a large purple drupe usually containing one seed. The fruit is about 1 inch in length and $\frac{1}{2}$ an inch in breadth. This is called mother of cloves.”*

Properties of Dried Cloves: *Color:* Reddish-brown.

Size and Shape: From $\frac{1}{2}$ to $\frac{3}{4}$ of an inch in length. In shape, the clove resembles a round-headed nail (the word clove is derived from the French “clou,” a nail, and Latin *clavus* nail).

Appearance: The stem-like calyx is complete with its crown. Four points project immediately beneath the round head, or crown. Bold, plump, somewhat rough to the touch but not wrinkled or shrivelled. When pressure is applied to the calyx-tube with the finger nail, a small amount of oil is exuded.

* Correspondence, Dept. of Agriculture, Zanzibar, East Africa, Nov. 1943.

Aroma and Taste: A very strong aromatic odor, and a hot, pungent, aromatic taste.

“The unopened clove buds are removed by pickers who climb the trees and gather the whole bunches. The cloves are removed from the bunches later by hand, the stripped bunches being the clove stems of commerce.

The cloves are then dried either on grass mats or cement drying floors for four or five days until quite dry and brittle.

Under bad drying and storage conditions, the color becomes darker and the sample becomes rather musty. Finally the epidermis becomes pale and wrinkled and cloves of this type are known as Khoker.” *

Penang and Amboyna cloves are generally considered superior but Zanzibar and Madagascar cloves are also of excellent quality and flavor.

“Pemba cloves are now similar in all respects to the Zanzibar cloves and all exports from Pemba to Zanzibar are inspected in Pemba. Previously the Pemba cloves were regarded as somewhat inferior.” *

There are approximately 252 to 420 whole cloves to one ounce and approximately 4,032 to 6,720 to one pound, according to source and quality.

Grading: Cloves are graded according to appearance and impurities present. Zanzibar cloves are graded special, No. 1, No. 2, and No. 3 as follows:

Special grade: Extraneous matter (i.e. stems, mother of cloves, foreign and inferior matter), 3%

Khoker, 2%

Moisture, 16%

Grade 1: Extraneous matter, 5%

Khoker, 3%

Moisture, 16%

Grade 2: Extraneous matter, 5%

Khoker, 7%

Moisture, 16%

* Correspondence, Dept. of Agriculture, Zanzibar, East Africa, Nov. 1943.

Grade 3: Extraneous matter, 5%
Khoker, 20%
Moisture, 16%

Uses: One of the most widely used culinary spices for flavoring roasts, hams, stews, preserves, cakes, puddings, pickles, etc., and an important flavoring ingredient of many commercially prepared foodstuffs. A constituent of numerous spice formulae, e.g., pickling spice, mincemeat spice, pastry spice, poultry dressing, sausage seasoning and hamburger seasoning.

Adulteration: Whole cloves are sometimes adulterated by the inclusion of excess clove stems, exhausted cloves and withered cloves. Common adulterants of ground cloves are clove stems, farinaceous products, cereal starches and ground fruit stones.

Grinding: Cloves should be ground fine enough to pass through a mesh 38 to 48 screen.

Packing: Cloves are packed in bales of 140 to 148 pounds net.

Starch: Cloves contain no starch. (Mother cloves contain a small quantity of starch.)

Essential Oil: Cloves yield from 14 to 21% of volatile oil having the following properties:*

Specific gravity at 15°C.: 1.044–1.069

Optical rotation at 20°C.: 0 to -2°

Refractive index at 25°C.: 1.528–1.540

Principal constituent: Eugenol (80–95%)

Solubility: 1 part in 1–3 parts of 70% alcohol.

Government Standards: F. D. Canada. "Cloves shall be the dried flower buds of *Caryophyllus aromaticus* L., and shall not contain more than five (5) per cent of clove stems, more than eight (8) per cent of total ash, more than five-tenths of one (0.5) per cent of ash insoluble in hydrochloric acid, more than ten (10) per cent of crude fiber and shall contain not less than fifteen (15) per cent of volatile ether

* *The Chemists' Year Book, 1944* (see p. 22).

extract." F. D. No. 2, U.S.A. "CLOVES. The dried flower buds of *Caryophyllus aromaticus* L. They contain not more than 5 per cent of clove stems, not less than 15 per cent of volatile ether extract, not less than 12 per cent of quercitannic acid (calculated from the total oxygen absorbed by the aqueous extract), not more than 7 per cent of total ash, nor more than 0.5 per cent of ash insoluble in hydrochloric acid."

CHAPTER 7

GINGER

Plant: *Zingiber officinale* Roscoe.

Family: Zingiberaceae.

Nativity and Cultivation: Native to tropical Asia and cultivated in the West Indies, India, Africa, China, Japan, and Dutch East Indies.



Cochin Ginger

Description: A perennial herbaceous plant of the ginger family.

Ginger, or root ginger, is the name given to the thick underground stem or rhizome of the plant. Two forms of ginger are exported from Jamaica, the peeled and unpeeled ginger. The peeled ginger is prepared by scalding the tubers in hot water and then removing the epidermis by means of a knife.* To spice importers, millers, and distributors, the ginger of West Indies, India

* Correspondence, Dept. of Agriculture, Jamaica, B. W. I., Oct. 1943.

and Africa are especially well known and of importance in the order shown.



Jamaica Ginger

WEST INDIES: The spice trade generally considers Jamaica ginger to be the best quality.

Properties of Jamaica Ginger: *Color:* Very light buff.

Size and Shape: Pieces vary in size from 2½ to 3½ inches in length. Shape, irregular, branched, palmate.

Appearance: Clean, hard and somewhat fibrous; free from cork.

Aroma and Taste: Agreeable, aromatic, somewhat pungent odor and an aromatic, pungent, biting taste.

Jamaica ginger is graded No. 1, No. 2, No. 3 and Ratoon. The last mentioned is an inferior ginger consisting of smaller and more fibrous pieces. Exports of ginger from Jamaica for the year 1941, amounted to 2,376,919 pounds valued at £ 72,828 f.o.b. and for the year 1942, 1,845,226 pounds valued at £ 125,-213 * (note effect of war on exports and prices).

INDIA: The production of Indian ginger is "confined to the west coast. It occupies an area of 11,600 acres, out of which Malabar contributed 11,200 acres." ** Cochin and Calicut ginger enjoy considerable demand in the market and are used extensively

* Correspondence, Dept. of Agriculture, Jamaica, B. W. I., Oct. 1943.

** Correspondence, Dept. of Agriculture, Madras, India.

by spice millers for blending purposes. The color is pale brown. Pieces are irregular in shape and size, fibrous, with cork not entirely removed.

AFRICA: African ginger, generally available at a lower price than the above varieties, is largely employed for blending where price is a factor and where color and aroma are not considered important. African ginger lacks the fine aroma of Jamaica ginger but it has an intensely pungent odor.

JAPAN: Japanese ginger resembles Cochin ginger but it is a generally inferior product, lacking aroma and pungency. It is usually limed.

Ginger is available whole, cracked, or ground.

Uses: Ginger is used to give flavor and pungency to numerous food products including pies, cookies, cakes, biscuits, and gingerbread. It is always in demand by bakers and confectioners. It is employed extensively for the flavoring of beverages and essences. Cracked ginger is a constituent of whole mixed pickling spice and ground ginger is included in the formulae for sausage seasoning, pastry spice, mince-meat spice, curry powder and liver sausage seasoning.

Adulteration: Ginger from which most of the volatile oil has been removed is known as "spent" ginger. When such ginger is admixed with pure ginger, it constitutes an adulteration of the product. Common adulterants of ground ginger are cornmeal and farinaceous products.

Grinding: Ginger should be cracked and ground fine enough to pass through a mesh 58 to 66 screen.

Packing: Jamaica ginger is packed in jute bags of 180 and 200 pounds; Cochin ginger in bags of 130 and 136 pounds; Calicut ginger in bags of 112 and 130 pounds; African ginger in bags of 112 pounds.

Starch: Ginger contains a considerable amount of starch. The granules are ovate and characterized by a protuberance at one end.

Essential Oil: Ginger yields from 1 to 3% of volatile oil having the following properties: *

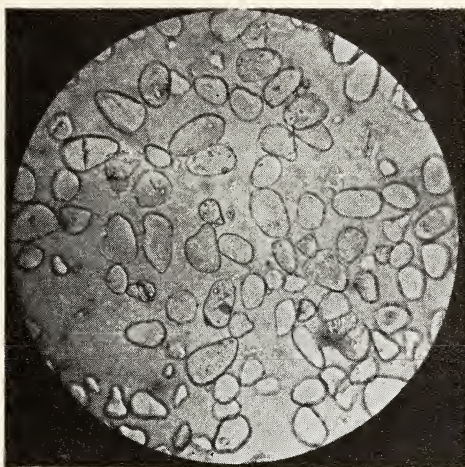
* *The Chemists' Year Book, 1944* (see p. 22).

Specific gravity at 15°C.: 0.872–0.886

Optical rotation at 20°C.: –25 to –45°

Refractive index at 20°C.: 1.478–1.495

Solubility: 1 part in 1–3 parts of 70% alcohol.



Ginger Starch x 250

Government Standards: F. D. Canada. "Ginger shall be the washed and dried or decorticated and dried rhizome of *Zingiber officinale* Roscoe. It shall not contain more than ten (10) per cent of moisture, and in the water-free substance more than nine (9) per cent of crude fiber, more than one (1) per cent of calcium calculated as CaO, more than seven and five-tenths (7.5) per cent of total ash, more than two (2) per cent of ash insoluble in hydrochloric acid and shall contain not less than forty-five (45) per cent of ginger starch, not less than two (2) per cent of ash soluble in water and not less than thirteen and three-tenths (13.3) per cent of cold water extractive as determined by the method defined in Section XLX, Division 1."

"Jamaica Ginger shall be ginger grown in Jamaica and shall contain not less than sixteen and six-tenths (16.6) per cent of cold water extractive in the water-free substance."

“Limed Ginger or Bleached Ginger shall be ginger coated with calcium carbonate. It shall conform to the standards for ginger except that it may contain more than seven and five-tenths (7.5) per cent of total ash but not more than eleven (11) per cent of total ash, and may contain more than one (1) per cent but not more than two (2) per cent of calcium calculated as CaO.”

F. D. No. 2, U.S.A. “GINGER. The washed and dried, or decorticated and dried, rhizome of *Zingiber officinale* Roscoe. It contains not less than 42 per cent of starch, not more than 8 per cent of crude fiber, not more than 1 per cent of lime (CaO), not less than 12 per cent of cold-water extract, not more than 7 per cent of total ash, not more than 2 per cent of ash insoluble in hydrochloric acid, nor less than 2 per cent of ash soluble in cold water.

JAMAICA GINGER. Ginger grown in Jamaica. It contains not less than 15 per cent of cold-water extract, and conforms in other respects to the standards for ginger.

LIMED GINGER, BLEACHED GINGER. Whole ginger coated with carbonate of calcium. It contains not more than 4 per cent of carbonate of calcium nor more than 10 per cent of total ash, and conforms in other respects to the standards for ginger.”

CHAPTER 8

NUTMEG

Plant: *Myristica fragrans* Houtt.

Family: Myristicaceae.

Nativity and Cultivation: Native to the Moluccas, or Spice Islands (East India Archipelago) and cultivated in Penang,



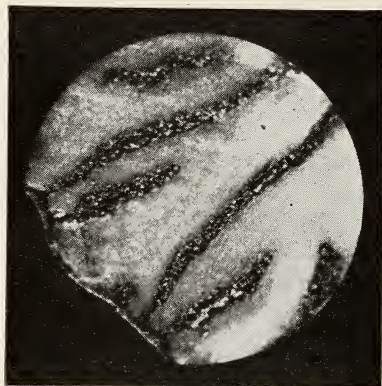
Nutmeg

Transverse View Showing Oil Veins

Sumatra, Java, Banda Islands, and the British West Indies, almost exclusively, from the commercial point of view, from from the Island of Grenada.

Description: An evergreen tree reaching as high as 40 feet or more. Its leaves resemble closely those of *Rhododendron*. The fruit is nearly globular, yellowish-green, resembling a good sized peach in appearance. When ripe, the fruit splits open, revealing the crimson aril (mace) which covers a hard shiny brown kernel, about $\frac{1}{64}$ of an inch thick. Inside the kernel is found the seed, or nutmeg as it is known in

commerce. The peach-like fruit and the hard shiny kernel are not exported. The crimson aril is dried, losing some of its crimson color (see mace).



Nutmeg
x7½

Transverse View Showing Oil Veins Magnified

Properties of Nutmeg: *Color:* Grayish-brown.

Size and Shape: Nutmegs vary in size. The large nuts are approximately $1 \frac{3}{16}$ inches in length and $\frac{13}{16}$ of an inch in width. Shape, mostly oval and some nearly globular.

Appearance: Wrinkled, due to numerous longitudinal furrows but smooth to the touch. They are quite hard, yet cut easily. When cut transversely, the surface presents a pale brown color and reveals many brown veins of various lengths extending from the outside or rim of the nutmeg, toward the center. It is in these veins that the volatile oil of nutmeg is found and pressure upon any one of them by the finger nail will cause a prompt exudation of oil.

Aroma and Taste: A very characteristic and strongly aromatic odor and an aromatic, warm, slightly bitter taste.

Nutmegs are graded large, medium or small according to the number of nutmegs contained in one pound. For example, the description Grenada nutmegs, 110s, would indicate the nut-

megs are of West Indies origin and of small size, since the grade is 110, or 110 nutmegs to the pound. Medium size nutmegs



Nutmegs

average about 90 to the pound and large size nutmegs vary from about 60 to 75 to the pound. Nowadays, practically all the West India nutmegs shipped to the United States are unassorted and unlimed, the main reason being that the use of whole nutmegs has almost disappeared. East India nutmegs reach the United States limed. The practice of liming is commonly followed for the protection of the spice against worms and insect attacks.

East India nutmegs are generally considered superior, those of Penang the best. West India nutmegs are of excellent quality though said to lack the fragrance of the East India spice. In connection with West India nutmegs the following passage* is quite interesting:

“In Grenada, the area under nutmegs continues to be extended,

* Taken from: *The West Indies Year Book*, 1941-42.

and mace, a derivative of the nutmeg, commands a high price. According to Mr. H. C. Sampson, Economic Botanist at Kew, England, the reason for the lower price obtained for Grenada nutmegs on the English market as compared with the nutmegs from the East is that the latter are rounder in shape than those from Grenada which are generally oval. It is said, the English consumer insists on having the rounder nutmeg, having always been accustomed to this shape. The objection seems silly, but there it is. If, therefore, Grenada is to sell on the English market, she must either alter the shape of her nutmeg or must sell at a considerable discount."

Macassar nutmeg, Papua nutmeg, Male nutmeg, Long nutmeg are recognized under F. D. No. 2, U.S.A. (see Government Standards for nutmeg) but they are generally inferior and not considered true nutmegs by the spice trade. They are longer and narrower and lack the aroma and flavor of true nutmeg.

Nutmegs are available whole or ground.

Uses: The culinary uses for nutmeg include the flavoring of sweet dishes, pies, puddings and sauces. Nutmegs are included in the formulae for many ground spices and seasonings including mincemeat spice, pastry spice, poultry dressing, sausage, Bologna, and frankfurter seasonings.

Adulteration: Whole nutmegs do not lend themselves to adulteration but the ground spice is sometimes found adulterated with farinaceous products although the various pure food laws have practically prevented the distribution of adulterated ground nutmeg.

Grinding: Nutmegs should be ground fine enough to pass through a mesh 29 to 38 screen according to the degree of fineness required. Ground nutmeg is a dull yellowish-brown in color.

Packing: East Indies nutmegs are packed in bags of 200 pounds and in cases or bags of 136 pounds. West Indies nutmegs are packed in bags averaging 200 pounds gross weight.

Starch: Nutmeg contains considerable starch. The granules are round and vary in size. They are seen under the microscope in groups of two or four.

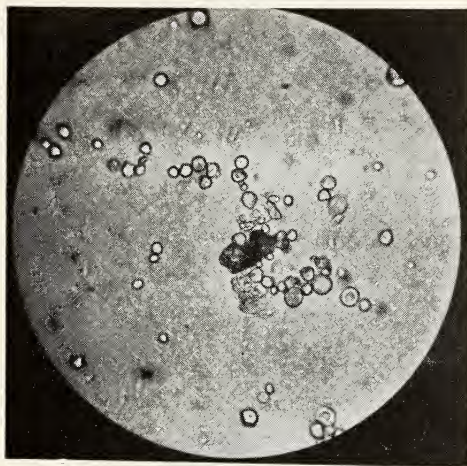
Essential Oil: Nutmeg yields from 7 to 15% of volatile oil having the following properties: *

Specific gravity at 15°C.: 0.865–0.930

Optical rotation at 20°C.: +10 to +30°

Refractive index at 25°C.: 1.475–1.489

Solubility: 1 part in 3 parts of 90% alcohol.



Nutmeg Starch
x 250

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U.S.A. "NUTMEG. The dried seed of *Myristica fragrans* Houtt. Deprived of its testa, with or without a thin coating of lime (CaO). It contains not less than 25 per cent of non-volatile ether extract, not more than 10 per cent of crude fiber, not more than 5 per cent of total ash, nor more than 0.5 per cent of ash insoluble in hydrochloric acid.

MACASSAR NUTMEG, PAPUA NUTMEG, MALE NUTMEG, LONG NUTMEG. The dried seed of *Myristica agentea* Warb. deprived of its testa."

* *The Chemists' Year Book*, 1944 (see p. 22).

CHAPTER 9

MACE

Mace is a product of the nutmeg tree, *Myristica fragrans* Houtt. The tree has already been described under nutmeg. The mace of commerce is the crimson aril which clothes the nutmeg kernel. The aril is skillfully removed, flattened and dried when it changes



Bombay Mace

in color to a pale yellowish or reddish brown and becomes horny and brittle. Banda and Penang mace are considered by the trade to be of superior quality. This true mace must be differentiated from mace consisting of the aril of *Myristica argentea* Warb., known as Macassar or Papua mace, or, of the aril of *Myristica malabarica* Lam., known as Bombay or wild mace. The first tree is native to New Guinea and the second to India.



True Mace
(Grenada)

Properties of True Mace: *Color:* varies from yellowish-brown to reddish-brown.

Size and Shape: Approximately 1 3/16 inches in length. Flat pieces of no particular shape, branched.

Appearance: Shiny, smooth, horn-like and brittle.

Aroma and Taste: Fragrant, nutmeg-like odor and an aromatic, slightly warm taste.

Mace is available whole, broken, or, ground.

According to the *West Indies Year Book, 1941-42*, mace to the value of £ 38,507 was exported from those islands during the year 1940. Of this amount £ 2,939 went to the United States and £ 3,624 went to the Dominion of Canada.

Properties of Bombay Mace: *Color:* Dark reddish-brown.

Size and Shape: Length, 1½ inches. Shape, elongated and dome-like.

Appearance: Complete aril, numerous branches, shiny, horn-like and brittle.

Aroma and Taste: Practically odorless and definitely tasteless.

Grading of True Mace: True mace is graded No. 1, or No. 2

according to color and quality. Broken mace is graded similarly.

Uses: The culinary uses for mace include the flavoring of cakes, biscuits, preserves, sauces, fish and meat dishes, and pickling. It is employed in the commercial manufacture of certain foodstuffs such as tomato catsup, Yorkshire relish, mustard sauce, Worcester sauce, frankfurters and Cambridge sausage. It is also employed by the bakery trade for the making of basic sweet dough, etc. Mace is a constituent of a number of ground spice formulae including mincemeat spice, poultry dressing, pork sausage spice and frankfurter seasoning.

Adulteration: Whole and broken mace is sometimes found adulterated with wild mace. Common adulterants of ground mace are farinaceous products, wild mace, and cheaper spices of similar aroma and flavor.

Grinding: Mace should be ground fine enough to pass through a mesh 29 to 38 screen according to the degree of fineness desired.

Packing: Banda mace is packed in cases of 110 and 160 pounds, Amboyna mace in cases of 135 and 200 pounds, West Indies mace in cases of 200, 250 and 363 $\frac{1}{3}$ pounds, West Indies (Grenada) broken mace in cases of 112 and 200 pounds. Bombay mace is packed in bags of 170 pounds.

Essential Oil: "Mace contains from 7 to 14% of a volatile oil, which resembles closely in chemical and therapeutic properties the oil of nutmeg."*

Mace oil (ex arillus of nutmeg) has the following properties: **

Specific gravity at 15°C.: 0.890–0.930

Optical refraction at 20°C.: +10 to +20°

Refractive index at 20°C.: 1.476–1.480

Solubility: 1 part in 3 parts of 90% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U.S.A. "MACE. The dried arillus of *Myristica*

* *U. S. Dispensatory*, 23rd Ed., p. 1430.

** *The Chemists' Year Book*, 1944 (see p. 22).

fragrans Houtt. It contains not less than 20 per cent nor more than 30 per cent of non-volatile ether extract, not more than 10 per cent of crude fiber, not more than 3 per cent of total ash, nor more than 0.5 per cent of ash insoluble in hydrochloric acid.

MACASSAR MACE, PAPUA MACE. The dried arillus of *Myristica argentea* Warb.”

CHAPTER 10

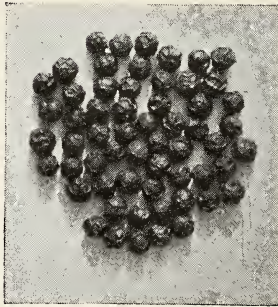
PEPPER

BLACK PEPPER

Plant: *Piper nigrum* L.

Family: Piperaceae.

Nativity and Cultivation: Native to the East Indies and culti-



Black Pepper

vated extensively in tropical countries including India, French Indo-China, Sumatra, Java, and Thailand.

Description: A perennial climbing shrub.

Properties of Black Pepper: *Color:* Dark brown to black.

Size and Shape: Diameter, $\frac{5}{32}$ to $\frac{3}{16}$ of an inch. Shape, nearly globular.

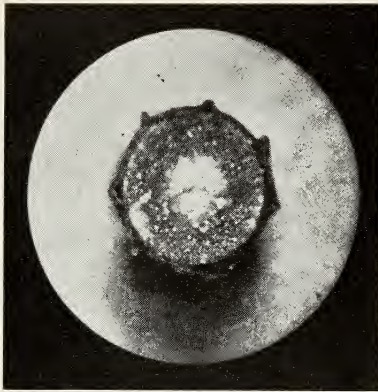
Appearance: Small, wrinkled berries. The deep-set wrinkles form a characteristic network on the surface of the dried black pepper berry.

Aroma and Taste: Characteristic, penetrating, aromatic odor and a hot, biting and very pungent taste.

There are approximately 520 whole black peppercorns of fair

size and quality in one ounce and approximately 8,320 in one pound.

There are many varieties of black pepper known to the trade. They take their names from the localities where grown or from



Transverse View of Black Pepper
x $7\frac{1}{2}$

the ports through which they are exported, e.g., Singapore, Penang, Tellicherry, Alleppey, Lampong, and Saigon.



Black Pepper
x $7\frac{1}{2}$

Lamong black pepper is that pepper grown in the Lampong district of Sumatra, Dutch East Indies.

Singapore black pepper is grown in surrounding localities and exported through Singapore.

Penang black pepper is grown in the Acheen district of Sumatra and shipped from Penang. This pepper is also known as Acheen.

Tellicherry black pepper is a product of the Malabar coast of southern India and is shipped from Tellicherry.

Alleppey black pepper is also a product of the Malabar coast but exported through the port of Alleppey in the District of Travencore.

Saigon black pepper is a product of French Indo-China and takes its name from Saigon, a provincial capital of that country.

These peppers differ slightly from each other in their physical and chemical properties, the color, size and flavor varying among them as well as amounts of crude fiber, ash, starch, volatile and non-volatile extract, etc. Tellicherry and Alleppey peppercorns are large, dark reddish-brown, very aromatic, and of high grade; the harvesting process includes special washings. Lampong and Singapore peppercorns are smaller and more shriveled but very pungent.

Madras Presidency, India, exports about 2,000 tons of black pepper annually. "The pepper vine is grown in Mysore, Coorg, Travencore and the west coast of Madras Province. The total area under this crop during 1941-42 in Madras Presidency was about 105,000 acres out of which Malabar alone accounted for 96,368 acres. South Kanara is the only other district in Madras Province producing pepper and it accounted for the rest of the area." *

The production of pepper is heaviest in the Dutch East Indies amounting in some years to 40,000 tons.**

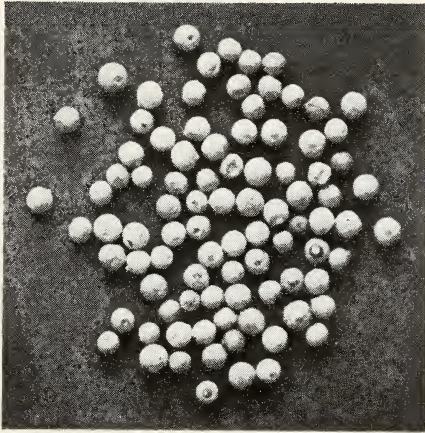
WHITE PEPPER

White pepper is obtained by depriving the dried mature pepper-

* Correspondence, Dept. of Agriculture, Madras, India.

** *Spice Manual and Directory*, 1943, A. S. T. A., p. 101.

corns of *Piper nigrum* of their outer dark coating. This is accomplished by soaking the black peppercorns in water to soften and loosen the dark outer coating or hull, followed by a process of bruising or rubbing to remove the hull, or it may be effected by the mechanical decortication of the dried black peppercorns.



White Pepper

Properties of White Pepper: *Color:* Light yellowish-gray.

Size and Shape: Diameter, $\frac{5}{32}$ to $\frac{3}{16}$ of an inch. Shape, nearly globular.

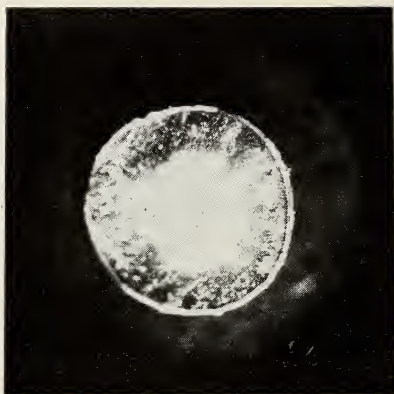
Appearance: Smooth, striated surface, flattened and indented at one point with a small protuberance diametrically opposite. The longitudinal striations are very distinct on some peppercorns and indistinct or not visible on others.

Aroma and Taste: Characteristic, penetrating, aromatic odor and a hot, biting and pungent taste.

There are approximately 538 to 879 whole white peppercorns, according to source and quality, in one ounce and approximately 8,608 to 14,064 in one pound.

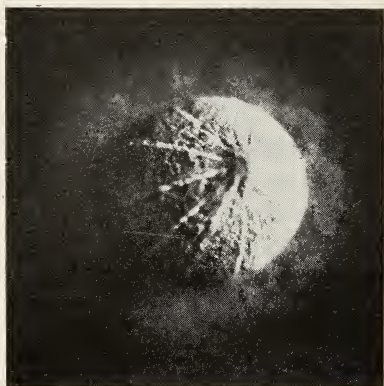
Like black pepper, the varieties of white pepper take their names from the localities in which the pepper is grown or from the ports through which it is exported. The varieties of white pepper

best known to commerce are Singapore, Muntok, Siam, Sarawak, and Tellicherry.



Transverse View of White Pepper
x 7½

Singapore white pepper is produced in surrounding localities and exported through Singapore.



White Pepper
x 7½
Showing Striations

Muntok white pepper is a product of the Dutch East Indies and exported through the port of Muntok.

Sarawak white pepper is a product of Sarawak, a British possession in the island of Borneo.

Tellicherry white pepper is produced on the Malabar coast of India and exported through Tellicherry.

Siam white pepper is produced in Siam (now known as Thailand).

These are all good grade peppers. Tellicherry white pepper is very highly esteemed but not abundant.

Uses: Culinary seasoning of universal use and an essential ingredient of numerous commercial foodstuffs. Pepper is an important constituent of whole pickling spice and many ground spice formulae including poultry dressing, sausage, Bologna, summer sausage, hamburger, and frankfurter seasonings.

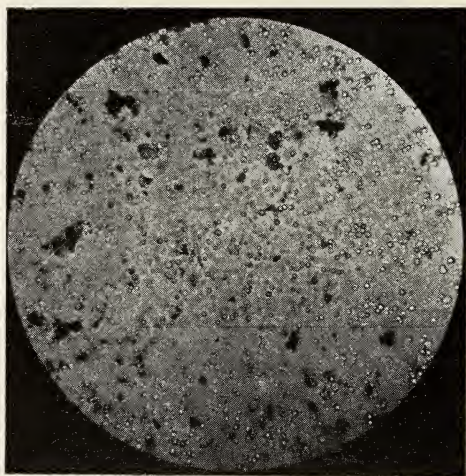
Under the rules of the American Spice Trade Association for standard arrival, standard spot, and standard future contracts, "All pepper shall be subject to allowance if it contains a greater percentage of dust, dirt, stems, chaff, or extraneous matter than is customary in pepper of its kind, and in no case to exceed 3 per cent, as determined by sifting through a No. 9½ roundhole sieve."

Adulteration: Apart from "dust, dirt, stems, chaff or extraneous matter," whole pepper is not likely to be adulterated. The common adulterants of ground pepper include pepper shells, ground fruit stones, rice, linseed, buckwheat hulls, mustard seed, wheat and corn products.

Grinding: Black pepper should be ground fine enough to pass through a mesh 38 to 48 screen. White pepper should be ground fine enough to pass through a mesh 48 screen or finer, according to the degree of fineness required. Pure ground black pepper is brownish-gray and pure ground white pepper is grayish-white in color. In each case, the ground pepper is speckled with the dark fragments of their respective coatings. Decorticating: Using as large-berried black pepper as can be secured, many of the larger spice grinding firms

have machines which remove the outer (black) shell of the berry leaving the inner portion which is yellow and is known as "decorticated white pepper" while the ordinary white pepper is grayish. This material commands a high market premium and is specially desired for use in producing mayonnaise and similar articles where black specks are undesirable.

Packing: Black pepper is packed in jute bags of 140 pounds and white pepper is packed in bags of 135, 158, and 200 pounds weight.



Pepper Starch
x 250

Starch: The average starch content of black pepper is about 33% and of white pepper 56%. The granules are very small and are seen under the microscope in irregular masses as well as individual grains.

Essential Oil: A volatile oil is obtained from black pepper which has, according to the *Merck Index*, the following properties:
Specific gravity at 15°C.: 0.890–0.900
Optical rotation about: -3° to -5°
Refractive index at 20°C.: 1.4935–1.4977

Principal constituent: 1-phelandrene.

Solubility: Insoluble in water. Soluble in alcohol, one part to 15 parts of 90% alcohol.

Government Standards: F. D. Canada. "Black Pepper shall be the dried immature berry of *Piper nigrum* L., and shall contain not less than six and seventy-five hundredths (6.75) per cent of non-volatile ether extract, not less than thirty (30) per cent of pepper starch and shall not contain more than seven (7) per cent of total ash or more than one and five-tenths (1.5) per cent of ash insoluble in hydrochloric acid.

Ground Black Pepper shall be the product made by grinding the entire berry, as above defined. It shall contain the several parts of the berry in their normal proportions and shall conform in its composition to the standards for black pepper.

White Pepper shall be the dried mature berry of *Piper nigrum* L. from which the outer coating, or the outer and inner coatings have been removed. It shall contain not less than seven (7) per cent of non-volatile ether extract, not less than fifty-two (52) per cent of pepper starch and it shall not contain more than five (5) per cent of crude fiber, more than three and five-tenths (3.5) per cent of total ash or more than three-tenths of one (0.3) per cent of ash insoluble in hydrochloric acid.

Ground White Pepper shall be the product made by grinding white pepper and shall conform in its composition to the standards for white pepper."

F. D. No. 2, U.S.A. "BLACK PEPPER. The dried immature berry of *Piper nigrum* L. It contains not less than 6.75 per cent of non-volatile ether extract, not less than 30 per cent of starch, not more than 7 per cent of total ash, nor more than 1.5 per cent of ash insoluble in hydrochloric acid.

GROUND BLACK PEPPER. The product made by grinding the entire berry of *Piper nigrum* L. It contains the several parts of the berry in their normal proportions.

WHITE PEPPER. The dried mature berry of *Piper*

nigrum L. from which the outer coating (or the outer and inner coatings) have been removed. It contains not less than 7 per cent of non-volatile ether extract, not less than 52 per cent of starch, not more than 5 per cent of crude fiber, not more than 3.5 per cent of total ash, nor more than 0.3 per cent of ash insoluble in hydrochloric acid."

LONG PEPPER

According to F. D. No. 2, U.S.A., long pepper is the dried fruit of *Piper longum* L. The standard does not recognize *Piper officinarum* Casimir DC.,* although it seems to be the more important source of long pepper. The former plant is cultivated chiefly in Bengal, India and the latter in Java, Netherlands East Indies.

The dried fruits are roughly cylindrical, being about 3/16 to 5/16 of an inch in diameter and about 3/4 to 2 inches or more in length. The fruit is spirally-furrowed, grayish-brown in color and has an aromatic odor and pungent taste. It is used chiefly for pickling purposes but the spice is not abundant.

* *U. S. Dispensatory*, 2nd Ed.

CHAPTER 11

CAPSICUM SPICES

(*Genus Capsicum*)

RED PEPPER

Cayenne pepper, paprika, red pepper and chilli powder are all prepared from the dried, ripe fruits of the genus *Capsicum*.



Red Peppers

Right: Long Red Cayenne
Top Left: Domestic Sports
Bottom Left: Congo Chillies

Dried *Capsicum* red peppers vary considerably in size, shape and flavor. The small, very acrid peppers are known as chillies and they are used whole for pickling purposes or they are ground to make Cayenne pepper. Paprika is manufactured from the larger pods and may be sweet, semi-sweet, mildly pungent or pungent. Red pepper may refer to Cayenne or may be the pungent, dried whole or ground pods of a variety of *Capsicum annum* such as var. *acuminatum*. Chilli powder is made by grinding

selected pods of mild or pungent varieties of the genus *Capsicum* depending upon whether a mild or "hot" product is required.

In this book Cayenne pepper has been ascribed to *Capsicum frutescens*, *Capsicum baccatum*, or some other small fruited species of *Capsicum*, and paprika has been ascribed to *Capsicum annuum*. This was done to agree with Government Standards but since considerable confusion seems to exist concerning the number of species of *Capsicum*, the reader's attention is drawn to the following enlightening extract from the bulletin by A. T. Erwin* and also to The National Formulary standard for *Capsicum* under "Cayenne pepper." "The genus comprises a wide range of forms, particularly as to the shape and pungency of the fruit. At one time or another many of these variations have been described as species. Linnaeus in his *Hortus Clifforensis*, 1737, describes two species, *C. annuum* and *C. frutescens*. Fingerhuth, 1832, recognized 25 species and 28 botanical varieties; three of the species and all the botanical varieties were first described by him. Irish in his monograph on the *Capsicums* reduced the number to two species, namely *C. annuum* and *C. frutescens*, but does not clearly differentiate between the two species. Bailey reduced these two species to a single form, namely *C. frutescens*. A study of the garden varieties presents material evidence in support of this point of view. Linnaeus, who described the two species named above, characterized the one as an annual and the other as a perennial, i.e., frutescent or woody. In the North, however, both species are killed by the winters and conversely, below the frost line both species are perennials. . . We, therefore, concur with Bailey that garden peppers all belong to one species of pepper. 'I am convinced,' states Bailey, 'that the horticultural kinds are all forms of one species and that the species is shrubby, the herbaceous or so-called annual kinds being races that develop in a short season and do not become woody before killed by frost. In the *Capsicum* shrubs of the tropics, one finds puffy

* A. T. Erwin, *The Peppers*, Bulletin No. 293, June, 1932, Agricultural Experiment Station, Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa.

fruit of the bell-pepper type as well as the slender finger-like and berry-like kinds; and when the northern kinds are grown in the tropics they become shrubs. Leaf variation also has an equal range. I, therefore, propose to arrange the most significant forms of this multifarious species under *C. frutescens* rather than under *C. annuum*. In doing so, I accept the second rather than the first of the two names proposed by Linnaeus in *Species Plantarum*, but when no question of authority or priority is involved, I cannot allow the incident of precedence on pages to obscure a biological fact.' Irish concurs in this point of view. 'From a further study of the genus *Capsicum*, I have reached the conclusion that the garden varieties are simply dwarf northern forms of *C. frutescens*.'

If one accepts the hypothesis that the cultivated forms represent but one species, the question still remains as to whether the designation should be *annuum* or *frutescens*. According to the American code it would be the former because it takes precedence on the page in Linnaeus' description, but such is not the case in the International code. The use of a term which contradicts the facts of the case by calling a plant an annual which is a perennial is not advisable. We, therefore, refer to *C. frutescens* all of the garden forms of peppers."

A. T. Erwin classifies the varieties of red *Capsicum* fruits under seven headings, selecting the name of a familiar variety of each group for the title name as follows:

"Tabasco Group

This group is characterized by small, erect, elongated fruits which are very pungent. The pods are borne singly, in pairs or in clusters and average from 1 to 3 inches long. The fruits are compressed at the base and appear above the foliage; peduncles slender, straight and erect; calyx cup-shaped. The Tabasco is perhaps the best known variety of this group, and from it is made the famous Tabasco sauce. It is one of the smallest-podded varieties of long peppers, but what it lacks in size is made up in pungency. . . The Tabasco group includes the

two botanical varieties *conoides* and *fasciculatum* of Irish. The varieties belonging to the Tabasco group are:

Cardinal	Orange Red Cluster
Chili Dwarf	Red Chili
Chili Piquin	Red Cluster
Coral Gem	Small Cayenne
De Bouquet Rouge	Small Chili
Japanese Cluster	Small Red Chili
Japanese Fuschin Pungent	Tabasco
Japanese Tassel	True Red Chili
	Very Small Cayenne."

"Cayenne Group

The Cayenne group, often called chili or finger peppers, is characterized by long curved pods ranging from 4 to 12 inches in length. In some varieties, as the Cayenne, the pods are slender; in others the base is enlarged, forming an elongated conical shape. Flesh ranges from thin to moderately thick; color red. Most varieties are distinctly pungent, but some are only mildly so. Fruits commonly pendent, but semi-erect in some varieties. Calyx cup-shaped in the slender-fruited varieties, and semi-flattened in the larger-fruited forms; peduncles short, often stout, and curved. The varieties comprising the Cayenne group are:

Anaheim	Giant Cayenne
Anaheim Giant Chili	Half Long Hot
Bulgarian Hot	Half Long Narrow Cayenne
Bulgarian Long Hot	Hungarian
Cayenne	Hungarian Long Wax
Cayenne Langer, Dunner	Hungarian Wax
Roter	Improved Thick Long Red
Cayenne Pickling	Japanese Fuschin, Sweet,
Chili Ancho	Green
Come d'Orient	Japanese Fuschin Pungent
Du Chili, smallest of the	Japanese Nikko Long Scarlet
Cayennes	Japanese Ornamental, Varie-
Dwarf Chili	gated
Garcia's No. 9	Jaune Demi Long Antibes

Jaune Long	Prolific
Large Anaheim Chili	Prolific Red
Large Red Chili	Red Cayenne
Large Thick Cayenne	Red Chili
Long Cayenne	Rainbow
Long Narrow	Red Dawn
Long Narrow Cayenne	Red Hot
Long Red	Rouge Long Ordinaire
Long Red Cayenne	Rouge Long Ordinaire Paivre
Mammoth Cayenne	Santa Fe
Mexican Chili	Short Thick Cayenne .
New Giant Cayenne	Thick Long Red
New Quality	Trompe d'Elephant
Pot Herb	True Red Chili."

"Cherry Group

The pods of this group are cherry-shaped or globose. The fruits are borne on long, slender, upright pedicels which carry the fruit more or less above the foliage. The berries are orange to a deep red in color, solitary, three celled, pungent. The varieties of this group are used to only a minor degree as a condiment. They are an attractive ornamental and are widely grown under glass for the holiday trade. The varieties included in this group are:

Bird Cherry	Japanese Miniature
Bird's Eye	Large Cherry
Cerise	Red Cherry
Cherry	Small Cherry
Creole	Tom Thumb

Yellow Cherry."

"Celestial Group

In the Celestial group the pods are cone shaped, $\frac{3}{4}$ to $1 \frac{1}{4}$ inches long, three-celled; color changing from a yellowish-green to purplish, then orange-red. The fruits are three-celled, erect and very abundant, appearing above the foliage, and acrid. The varieties included in this group are:

Celestial	Floral Gem
Chameleon	Little Gem
Chinios	Prince of Wales
Coral Gem	Spanish Gem."

"Perfection Group

Pods distinctly conical to sub-conical, apex bluntly pointed, 3 to 4 inches long, smooth; calyx flattened, stems stout, curved; flesh thick, non-pungent. Varieties included in the Perfection group are:

Doux de Genes	Salad Pimiento
Giant Pimiento	Spanish Pimiento
Panama	Sweet Genna
Perfection	Sweet Meat Glory
Pimiento	Sweet Salad
Salad	Rouge de Cavaillon."

"Tomato Group

The tomato group is characterized by a distinctly flattened or oblate form of four cells which bears a striking resemblance to a tomato. The fruit usually is flattened at both the base and apex; size 2-4 inches in diameter and half as thick; furrowed walls thick, in some varieties as much as $\frac{3}{8}$ of an inch; four-celled; flavor mild. The varieties that belong to this group are:

Bickling	Squash
Cheese Pepper	Sunnybrook
Early Sweet	Tomato Nain Hatif
Early Sweet Pimiento	Tomato Salad
Polombo	Tomato Shaped
Red Apple	Tomato Shaped Pimiento
Salad	Topepo."

"Bell Group

Fruits blocky, about 4 inches long and equally as wide, squarish, subtruncate to truncate, often deeply furrowed; apex 3 to 4-nosed; calyx recessed, flattened; flesh thick, as much as $\frac{3}{8}$ of an inch;

flavor usually mild, but hot in a few varieties; color red or yellow.

The varieties belonging to the Bell group are:

Bull Nose	Harris Earliest
California Wonder	Italian Sweet Neapolitan
Chinese Giant	Kolumbus Roter
Crimson Giant	Large Bell
Early Giant	Magnum Dulce
Early Giant Neapolitan	Neapolitan
Early Large Neapolitan	Ohio Crimson
Giant Crimson	Royal King
Great Western H	Schells Quality
Hamilton Market	Sweet Upright
Ruby King	Sweet Upright Salad."

Capsicum fruits are an excellent source of vitamin C, a fact which could be publicized to a much greater extent than it is now. According to "Vitamin Values of Foods," Miscellaneous Publication No. 505, U. S. Department of Agriculture, 1942, the raw peppers have the following vitamin C content:

Mild 200 milligrams ascorbic acid (vitamin C) in 100 grams.

Pungent 170 milligrams ascorbic acid (vitamin C) in 100 grams.

CAYENNE PEPPER

Plant: *Capsicum frutescens* Linn., *C. baccatum* L., or some other small-fruited species of *Capsicum*. (See N. F. standard under Government Standards at end of this article.)

Family: Solanaceae.

Nativity and Cultivation: Native to tropical America and cultivated in many tropical and subtropical parts of the world including South America, Central America, Africa, India and Japan.

Description: A shrubby perennial of the nightshade or potato family. *C. baccatum* is considered a variety of *C. frutescens*.

Properties of the Dried Fruit: *Color:* Dark to bright red; seeds, yellow.



Cayenne Pepper

- Top Left: Domestic Sports (U. S. A.)
 Top Right: Honka Chillies (Japan)
 Center: Chiltepin (Mexico)
 Center Right: Mombasa Chillies (Africa)
 Bottom Left: Nigerian Chillies (Africa)
 Bottom Right: Congo Chillies (Africa)

All of These Peppers May Be Used for the Manufacture of Cayenne Pepper

Size and Shape: The dried peppers vary in length from $\frac{3}{8}$ to $2\frac{1}{4}$ inches and in width from $\frac{3}{16}$ to $\frac{1}{2}$ an inch according to variety. Shape, blunt and roundish at the base, tapering to a point; oblong-acuminate.

Appearance: Dried, shiny pods, flattish and somewhat wrinkled. The pods contain numerous small, flat, reniform, yellow seeds.

Aroma and Taste: Characteristic, but not unpleasant odor. Their dust, however, disturbed in handling is very irritating and annoying. Particularly is this true of the small African peppers. Taste, very pungent, sharp and biting. Seeds, pungent and acid.

Cayenne pepper is the ground product of these small, red,

dried, ripe fruits. In the whole form, these dried pods are considered chillies and are known as Mombasa chillies, Zanzibar chillies, Japanese chillies, etc.

Uses: The culinary uses for Cayenne pepper include the flavoring of meat and fish dishes and sauces. It is a constituent of curry powder and pork sausage seasoning. The whole pods are included in pickling spice formulae.

Adulteration: Common adulterants of Cayenne pepper are farinaceous products, linseed, cereal starches, and ground fruit stones.

Grinding: The whole peppers should be ground fine enough to pass through a mesh 38 to 48 screen.

Packing: The whole peppers are packed in bales of 30 and 84 pounds and in bags of 100 pounds depending upon variety.

Essential Oil: Cayenne contains no volatile oil.

Government Standards: F. D. Canada. "Cayenne Pepper, Cayenne shall be the dried ripe fruit of *Capsicum frutescens* L., *Capsicum baccatum* L., or some other small-fruited species of *Capsicum*. It shall contain not less than fifteen (15) per cent of non-volatile ether extract and it shall not contain more than one and five-tenths (1.5) per cent of Cayenne starch, more than twenty-eight (28) per cent of crude fiber, more than eight (8) per cent of total ash or more than one and twenty-five hundredths (1.25) per cent of ash insoluble in hydrochloric acid."

F. D. No. 2, U. S. A. "CAYENNE PEPPER, CAYENNE. The dried, ripe fruit of *Capsicum frutescens* L., *C. baccatum* L., or some other small-fruited species of *Capsicum*. It contains not less than 15 per cent of non-volatile ether extract, nor more than 1.5 per cent of starch, not more than 28 per cent of crude fiber, not more than 8 per cent of total ash, nor more than 1.25 per cent of ash insoluble in hydrochloric acid."

The National Formulary Standard: "Capsicum is the dried ripe fruit of *Capsicum frutescens* Linn., known in commerce as African Chillies, or of *Capsicum annum* Linne var.

conoides Irish, known in commerce as Tabasco pepper, or of *Capsicum annuum* var. *longum* Sendt, known in commerce as Louisiana Long Pepper, or, of a hybrid between the Honka variety of Japanese *Capsicum* and the old Louisiana Sport *Capsicum*, known in commerce as Louisiana Sport Pepper (Family Solanaceae). *Capsicum* must be labeled to indicate which of the above varieties is contained in the package. *Capsicum* contains not more than 3 per cent of its stems and calyxes, and not more than 1 per cent of other foreign organic matter. It yields not less than 12 per cent of a non-volatile ether-soluble extractive and not more than 1.25 per cent of acid-insoluble ash."*

PAPRIKA



Canadian Paprika Pod

About One Quarter Natural Size

Plant: *Capsicum annuum* Linn.

Family: Solanaceae.

Nativity and Cultivation: Native to Central America and cultivated in Hungary, Bulgaria, Spain, Portugal, Argentine, Chile, United States and Canada.

* *The National Formulary, Seventh Edition*, taken from the U. S. Dispensatory, 23rd Ed. p. 255, CAPSICUM, Capsic (Cayenne Pepper).

Description: Herbaceous annuals in temperate climates, biennials or perennials in warm and tropical climates.

Paprika is the powder prepared by grinding the dried ripe pods of varieties of *C. annuum*. In the manufacture of first quality paprika, only carefully selected pods are used and of these only the fleshy pericarp and seeds are ground. Stalks, stems, and placentae are included in the preparation of lower and inferior grades.

Properties of Good Quality, Mild, Paprika: *Color:* Bright, rich red to bright, rich dark red.

Aroma and Taste: A slight, pleasant odor, and an agreeable, slightly sweet, and mildly pungent taste.

The properties of paprika vary considerably depending upon the variety of *C. annuum* grown, conditions governing production, methods of processing, etc. The color may vary from dull, medium or bright brick-red to the bright, rich dark red of first quality paprika. The aroma may vary from the unpleasant cocoa-like odor of inferior grades to the slight, but pleasant, odor of superior grades. The taste may vary from none at all to sweet, mildly pungent, or strongly pungent. The war, shutting out Hungarian ("Noble sweet," "Semi-sweet," "Rose," "Strong" and "Mercantile" paprika) and Bulgarian paprika, has proved an incentive to production in certain neutral countries and to growers and manufacturers here in America. Today paprika reaches our markets from Spanish, Portuguese, Chilean, Argentine, American and Canadian producers. More Portuguese paprika has been imported in the U. S., since 1941, than any other type. It is worthy of note that U. S. growers of paprika pods produced a commercial crop estimated according to the *Spice Manual and Directory*,* at about three million pounds in 1942. The quality of United States and Canadian paprika is most desirable but production of the latter is not yet very great.

Uses: Because of its rich color, flavor, and vitamin C content, paprika is quite a culinary favorite and is used for garnish-

* *Spice Manual and Directory*, 1943, p. 100, A. S. T. A.

ing and flavoring the following foods: fish and meat dishes, salad dressing, salads, canapes, poached and devilled eggs, devilled chicken, etc. It is also employed in the commercial manufacture of foodstuffs including fancy meats, tomato catsup, chilli sauce, biscuits, etc. Paprika is an ingredient of a number of ground spice formulae including frankfurter, Bologna, and summer sausage.

Adulteration: The adulteration of paprika is not unknown, cornstarch, cornmeal, ground wheat, ground linseed and other edible adulterants being employed. Olive oil is sometimes used in grinding to intensify color. Because color is an important property of paprika, it is sometimes found bolstered by the addition of coal tar or vegetable dyes. The blending of cheap, inferior grades with first quality paprika to bring down the price is sometimes practiced, the deception arising when such paprika is represented as a first quality product.

Grinding: Paprika is not usually ground by spice millers. Good quality paprika is generally fine enough to pass through a mesh 74 screen.

Packing: Hungarian, Bulgarian, Spanish, Portuguese and Chilean paprika is packed in 110 pound bags. Some Chilean paprika is packed in 35 kilogram (77 pounds) bags. Canadian and American paprika is sometimes packed in 200 pound barrels.

Essential Oil: Paprika contains no volatile oil.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "PAPRIKA. The dried, ripe fruit of *Capsicum annuum* L. It contains not more than 8.5 per cent of total ash, not more than 1 per cent of ash insoluble in hydrochloric acid. The iodine number of its extracted oil is not less than 125, nor more than 136.

HUNGARIAN PAPRIKA. Paprika having the pungency and flavor characteristic of that grown in Hungary.

a. Rosenpaprika, rosapaprika, rose paprika, is Hungarian paprika prepared by grinding specially selected pods of paprika, from which the placentae, stalks, and stems

have been removed. It contains no more seeds than the normal pods, not more than 18 per cent of non-volatile ether extract, not more than 23 per cent of crude fiber, not more than 6 per cent of total ash, nor more than 0.4 per cent of ash insoluble in hydrochloric acid.

- b. Koenigspaprika, king's paprika, is Hungarian paprika prepared by grinding whole pods of paprika without selection, and includes the seeds and stems naturally occurring with the pod. It contains not more than 18 per cent of non-volatile ether extract, not more than 23 per cent of crude fiber, not more than 6.5 per cent of total ash, nor more than 0.5 per cent of ash insoluble in hydrochloric acid.

PIMENTON, PIMIENTO, SPANISH PAPRIKA. Paprika having the characteristics of that grown in Spain. It contains not more than 18 per cent of non-volatile ether extract, not more than 21 per cent of crude fiber, not more than 8.5 per cent of total ash, nor more than 1 per cent of ash insoluble in hydrochloric acid."

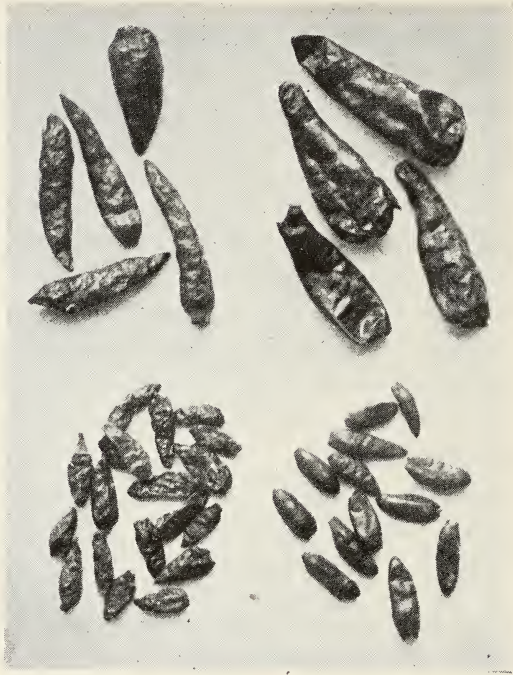
CHILLIES



Chilli Ancho

Known as "Mexican Chilli Pods"

Chillies are small, whole, red, very pungent, dried ripe *Capsicum* fruits. The best known are:



Chillies

Top Left: African Nigerian

Top Right: Japanese Honka

Bottom Left: African Mombasa

Bottom Right: Mexican Chiltepin

African: Mombasa

Congo

Zanzibar

Nigerian

Properties similar.

Size: Length, $\frac{3}{8}$ to $\frac{5}{8}$ of an inch.

Color: Murky brownish-red.

Appearance: Wrinkled, shiny, dull to moderately bright.

Taste: Very acrid.

Size: Length, $\frac{1}{2}$ to $1\frac{1}{4}$ inches.

Color: Bright red.

Appearance: Wrinkled, shiny, very bright.

Taste: Acrid.

Mexican: Chiltepin (also known as Chilepique, Chili piquin, Chilepetine)	<i>Size:</i> Length, $\frac{1}{4}$ to $\frac{9}{16}$ of an inch. <i>Color:</i> Orange-red. <i>Appearance:</i> Smooth, shiny and bright. <i>Taste:</i> Very acrid.
Japanese: Honka (known as Hontakas)	<i>Size:</i> Length, 1 to 2 inches. <i>Color:</i> Orange-red to dark red. <i>Appearance:</i> Compressed, somewhat wrinkled, shiny and bright. <i>Taste:</i> Very pungent.
United States of America: Domestic Sports (Louisiana Sport Pepper)	<i>Size:</i> Length, 1 to $2\frac{1}{4}$ inches. <i>Color:</i> Deep red to orange-red. <i>Appearance:</i> Smooth, shiny and bright. <i>Taste:</i> Very pungent.

Another well-known chilli of commercial importance is the Tabasco. Tabasco chillies are small, extremely pungent peppers used in the making of Cayenne pepper and in the manufacture of Tabasco sauce, a product widely employed to add a piquant touch to oysters on the half-shell and to shell-fish cocktails. Tabasco chillies are cultivated in the Gulf States of the United States of America and in Mexico. They are native to Mexico and named after the River Tabasco.*

The small African chillies, when disturbed, give off an offensive, irritating, acrid dust and should be handled with care. Do not put fingers to the eyes after handling chillies and do not taste the chillies if you would like to avoid painful, smarting eyes and mouth. This applies also to the large-fruited varieties of pungent red peppers.

The word "chilli" or "chili" is used to name some of the large-fruited varieties of the Cayenne group. Mexican chilli pods (Chile Ancho, var. *acuminatum*), the dried fruits of a member of this group are extensively used for the manufacture of the popular Mexican chilli powder, with or without blended spices.

* A. T. Erwin, *The Peppers*, Bulletin No. 293, June, 1932.

These chillies are $3\frac{1}{2}$ to $4\frac{1}{4}$ inches long and $2\frac{1}{2}$ to $2\frac{3}{4}$ inches wide at the broadest part when measured in the dried, collapsed condition. The fruits are wrinkled, shiny, and maroon colored. The calyx is of the flat or saucer type and adheres firmly to the pod. The peduncle is curved, stout and from $1\frac{1}{2}$ to 2 inches long. The flesh is moderately pungent.

The bull nose pepper, a large, almost square, thick-fleshed, mild fruit of a variety of the bell group is often referred to as a chilli.

Whereas there may be no lexical reason why the word "chilli" should not be given to the *Capsicum* fruit regardless of variety or size, the word is generally confined to the small, pungent peppers and the larger peppers, pungent or otherwise, should not be confused with them.

Chillies are used in the manufacture of Cayenne pepper and employed whole for pickling purposes.

CHAPTER 12

TURMERIC

Plant: *Curcuma longa* L.

Family: Zingiberaceae.

Nativity and Cultivation: Native to East Indies and Cochin-China and cultivated in China, India ("Occupies an area



Alleppey Turmeric

of about 42,000 acres, the chief centers of production being the districts of Kistna, Guntar, Cuddapah, Coimbatore and Malabar."*), East Indies (Java) and West Indies (Haiti).

Description: An herbaceous plant with a perennial rootstock or rhizome. The rhizomes are cleaned, washed and sun-dried.

Properties of the Spice: *Color:* Deep yellow to orange-yellow.

Alleppey Turmeric: *Size and Shape:* The rhizomes of turmeric vary in size from about 1 to 3 inches in length and from about $\frac{5}{16}$ to $\frac{1}{2}$ an inch in thickness. The pieces are roughly

* Correspondence, Dept. of Agriculture, Madras, India.

cylindrical, curved and tapering at the ends. Some pieces are palmate (known as fingers), some have tubercle-like protuberances, while others are plainly cylindrical but thicker toward one end (known as bulbs).

Appearance: Rough and hard with numerous ridge-like rings encircling the rhizome; annulate. The rhizome is not easily broken but when fractured, it breaks clean, not being splintery or fibrous. The surface of the fracture is darker than the exterior of the rhizome, waxy and resinous in appearance. A very thin line describing a circle is seen on the surface. If the surface is wet and pressed against white paper, a deep yellow stain will be left.

Aroma and Taste: Characteristic, peppery odor and a slightly aromatic, somewhat bitter taste.

Powdered turmeric is manufactured by grinding the rhizomes. The colors of the ground product are:

Alleppey—orange yellow

Madras—lemon yellow

Most U. S. users of turmeric, particularly where the finished product is packed in glass containers, prefer the Alleppey because experience has shown that it will hold its color better than the Madras when exposed to direct or indirect sunlight. Haiti ground turmeric is a very dark orange-yellow in color.

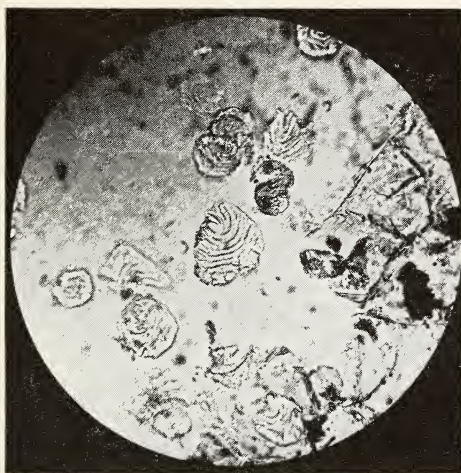
Uses: Turmeric is employed in the kitchen for the flavoring of meat and egg dishes. It is used in the manufacture of cheap mustard, the practice being to compound pure mustard with a quantity of soft flour and add ground turmeric in sufficient quantity to bring the color up to standard. It is also used in the manufacture of pickles and it is an important ingredient of curry powder.

Adulteration: Whole turmeric is not subject to adulteration and because the ground product possesses such a distinctive color, it is unlikely that adulteration would be attempted. Certainly it would be difficult to find a product for the purpose that would not immediately show its presence.

Grinding: Turmeric should be ground fine enough to pass through a mesh 74 screen.

Packing: Turmeric is packed in bags of approximately 140 pounds net weight.

Essential Oil: Turmeric contains about 5%* of volatile oil having a specific gravity** of 0.942–0.952.



Turmeric Starch x 250

Starch: The granules of turmeric starch are large and very characteristic. They are roughly ovate but irregular in shape and have a shell-like surface.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "CURCUMA, TURMERIC. The dried rhizome or bulbous root of *Curcuma Longa* L."

* *Merck Index*, Merck & Co., Inc., Rahway, N. J., 1940, 5th Ed., p. 182.

** Calculated from the little information available on this oil. The range is probably greater.

PART 3
AROMATIC SEEDS

CHAPTER 13

ANISE

Plant: *Pimpinella anisum* L.

Family: Umbelliferae.

Nativity and Cultivation: Native to Egypt and cultivated in temperate, warm and hot climates including Russia, Turkey,



Aniseed

Syria, Cyprus, Bulgaria, Germany, Italy, France, Spain, India, Mexico and South America.

Description: An annual herbaceous plant of the parsley family.

Properties of the Seed: *Color:* Greenish-gray to grayish-brown.

Size and Shape: Length, from $\frac{3}{32}$ to $\frac{3}{16}$ of an inch. Shape, oval.

Appearance: United or separate mericarps with short length of stalk (pedicel) attached. Five longitudinal ridges on each mericarp are clearly visible. Viewed under the low

power of the microscope, the surface between the ridges is seen to be covered with numerous short hairs.

Aroma and Taste: Characteristic, agreeable odor and a pleasant, aromatic taste.



Aniseed x 7½

Aniseed is available whole or ground. There are approximately 6,440 whole, united mericarps in one ounce and approximately 103,040 in one pound.

Uses: Aniseed is employed by the bakery trade to flavor rolls, cakes, cookies and biscuits and by confectioners to flavor licorice and other candies. It is also in demand by manufacturers of foods for domestic animals. It is used extensively for flavoring anisette and other liqueurs.

Adulteration: Whole anise is subject to adulteration with exhausted seeds, excessive stems and earth. The ground seed is sometimes found adulterated with fennel. This seed is considerably cheaper than aniseed and its aroma and flavor are similar to anise.

Grinding: Anise should be ground fine enough to pass through a mesh 54 screen.

Packing: Anise is packed in bags of various weights depending upon the source of seed. Spanish aniseed is packed in bags

of 110 pounds, Mexican in bags of 145 pounds and Bulgarian in bags of 175 pounds.

Essential Oil: Aniseed yields from 2 to 3% of essential oil having the following properties:*

Specific gravity at 20°C.: 0.975–0.990

Optical rotation at 20°C.: 0 to –2°

Refractive index at 25°C.: 1.552–1.558

Principal constituent: Anethole (80–90%)

Solubility: 1 part in 3–5 parts of 90% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "ANISE, ANISEED. The dried fruit of *Pimpinella anisum* L. It contains not more than 9 per cent of total ash, nor more than 1.5 per cent of ash insoluble in hydrochloric acid."

* *The Chemists' Year Book, 1944* (see p. 22).

CHAPTER 14

CARAWAY SEED

Plant: *Carum carvi* L.

Family: Umbelliferae.

Nativity and Cultivation: Native to Europe and cultivated in Russia, Syria, Poland, Bulgaria, Rumania, Holland, Morocco, Canada and United States of America.



Caraway Seed

Description: A biennial, umbelliferous herbacious plant of the parsley family.

Properties of the Seed: *Color:* Light to dark brown with pale-colored, somewhat yellowish ridges.

Size and Shape: Variable in length from about $\frac{5}{32}$ to $\frac{1}{4}$ of an inch, curved and tapered at each end.

Appearance: Separate mericarps, clean and free from stalk

ends.* Hard and somewhat sharp to the touch. Five longitudinal ridges are clearly visible.

Aroma and Taste: Characteristic and agreeable odor and an aromatic, pleasant, warm, somewhat sharp taste.

Caraway seed is available whole or ground. There are approximately 6,500 to 9,400 mericarps in one ounce and approximately 104,000 to 150,400 in one pound, according to the source of seed.



Caraway Seed x 7½

Uses: Caraway seed is widely employed for flavoring bread, biscuits and cakes. Europeans use it for flavoring cheese and sauerkraut. It is an ingredient of pork sausage seasoning and some manufacturers include it in the formula for whole mixed pickling spice. The Dutch variety has been used, for many years, in the production of Kummel, a potent alcoholic cordial.

Adulteration: Whole caraway is subject to adulteration with exhausted seeds, excess stems and earth. The ground product is sometimes found adulterated with cheaper seeds of similar flavor, farinaceous products or worthless vegetable seeds.

Grinding: Caraway seeds should be ground fine enough to pass through a mesh 54 screen.

* Known as "dewhiskered" in the spice trade.

Packing: Dutch, Russian and Spanish caraway seed is packed in bags of 110 pounds and Syrian is packed in bags of 150 or 160 pounds.

Essential Oil: Caraway yields from 3 to 7% of volatile oil having the following properties: *

Specific gravity at 15°C.: 0.907–0.920

Optical rotation at 20°C.: +70 to +82°

(usually +75 to +78°)

Refractive index at 25°C.: 1.484–1.497

Principal constituent: Carvone (50–60%).

Solubility: 1 part in 10 parts of 80% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "CARAWAY, CARAWAY SEED.

The dried fruit of *Carum Carvi* L. It contains not more than 8 per cent of total ash, nor more than 1.5 per cent of ash insoluble in hydrochloric acid."

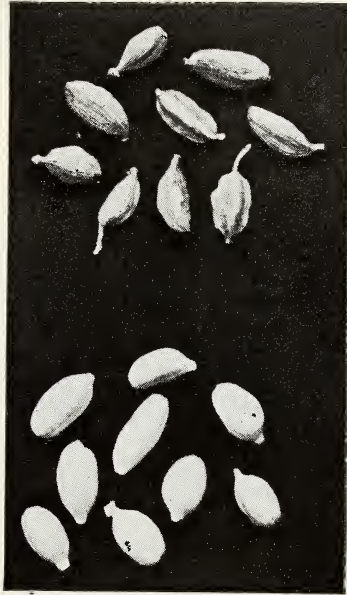
* *The Chemists' Year Book, 1944* (see p. 22).

CHAPTER 15

CARDAMOM SEED

Plant: *Elettaria cardamomum* Maton.

Family: Zingiberaceae.



Top: Green Cardamoms

Bottom: Bleached Bold Cardamoms

(About $\frac{2}{3}$ rd Natural Size)

Nativity and Cultivation: Native to India and cultivated in India (Malabar, Mangalore, Mysore) and Ceylon. It is also cultivated to some extent in Central America.

Description: A perennial herb of the ginger family.

The dried cardamom fruit consists of a tough capsule contain-



Cardamom Seeds

(The Seeds Contained in the Capsule) One Seed Cut Transversely



Cardamom Seed

Bleached Medium Bold

ing small irregular shaped seeds which vary in number from about eight to sixteen.

Properties of the Dried Unopened Fruit: Type "Medium Bold": *Color:* Creamy white. The unbleached or green cardamoms are greenish-brown in color.

Size and Shape: Vary in length from 5/16 to 9/16 of an inch. The breadth is fairly constant being about 5/16 of an inch at the widest part of the fruit. Shape, three-sided and oval-oblong.

Appearance: Clean and longitudinally wrinkled; fairly smooth to the touch. The capsule is of a very tough, fibrous and paper-like nature.

Aroma and Taste: The unopened fruits have an aromatic odor. The capsule has a slight aromatic taste.

Properties of the Seed: *Color:* Varies from light reddish-brown to dark reddish-brown.

Size and Shape: About 3/32 of an inch long and 1/16 of an inch thick. Shape, angular and irregular.

Appearance: Covered with a thin membrane, wrinkled and hard to the touch.

Aroma and Taste: Pleasant, aromatic odor and a characteristic, warm, slightly pungent, highly aromatic taste.

Cardamoms are available whole bleached, whole semi-bleached, whole green, decorticated (i.e., capsule removed) and ground. Whole cardamoms are marketed as extra superior bleached, superior bleached, bold bleached, medium bold bleached, bold green, fair average quality (FAQ) green, average quality (AQ) green. There are approximately 198 medium bold bleached cardamoms to one ounce and approximately 3,168 to one pound.

Uses: Ground cardamom is employed for flavoring bread, cakes and cookies. Cardamom is an ingredient of curry powder and of a number of ground spice seasonings including liver sausage, pork sausage and hamburg seasoning. Cardamoms are included in the formula for whole mixed pickling spice by some manufacturers.

Grinding: Cardamoms should be ground fine enough to pass through a mesh 54 screen.

Packing: Cardamoms are packed in cases of 112 pounds.

Essential Oil: Cardamom yields from 3.5 to 8 per cent of volatile oil having the following properties:*

Specific gravity at 15°C.: 0.922–0.950

Optical rotation at 20°C.: +22 to +40°

Refractive index at 20°C.: 1.460–1.470

Solubility: 1 part in 2–5 parts of 70% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "CARDAMOM. The dried, nearly ripe fruit of *Elettaria cardamomum* Maton."

"CARDAMOM SEED. The dried seed of cardamom. It contains not more than 8 per cent of total ash, nor more than 3 per cent of ash insoluble in hydrochloric acid."

* *The Chemists' Year Book, 1944* (see p. 22).

CHAPTER 16

CELERY SEED

Plant: *Apium graveolens* L.

Family: Umbelliferae.

Nativity and Cultivation: Native to Southern Europe and cultivated in France, Holland, Great Britain, India and United States of America.



Celery Seed

Description: A biennial herbaceous plant of the parsley family.

Properties of the Seed: *Color:* Varies from light brown to brown, with pale colored ridges.

Size and Shape: From $\frac{3}{64}$ to $\frac{1}{16}$ of an inch in length. The separated mericarps are flat to slightly concave on the inner surface and convex on the dorsal surface.

Appearance: Small; united or separate mericarps, some with stalk ends attached. Numerous small pieces of stalk present with the seed. The ridges of each mericarp are clearly visi-

ble, and when examined under the low power of the microscope are found to be five in number and very prominent.

Aroma and Taste: The well-known, characteristic, celery aroma and taste, this last being warm and slightly bitter.

Celery seed is available whole or ground. There are approximately 47,550 whole, united mericarps to one ounce and approximately 760,800 to one pound.



Celery Seed x 7½

Uses: Employed in the kitchen as a substitute for fresh celery and used to flavor soups, salads, tomato juice, spreads, sauces, etc. It is also used in pickling and in the manufacture of CELERY SALT which is a mixture of ground celery seed and free-running table salt.

Adulteration: Whole celery seed is subject to adulteration by the addition of exhausted, or spent, seeds; excess stems; earth; etc. The ground product is sometimes found adulterated with farinaceous products, linseed meal, worthless vegetable seeds, etc.

Grinding: Celery seed should be ground fine enough to pass through a mesh 54 screen.

Packing: Indian celery seed is packed in bags of 130 pounds and the French seed is packed in bags of 220 pounds.

Essential Oil: Celery seed yields from 2.5 to 3% of essential oil having the following properties: *

Specific gravity at 15°C.: 0.860–0.895

Optical rotation at 20°C.: +60 to +80°

Refractive index at 20°C.: 1.479–1.486

Solubility: 1 part in 10 parts of 90% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "CELERY SEED. The dried fruit of *Celeri graveolens* (L) Britton (*Apium graveolens* L.).

It contains not more than 10 per cent of total ash, nor more than 2 per cent of ash insoluble in hydrochloric acid."

* *The Chemists' Year Book, 1944* (see p. 22).

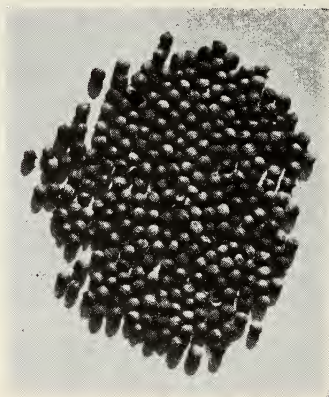
CHAPTER 17

CORIANDER SEED

Plant: *Coriandrum sativum* L.

Family: Umbelliferae.

Nativity and Cultivation: Native to Europe and cultivated in

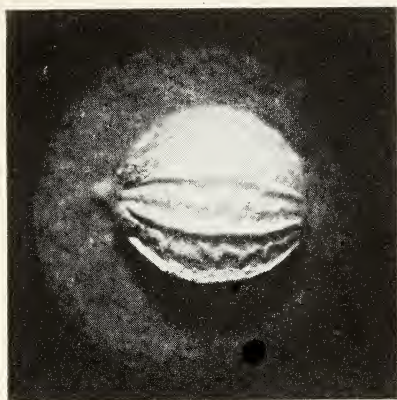


Coriander Seed

North Africa (Morocco), Russia, Asia Minor, India, South America, and to a limited extent in the United States of America.

Description: An annual umbelliferous herb of the parsley family, growing to about 2 feet. The lower leaves are broad and deeply segmented or lobed while the leaves of the upper part of the plant are composed of very narrow linear segments. The plant bears umbels of very small pinkish flowers. The herb gives off a very pronounced odor which some think offensive. The odor must have been offensive to the ancient Greeks for they compared it to that of a bedbug. The word coriander (Greek *Koriandron*) is derived from the Greek

word *Koris* meaning a bedbug. The seeds are free of any such odor, having, on the contrary, a fragrant scent.



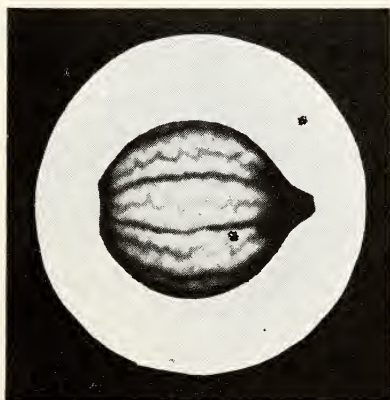
Coriander Seed x $7\frac{1}{2}$

Note Straight and Wavy Ridges

Properties of the Seed: *Color:* Yellowish-brown.

Size and Shape: Varies in size from $\frac{1}{8}$ to $\frac{3}{16}$ of an inch in diameter. Shape, nearly globular.

Appearance: United mericarps. The seed easily breaks apart,



Coriander Seed x $7\frac{1}{2}$

Specially Illuminated to Show Straight and Wavy Ridges

however, and a handful of the seed will show a number of single or separate mericarps. The seed is at once recognized by its straight and wavy ridges. Each mericarp has four, straight, primary ridges and five, less distinct, wavy, second-



Umbels of Coriander

ary ridges. Five calyx teeth and a short conical style complete the apex of the seed. An occasional seed will be noticed with a short length of stalk attached.

Aroma and Taste: A slight, fragrant odor and a pleasant, aromatic taste.

Coriander seed is available whole or ground. There are approximately 1,984 to 2,778 whole, united mericarps to one ounce and approximately 31,744 to 44,448 to one pound depending upon source of seed.

Uses: Coriander is used for flavoring pastry, cookies, buns and cakes. The whole seed is an important ingredient of whole mixed pickling spice. The ground seed is included in formulae for curry powder and Hindu spice, pork sausage, frankfurter and other seasonings. It is also used as an in-

gredient in manufacture of tobacco products. Practically all of the U. S. crop, centering in Kentucky, is used in flavoring liquors, mainly gin.

Grinding: Coriander seed should be ground fine enough to pass through a mesh 54 screen.

Packing: Indian coriander seed is packed in bags weighing from 83 to 93 pounds net. Morocco seed is packed in bags of 110 pounds.

Essential Oil: Coriander seed yields from 0.1 to 1% of volatile oil having the following properties: *

Specific gravity at 15°C.: 0.870–0.885

Optical rotation at 20°C.: +7 to +14°

Refractive index at 20°C.: 1.463–1.476

Solubility: 1 part in 3 parts of 70% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "CORIANDER SEED. The dried fruit of *Coriandrum sativum* L. It contains not more than 7 per cent of total ash, nor more than 1.5 per cent of ash insoluble in hydrochloric acid."

* *The Chemists' Year Book, 1944* (see p. 22).

CHAPTER 18

CUMIN SEED

Plant: *Cuminum cyminum* L.

Family: Umbelliferae.

Nativity and Cultivation: Native to Egypt and the Mediterranean region. Cultivated in Morocco, Sicily, Malta, Cyprus, Egypt, Iran and India.



Cumin Seed

Description: An annual umbelliferous plant of the parsley family.

Properties of the Seed: *Color:* Yellowish-brown.

Size and Shape: The separate mericarps vary from $\frac{1}{8}$ to $\frac{1}{4}$ of an inch in length. Shape, oval, elongated; dorsal surface convex.

Appearance: United and separate mericarps, ridged, with

Cumin Seed x $7\frac{1}{2}$

Note Secondary Hairy Ridges

many seeds having a short length of stem attached. Examination with a good hand lens or the low power of the microscope reveals five clean, prominent, longitudinal, primary ridges and four less distinct, hairy, secondary ridges. *Aroma and Taste:* A strong, distinctive, odor resembling caraway. Taste, warm and aromatic.

Cumin seed is available whole or ground. There are approximately 10,052 separate mericarps to one ounce and approximately 160,832 to one pound.

Uses: The culinary uses for cumin seed include the flavoring of bread, soups, rice and meat dishes. It is employed in the manufacture of certain prepared meats, pickles and cheese. Cumin seed is an ingredient of curry powder, chilli powder, Hindu spice, pungent mango pickles and green mango chutney.

Grinding: Cumin seed should be ground fine enough to pass through a mesh 54 screen.

Packing: Morocco and Cyprus cumin seed is packed in bags of 110 pounds. Indian cumin seed is packed in bags of 120 and 135 pounds.

Essential Oil: Cumin seed yields from 2.5 to 4.5% of volatile oil having the following properties: *

Specific gravity at 15°C.: 0.900–0.930

Optical rotation at 20°C.: +3 to +8°

Refractive index at 20°C.: 1.494–1.510

Principal constituent: Cuminal (20–35%)

Solubility: 1 part in 3 parts of 80% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "CUMIN SEED. The dried fruit of *Cuminum cyminum* L. It contains not more than 9.5 per cent of total ash, not more than 1.5 per cent of ash in soluble in hydrochloric acid, nor more than 5 per cent of harmless foreign matter."

* *The Chemists' Year Book, 1944* (see p. 22).

CHAPTER 19

DILL SEED

Plant: *Anethum graveolens* L.

Family: Umbelliferae.

Nativity and Cultivation: Native to Europe and cultivated in many parts of that continent, England, India and the United States of America.



Dill Seed

Description: An herbaceous umbelliferous annual of the parsley family. The plant reaches a height of 3 or 4 feet and has finely divided light green leaves and bears compound umbels of small yellow flowers. All parts of the plant are aromatic. It is grown in many home gardens, being easily cultivated.

Properties of the Seed: *Color:* Light brown.

Size and Shape: Varies in size from $\frac{3}{32}$ to $\frac{3}{16}$ of an inch in length and $\frac{1}{16}$ to $\frac{1}{8}$ of an inch in width. Shape, oval.

Appearance: United and separate mericarps. The mericarp is concave on the inner surface, convex and ridged on the dorsal surface. The dorsal ridges are three in number, longitudinal and quite prominent. The lateral ridges are two in number and form thin wing-like expansions. These lateral ridges are a pale yellowish-brown color.



Dill Seed x 7½

Note Broad Lateral Ridges

Aroma and Taste: An aromatic odor faintly resembling that of caraway and a warm, aromatic, slightly sharp taste akin to caraway.

Dill seed is available whole or ground. There are approximately 11,400 separate mericarps to one ounce and approximately 182,400 to one pound.

Uses: Dill seed is employed in the kitchen for flavoring soups, salads, meat and fish sauces, meat dishes, etc. It is used by housewife and manufacturer alike for flavoring dill pickles. The ground seed is a constituent of many seasoning preparations including frankfurter, Bologna, liverwurst, summer sausage and pork sausage seasoning. Due to high costs of caraway seed, it was used largely, during world war I and is being used during world war II, as a substitute for caraway.

Grinding: Dill seed should be ground fine enough to pass through a mesh 54 screen.

Packing: Dill seed is packed in bags of 120 and 140 pounds.

Essential Oil: Dill seed yields from 2.5 to 4% of volatile oil having the following properties: *

Specific gravity at 15°C.: 0.895–0.918

Optical rotation at 20°C.: +70 to +82°

Refractive index at 25°C.: 1.477–1.490

Principal constituent: Carvone (30–60%)

Solubility: 1 in 3 parts of 90% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "DILL SEED. The dried fruit of *Anethum graveolens* L. It contains not more than 10 per cent of total ash, nor more than 3 per cent of ash insoluble in hydrochloric acid."

* *The Chemists' Year Book, 1944* (see p. 22).

CHAPTER 20

FENNEL SEED

Plant: *Foeniculum vulgare* Miller.

Family: Umbelliferae.



Fennel Seed

Nativity and Cultivation: Native to Europe and cultivated in Germany, Rumania, Italy, France, North Africa, Russia, Syria, India and Japan.

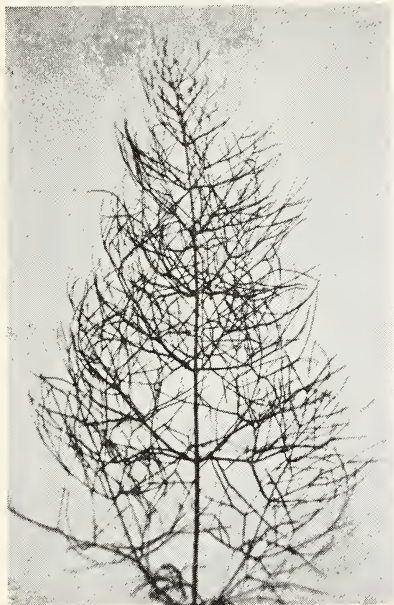
Description: A biennial or perennial umbelliferous herb of the parsley family. The fruits (or seeds), leaves and stems are all aromatic. The plant has finely divided green leaves made up of numerous thread-like segments and bears umbels of small yellow flowers. It is easily grown in the garden.

Properties of the Seed: *Color:* Greenish or yellowish-brown.

Size and Shape: Varies from $\frac{5}{32}$ to $\frac{5}{16}$ of an inch in length. Shape, oblong oval, straight or slightly curved.

Appearance: Bold, united mericarps with prominent ridges. Many seeds have a short length of stem attached. Separate

mericarps are flat on the inner surface and convex on the dorsal surface. Each mericarp has five distinct, yellowish, longitudinal ribs or ridges.



Finely Divided Leaves of Fennel

Aroma and Taste: Pleasant, aromatic odor and taste strongly resembling that of aniseed.

Fennel is available whole or ground. There are approximately 3,118 whole, united mericarps to one ounce and approximately 49,888 to one pound.

Uses: The culinary uses for fennel seed include the flavoring of soups, fish dishes and sauces. It is extensively used by Italians in roasting pork. It is employed by bakers for flavoring bread, rolls and pastries. It is also used in the manufacture of sweet pickles.

Grinding: Fennel seed should be ground fine enough to pass through a mesh 54 screen.

Packing: Indian fennel seed is packed in bags of 112 pounds.
Morocco fennel seed is packed in bags of 110 pounds.



Fennel Seed x 7½

Essential Oil: Fennel seed yields from 4 to 6% of volatile oil having the following properties: *

Specific gravity at 15°C.: 0.960–0.990

Optical rotation at 20°C.: +6 to +24°

Refractive index at 20°C.: 1.525–1.550

Principal constituent: Anethol (50–60%)

Solubility: 1 part in 5–8 parts of 80% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "FENNEL SEED. The dried fruit of cultivated varieties of *Foeniculum vulgare* Hill. It contains not more than 9 per cent of total ash nor more than 2 per cent of ash insoluble in hydrochloric acid."

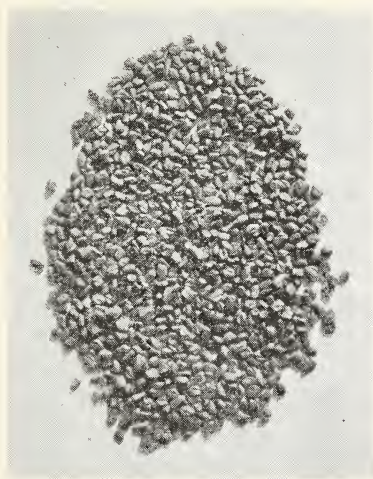
* *The Chemists' Year Book*, 1944 (see p. 22).

CHAPTER 21

FENUGREEK

Plant: *Trigonella foenum-graecum* L.

Family: Leguminosae.



Fenugreek Seed

Nativity and Cultivation: Native to Southern Europe and cultivated in France, Germany, Morocco, Egypt, India and United States of America.

Description: An annual leguminous herb of the pea family.

Properties of the Seed: *Color:* Brownish-yellow.

Size and Shape: Varies in length from $\frac{3}{32}$ to $\frac{3}{16}$ of an inch and in breadth from $\frac{5}{64}$ to $\frac{1}{8}$ of an inch. Shape, oblong-rhomboidal.

Appearance: Clean, sound seeds, each marked with a deep furrow running obliquely from one side. The seeds are

very hard and when grasped with fingers and thumb feel like very small pebbles.

Aroma and Taste: The odor is strong, pleasant and reminiscent of that of burnt sugar. The taste is decidedly farinaceous and slightly bitter.

Fenugreek seeds are available whole or ground. There are approximately 2,551 whole seeds to one ounce and approximately 40,816 to one pound.



Fenugreek Seed x 7½

Note Deep Furrow

Uses: Fenugreek is employed in the manufacture of imitation maple extract, pungent mango pickle and green mango chutney. It is an ingredient of some formulae for curry powder. Fenugreek is also used in stock foods, in veterinary medicinal preparations, and for planting as a cover crop in citrus fruit areas.

Grinding: Fenugreek seed should be ground fine enough to pass through a mesh 54 screen.

Packing: Indian fenugreek seed is packed in bags of 100 and 200 pounds. Morocco fenugreek seed is packed in bags of 220 pounds.

Government Standards: F. D. Canada. No reference.
F. D. No. 2, U. S. A. No reference.

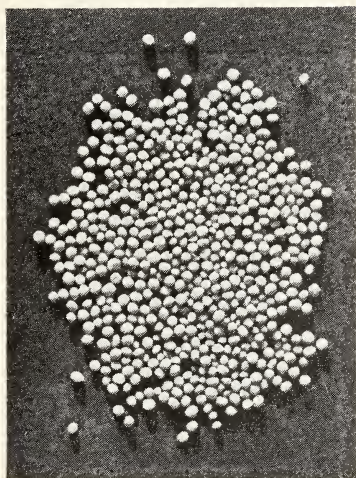
CHAPTER 22

MUSTARD

(a) *White (Commonly Called Yellow) Mustard Seed*

Plant: *Sinapis alba* L.

Family: Cruciferae.

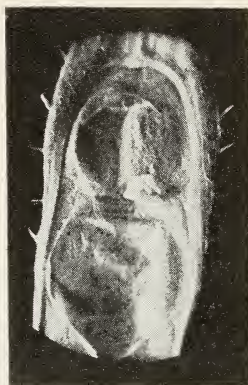


Yellow (White) Mustard Seed

Nativity and Cultivation: Native to Europe and Southwestern Asia and cultivated in Holland, Germany, Austria, Italy and other parts of Europe, India, North Africa, England, Canada and United States of America. In South America, black mustard is produced in Chile.

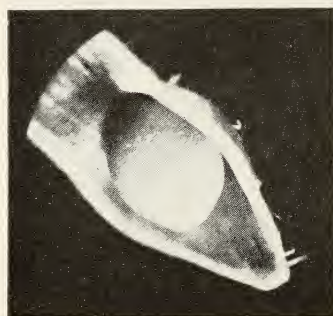
Description: An annual herbaceous plant of the mustard family. The leaves are deep green, lobed and hairy. The plant bears clusters of small yellow flowers with four petals resembling a cross in arrangement. The cross-like arrangement of the

petals is responsible for the family name cruciferae. The seeds are borne in a bristly pod, with a long flattish beak, known botanically as a silique. The silique is composed of



Illustrating the Membrane Which Separates the Two Carpels
of the White Mustard Silique x $7\frac{1}{2}$

two carpels which are separated by a fine membrane. The pods of black mustard are smooth, and narrower than those of white mustard and have a much shorter and more slender beak. Mustard is easily grown in the garden.



White Mustard Seed x $7\frac{1}{2}$
Resting in Section of Carpel

Properties of the Seed: *Color:* Yellowish.

Size and Shape: Vary in size from $3/64$ to $3/32$ of an inch in diameter. Shape, roughly globular.

Appearance: Small, round, clean-looking seeds; hard to the touch. When examined microscopically, the seed is seen to be minutely pitted.

Aroma and Taste: The whole seeds yield no perceptible odor and no odor results from crushing them in the presence of water (see black mustard seed). Taste, pungent.

(b) *Black (Commonly Called Brown) Mustard Seed*

Plant: *Brassica nigra* (L.) Koch.

Family:

Nativity and Cultivation: } See under *Sinapis alba*.

Description: }

Properties of the Seed: *Color:* Dark reddish-brown.

Size and Shape: Vary in size from $3/64$ to $1/16$ of an inch in diameter. Shape, roughly globular.

Appearance: Small, round, clean-looking seeds. When examined microscopically, the seed is seen to be minutely pitted.

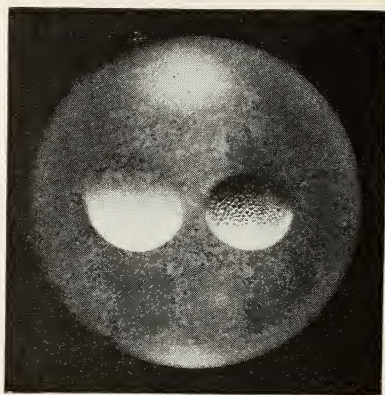
Aroma and Taste: The whole seeds yield no perceptible odor but when they are crushed in a mortar in the presence of a little water a sharp, piercing, irritating odor is given off (due to the presence of allyl isothiocyanate). Taste, pungent.

(c) *Mustard (Mustard Flour or Ground Mustard)*

Ground mustard or mustard flour is the product obtained by crushing, grinding and sifting the whole mustard seeds. The seeds are crushed to facilitate the removal of the hulls and a portion of the fixed oil. The remaining mustard cake is dried, ground and sifted to a fine powder. Pure ground mustard is a pale yellow in color. Ground mustard is graded to distinguish the various qualities, e.g., double superfine (DSF), extra fine (EF), pure No. 1, and pure No. 2.

Adulteration: Common adulterants of mustard seed are the worthless seeds of other species of mustard plants and weed

seeds. Ground mustard is often found adulterated with wheat flour and turmeric.



Mustard Seed x $7\frac{1}{2}$

Left: White (or Yellow)
Right: Black (or Brown)

Uses: Ground mustard is a widely used condiment and is employed to add flavor and piquancy to meats of all kinds. It is used in the preparation of mustard pickles. Mustard powder is employed in the manufacture of "prepared" mustard, a paste product containing mustard flour, vinegar, spices, etc., and is well known to the public. Yellow mustard seed is a constituent of whole mixed pickling spice. Brown mustard is extensively used, medicinally, in the preparations known as "mustard plasters."

There are approximately 5,131 whole white mustard seeds to one ounce and approximately 82,096 to one pound and there are approximately 12,740 whole black mustard seeds to one ounce and approximately 203,840 to one pound.

Packing: Mustard seed is packed in bags of 100, 150, 200 and 224 pounds depending upon place of origin. Pure ground mustard is packed in barrels of 220 pounds and in bags of 150 and 75 pounds.

Starch: Ground mustard should be negative to the ordinary iodine test for starch.

Essential Oil: Black mustard seed (*B nigra*) yields 0.5 to 1% of volatile oil having the following properties: *

Specific gravity at 15°C.: 1.014–1.032

Optical rotation: Inactive

Refractive index at 25°C.: 1.525–1.535

Principal constituent: Allyl isothiocyanate (90–95%).

Government Standards: F. D. Canada. "Mustard, Mustard Flour, Ground Mustard shall be the powder made from mustard seed with the hulls largely removed and with or without the removal of a portion of the fixed oil. It shall not contain more than one and five-tenths (1.5) per cent of mustard starch or more than six (6) per cent of total ash."

F. D. No. 2, U. S. A. "MUSTARD SEED. The seed of *Sinapis alba* L. (white mustard), *Brassica nigra* (L.) Koch (black mustard), *B. juncea* (L.) Cosson, or varieties or closely related species of the types of *B. nigra* and *B. juncea*. *Sinapis alba* (white mustard) contains no appreciable amount of volatile oil. It contains not more than 5 per cent of total ash nor more than 1.5 per cent of ash insoluble in hydrochloric acid.

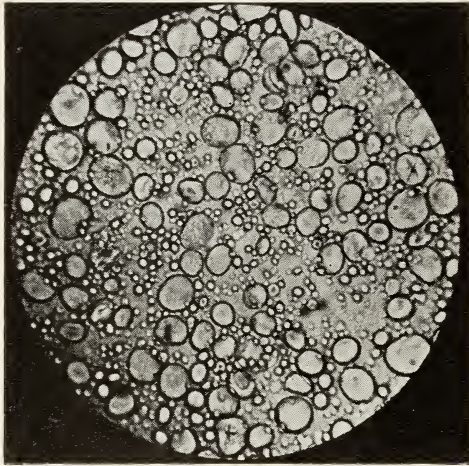
Brassica nigra (black mustard) and *B. juncea* yield 0.6 per cent of volatile mustard oil (calculated as allyl isothiocyanate). The varieties and species closely related to the types of *B. nigra* and *B. juncea* yield not less than 0.6 per cent of volatile mustard oil, similar in character and composition to the volatile oils yielded by *B. nigra* and *B. juncea*. These mustard seeds contain not more than 5 per cent of total ash, nor more than 1.5 per cent of ash insoluble in hydrochloric acid.

GROUND MUSTARD SEED, MUSTARD MEAL. Unbolted, ground mustard seed, conforming to the standards for mustard seed.

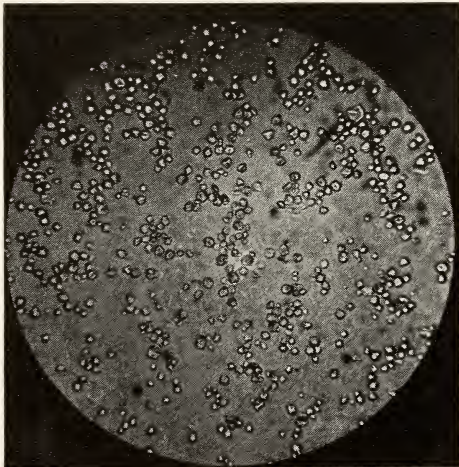
MUSTARD CAKE. Ground mustard seed, mustard meal, from which a portion of fixed oil has been removed.

* *The Chemists' Year Book, 1944* (see p. 22).

MUSTARD FLOUR, GROUND MUSTARD, 'MUSTARD.' The powder made from mustard seed with the hulls largely removed and with or without the removal of a portion of the fixed oil. It contains not more than 1.5 per cent of starch, nor more than 6 per cent of total ash.

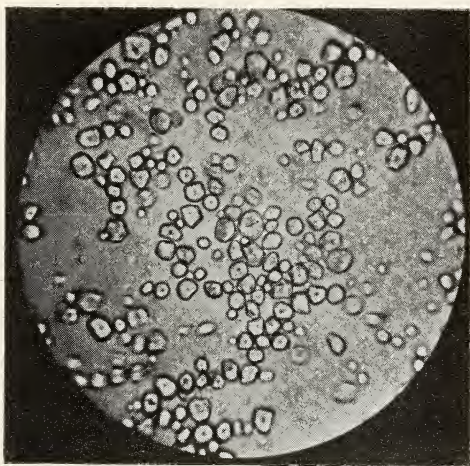


Wheat Starch x 250



Rice Starch x 250

PREPARED MUSTARD. A paste composed of a mixture of ground mustard seed and/or mustard flour and/or mustard cake, with salt, a vinegar, and with or without sugar and/or dextrose, spices, or other condiments. In the fat-, salt-, and sugar-free solids it contains not more than 24 per cent of carbohydrates, not more than 12 per cent of crude fiber, nor less than 5.6 per cent of nitrogen, the carbohydrates being calculated as starch."



Corn Starch x 250

CHAPTER 23

POPPY SEED

Plant: *Papaver somniferum* L.

Family: Papaveraceae.

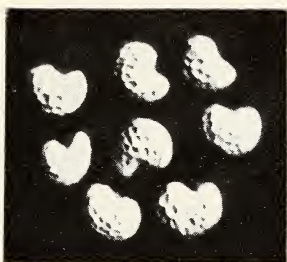
Nativity and Cultivation: Indigenous to Asia and cultivated in France, Poland, Holland, Germany, Hungary, India, Turkey, England, Canada, and United States of America.



Blue Poppy Seed

Description: An annual herbaceous plant of the poppy family. Poppy seed is available white or blue. The blue seed of commerce may be the genuine blue poppy seed or it may be the white poppy seed artificially colored blue. The dye used to color white poppy seed is water soluble and its presence is

readily discovered by adding 5 or 10 ml. of water to a few seeds held in a test tube. For our purpose, the genuine blue seed of commerce is described but it must not be thought that the white seed is in any way inferior. It is every bit as good but consumers prefer the colored seed because it is largely employed for decorating purposes. Indian white poppy has been used in a large way since the start of world war II, both straight and mixed with the blue. Poppy seeds have no narcotic properties.



Poppy Seed x $7\frac{1}{2}$

Properties of the Seed: *Color:* Actually slate-colored, but considered blue by the trade.

Size and Shape: About $\frac{3}{64}$ of an inch in length, and kidney shaped.

Appearance: Small, hard, clean looking seeds. The seeds should be studied under the low power of the microscope to be fully appreciated. Thus seen, the surface of the seed is found to be covered with a beautiful raised-ridge network.

Aroma and Taste: A slight, pleasant, nut-like odor and an agreeable, decidedly nutty taste.

Poppy seed is available whole, it is not usually ground. There are approximately 52,000 seeds to one ounce and approximately 832,000 to one pound.

Uses: Poppy seeds are employed by bakers for spreading on breads, rolls, cakes and cookies.

Packing: Turkish, Dutch and Indian poppy seed is packed in bags of 110 pounds.

Essential Oil: Poppy seeds do not contain essential oil but they do contain from 50 to 60% of fixed oil which has considerable commercial importance.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. No references.

PART 4

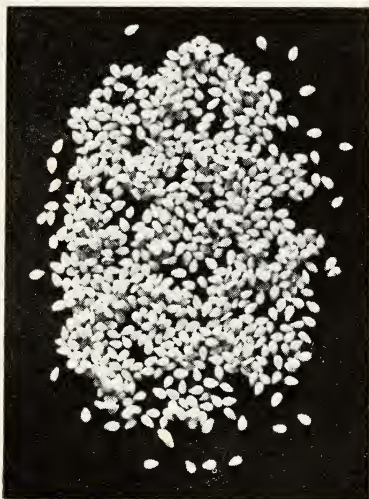
HERBS

SESAME SEED

Plant: *Sesamum indicum* L.

Family: Pedaliaceae.

Nativity and Cultivation: Native to Asia and cultivated in India, Turkey, China and other parts of Asia.



Sesame Seed

Description: An annual herbaceous plant of the *Sesamum* family.

Properties of the Seed: *Color:* Creamy-white.

Size and Shape: Varies from $\frac{3}{32}$ to $\frac{1}{8}$ of an inch in length. Shape, oval, compressed, with a small protuberance at one end.

Appearance: Hulled, clean, smooth and shiny seeds, not very hard and somewhat slippery to the touch.

Aroma and Taste: Very faint nutty odor and an agreeable, nutty taste.

Sesame seed is available whole, it is not usually ground. There are approximately 12,105 seeds to one ounce and approximately 193,680 to one pound.



Sesame Seed x 7½

Sesame seed is imported in unhulled and hulled form. This last is described above and is the seed generally in demand. The properties of the first are similar to those of the second excepting color which varies from a grayish-white to black. Sesame seed is also known as "Benne" or "Bene" seed.

Uses: Sesame seed is employed by bakers for use on bread, rolls, cookies, biscuits, etc., to improve the taste and impart a nut-like flavor.

Packing: Chinese sesame seed is packed in bags of 200 pounds, Indian sesame seed is packed in bags of 170 pounds.

Essential Oil: Sesame seed does not contain volatile oil but it does contain a fixed oil of considerable commercial importance.

Government Standards: F. D. Canada. No reference.
F. D. No. 2, U. S. A. No reference.

CHAPTER 25

STAR ANISE



Star Anise

Plant: *Illicium verum* Hook.

Family: Magnoliaceae.

Nativity and Cultivation: Indigenous to Southeastern Asia and cultivated in China.

Description: A small evergreen tree of the magnolia family.

Properties of the Dried Fruit: *Color:* Reddish-brown.

Size and Shape: Varies from about 1 to $1\frac{3}{4}$ inches measured from tip of one carpel to tip of carpel directly opposite. Individual carpels vary from about $\frac{3}{8}$ to $\frac{3}{4}$ of an inch in length. Star shaped as the name implies but many fruits are quite irregular.

Appearance: Eight carpels joined to short central peduncle; hard-looking, wrinkled, woody appearance. The carpels are laterally broad at stalk end, bellied and taper to a point. Individual carpels break off quite easily which accounts for

a number of the fruits in any sample having less than eight carpels. Each carpel contains a single, glossy, oval, compressed seed. The carpels are hard, rigid and not easily opened. The seeds are very brittle.

Aroma and Taste: The carpels have a pleasant, anise-like odor and an agreeable, aromatic, sweet, anise-like taste; the seeds to a much lesser extent.

Star anise is available whole. It is not usually ground. There are approximately 12 whole dried fruits to one ounce and approximately 192 to one pound.

Uses: Star anise is used by confectioners for flavoring purposes.

It is also employed to a limited extent for pickling purposes. Chinese people say that one or two carpels added to a chicken which is to be roasted improves the flavor tremendously. It is used as a flavor in cough drops and in the production of absinthe.

Packing: Star anise is packed in bags of 112 pounds. It is also packed in cases.

Essential Oil: Star anise yields 3% of volatile oil having the following properties: *

Specific gravity at 20°C.: 0.975–0.990

Optical rotation at 20°C.: –2 to +1°

Refractive index at 25°C.: 1.552–1.558

Solubility: 1 part in 3 parts of 90% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "STAR ANISEED. The dried fruit of *Illicium verum* Hook. It contains not more than 5 per cent of total ash."

* *The Chemists' Year Book, 1944* (see p. 22).

CHAPTER 26

LAUREL LEAVES



Laurel Leaves

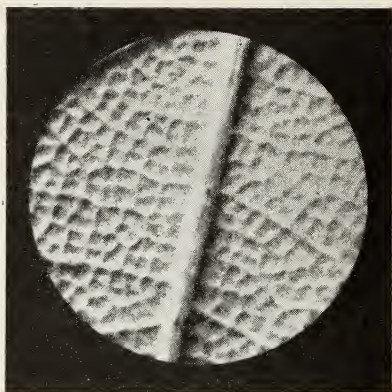
Laurel leaves are also called bay leaves, no doubt because of the fact that *Laurus nobilis* L. is known as the sweet bay laurel. I understand that many years ago, when the pure food law was passed in the United States, a regulation was adopted which ordered that, because there is, botanically, a bay leaf from which bay rum* is derived, the leaves of *Laurus nobilis* must be described as laurel leaves. Distributors all refer to and invoice them as laurel leaves.

Plant: *Laurus nobilis* L.

Family: Lauraceae.

* "Proper bay rum was the product directly distilled from the leaves of the bay tree. The dried leaves were mixed with rum and water, containing a little salt, and the whole of the distillate from this collected. Poucher (P. J. 1924, 112, 186) states that this sort of bay rum is no longer produced." U. S. Dispensatory, 23rd Ed. p. 772.

The bay tree mentioned in the above quotation refers no doubt to *Pimenta acris* (family Myrtaceae), from whose leaves it was said bay oil, officially



Underside of Laurel Leaf $\times 7\frac{1}{2}$

Magnified to Show Section of Prominent Midrib and Network of Veins

Nativity and Cultivation: Indigenous to countries bordering on the Mediterranean and cultivated in Greece, Spain, Portugal, Asia Minor, and Central America (Guatemala). The Guatemalan leaves are considered inferior to the other types.

Description: An evergreen tree or shrub of the laurel family with smooth, shiny green leaves.

Properties of the Leaf: *Color:* The surface of the leaf is green and the underside is pale green and somewhat yellowish in color.

Size and Shape: Variable in size from about 1 to 3 inches or more in length and $\frac{5}{8}$ to 1 inch or more in breadth at the widest part of the leaf. Shape, elliptical, tapering to a point at base and tip of leaf.

known as oil of Myrcia, was obtained. However, oil of bay is derived from the leaves of *Pimenta racemosa*, and bay rum is manufactured from this oil. As far as I can ascertain, the oil is dissolved in alcohol and to this solution other aromatic materials are added.

Another tree commonly referred to as the bay tree or bay laurel tree is *Umbellularia californica*. The leaves of this tree are aromatic and also yield a volatile oil on distillation.

These various bay leaves and bay oils must be distinguished from the leaves and oil of the sweet bay laurel, *Laurus nobilis* L., and to avoid confusion, the aromatic leaves of *Laurus nobilis* L. should always be spoken of as LAUREL leaves.

Appearance: The dried leaf is smooth, somewhat shiny on the surface and dull underneath. It is stiff in texture and brittle. The midrib and branching side veins stand out prominently, especially on the under side of the leaf where a network of numerous small veins is also clearly visible. The edge of the leaf is slightly wavy; undulate.

Aroma and Taste: Laurel leaves have a pleasant odor but they must be crushed to appreciate the delicate, aromatic fragrance which they possess. The taste is aromatic and bitter.

Uses: The culinary uses for laurel leaves are numerous, including the flavoring of soups, stews, meat and game dishes, fish dishes and sauces. They are employed in the manufacture of pickles and are an important constituent of whole mixed pickling spice. Laurel leaves are available whole or cracked. They are not usually ground.

Packing: Laurel leaves are packed in bags of 55 and 110 pounds net weight.

Essential Oil: According to Parry,* laurel leaves yield 1 to 3% of volatile oil having the following properties:

Specific gravity: 0.915–0.930 (occasionally higher)

Optical rotation: -15 to -22°

Refractive index: 1.4670–1.4775

According to *The Chemists' Year Book, 1944*, the laurel leaf (*L. nobilis*) yields from 1 to 3% of volatile oil having the following properties:

Specific gravity at $15^{\circ}\text{C}.$: 0.915–0.936

Optical rotation at $20^{\circ}\text{C}.$: -15 to -22°

Principal constituent: Cineol (25–50%)

Solubility: 1 part in 3 parts of 80% alcohol.

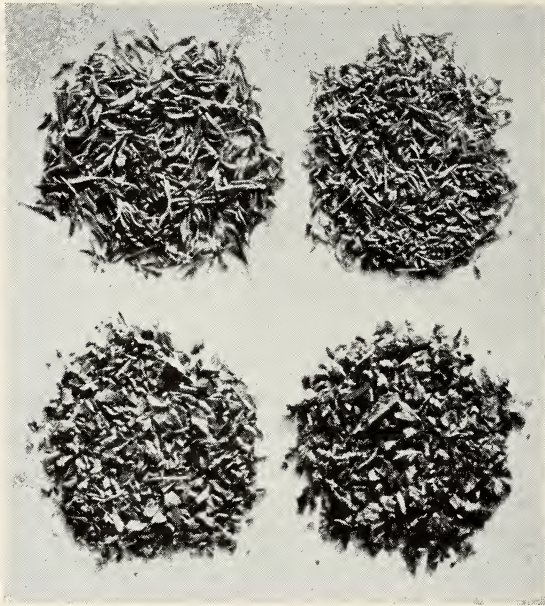
Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "BAY LEAVES. The dried leaves of *Laurus nobilis* L."

* Ernest J. Parry, *Parry's Cyclopedia of Perfumery*, vol. 1, p. 376.

CHAPTER 27

MARJORAM



Dried Herbs

- Top Left: Savory, Whole
Top Right: Thyme, Whole
Bottom Left: Marjoram, Whole
Bottom Right: Origanum, Rubbed

Plant: *Maiorana hortensis* M.

Family: Labiatae.

Nativity and Cultivation: Native to Western Asia and the Mediterranean region and cultivated in France, Germany, Hungary, Spain, Portugal, England, North Africa, South and North America.



Marjoram x 7½

Note Growth of Small Hairs

Description: A perennial herb of the mint family, small and delightfully fragrant. It is easily grown in the garden.

Properties of the Dried Herb: *Color:* Light green with a slight grayish tinge.

Appearance: Dried, whole and broken leaves. The whole leaves are small and elliptical. When examined under the low power of the microscope many dot-size oil glands will be observed in the leaf as well as a growth of numerous, downy, whitish hairs. These hairs are found on both sides of the leaf.

Aroma and Taste: The odor is pleasant and aromatic. The French marjoram is especially fragrant. The taste is warm, aromatic, slightly sharp, bitterish and somewhat camphoraceous.

Marjoram is available whole or ground.

Uses: The culinary uses for marjoram include the flavoring of soups, stews, dressings, salads, egg and vegetable dishes, cheese, etc. It is an ingredient of poultry dressing and is employed in the seasoning of a number of fancy meats and sausages by industrial manufacturers of such foodstuffs.

Grinding: Marjoram should be ground fine enough to pass through a mesh 38 to 48 screen.

Packing: French marjoram is packed in bales of 110 pounds, English marjoram in bags of 224 pounds and Chilean marjoram in bags of approximately 50 pounds.

Essential Oil: Marjoram yields from 0.3 to 0.9% of volatile oil having the following properties: *

Specific gravity at 15°C.: 0.890–0.910

Optical rotation at 20°C.: +15 to +18°

Refractive index at 20°C.: 1.472–1.478

Solubility: 1 part in 3 parts of 80% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "MARJORAM, LEAF MARJORAM. The dried leaves, with or without a small proportion of the flowering tops, of *Marjoram hortensis* Moench. It contains not more than 16 per cent of total ash, not more than 4.5 per cent of ash insoluble in hydrochloric acid, nor more than 10 per cent of stems and harmless foreign material.

* *The Chemists' Year Book, 1944* (see p. 22).

CHAPTER 28

MINT



Dried Mint

As Received in Commerce About Half Natural Size

There are a number of species of the genus *Mentha* and many varieties. For our purpose, it is only necessary to describe the following members because they alone are important to the spice trade.

Plant: *Mentha spicata* L. (Spearmint) and *Mentha piperita* L. (Peppermint).

Family: Labiatae.

Nativity and Cultivation: Native to Europe and Asia and grown more or less in all parts of Europe, in some parts of Asia, England and North and South America.

Description: Perennial herbs.

Properties of the Dried Herb: (Note: The properties of the two species are so much alike, they need not be described separately for our purpose.)

Color: Dark green.

Appearance: Dried, crumpled, shriveled, whole and broken leaves with leaf-stalks attached to whole leaves or parts of whole leaves. Whole leaves are ovate-oblong to ovate-lanceolate in shape.

Aroma and Taste: Strong, sweetish, characteristic odor and a warm, pleasant, aromatic, pungent taste, with a cooling after-taste.

Mint is available whole, rubbed or pulverized.

Uses: Mint is used in the kitchen for flavoring meat and fish sauces, soups and stews. Mint sauce with lamb is a great favorite. It is also employed for flavoring beverages, mint jelly, vinegar, teas, etc.

Grinding: Mint should be ground fine enough to pass through a mesh 38 to 48 screen.

Packing: Mint is packed in bales of approximately 90, 125, 166 $\frac{2}{3}$, 200, 225, and 250 pounds.

Essential Oil: Spearmint (*M. spicata*) fresh herb yields 0.3% of volatile oil having the following properties: *

Specific gravity at 15°C.: 0.920–0.940

Optical rotation at 20°C.: –30 to –52°

Refractive index at 25°C.: 1.480–1.489

Principal constituent: Carvone (35–66%)

Solubility: 1 part in 1–1.5 parts of 80% alcohol.

Peppermint (*M. piperita*) English, yields 0.4 to 1% of volatile oil having the following properties: *

Specific gravity at 15°C.: 0.900–0.910

Optical rotation at 20°C.: –22 to –33°

Refractive index at 20°C.: 1.460–1.465

Solubility: 1 part in 3–5 parts of 70% alcohol.

Q

* *The Chemists' Year Book, 1944* (see p. 22).

Peppermint (*M. piperita*) American, yields 0.1 to 1% of volatile oil having the following properties: *

Specific gravity at 20°C.: 0.900–0.920

Optical rotation at 20°C.: –18 to –33°

Refractive index at 20°C.: 1.458–1.467.

Government Standards: F. D. Canada. No reference except under flavoring extracts, "Spearmint shall be the leaves and flowering tops of *Mentha spicata* L."

"Peppermint shall be the leaves and flowering tops of *Mentha piperita* L. or of *Mentha arvensis* DeC., var. *piperascens*, Holmes."

F. D. No. 2, U. S. A. No reference, but under flavoring extracts (under the Federal Food, Drug, and Cosmetic Act) "SPEARMINT. The leaves and flowering tops of *Mentha spicata* L."

"PEPPERMINT. The leaves and flowering tops of *Mentha piperita* L."

CHAPTER 29

ORIGANUM

Mexican Origanum

Also Known as Oregano and Mexican Sage



Tip of Origanum Leaf x 7½

Plant: I am unable to botanically classify Mexican origanum. The Department of Agriculture of Mexico indicate the herb to be *Origanum vulgare* belonging to the family Labiatae, to which also belong the sages.* The U. S. Dispensatory, 23rd Edition, lists origanum and explains that several related species of Labiatae plants have been used as condiments under the title of marjoram or origanum, "those most frequently met with being *Majorana hortensis* Moench (*Origanum majorana* L.) commonly called sweet marjoram, and the *Origanum vulgare* L." Mexican origanum is probably *Origanum vulgare* L.

* Correspondence Dept. of Agriculture, Mexico, October, 1943.

The properties of Mexican origanum resemble those of the sages rather than those of marjoram. The leaves are finely crenate, much larger and coarser than those of marjoram. The aroma has not the fragrance of marjoram but is strong and camphoraceous and the taste is more pungent, bitter and camphoraceous than that of marjoram.

Nativity and Cultivation: Probably native to the Mediterranean region. Origanum is cultivated in Greece and Italy and grown abundantly in Mexico.

Description: A perennial herb of the mint family.

Properties of the Dried Herb: *Color:* Light green.

Size and Shape: Length of leaves, from about $\frac{1}{4}$ to $\frac{5}{8}$ of an inch. Shape, ovate.

Appearance: Dried, brittle, finely crenate, pubescent, curled or folded leaves with short petioles. The midrib and branching veins of the leaf are very prominent.

Aroma and Taste: A strong, aromatic, camphoraceous odor and an aromatic, warm, pungent, bitter, camphoraceous taste.

Mexican origanum is available whole, rubbed, or ground.

Uses: No Mexican kitchen is without origanum, for the Mexicans contend no other herb communicates such excellent aroma and flavor to food. It is used for flavoring soups, chile-con-carne, pork and other meat dishes, fish and egg dishes, salads, and in the making of chilli powder.

Grinding: Origanum should be ground fine enough to pass through a mesh 38 to 48 screen.

Packing: Mexican origanum is packed in sacks of approximately 45 and 90 pounds.

Essential Oil: Mexican origanum contains a volatile oil but in the absence of a definite classification of this herb no properties can be given with certainty.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. No reference.

CHAPTER 30

PARSLEY



Dried, Rubbed Parsley Leaves x 7½

Plant: *Petroselinum sativum*, Hoffm.

Family: Umbelliferae.

Nativity and Cultivation: Native to Sardinia and the Mediterranean region. Widely and extensively cultivated. In the United States, parsley is extensively cultivated in the state of Louisiana.

Description: A biennial, umbelliferous herbaceous plant with rich green compound leaves. The leaflets are 3 lobed with each lobe divided into smaller, tooth-like lobes or segments; curly.

Properties of the Dried Herb: *Color:* Green.

Appearance: Dried, shrivelled, curled, broken leaves.

Aroma and Taste: A pleasant, characteristic, aromatic odor. Taste, characteristic and agreeable.

Dried parsley is available in the whole, rubbed, or ground form. It is an excellent source of vitamin C, containing 460 milligrams * of this important vitamin in 100 grams of the dried herb.



Parsley Leaf

Uses: The culinary uses for dried parsley include the flavoring of soups, meat and fish dishes, sauces and vegetable dishes, salads and garnishing. It is an ingredient in some commercial formulae for meat and poultry seasonings.

Grinding: Dried parsley should be ground fine enough to pass through a mesh 38 to 48 screen.

Packing: Dried parsley leaves are packed in bales of approximately 87 pounds and in tins of 20 pounds each. Two tins are packed to the case.

Essential Oil: Parsley leaves contain a small quantity of volatile oil. Guenther ** distilled an oil exclusively from leaf material without the presence of seed. He obtained a yield of 0.066% volatile oil having the following properties:

Specific gravity at 15°C.: 0.911

* *Vitamin Values of Foods*, Miscellaneous Bulletin, No. 505, Department of Agriculture, page 18.

** Dr. Ernest S. Guenther, Chief Research Chemist, Fritzsche Brothers, Inc. (reported in *Am. Perfumer*, 1935).

Optical rotation: $+6^{\circ}0'$

Refractive index: 1.5029

A volatile oil is also obtained from the seed of parsley. The properties of this oil differ from those of the volatile oil obtained from the leaves. The properties of the seed oil, as given in *The Chemists' Year Book, 1944*, are as follows:

Parsley *P. sativum* (fruit), yield 2 to 7%

Specific gravity at $15^{\circ}\text{C}.$: 1.040–1.100

Optical rotation at $20^{\circ}\text{C}.$: -5 to -10°

Refractive index at $20^{\circ}\text{C}.$: 1.512–1.525

Solubility: 1 part in 4–5 parts of 80% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. No reference.

CHAPTER 31

ROSEMARY



Rosemary

Plant: *Rosmarinus officinalis* L.

Family: Labiatae.

Nativity and Cultivation: Native to Southern Europe and cultivated in Yugoslavia, Spain, Portugal and other parts of Europe. It is also cultivated in the United States of America.

Description: A small perennial evergreen shrub of the mint family, with numerous linear-shaped leaves folded back at the edges.

Properties of the Dried Herb: *Color:* Brownish-green.

Appearance: During the drying process, the margins of the leaves which are already naturally folded back become more so, giving them a permanent revolute form having the shape and appearance of pine needles. The dried leaves vary in length from about $\frac{1}{4}$ to 1 inch and are slightly curved and brittle.



Rosemary x 7½

Showing Apex, Center and Base of Dried Leaf

Aroma and Taste: Rosemary leaves have a tea-like fragrance and, when crushed in the mortar, yield an agreeable and aromatic odor possessing a slight camphoraceous note. The taste is aromatic, pungent, somewhat bitter and slightly camphoraceous.

Rosemary is available whole or ground.

Uses: Rosemary is employed in the kitchen for flavoring soups, sauces, vegetable and meat dishes.

Grinding: Rosemary should be ground fine enough to pass through a mesh 38 to 48 screen.

Packing: Rosemary is packed in bales of 110 pounds to 220 pounds according to the place of origin.

Essential Oil: Rosemary leaves yield from 1 to 2% of volatile oil having the following properties: *

Specific gravity at 15°C.: 0.895–0.920

Optical rotation at 20°C.: –2 to +15°

Refractive index at 25°C.: 1.466–1.472

Solubility: 1 part in 10 parts of 80% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. No reference.

* *The Chemists' Year Book*, 1944 (see p. 22).

CHAPTER 32

SAGE



Tip of Young Dalmatian Sage Leaf x 7½

Plant: *Salvia officinalis* L.

Family: Labiatae.

Nativity and Cultivation: Native to Southern Europe and cultivated in Yugoslavia, and other parts of Europe; England, Canada, and United States of America.

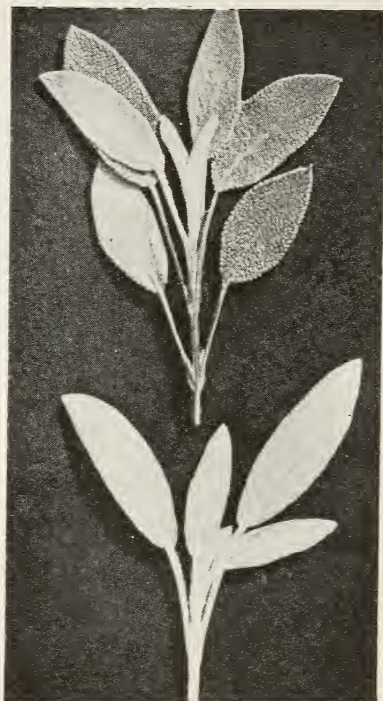
Description: A perennial herb of the mint family.

Properties of the Dried Herb: *Color:* Gray, tinged with green.

Appearance: Dried, whole and broken leaves with fragments of stems (petioles). The leaves are oblong-lanceolate and covered with a growth of fine short hair giving them a furry or wooly appearance (pubescent).

Aroma and Taste: The odor is strong, fragrant and aromatic and the taste is aromatic, warm, somewhat astringent and a little bitter.

The properties described above are those of Dalmatian sage, considered by the trade to be the best quality sage reaching us



A Variety of Sage (*Salvia officinalis*)

Grown in America and Canada



Tip of Young Sage (*S. officinalis*)

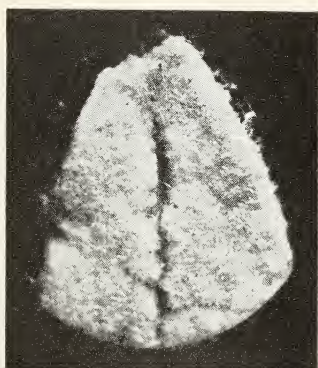
Taken from a Variety Grown in America and Canada

here in America. Due to war conditions, imports of sage from Dalmatia have been interrupted and other varieties and species have found a place in our markets, for example, Portuguese, Spanish and Cyprus sage.

PORTUGUESE SAGE



Dried Portuguese Sage Leaves

Tip of Portuguese Sage Leaf x $7\frac{1}{2}$

(Tip Point of This Leaf Is Broken)

Properties: *Color:* Light gray.

Appearance: Dried, whole and broken leaves together with short lengths of stalk having a few leaves attached. Whole leaves are comparatively long and lanceolate. Due to the

growth of numerous short hairs, leaves appear furry or wooly and are very soft and smooth to the touch.

Aroma and Taste: Practically devoid of odor and flavor. Portuguese sage is useless by itself for flavoring purposes.

SPANISH SAGE



Dried Spanish Sage Leaves



Tips of Two Spanish Sage Leaves x 7½

Properties: *Color:* Moderately dark gray.

Appearance: Dried, whole and broken leaves together with stems fragments (mostly petioles). Whole leaves are small,

elliptical and covered with a growth of fine short hair (pubescent). The leaves do not have the wooly appearance of Dalmatian or Portuguese sage.

Aroma and Taste: When the leaves are crushed, the odor is aromatic with a camphoraceous note. The taste is warm, a little bitter, somewhat astringent and camphoraceous.

CYPRUS SAGE



Dried Cyprus Sage Leaves

Properties: *Color:* Grayish-green to dark gray.

Appearance: This sage has a hard, coarse appearance and consists of whole and broken leaves. The whole leaves are larger than those of Spanish sage, oval, or ovate-lanceolate. The leaves are finely crenate and covered with a growth of fine short hair but they do not have a furry or wooly appearance.

Aroma and Taste: Aromatic, fragrant, somewhat camphoraceous odor. The taste is faintly aromatic, a little bitter, and somewhat camphoraceous. The properties of aroma and taste of different samples of this sage were found to vary considerably.

Cyprus sage more closely resembles the Dalmatian and domestically produced "Dalmatian types" than any other type but due to its brittleness it cannot be satisfactorily rubbed.

Canadian and American sage has also found its way to market



Tip of Cyprus Sage Leaf x 7½

and for aroma and flavor these sages are very good and akin to the Dalmatian herb. Unfortunately production is not yet very large. No crop figures are available for the Canadian herb but the 1942 crop of United States sage is estimated at 100,000 pounds.*

A wild sage is gathered in California, north of Los Angeles, known as *Leucophylla*. The U. S. government, however, does not class it as *Salvia officinalis* and it cannot be used in the preparation of meats.

Uses: Sage is probably the most important culinary herb in existence. It is found in every kitchen for the flavoring of meat and fish dishes and is used in the making of poultry stuffings. Meat packers and makers of fancy meats and sausages use considerable quantities of this herb. Sage is an important constituent of many ground spice formulae, including poultry dressing, sausage, liver sausage and hamburger seasonings.

Grinding: Due to the "wooly" nature of sage it is best ground in a pulverizer or hammer mill. This will reduce it to the requisite fineness without further screening.

Adulteration: Dalmatian sage is subject to adulteration with inferior varieties and species of sage.

Packing: Dalmatian sage is packed in bales of 200 to 400 pounds; Spanish sage in bales of 130 pounds; Cyprus sage

* *Spice Manual and Directory*, 1943, A.S.T.A., p. 105.

in bales of 550 to 700 pounds; Portuguese sage in bales of 110 pounds.

Essential Oil: Sage (*Salvia officinalis*) yields from 1.5 to 3% of volatile oil having the following properties: *

Specific gravity at 15°C.: 0.910–0.932

Optical rotation at 20°C.: +2 to +25°

Refractive index at 20°C.: 1.457–1.469

Solubility: 1 part in 2 parts of 80% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "SAGE. The dried leaf of *Salvia officinalis* L. It contains not more than 12 per cent of stems (excluding petioles) and other foreign matter."

* *The Chemists' Year Book, 1944* (see p. 22).

SAVORY



Savory Leaf (Folded) x 7½

Note Dot-Like Oil Glands

Plant: *Satureia hortensis* L.

Family: Labiatae.

Nativity and Cultivation: Native to Southern Europe and cultivated in Southern France, Germany, Spain and other parts of Europe; England, Canada and United States of America.

Description: An annual herbaceous plant of the mint family.

Properties of the Dried Herb: *Color:* Brownish-green.

Appearance: Very small, averaging about ¼ of an inch in length, dried, whole leaves with some stem fragments present. Savory leaves fold along the midrib during the drying process. The unfolded leaf is spatulate, obtuse at apex and tapered at base into petiole. If the leaf is examined under the low power of the microscope, many dot-size oil glands will be seen.

Aroma and Taste: Fragrant, aromatic odor and a warm, aromatic, slightly sharp and somewhat camphoraceous taste.

Savory is available whole, rubbed or powdered.

Uses: The culinary uses for savory include the flavoring of soups and sauces, meat, egg and salad dishes. It is a constituent of poultry dressing.

Grinding: Savory should be ground fine enough to pass through a mesh 38 to 48 screen.

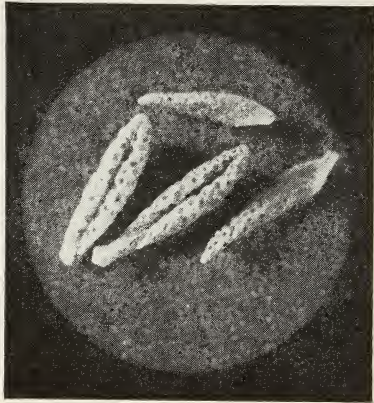
Packing: Savory is packed in bags varying from 85 to 135 pounds net, according to the place of origin.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "SAVORY, SUMMER SAVORY. The dried leaves and flowering tops of *Satureia hortensis* L."

CHAPTER 34

THYME



Dried Thyme Leaves x 7½

Plant: *Thymus vulgaris* L.

Family: Labiatae.

Nativity and Cultivation: Native to Southern Europe and cultivated in France, Germany, Spain, Italy and other parts of Europe, England, North Africa, Canada and United States of America.

Description: A perennial herbaceous plant of the mint family.

Properties of the Dried Herb: *Color:* Brownish-green.

Appearance: Small, dried, revolute leaves with a few stem fragments present. The dried leaves vary in length from about 1/16 to ¼ of an inch in length. When the leaf is viewed under the low power of the microscope, many dot-size oil glands will be seen.

Aroma and Taste: Crushed in the mortar, the leaves yield

a fragrant and aromatic odor. The taste is aromatic, warm and pungent.

Thyme is available whole or ground.

Uses: The culinary uses for thyme include the flavoring of soups, meat and fish dishes. It is an ingredient of poultry dressing.

Grinding: Thyme should be ground fine enough to pass through a mesh 38 to 48 screen.

Packing: Thyme is packed in bales of 75 and 110 pounds. French thyme is packed in bags of 160 pounds.

Essential Oil: Thyme yields about 2.5% of volatile oil having the following properties:*

Specific gravity at 15°C.: 0.905–0.930

Optical rotation at 20°C.: 0 to -4°

Refractive index at 20°C.: 1.480–1.498

Solubility: 1 part in 2 parts of 80% alcohol.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. A. "THYME. The dried leaves and flowering tops of *Thymus vulgaris* L. It contains not more than 14 per cent of total ash, nor more than 4 per cent of ash insoluble in hydrochloric acid."

* *The Chemists' Year Book, 1944* (see p. 22).

GARLIC POWDER

Plant: *Allium sativum* L.

Family: Liliaceae.

Nativity and Cultivation: Nativity unknown; cultivation intensive and universal.

Description: A perennial bulbous plant of the lily family.

Garlic powder is the ground product of dehydrated garlic. In the finer grades of garlic powder, only the selected cloves of garlic are used. The powder is cream or creamy-white in color and its strong, heavy, persistent aroma and taste are well known. Garlic powder should be kept in a closed container impervious to moisture otherwise it will become lumpy and hard.

GARLIC SALT is a mixture of garlic powder and free-running table salt with or without starch. Starch is sometimes added to help prevent the caking of the product.

Uses: Garlic powder is employed by the meat packing industry and other makers of fancy meats and sausages for the flavoring of their products. Garlic salt has numerous culinary uses and if not overdone, greatly improves the flavor of meat dishes, salads and sauces. It goes well with tomato juice.

Packing: Garlic powder is usually packed in 30 pound metal containers there being two containers to the wooden case.

Starch: Garlic powder contains no starch.

Essential Oil: Garlic contains about 0.1% of volatile oil having a specific gravity of 1.046 to 1.057.*

Government Standards: F. D. Canada. No reference.
F. D. No. 2, U. S. No reference.

* *U. S. Dispensatory*, 23rd Ed., 1943, p. 1251.

ONION POWDER

Plant: *Allium capa* L.

Family: Liliaceae.

Nativity and Cultivation: Nativity unknown; cultivation widespread and intensive.

Description: A biennial bulbous plant of the lily family.

ONION POWDER is the ground product of dehydrated onions. It is a creamy-white powder with properties of aroma and taste similar to those of the fresh onion. Like garlic powder, it should be kept in containers impervious to moisture otherwise the powder becomes lumpy and hard.

ONION SALT is a mixture of onion powder and free-running table salt, with or without starch. Starch is sometimes added to prevent the caking of the powder.

Uses: Onion powder may be put to most of the purposes for which the fresh onion is ordinarily used. It is always in demand by the meat packing industry and makers of fancy meats and sausages. The salt is excellent for flavoring meats, gravies, sauces, sandwiches, etc.

Packing: Onion powder is packed in 25 pound metal containers and two of these containers are packed in a wooden case.

Starch: Onion powder contains no starch.

Government Standards: F. D. Canada. No reference.

F. D. No. 2, U. S. No reference.

CHAPTER 37

MISCELLANEOUS MIXTURES OF SPICES AND HERBS

CURRY POWDER

Curry powder is prepared by grinding together a number of spices including cinnamon, cumin, cardamom, coriander, turmeric, cloves, red pepper, fenugreek, allspice, black pepper, ginger, mustard and nutmeg. Depending upon the type of curry powder required, all these spices may be employed, some may be omitted, others may be added.

A standard mixture would be unsuitable to those who know and use curry powder because curry requirements vary with the dish in hand. For example, to curry fish a different mixture is required from that used to curry meat. Again, some prefer a mild curry while others must have a "hot" curry.

Curry powder is used for currying meat, fish and eggs. It is also employed to some extent as a flavoring agent in sauces, meat and fish dishes.

PASTRY SPICE

Pastry spice is a blend of spices including cinnamon, cloves, ginger, allspice and nutmeg, with or without sugar. It is a convenient way to buy these essential spices and many commercial and domestic users prefer such a preparation for the flavoring of pastries, puddings, cakes, etc.

POULTRY DRESSING

Poultry dressing is a mixture of herbs and spices usually including pepper, ginger, mace, allspice, cloves, marjoram, nutmeg, thyme, savory and sage. The seasoning may be prepared by grind-

ing the various spices and herbs together or the ground ingredients may be mechanically mixed. It is a kitchen favorite for poultry, veal and pork stuffings and it is also employed by industrial processors of delicatessen and fancy meats.

PICKLING SPICE (Whole, Mixed)

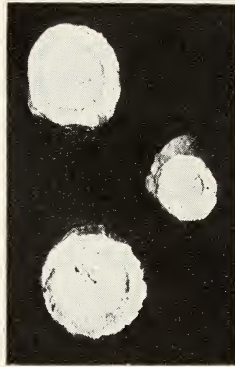
Whole mixed pickling spice is a mixture of the following whole spices: cassia, allspice, coriander, mustard seed, laurel leaves, cloves, ginger, pepper, chilli peppers and cardamom seed. The cassia, ginger and laurel leaves are first "cracked" to bring these spices to the right size and then all of the ingredients are thoroughly mixed with or without a small quantity of salad oil. The oil is generally added to give the mixture a bright appearance. Pickling spice is extensively employed for the pickling and preserving of vegetables and it is very much in demand during the pickling season by both the public and industrial food processors.

SAUSAGE SEASONING

Sausage seasoning is a mixture of pepper, sage, ginger, nutmeg, cloves or allspice, and sometimes red pepper. It may be prepared by grinding the various spices together or the ground ingredients may be mechanically mixed. It is usually in demand by butchers and makers of fancy meats.

MISCELLANEOUS ROOTS,
HERBS, BARKS, ETC.

ANGELICA



Angelica Root

Somewhat Less Than Half Natural Size

Angelica root is the rhizome of *Angelica archangelica* L. (*Archangelica officinalis* Hoffm., family Umbelliferae), a perennial herb, native to Asia Minor and cultivated in Germany. The root has an agreeable odor and an aromatic, pungent taste. All parts of the plant are aromatic. It is used chiefly for flavoring liqueurs, e.g., absinthe, anisette, chartreuse, Benedictine, and gin.

“Angelica is one of those survivals of ancient superstition which attributed medicinal properties to so many aromatic herbs. The potency of the drug may be estimated by the fact that in Europe the root and stems are candied and eaten as a conserve.”
U. S. Dispensatory 23rd Ed., 1943.

CALAMUS ROOT

Calamus root is the dried rhizome of *Acorus calamus* L., a perennial plant growing in Europe and America. The root has an aromatic odor and taste and is used, as is also its essential oil, in the manufacture of liqueurs, essences and bitters.

CAPERS

According to the U. S. Dispensatory, 23rd Edition, 1943, capers are the buds of unexpanded flowers of *Capparis spinosa* L., (family Capparidaceae), a low, trailing shrub, growing in the south of Europe and North Africa.

Capers are used for flavoring pickles, relishes, and sauces. Caper sauce with boiled mutton is a great favorite.

GENTIAN ROOT



Gentian Root

Somewhat Less Than Half Natural Size

Gentian root is the dried rhizome of *Gentiana lutea* L. growing in Europe and Asia Minor. It has a characteristic odor and a

bitter taste and it is used in the manufacture of stomach essences and bitters.

JUNIPER BERRIES



Juniper Berries

About $\frac{2}{3}$ Natural Size

Juniper berries are the dried ripe fruits of *Juniperus communis* Linn. (family Pinaceae). The plant is an evergreen of variable size growing in Europe, Northern Asia and America. The aroma of the berries is pleasant and aromatic. The taste is sweet. They are used in the manufacture of gin, juniper berry liqueur, and bitters.

According to F. D. No. 2, U. S. A., Saffron is "the dried stigma of *Crocus sativus* L. It contains not more than 10 per cent of yellow styles and other foreign matter, not more than 14 per cent of volatile matter when dried at 100°C., not more than 7.5 per cent of total ash, nor more than 1 per cent of ash insoluble in hydrochloric acid."

Saffron is cultivated in Austria, Spain, France, Greece, England and the Orient. The dried stigmas are about one inch long and are dark red to reddish-brown in color. The odor is characteristic and the taste somewhat bitter. It is employed as a flavoring and coloring agent.

SAFFRON



Spanish Saffron x 7½



Mexican Saffron x 7½

MEXICAN SAFFRON: Mexican saffron is not the true saffron, *Crocus sativus* of the iris family. It is botanically classified as *Carthamus tinctorius* L. of the family *compositae* and is an annual herb grown in the temperate regions of the central Mexican tablelands.*

* Correspondence, Dept. of Agriculture, Mexico. Oct. 6, 1943.

SASSAFRAS

“Sassafras is the dried bark of the root of *Sassafras albidum* (Nuttall) Nees (family Lauraceae). Sassafras contains not more than 4 per cent of adhering wood, outer corky tissues, or other foreign matter, yields not more than 5 per cent of acid-insoluble ash, and not less than 4.0 ml. of oil of sassafras from each 100 g. of drug.” National Formulary.**

The aromatic odor and flavor of this bark is responsible for its use in the manufacture of root beer and sarsaparilla extract. The oil of sassafras has considerable commercial value and it is used extensively as a perfume by these industries manufacturing soaps, insecticides, floor oils and polishing oils.

SWEET BASIL

Sweet basil, *Ocimum basilicum* L. (family Labiatae), is an annual herbaceous plant native to India and Persia and cultivated



Part of Sweet Basil Leaf x15

Showing Dot-Like Oil Glands

** *The National Formulary, Seventh Edition*, taken from U. S. Dispensatory, 23rd Ed., 1943.



Part of Sweet Basil Leaf x 50
Showing Oil Glands



Leaves of Sweet Basil

in Europe and America. The stems are square, i.e., four-sided, and the bright green leaves are opposite, ovate, somewhat toothed, and vary from $\frac{1}{2}$ an inch to $1\frac{1}{2}$ inches in length. The leaves

have numerous dot-like oil glands (see photomicrograph) in which the aromatic volatile oil of this herb is contained. The herb is low growing and bears clusters of small, white, two-lipped flowers in raceme fashion. It is easily grown in the garden.

The color of the dried leaves is brownish-green and in appearance a sample of the dried herb presents a mass of whole and broken leaves, brittle, curled or folded, together with some flowering tops.

The odor of sweet basil is aromatic, fragrant and sweet. When crushed, the odor is decidedly sweetish and strongly suggestive of anise. The taste is aromatic, warm, and somewhat pungent.

The culinary uses for sweet basil are numerous including the flavoring of soups, tomato and vegetable dishes, stews and dressings.

TARRAGON

According to F. D. No. 2, U. S. A., Tarragon is "the dried leaves and flowering tops of *Artemisia dracunculus* L." The leaves of this small herbaceous perennial are used for flavoring vinegar, pickles, prepared mustard, and to a limited extent in the culinary art for the flavoring of soups, salads, and some meat dishes. This herb is the source of the volatile oil of Tarragon responsible for the aromatic, anise-like odor of the plant.

VALERIAN ROOT

Valerian root is the dried rhizome of *Valeriana officinalis* L., an herbaceous plant belonging to the family Valerianaceae. It has a sweetish and somewhat camphoraceous taste and is used in the manufacture of valerian tincture, liqueurs and essences.

ZEDOARY ROOT

Zedoary root is the dried rhizome of *Curcuma zedoaria* Roscoe. The plant is a member of the ginger family and is native to India where it is cultivated. The root has an aromatic, pungent taste and is used in the manufacture of liqueurs, stomach essences and bitters.

PART 5
SPICE FORMULAE



SPICE FORMULAE

A number of the more often called for spice formulae are given here to assist those interested in arriving at the best combination of spices, seeds, and herbs for the flavoring of the particular food product they have in hand. There is nothing rigid or fixed about a spice formula and just what is the right quantity of this or that ingredient depends largely upon individual and community tastes. Quality and richness of flavor is the objective and some users and manufacturers might find that a blend of certain herbs is more satisfactory than the use of one commonly accepted herb and amongst the spices and aromatic seeds some might find a combination of two or three spices, or seeds, to be preferred to the generally accepted spice or seed.

The requirements of the spice manufacturer have been kept in mind and an attempt has been made to construct formulae to meet the demands made upon him for high and low priced mixtures capable of doing the work for which they are named.

The quantities of the ingredients of the various formulae are given in parts and the figures represent pounds, ounces, grams, or whatever weights the user is concerned with.

Curry Powder

	a	b	c	d	e	f	g	h	i
Allspice	..	..	..	4	4	..	4	4	2
Cayenne	1	6	6	4	4	2	5	2	2
Cassia	..	..	..	4	4	..	..	..	..
Cardamom	12	12	12	5	5	..	..	..	..
Coriander	24	22	26	27	37	32	36	36	50
Cloves	4	2	2	2	2	..	..	..	..
Cumin	10	10	10	8	8	10	10	10	10
Fennel	2	2	2	2	2	4	..	..	..
Fenugreek	10	4	10	4	4	10	10	10	5
Ginger	..	7	7	4	4	..	5	2	1
Mace	..	..	..	2	2	..	..	..	..
Mustard, yellow	..	..	..	..	..	..	5	3	5
Pepper, black	..	..	5	..	4	..	5	..	..
Pepper, white	5	5	..	4	..	10	..	5	10
Turmeric	32	30	20	30	20	32	20	28	15
	100	100	100	100	100	100	100	100	100

(a) Indian type mild curry.

(b) Indian type hot curry, light color.

(c) Indian type hot curry, dark color.

(d) A good quality, moderately hot curry, light color.

(e) A good quality, moderately hot curry, dark color.

(f) A curry suitable for fish.

(g) An inexpensive hot curry, dark color.

(h) An inexpensive mild curry, light color.

(i) A cheap, mild, dark color curry.

Hindu Spice

	a	b	c
Allspice	5	4	5
Cassia	7	8	5
Cloves	..	2	5
Coriander	40	42	35
Caraway	5	4	..
Cumin	35	35	35
Chillies	5	4	..
Cardamom	3	1	..
Ginger	..	..	10
Pepper, black	..	..	5
	100	100	100

Mincemeat Spice

	a	b	c	d	e	f	g
Allspice	25	25	38	25	24	20	10
Cinnamon	50	50	35	45	46	40	40
Cloves	..	..	12	5	10	10	10
Ginger	..	5	..	5	5	10	10
Mace	10	7	15	7	5	10	10
Nutmeg	15	13	..	13	10	10	10
	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100

Pastry Spice

	a	b	c	d	e	f	g	h	i
Aniseed	5	5	2	..	..	..	..	..	..
Allspice	10	5	15	14	14	20	25	15	20
Cardamom	5	5	2	..	..	..	..	..	..
Caraway	5	..	1	3	..	..	..	..	..
Cinnamon	30	30	30	45	50	50	25	40	20
Cloves	10	15	10	6	6	10	20	4	20
Coriander	..	..	..	..	..	..	20	..	5
Ginger	5	5	5	4	4	10	5	6	5
Mace	10	15	10	10	10	..	..	5	..
Nutmeg	10	15	15	8	8	..	5	10	20
Sugar	10	5	10	10	8	10	..	20	10
	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100

Pumpkin Pie Spice

	a	b	c
Cinnamon	36	40	50
Cloves	10	..	10
Ginger	36	35	25
Nutmeg	18	5	5
Mace	..	20	10
	<hr/> 100	<hr/> 100	<hr/> 100

Bologna Seasoning

	a	b	c	d
Allspice	10	5	10	15
Caraway	3	5	..	5
Coriander	..	5	..	10
Dill	5	5	10	..
Mace	5	5	5	..
Nutmeg	10	10	10	5
Onion powder	4	5	5	5
Pepper, white	53	50	50	55
Paprika	10	10	10	5
	<hr/>	<hr/>	<hr/>	<hr/>
	100	100	100	100

Frankfurter Seasoning

	a	b	c	d	e
Allspice	10	5	5	..	..
Anise	..	5	5	10	5
Caraway	10	5	5	10	5
Coriander	10	10	10	10	20
Dill	..	5	5	..	5
Mace	5	10	10	10	10
Nutmeg	10	5	5	5	..
Onion powder	3	5	3	3	3
Paprika	5	4	4	2	2
Pepper, white	47	46	48	50	50
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	100	100	100	100	100

Hamburger Seasoning

	a	b
Allspice	36	45
Celery seed	10	10
Cloves	10	5
Cardamom	5	..
Onion powder	2	2
Pepper, white	12	15
Sage	25	23
	<hr/>	<hr/>
	100	100

Liver Sausage Seasoning

	8	5	..
Cardamom	8	5	..
Celery seed	10	10	5
Ginger	10	12	10
Marjoram	20	20	20
Onion powder	2	3	5
Origanum	..	..	5
Pepper, white	40	40	20
Pepper, black	..	..	25
Sage	10	10	5
Savory	..	..	5
	<hr/>	<hr/>	<hr/>
	100	100	100

Mixed Herbs

a		b		c	
Marjoram	25	Celery seed	7	Marjoram	30
Mint	5	Marjoram	15	Rosemary	25
Rosemary	20	Parsley	28	Sage	15
Sage	15	Savory	15	Thyme	30
Savory	15	Sweet basil	7		
Thyme	20	Thyme	28		
	<hr/>		<hr/>		<hr/>
	100		100		100

Pickling Spice, Whole Mixed

	a	b	c	d	e	f
Allspice	15	15	18	20	10	15
Bay leaves, cracked	5	5	5	5	5	5
Cardamom, decorticated	5	5	..	..	..	..
Cassia, cracked	15	15	12	10	10	5
Chillies, whole	5	5	5	5	5	5
Coriander, whole	20	20	20	20	20	20
Cloves, whole	5	5	5	4	5	5
Ginger, cracked	5	5	5	4	5	5
Mace, broken	5	..	..	..	..	..
Mustard seed, whole	10	15	18	20	20	20
Pepper, black, whole	10	10	12	12	20	20
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	100	100	100	100	100	100

Note: Some manufacturers include a small quantity of dill seed, or caraway seed, or both.

Pickling Spice, Whole Mixed, For Fish

	a	b
Allspice, whole	8	12
Bay leaves, cracked	15	12
Cardamom, decorticated	4	6
Chillies, whole	15	10
Cinnamom, cracked	4	12
Cloves, whole	15	12
Ginger, cracked	4	10
Mace, broken	4	6
Mustard seed, whole	15	10
Pepper, black, whole	8	10
Pepper, white, whole	8	..
	<hr/>	<hr/>
	100	100

Pork Sausage Seasoning

	a	b	c	d	e
Allspice	5	10	10	15	..
Celery seed	..	..	2	..	5
Cardamom	5	3	5	..	..
Coriander	20	10	10	15	5
Caraway	5	..	2	..	..
Cayenne	..	2	1	..	..
Cassia	..	5	2	..	..
Dill seed	..	..	3	..	15
Mace	10	5	5	..	..
Nutmeg	..	5	10	10	20
Pepper, white	50	55	40	50	45
Sage	..	5	5	10	10
Thyme	5	..	5	..	..
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	100	100	100	100	100

Poultry Dressing

	a	b	c	d	e	f
Allspice	5	5	5	10	5	5
Cloves	5	5	..	5	..	5
Ginger	5	10	10	10	5	12
Mace	..	5	..	5	..	..
Marjoram	15	..	10	..	..	..
Nutmeg	5	5	5	10	5	10
Pepper, white	35	25	35	30	50	48
Sage	15	15	15	10	15	6
Savory	5	15	10	10	5	8
Thyme	10	15	10	10	15	6
	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100

Sausage Seasoning

	a	b	c	d	e
Allspice	15	10	10	..	18
Cloves	5	..	5	2	..
Ginger	10	5	5	15	5
Mace	5	10	5	5	..
Nutmeg	15	5	10	5	10
Pepper, white	30	55	45	58	50
Paprika	5	5	5	..	2
Sage	15	10	10	5	5
Salt	..	..	5	10	10
	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100	<hr/> 100

Summer Sausage Seasoning

	a	b	c
Caraway	5	5	3
Dill	10	5	7
Marjoram	12	7	5
Garlic powder	3	3	5
Paprika	5	5	5
Pepper, white	40	25	..
Pepper, black	20	45	70
Turmeric	5	5	5
	<hr/> 100	<hr/> 100	<hr/> 100

APPENDIX
STANDARDS CONTRACTS
OF THE
AMERICAN SPICE TRADE ASSOCIATION

Standard Arrival Contract
of the
American Spice Trade Association . .

As amended, effective on and after Sept. 1, 1944
New York, N. Y.

Sold for account of M.
to M.

Quantity, about

Article

Quality

Price

(Any change in present import duties of the U. S. A. and any
Federal, State and Municipal taxes shall be for account of
buyer)

Shipment

By Steamer or Steamers during

. 19 , direct or indirect to

Terms

Weights

Tares

Insurance

Insurance to include war risk according to American Institute
form or equivalent prevailing at the time of shipment, but
any expense for covering war risk in excess of one-half of
one per cent ($\frac{1}{2}\%$) to be for account of buyers. Rate of in-
surance to be approximately that ruling in New York at the
time of shipment.

A. All questions and controversies, and all claims arising under
this contract shall be submitted to and settled by Arbitration under
the Rules of The American Spice Trade Association printed on
the reverse side hereof. This contract is made as of in New York.

WAIVER OF PERSONAL SERVICE

Each party to a submission or other agreement which provides for arbitration under these rules, shall be deemed to have consented that any papers, notices or process necessary or proper for the institution or continuation of an arbitration proceeding under these rules or for the confirmation of an award and entry of judgment on an award made thereunder, including appeals in connection therewith, may be served upon such party (a) by mail addressed to such party's last known address or (b) by personal service, within or without the State wherein the arbitration is to be held, or within or without the limits of the jurisdiction of the Court having jurisdiction in the premises (whether such party be within or without the United States of America) or (c) where a party to a controversy is not located in the City of New York, by mail or personally, as provided in (a) and (b) hereof, upon his agent or broker through whom the contract was made; provided that a reasonable time shall be allowed such party to appear and defend.

ACCEPTED

.....

Signature.

Rules for Standard Arrival Contract

1. *DISPUTES*. Any question, controversy or claim whatever between buyer and seller arising out of this contract, not adjusted by mutual agreement, shall be settled by arbitration in New York under the rules herein provided.

2. *QUANTITY*. It is understood that the word "about" applied to quantity contracted for, means the nearest amount which sellers should fairly and reasonably deliver, but no excess or deficiency to be greater than $2\frac{1}{2}$ per cent. Unless otherwise specified, the ton shall be considered 2,240 pounds.

3. *SHIPMENT*. Prompt, shall mean shipment within fourteen days. The date of shipment shall be, prima facie, the date of the Bill of Lading covering the merchandise.

4. *DECLARATIONS*. The name of the vessel or vessels shall be declared to the buyer by the seller before arrival of the vessel or vessels, and in no case later than two business days after the name of the vessel or vessels become known to the seller, excepting in case of shipments from English, West Indian, Continental or African Ports to American Ports; and excepting also when sellers can show that they were prevented from making such declaration before the vessel's arrival by circumstances over which they had no control. No declaration may be withdrawn or changed by seller unless he can show error in the original declaration received by him; each declaration shall be treated as a separate contract. The word "afloat" shall be deemed to mean that the steamer carrying the merchandise in question shall have left the port of shipment at the date of sale.

5. *LANDING WEIGHTS*. Landing weights shall be the actual gross weights; the goods to be weighed at seller's expense by public weighers, as soon as practicable after landing, in such lots as may be requested by buyers in writing within three days after the arrival of vessel.

6. *TARES*. Pepper, Black and White, 2 per cent; Pimento, 3 lbs. per bag; Ceylon Cinnamon, 3 lbs. per bale; Tapioca, 2 lbs. per bag.

All other spices, seeds and herbs in bags or bales; average actual, to be ascertained by taring a certain percentage of the sound portion of each chop or invoice, as follows: 100 packages or more, 5 per cent less than 100 packages, 10 per cent (such percentages to be at least the average gross weight of the chop or invoice) to be tared to the ounce and adjusted to the quarter-pound, each fraction of a quarter of a pound to be carried to the next higher quarter-pound.

All spices and seeds in cases or barrels: Tares to be ascertained by taking a test tare of 5 per cent on each 100 packages and 10 per cent on less than 100 packages, taking the marked tares, and adjusting up or down according to the gain or loss shown by the test tare. In case of no marked tares, actual tares to govern.

In case of packing in double bags, the outside bag shall be

average actual. This rule to apply on all commodities. Weighers' returns of tares to state the gross weight of every package tared.

7. *DATE OF DELIVERY*. Shall be the final date of weighing; or when the goods are not to be weighed, the last date of ships' receipts, but in either case not later than ten days after landing, except that in case of missing packages, such missing packages shall be invoiced separately if and when delivered, provided such delivery is within thirty days.

In the event of the merchandise being detained by the Food and Drug Administration of the Federal Security Agency or Successor Agency or Agencies, date of invoice shall be date of release. This rule not to apply to C. I. F. and C. & F. contracts.

8. *IMPORT REGULATIONS*. All spices, seeds, tapioca or herbs purchased under this contract shall comply with the rules and standards under which the Food and Drug Administration of the Federal Security Agency or Successor Agency or Agencies enforces the Food, Drug and Cosmetic Act of June 25, 1938, and amendments thereto, at date of signing this contract. If any such merchandise must be recleaned or repicked to comply with these standards, the expense and loss in weight incident thereto shall be for the account of the seller; any reasonable loss in weight on reconditioning to be considered part of tender.

Should such merchandise fail to comply with these Government standards after the seller has made every reasonable effort with due diligence, including recleaning and repicking, to make it pass, the buyer shall still have the option to accept the merchandise; otherwise, the contract shall be considered cancelled, excepting should such merchandise be inferior to contract description, it shall not be a proper tender against the contract.

Where goods are sold to be released by the Food and Drug Administration or no sale, expenses of storage, labor, cartage and insurance pending decision, shall be borne by seller if excluded and by buyer if released.

Sound and damaged merchandise to be taken by the buyer. Allowance for damage to be determined by arbitration or otherwise. Should the quality of the damaged portion in the opinion of the

arbitrators be unmerchantable, buyer shall have the option of rejecting the damaged portion, but seller shall have the right to replace the rejected quantity from dock or steamer within the contract period or within ten days from date of arbitration decision.

Under a C. I. F. or C. & F. contract: This rule not to apply to any portion of the shipment arriving in a damaged condition, if said damage is caused during the voyage, provided that the sound merchandise is up to contract description.

9. *STANDARDS.* All Pepper shall be subject to allowance if it contains a greater percentage of dust, dirt, stems, chaff or extraneous matter than is customary in Pepper of its kind, and in no case to exceed 3 per cent as determined by sifting through a No. 9½ roundhole sieve. The permissible percentage of stems in Cloves shall be 5 per cent. The permissible percentage of loose lime in Japan Ginger shall be 2 per cent, as determined by sifting through a No. 30 sieve.

10. *EQUIVALENT DELIVERIES.* On contracts for Cloves for shipment from Africa, and for Black and White Peppers for shipment from Far Eastern Ports, to American Ports with an equivalent delivery clause, the minimum period under which an equivalent delivery may be made shall be 60 days from the first day of the stipulated shipping period, and the maximum period shall be 60 days from the last day of the stipulated shipping period.

If the first seller exercises his option of equivalent delivery, the seller shall declare same before 12 o'clock noon, at least 3 business days prior to the day on which the equivalent delivery is to be made. Subsequent redeclaration to be made with due dispatch.

11. *CLOVES.* The permissible percentage of moisture in Cloves shall not exceed 16 per cent by the Toluol method. In the event Cloves should be delivered with a moisture content in excess of the foregoing limit, allowance is to be made by sellers to buyers in proportion to the excess moisture as certified by a public analyst.

12. *LOSS OF VESSEL.* Should any vessel or vessels and/or the merchandise thereon, or any portion, which may apply to this

contract, be lost before declaration, this contract shall be cancelled and void so far as regards such lost vessel or vessels and/or the merchandise, on the production of satisfactory proofs of shipment by sellers as soon as practicable after said loss is ascertained. Should any vessel or vessels and/or the merchandise or any portion be lost after declaration, the contract shall be cancelled and void for such amount as shall be lost. Should the merchandise or any portion of it be transshipped to any other vessel or vessels and arrive for account of the original importer, the contract shall stand good for such portion.

However, should such losses occur of merchandise sold under C. & F. and/or C. I. F. contract conditions, the buyer shall take up proper documents tendered by the seller in accordance with the terms and conditions of the contract.

A. Merchandise sold under a C. I. F. contract to be insured by sellers at the price of the contract; free of particular average under 3 per cent in series of not more than ten packages, each separately insured.

13. *DEFAULT OF SELLER.* Whenever it shall be admitted by the seller or decided by arbitration that the seller has failed to fulfill the terms of his contract, and is, therefore, in default, the contract shall be settled as follows: The buyer shall invoice the merchandise back to the seller at a price and weight to be fixed by arbitration, the price to be the market value on the day of default as specified by arbitration, which price shall not be less than 2 per cent and not more than 10 per cent over the market value established as of the day of default; the weight, in case the contract calls for shipping weights, to be the full contract weight, and in the case of landing weights, the full contract weight less reasonable and usual loss in weight. The difference to be paid in cash within ten days from the date of the arbitration award.

14. *INSOLVENCY OF BUYER OR SELLER.* If before the maturity of this contract, either party liable on the face thereof shall suspend payment, or, be a defaulter, or, commit an act of bankruptcy, or, issue a notice convening a meeting of his creditors,

or, become bankrupt or insolvent, or, fails to meet his general trade obligations in the regular course of business, this contract shall thereupon be closed (forty-eight hours' notice having been previously given to him) at a price to be fixed by arbitration.

15. *ARBITRATION*. The following regulations shall govern all arbitration held under this contract.

A. *QUALITY*. Unless it can be shown by the buyer that it was impossible to do so, arbitration of all disputes as to quality of merchandise and/or claims for allowance in price between buyer and seller shall be demanded within ten business days after the parcel is landed, and samples shall be drawn from the parcel on the wharf unless the entire parcel shall have been meanwhile stored in public warehouse, in which case samples shall be drawn within five business days after the parcel shall have been so housed and arbitration shall be held within six weeks of arrival of vessel. Individual samples for arbitration shall be drawn and scaled by a public sampler in the presence of representatives of both parties to the contract and shall be drawn from at least 10 per cent of each chop or invoice. Failure promptly to appoint a representative to supervise sampling will be considered as a waiver of the privilege and samples drawn in good faith by order of the other party, shall be used by the arbitrators.

B. *ARBITRATORS*. Each disputant shall appoint a disinterested member of the Association as arbitrator. If either disputant shall neglect to appoint an arbitrator within three business days after notice in writing is received by him from the other disputant of the appointment of his arbitrator, the President shall appoint the other arbitrator upon written request from either party to the dispute. Disputants may appoint one person to act as sole arbitrator.

C. *UMPIRE*. The two arbitrators shall select a third disinterested member of the Association as umpire, who shall meet and act with the arbitrators in the decision of the arbitration, and shall act as Chairman thereof. If the arbitrators shall fail to select the umpire within seven business days from their appointment, the

President shall appoint the umpire upon request in writing from either arbitrator. Both parties shall be duly notified of the date of hearing and entitled to be present thereat.

D. DISINTERESTED MEMBER. A disinterested member of the Association shall be deemed to be one who will not be directly affected by the decision of the arbitration on which he is required to serve as arbitrator, umpire or member of the Arbitration Committee. No disinterested member may refuse any reasonable request of the Arbitration Committee (except Alternates) shall not be eligible to serve as arbitrators or umpires.

E. AWARD. The award of such arbitrators and umpire or sole arbitrator shall be final and binding on both parties, unless within three business days after receipt of the award, an appeal with a fee of \$50 be lodged with the Secretary of the Association by either disputant. Settlements under an arbitration award or award of the Arbitration Committee shall be made within ten days from the date of such award, and if not so settled, judgment may be entered thereon in accordance with the practice of any Court having jurisdiction.

F. APPEAL. All appeals shall be heard by the Arbitration Committee, which shall consider cases decided by arbitrators and umpires, and shall sustain, reverse or modify same. They shall have the right to remand appeals to the arbitrators and umpires for re-arbitration. If, on any appeal, any member of the Arbitration Committee shall be an interested party in the transaction, or contract in question, his place shall be taken for that appeal by the member on the list of Arbitration Committee Alternates next in rotation for service. Three business days' notice of the hearing of the appeal shall be given by the Secretary to the disputants and to the arbitrators and umpire whose award is appealed against, and they shall be entitled to be present and to be heard upon the matter in question. Not less than five of the Arbitration Committee being present, the decision of the majority shall be the final and binding decision of the appeal.

G. BRIEFS. On appeals, other than those involving quality only, each appellant and respondent shall deliver to the Secretary

of the Association seven copies of the brief or statement covering his case, duly sworn to, at least 48 hours before the time set for the appeal.

H. FEES. Unless otherwise divided or awarded by the arbitrators and umpire, or, the Arbitration Committee, the fees for arbitration or appeal shall be finally paid by the losing party. In event of arbitration between a member and non-member of the Association, the member must guarantee the payment of the fees or the non-member must deposit the fees with the Secretary before the arbitration is held, and adjustment shall be made after the award has been rendered.

The fees for arbitrators and umpires shall be \$10 each in all cases, and in addition a \$10 fee to the Association. In case the two disputants agree upon a single member, who shall act as the sole arbitrator, instead of two arbitrators and an umpire, the fee for the sole arbitrator shall be \$20 in all cases, and in addition a \$10 fee to the Association. If an appeal shall be decided in favor of the appellant, the appeal fee of \$50 shall be returned to the appellant and the respondent shall pay the appeal fee of \$50. Arbitrators or umpires shall be awarded extra fees by the Arbitration Committee, if in the judgment of the Committee the said arbitrators and umpires shall have performed unusual or extraordinary services during the arbitration on which they shall have served.

I. OATHS. In all arbitrations and appeals, the arbitrators, umpire and members of the Arbitration Committee shall, before acting, subscribe to the usual legal oath of office. In all arbitrations and appeal hearings, all witnesses and principals giving oral evidence shall be duly sworn in the usual manner. Awards must be legally acknowledged. All notary fees to be paid as awarded by the arbitrators or Arbitration Committee in case of appeal.

J. OFFER OF SETTLEMENT. In every case involving dispute, where the arbitrators and umpire decide that the contract has been properly fulfilled by the seller, or, in every case where the seller has before the arbitration offered settlement which is held by the arbitrators and umpire to be sufficient, but

which the buyer refused to accept, the fees shall be paid by the buyer; but where the buyer has offered a settlement and the seller has refused to make such settlement, which the arbitrators and umpire finally decide is adequate, the fees shall be paid by the seller; provided, that all offers as above shall have been made in writing.

16. *FORCE MAJEURE*. This contract is subject to Force Majeure. In case the seller is unable to ship within contract time on account of prohibition of exports, fires, strikes, lockouts, riots, war, revolution or other case of Force Majeure, the shipping period is automatically extended one month.

17. *MODIFICATIONS*. Any part of this contract written or inserted on the reverse side hereof, shall modify the rules printed on this side.

**Standard Future Delivery Contract
of the
American Spice Trade Association**

As amended, effective on and after Sept. 1, 1944
New York, N. Y.

Sold for account of M.
to M.

Quantity, about

Article

Quality

Price

Any change in present import duties of the U. S. A. and any Federal, State or Municipal tax of any nature whatsoever levied in the U. S. A. upon the article referred to herein shall be for account of buyer.

Terms

WEIGHTS: Weights and customary tares, as per reverse of this contract.

DELIVERY: To be ready for delivery at one of the steamship docks or public warehouses in the Port of provided that on the day of delivery there is no United States Government import tax or duty in effect in respect to the article tendered, otherwise "in bond" at one of the steamship docks or bonded public warehouses in the Port of, during 19.....

In order to be tenderable the merchandise must be in original packages. The seller shall be entitled to tender on any business day during the month of delivery except the last four full business days, and he shall be bound to tender not later than 11:00 a.m. on the business day preceding the last four full business days of the month of delivery. After that a tender shall be deemed to be out of time unless it has been made in accordance with clauses 9 and 10 on the back hereof.

INSURANCE: Fire risks to be covered by sellers for 10 days after the delivery at the price of this contract.

All questions and controversies, and all claims arising under this contract shall be submitted to and settled by Arbitration under the Rules of The American Spice Trade Association printed on the reverse side hereof. This contract is made as of in New York.

WAIVER OF PERSONAL SERVICE

Each party to a submission or other agreement which provides for arbitration under these rules, shall be deemed to have consented that any papers, notices or process necessary or proper for the institution or continuation of an arbitration proceeding under these rules or for the confirmation of an award and entry of judgment on an award made thereunder, including appeals in connection therewith, may be served upon such party (a) by mail addressed to such party's last known address or (b) by personal service, within or without the State wherein the arbitration is to be held, or within or without the limits of the jurisdiction of the Court having jurisdiction in the premises (whether such party be within or without the United States of America) or (c) where a party to a controversy is not located in the City of New

York, by mail or personally, as provided in (a) and (b) hereof, upon his agent or broker through whom the contract was made; provided that a reasonable time shall be allowed such party to appear and defend.

ACCEPTED

.....
Signature.

Rules for Standard Future Delivery Contract

1. *DISPUTES*. Any question, controversy or claim whatever between buyer and seller, arising out of this contract, not adjusted by mutual agreement, shall be settled by arbitration in New York under the rules herein provided.

2. *QUANTITY*. It is understood that the word "about" applied to quantity contracted for, means the nearest amount which sellers should fairly and reasonably deliver, but no excess of deficiency to be greater than $2\frac{1}{2}\%$. In case the excess or deficiency on any delivery should be over $2\frac{1}{2}\%$, the difference, up to a maximum of 5% , must be settled between buyer and seller at prevailing market price. Unless otherwise specified, the ton shall be considered 2,240 lb.

3. *TERMS*. When the terms of payment are net cash against delivery order or warehouse receipt, and merchandise is not weighed when tendered, payment shall be $97\frac{1}{2}\%$ of the approximate invoice amount, and the balance due shall be paid within seven days from the date of final invoice.

4. *TENDERS*. Black Pepper and White Pepper when sold in lots of fifteen tons or multiple thereof, must be tendered in units of fifteen tons, each unit to be on one dock or in one store of a public warehouse, but need not be made up of one chop or mark.

5. *STANDARDS*. All spices, seeds or herbs purchased under this contract, shall comply with the rules which the Food and Drug Administration of the Federal Security Agency or Successor Agency or Agencies enforce the Food, Drug, and Cosmetic Act of June 25, 1938, and amendments thereto in force at the

date of this contract. All Pepper shall be subject to allowance if it contains a greater percentage of dust, dirt, stems, chaff or extraneous matter than is customary in Pepper of its kind, and in no case to exceed 3 per cent, as determined by sifting through a No. 9½ roundhole sieve. The permissible percentage of stems in Cloves shall be 5 per cent, and of moisture not more than 16%. The permissible percentage of loose lime in Japan Ginger shall be 2 per cent, as determined by sifting through a No. 30 sieve.

6. *WEIGHTS*. All merchandise shall be weighed at the place of delivery at the seller's expense by a licensed public weigher, who shall issue a Certificate of Weight therefor and such Certificate of Weights shall be binding on all parties, unless fraud is proven, provided, however, that a delivery shall not be made more than fourteen days from date of such Certificate of Weight, with the exception of the articles hereinafter mentioned.

Certificate of Weight covering Black Pepper shall be valid more than fourteen days provided, however, that when a delivery is made later than the fourteenth day from the date of such Certificate of Weight, the seller, unless he elects to reweigh, in computing his invoice to the buyer shall credit an allowance for shrinkage on the basis of one-eighth of one per cent per month from the date of the Certificate of Weight, for the first twelve months, and one-twelfth of 1 per cent for the next twelve months. Such Certificate of Weight shall be valid not more than two years, provided the Pepper covered by such Certificate has not been moved, if weighed in warehouse, during such period; dock weights more than fourteen days old shall be valid provided the Pepper was moved into warehouse immediately after weighing and has not been moved while in warehouse. The buyer, at his option and at his own expense, which shall include cost of repiling, with due notice to the seller on receipt of the delivery order or warehouse receipt, may cause any lot of Pepper to be reweighed, in which case reweights shall be the basis of the final invoice.

7. *TARES*. Pepper, Black and White, 2 per cent; Pimento, 3 lbs. per bag; Ceylon Cinnamon, 3 lbs. per bale; Tapioca, 2 lbs. per bag.

All other spices, seeds and herbs in bags or bales, unless otherwise provided for; average actual, to be ascertained by taring a certain percentage of the sound portion of each chop or invoice, as follows: 100 packages or more, 5 per cent; less than 100 packages, 10 per cent (such percentages to be at least the average gross weight of the chop or invoice) to be tared to the ounce and adjusted to the quarter-pound, each fraction of a quarter of a pound to be carried to the next higher quarter-pound.

On all spices and seeds in cases or barrels: marked tares shall govern unless proved to be wrong by a public weigher's certificate.

In case of packing in double bags, average actual tares of the outside bag to be allowed. This rule to apply on all commodities. Weighers' returns of tares to state the gross weight of every package tared.

8. *DELIVERY*. When the subject matter and terms of contracts are identical, or identical except as to date and price, each seller other than the first shall be at liberty to tender during the three business hours following the receipt of the tender made to him but not after 4:30 p.m. local time, although his tender is beyond the time specified in the contract by the first seller, provided the first seller shall have made his tender within the time allowed by the contract for the purpose, and provided each intermediate seller between himself and the first seller shall have made his tender within the time allowed him for the purpose.

9. *FIRE OR DESTRUCTION*. In the event of damage or loss caused by fire, floods, riots or civil commotion, whereby a quantity of not less than one quarter of the entire stock of Black Pepper stored in public warehouses or docks in New York shall be destroyed or rendered untenderable, the first seller and each subsequent seller shall be entitled to an extension of two full calendar months on all Pepper deliverable during the calendar month during which such destruction occurs and on all deliveries during the following calendar month.

10. *STORAGE*. When delivery is made on dock, the first seller shall provide, at his expense, free dockage for at least seven full business days (Saturdays, Sundays, and holidays excepted),

from the delivery date. When delivery is made from warehouse, the first seller shall pay charges, storage and labor in and out up to and including seven full business days (Saturdays, Sundays, and holidays excepted), after the date of delivery, and if such charges and/or storage are unpaid, shall deduct the amount of the unpaid storage and charges from the invoice. The buyer shall enjoy the benefit of any unexpired storage. When an article is delivered "in bond," the seller shall present to the buyer, in addition to other documents required, a United States Government Withdrawal Permit, valid for not less than six (6) calendar months from the date on which delivery of the article is made. Such permit shall bear the marks and location of the article.

11. *DEFAULTS*. Whenever it shall be admitted by the seller, or decided by arbitration, that either party has failed to fulfill the terms of this contract, and is, therefore, in default, the contract shall be settled as follows: The buyer shall invoice the merchandise back to the seller at a price and weight to be fixed by arbitration, the price to be the market value on the day of default, as established by arbitration, which price shall not be less than 2% and not more than 10% over the estimated market value established on the day of default. The difference to be paid in cash within ten days from the date of the arbitration award.

12. *INSOLVENCY OF BUYER OR SELLER*. If before the maturity of this contract, either party liable on the face thereof shall suspend payment, or be a defaulter, or commit an act of bankruptcy, or issue a notice convening a meeting of his creditors, or become bankrupt or insolvent, or fails to meet his general trade obligations in the regular course of business, this contract shall thereupon be closed (forty-eight hours' notice having been previously given to him) at a price to be fixed by arbitration.

13. *ARBITRATION*. The following regulations shall govern all arbitrations held under this contract.

A. *QUALITY*. Unless it can be shown by the buyer that it was impossible to do so, arbitration of all disputes as to quality of merchandise and/or claims for allowance in price between buyer and seller shall be demanded within ten business days after

the parcel is delivered. Individual samples for arbitration shall be drawn and sealed by a public sampler in the presence of representatives of both parties to the contract and shall be drawn from at least 10 per cent of each chop or invoice. Failure promptly to appoint a representative to supervise sampling will be considered as a waiver of the privilege and samples drawn in good faith by order of the other party, shall be used by the arbitrators.

For clauses B, C, D, E, F, G, H, I, J, relating to arbitration see the Standard Arrival Contract.

14. *FORCE MAJEURE*. This contract is subject to Force Majeure. In case the seller is unable to ship within contract time on account of prohibition of exports, fires, strikes, lockouts, riots, war, revolution or other case of Force Majeure, the shipping period is automatically extended one month.

15. *MODIFICATIONS*. Any part of this contract written or inserted on the reverse side hereof, shall modify the rules printed on this side.

Standard Domestic A Contract
of the
American Spice Trade Association

As amended, effective on and after Sept. 1, 1944

New York, N. Y.

Sold for account of M.
to M.

Quantity, about

Article

Quality

Price

(Any Federal, State and Municipal taxes shall be for account of buyer)

Shipment }
 } during

Delivery }

.....19 , direct or indirect to

 Terms
 Weights
 Tares
 Insurance

Insurance to include war risk according to American Institute form or equivalent prevailing at the time of shipment, if sold C. I. F., seller to cover at his expense marine and war risk insurance to destination, unless otherwise stipulated, but any expense for covering war risk in excess of one-half of one per cent ($\frac{1}{2}\%$) to be for account of buyers. Rate of insurance to be approximately that ruling in New York at the time of shipment.

All questions and controversies not adjusted by mutual agreement, and all claims arising under this contract shall be submitted to and settled by Arbitration under the Rules of The American Spice Trade Association printed on the reverse side hereof. This contract is made as of in New York.

WAIVER OF PERSONAL SERVICE

Each party to a submission or other agreement which provides for arbitration under these rules, shall be deemed to have consented that any papers, notices or process necessary or proper for the institution or continuation of an arbitration proceeding under these rules or for the confirmation of an award and entry of judgment on an award made thereunder, including appeals in connection therewith, may be served upon such party (a) by mail addressed to such party's last known address or (b) by personal service, within or without the State wherein the arbitration is to be held, or within or without the limits of the jurisdiction of the Court having jurisdiction in the premises (whether such party be within or without the United States of America) or (c) where a party to a controversy is not located in the City of New York, by mail or personally, as provided in (a) and (b) hereof, upon his agent or broker through whom the contract was made; pro-

vided that a reasonable time shall be allowed such party to appear and defend.

ACCEPTED

.....
Signature.

Rules for Standard Domestic A Contract

1. *DISPUTES*. Any question, controversy or claim whatever between buyer and seller, arising out of this contract, not adjusted by mutual agreement, shall be settled by arbitration in New York under the rules herein provided.

2. *QUANTITY*. It is understood that the word "about" applied to quantity contracted for, means the nearest amount which sellers should fairly and reasonably deliver, but no excess or deficiency to be greater than 2½ per cent. Unless otherwise specified, the ton shall be considered 2,000 pounds.

3. *SHIPMENT*. Prompt, shall mean shipment within fourteen days. The date of shipment shall be, prima facie, the date of the Bill of Lading covering the merchandise.

4. *LANDING WEIGHTS*. Landing weights shall be the actual gross weights; the goods to be weighed at seller's expense by public weighers, as soon as practicable after landing, in such lots as may be requested by buyers in writing within three days after the arrival of vessel and/or other carrier.

5. *DATE OF DELIVERY*. Shall be the final date of weighing; or when the goods are not to be weighed, the last date of vessels' and/or other carriers' receipts, but in either case not later than ten days after landing; except that in case of missing packages, such missing packages shall be invoiced separately if and when delivered, provided such delivery is within thirty days.

In the event of the merchandise being detained by the Food and Drug Administration of the Federal Security Agency or Successor Agency or Agencies, date of invoice shall be date of release. This rule not to apply to C. I. F. and C. & F. contract.

6. *U. S. A. REGULATIONS*. All spices, seeds or herbs

purchased under this contract shall comply with the rules and standards under which the Food and Drug Administration of the Federal Security Agency or Successor Agency or Agencies enforces the Food, Drug and Cosmetic Act of June 25, 1938, and amendments thereto, at date of signing of this contract. If any such merchandise must be recleaned or repicked to comply with these standards, the expense and loss in weight incident thereto shall be for the account of the seller; any reasonable loss in weight on reconditioning to be considered part of tender.

Should such merchandise fail to comply with these Government standards after the seller has made every reasonable effort with due diligence, including recleaning and repicking, to make it pass, the buyer shall still have the option to accept the merchandise; otherwise, the contract shall be considered cancelled, excepting should such merchandise be inferior to contract description, it shall not be a proper tender against the contract.

Where goods are sold to be released by the Food and Drug Administration or no sale, expenses of storage, labor, cartage and insurance pending decision, shall be borne by seller if excluded and by buyer if released.

Sound and damaged merchandise to be taken by the buyer. Allowance for damage to be determined by arbitration or otherwise. Should the quality of the damaged portion in the opinion of the arbitrators be unmerchantable, buyer shall have the option of rejecting the damaged portion, but seller shall have the right to replace the rejected quantity from dock or vessel and/or other carrier within the contract period or within ten days from date of arbitration decision.

Under a C. I. F. or C. & F. contract: This rule not to apply to any portion of the shipment arriving in a damaged condition, if said damage is caused during the voyage, provided that the sound merchandise is up to contract description.

7. *LOSS OF VESSEL.* Should any vessel or vessels and/or the merchandise thereon, or any portion, which may apply to this contract, be lost before declaration, this contract shall be cancelled and void so far as regards such lost vessel or vessels and/or the

merchandise, on the production of satisfactory proofs of shipment by sellers as soon as practicable after said loss is ascertained. Should any vessel or vessels and/or the merchandise or any portion be lost after declaration, the contract shall be cancelled and void for such amount as shall be lost. Should the merchandise or any portion of it be transhipped to any other vessel or vessels and arrive for account of the original importer, the contract shall stand good for such portion.

However, should such losses occur of merchandise sold under C. & F. and/or C. I. F. contract conditions, the buyer shall take up proper documents tendered by the seller in accordance with the terms and conditions of the contract.

A. Merchandise sold under a C. I. F. contract to be insured by sellers at the price of the contract; free of particular average under 3 per cent, in series of not more than ten packages, each separately insured.

8. *DEFAULT OF SELLER.* Whenever it shall be admitted by the seller or decided by arbitration that the seller has failed to fulfill the terms of his contract, and is, therefore, in default, the contract shall be settled as follows: The buyer shall invoice the merchandise back to the seller at a price and weight to be fixed by arbitration, the price to be the market value on the day of default as specified by arbitration, which price shall not be less than 2 per cent and not more than 10 per cent over the market value established as of the day of default; the weight, in case the contract calls for shipping weights, to be the full contract weight, and in the case of landing weights, the full contract weight less reasonable and usual loss in weight. The difference to be paid in cash within ten days from the date of the arbitration award.

9. *INSOLVENCY OF BUYER OR SELLER.* If before the maturity of this contract, either party liable on the face thereof shall suspend payment, or, be a defaulter, or, commit an act of bankruptcy, or, issue a notice convening a meeting of his creditors, or, become bankrupt or insolvent, or, fails to meet his general trade obligations in the regular course of business, this contract

shall thereupon be closed (forty-eight hours' notice having been previously given to him) at a price to be fixed by arbitration.

10. *ARBITRATION*. The following regulations shall govern all arbitrations held under this contract.

A. *QUALITY*. Unless it can be shown by the buyer that it was impossible to do so, arbitration of all disputes as to quality of merchandise and/or claims for allowance in price between buyer and seller shall be demanded within ten business days after the parcel is landed, and samples shall be drawn from the parcel on the wharf and/or terminal, unless the entire parcel shall have been meanwhile stored in public warehouse, in which case samples shall be drawn within five business days after the parcel shall have been so housed and arbitration shall be held within six weeks of arrival of vessel and/or other carrier. Individual samples for arbitration shall be drawn and sealed by a public sampler in the presence of representatives of both parties to the contract and shall be drawn from at least 10 per cent of each chop or invoice. Failure promptly to appoint a representative to supervise sampling will be considered as a waiver of the privilege and samples drawn in good faith by order of the other party, shall be used by the arbitrators.

For clauses B, C, D, E, F, G, H, I, J, relating to arbitration, see the Standard Arrival Contract.

11. *FORCE MAJEURE*. This contract is subject to Force Majeure. In case the seller is unable to ship within contract time on account of prohibition of exports, fires, strikes, lockouts, riots, war, revolution or other case of Force Majeure, the shipping period is automatically extended one month.

12. *MODIFICATIONS*. Any part of this contract written or inserted on the reverse side hereof, shall modify the rules printed on this side.

Standard Domestic B Contract
of the
American Spice Trade Association

Effective on and after Sept. 1, 1944

New York, N. Y.

Sold for account of M.....
to M.....

Quantity, about

Article

Quality

Price

(Any Federal, State and Municipal taxes shall be for account of buyer)

Shipment }
Delivery } during

.....19 , direct or indirect to.....

Terms

Weights

Tares

Insurance

Insurance to include war risk according to American Institute form or equivalent prevailing at the time of shipment, if sold C. I. F., seller to cover at his expense marine and war risk insurance to destination, unless otherwise stipulated, but any expense for covering war risk in excess of one-half of one per cent ($\frac{1}{2}\%$) to be for account of buyers. Rate of insurance to be approximately that ruling in New York at the time of shipment.

All questions and controversies not adjusted by mutual agreement, and all claims arising under this contract shall be submitted to and settled by Arbitration under the Rules of The American Spice Trade Association printed on the reverse side hereof. This contract is made as of in New York.

WAIVER OF PERSONAL SERVICE

Each party to a submission or other agreement which provides for arbitration under these rules, shall be deemed to have consented that any papers, notices or process necessary or proper for the institution or continuation of an arbitration proceeding under these rules or for the confirmation of an award and entry of judgment on an award made thereunder, including appeals in connection therewith, may be served upon such party (a) by mail addressed to such party's last known address or (b) by personal service, within or without the State wherein the arbitration is to be held, or within or without the limits of the jurisdiction of the Court having jurisdiction in the premises (whether such party be within or without the United States of America) or (c) where a party to a controversy is not located in the City of New York, by mail or personally, as provided in (a) and (b) hereof, upon his agent or broker through whom the contract was made; provided that a reasonable time shall be allowed such party to appear and defend.

ACCEPTED

.....
 Signature.

Rules for Standard Domestic B Contract

1. *DISPUTES*. Any question, controversy or claim whatever between buyer and seller, arising out of this contract, not adjusted by mutual agreement, shall be settled by arbitration in New York under the rules herein provided.

2. *QUANTITY*. It is understood that the word "about" applied to quantity contracted for, means the nearest amount which sellers should fairly and reasonably deliver, but no excess or deficiency to be greater than 2½ per cent. Unless otherwise specified, the ton shall be considered 2,000 pounds.

3. *SHIPMENT*. Prompt, shall mean shipment within fourteen days. The date of shipment shall be, prima facie, the date of the Bill of Lading covering the merchandise.

4. *LANDING WEIGHTS*. Landing weights shall be the actual gross weights; the goods to be weighed at seller's expense by public weighers, as soon as practicable after landing, in such lots as may be requested by buyers in writing within three days after the arrival of vessel, and/or other carrier.

5. *DATE OF DELIVERY*. Shall be the final date of weighing; or when the goods are not to be weighed, the last date of vessel's and/or other carriers' receipts, but in either case not later than ten days after landing, except that in case of missing packages, such missing packages shall be invoiced separately if and when delivered, provided such delivery is within thirty days.

In the event of the merchandise being detained by the Food and Drug Administration of the Federal Security Agency or Successor Agency or Agencies, date of invoice shall be date of release. This rule not to apply to C. I. F. and C. & F. contract.

6. *U. S. A. REGULATIONS*. All spices, seeds or herbs purchased under this contract shall comply with the rules and standards under which the Food and Drug Administration of the Federal Security Agency or Successor Agency or Agencies enforces the Food, Drug and Cosmetic Act of June 25, 1938, and amendments thereto, at date of signing of this contract. If any such merchandise must be recleaned or repicked to comply with these standards, the expense and loss in weight incident thereto shall be for the account of the seller; any reasonable loss in weight on reconditioning to be considered part of tender.

Should such merchandise fail to comply with these Government standards after the seller has made every reasonable effort with due diligence, including recleaning and repicking, to make it pass, the buyer shall still have the option to accept the merchandise; otherwise, the contract shall be considered cancelled, excepting should such merchandise be inferior to contract description, it shall not be a proper tender against the contract.

Where goods are sold to be released by the Food and Drug Administration or no sale, expenses of storage, labor, cartage and insurance pending decision, shall be borne by seller if excluded and by buyer if released.

Sound and damaged merchandise to be taken by the buyer. Allowance for damage to be determined by arbitration or otherwise. Should the quality of the damaged portion in the opinion of the arbitrators be unmerchantable, buyer shall have the option of rejecting the damaged portion, but seller shall have the right to replace the rejected quantity from dock or vessel and/or other carrier within the contract period or within ten days from date of arbitration decision.

Under a C. I. F. or C. & F. contract: This rule not to apply to any portion of the shipment arriving in a damaged condition, if said damage is caused during the voyage, provided that the sound merchandise is up to contract description.

7. *PRODUCTION.* The seller agrees to plant or to have planted, or contracts or to have contracted to be planted, during the current planting season an acreage of land which will produce, under normal conditions, an amount of the customary grade of the article sold under this contract, sufficient to enable the seller to deliver to the buyer the merchandise herein specified.

8. It is understood and agreed that, in case there shall be prior to the planting, due to fire, accident, or otherwise, any damage to, or the destruction of, any portion of seller's stock seed, already on hand, or any portion of such material already contracted for, or which may hereafter be contracted for, appropriated for planting, as provided in Rule 7; or in case of partial or total failure of any or all of the crops to be planted by seller, provided in Rule 7; or in case there shall be subsequent to harvesting, due to fire, accident, or otherwise, any damage to, or the destruction of, any portion of the merchandise produced, as provided herein, which seller may happen to be holding awaiting shipment, seller shall be obligated to deliver only proportional quantities, such proportional quantities to be computed on the following basis:

A. The seller agrees that his total sales prior to the determination of the crop yield as provided in Rule 7 shall not exceed the pre-calculated production, based on an average yield of the last five years.

B. Should the production, based upon the conditions set forth above, prove to be less than seller's pre-harvest total sales, seller should be obligated to deliver to buyer only such proportion as the total quantity produced bears to seller's total sales. Seller shall have the right, in any event, to reserve for its stock seed, for next season's planting, the normal quantity of same. The quantity so reserved shall be deducted from the total production before pro rating.

9. The seller's fulfillment of this contract is contingent upon strikes, fires, accidents, riots, delays of carriers, actions of governmental authorities, and on other causes beyond the seller's control.

10. *LOSS OF VESSEL*. Should any vessel or vessels and/or the merchandise thereon, or any portion, which may apply to this contract, be lost before declaration, this contract shall be cancelled and void so far as regards such lost vessel or vessels and/or the merchandise, on the production of satisfactory proofs of shipment by sellers as soon as practicable after said loss is ascertained. Should any vessel or vessels and/or the merchandise or any portion be lost after declaration, the contract shall be cancelled and void for such amount as shall be lost. Should the merchandise or any portion of it be transshipped to any other vessel or vessels and arrive for account of the original importer, the contract shall stand good for such portion.

However, should such losses occur of merchandise sold under C. & F. and/or C. I. F. contract conditions, the buyer shall take up proper documents tendered by the seller in accordance with the terms and conditions of the contract.

A. Merchandise sold under a C. I. F. contract to be insured by sellers at the price of the contract; free of particular average under 3 per cent, in series of not more than ten packages, each separately insured.

11. *DEFAULT OF SELLER*. Whenever it shall be admitted by the seller or decided by arbitration that the seller has failed to fulfill the terms of his contract, and is, therefore, in default,

the contract shall be settled as follows: The buyer shall invoice the merchandise back to the seller at a price and weight to be fixed by arbitration, the price to be the market value on the day of default which price shall not be less than 2 per cent and not more than 10 per cent over the market value established as of the day of default; the weight, in case the contract calls for shipping weights, to be the full contract weight, and in the case of landing weights, the full contract weight less reasonable and usual loss in weight. The difference to be paid in cash within ten days from the date of the arbitration award.

12. *INSOLVENCY OF BUYER OR SELLER.* If before the maturity of this contract, either party liable on the face thereof shall suspend payment, or, be a defaulter, or, commit an act of bankruptcy, or, issue a notice convening a meeting of his creditors, or, become bankrupt or insolvent, or, fails to meet his general trade obligations in the regular course of business, this contract shall thereupon be closed (forty-eight hours' notice having been previously given to him) at a price to be fixed by arbitration.

13. *ARBITRATION.* The following regulations shall govern all arbitrations held under this contract.

A. *QUALITY.* Unless it can be shown by the buyer that it was impossible to do so, arbitration of all disputes as to quality of merchandise and/or claims for allowance in price between buyer and seller shall be demanded within ten business days after the parcel is landed, and samples shall be drawn from the parcel on the wharf and/or terminal unless the entire parcel shall have been meanwhile stored in public warehouse, in which case samples shall be drawn within five business days after the parcel shall have been so housed and arbitration shall be held within six weeks of arrival of vessel and/or other carrier. Individual samples for arbitration shall be drawn and sealed by a public sampler in the presence of representatives of both parties to the contract and shall be drawn from at least 10 per cent of each chop or invoice. Failure promptly to appoint a representa-

tive to supervise sampling will be considered as a waiver of the privilege and samples drawn in good faith by order of the other party, shall be used by the arbitrators.

For clauses B, C, D, E, F, G, H, I, J, relating to arbitration, see the Standard Arrival Contract.

14. *FORCE MAJEURE*. This contract is subject to Force Majeure. In case the seller is unable to ship within contract time on account of prohibition of exports, fires, strikes, lockouts, riots, war, revolution or other case of Force Majeure, the shipping period is automatically extended one month.

15. *MODIFICATIONS*. Any part of this contract written or inserted on the reverse side hereof, shall modify the rules printed on this side.

Standard Spot Contract
of
The American Spice Trade Association

As amended, effective on and after Sept. 1, 1944
New York, N. Y.

Sold for account of M.....
to M.....

Quantity, about

Article

Quality

Price

Terms

Privilege of Storage, Fire Insurance
and Weighing until (minimum 10 days).....

Weights, New York Weights and customary tares, as per reverse of this contract.

Shipping directions

All questions and controversies, and all claims arising under this contract shall be submitted to and settled by Arbitration under the Rules of The American Spice Trade Association printed

on the reverse side hereof. This contract is made as of in New York.

WAIVER OF PERSONAL SERVICE

Each party to a submission or other agreement which provides for arbitration under these rules, shall be deemed to have consented that any papers, notices or process necessary or proper for the institution or continuation of an arbitration proceeding under these rules or for the confirmation of an award and entry of judgment on an award made thereunder, including appeals in connection therewith, may be served upon such party (a) by mail addressed to such party's last known address or (b) by personal service, within or without the State wherein the arbitration is to be held, or within or without the limits of the jurisdiction of the Court having jurisdiction in the premises (whether such party be within or without the United States of America) or (c) where a party to a controversy is not located in the City of New York, by mail or personally, as provided in (a) and (b) hereof, upon his agent or broker through whom the contract was made; provided that a reasonable time shall be allowed such party to appear and defend.

ACCEPTED

.....

Signature.

Rules for Standard Spot Contract

1. *DISPUTES*. Any question, controversy or claim whatever between buyer and seller, arising out of this contract not adjusted by mutual agreement, shall be settled by arbitration in New York under the rules herein provided.

2. *QUANTITY*. It is understood that the word "about" applied to quantity contracted for, means the nearest amount which sellers should fairly and reasonably deliver, but no excess to be greater than $2\frac{1}{2}$ per cent or deficiency greater than $7\frac{1}{2}$

per cent. Unless otherwise specified, the ton shall be considered 2,240 pounds.

3. *DELIVERY*. On spot sales ex dock or warehouse for shipment to other points, the invoice date, unless otherwise specified, shall be the date of valid shipping receipt or Bill of Lading. In case shipping shall be delayed or deferred by the neglect of buyers to furnish shipping directions permitting immediate shipment, the invoice date shall be the date of the contract. On spot sales to local buyers, the invoice date shall be the date on which valid delivery order or storage receipt is tendered by sellers to buyers. On sales where approximate amount is payable on account, such payment shall be 90% of the amount of a reasonable, approximate invoice, unless otherwise specified.

A. On spot sales of merchandise involving storage, insurance and weighing privileges, the date of delivery shall be the date when sellers are prepared to make transfer according to contract.

B. If merchandise in warehouse sold for prompt delivery, or future spot delivery, shall be destroyed by fire, water or other acts of God, the seller shall not be required to make any other delivery on such sale, provided he has, previous to destruction, declared the marks and quantities of said merchandise.

C. In case the buyer shall question the quality of any delivery of merchandise after it has been received by him, the merchandise shall not be returned or disposed of in any way, until the matter shall have been decided by mutual agreement, or failing in the latter, by arbitration, as per Rule 1.

D. On spot sales for shipment to other points, prices shall be held to include cartage to transportation lines, unless otherwise specifically noted in the contract.

4. *TARES*. Pepper, Black and White, 2 per cent; Pimento, 3 lbs. per bag; Ceylon Cinnamon, 3 lbs. per bale; Tapioca, 2 lbs. per bag.

All other spices, seeds and herbs in bags or bales; average actual, to be ascertained by taring a certain percentage of the sound portion of each chop or invoice, as follows: 100 packages or more, 5 per cent; less than 100 packages, 10 per cent (such

percentages to be at least the average gross weight of the chop or invoice) to be tared to the ounce and adjusted to the quarter-pound, each fraction of a quarter of a pound to be carried to the next higher quarter-pound.

All spices and seeds in cases or barrels: Tares to be ascertained by taking a test tare of 5 per cent on each 100 packages and 10 per cent on less than 100 packages, taking the marked tares, and adjusting up or down according to the gain or loss shown by the test tares. In case of no marked tares, actual tares to govern.

In case of packing in double bags, the outside bag shall be average actual. This rule to apply on all commodities. Weighers' returns of tares to state the gross weight of every package tared.

5. *STANDARDS*. All spices, seeds or herbs purchased under this contract shall comply with the rules under which the Food and Drug Administration of the Federal Security Agency or Successor Agency or Agencies enforce the Food, Drug and Cosmetic Act of June 25, 1938, and amendments thereto, to date of signing this contract.

All Pepper shall be subject to allowance if it contains a greater percentage of dust, dirt, stems, chaff or extraneous matter than is customary in Pepper of its kind, and in no case to exceed 3 per cent as determined by sifting through a No. 9½ roundhole sieve. The permissible percentage of stems in Cloves shall be 5 per cent. The permissible percentage of moisture in Cloves shall not exceed 16% by the Toluol method. The permissible percentage of loose lime in Japan Ginger shall be 2 per cent as determined by sifting through a No. 30 sieve.

6. *DEFAULTS*. Whenever it shall be admitted by the seller, or decided by arbitration, that the seller has failed to fulfill the terms of his contract, and is, therefore, in default, the contract shall be settled as follows: The buyer shall invoice the merchandise back to the seller at a price and weight to be fixed by arbitration, which price shall not be less than 2% and not more than 10% over the estimated market value established on the day of default. The difference to be paid in cash within ten days from the date of the arbitration award.

7. *INSOLVENCY OF BUYER OR SELLER*. If before the maturity of this contract, either party liable on the face thereof shall suspend payment, or be a defaulter, or commit an act of bankruptcy, or issue a notice convening a meeting of his creditors, or become bankrupt or insolvent, or fails to meet his general trade obligations in the regular course of business, this contract shall thereupon be closed (forty-eight hours' notice having been previously given to him) at a price to be fixed by arbitration.

8. *ARBITRATION*. The following regulations shall govern all arbitrations held under this contract.

A. *QUALITY*. Unless it can be shown by the buyer that it was impossible to do so, arbitration of all disputes as to quality or merchandise and/or claims for allowance in price between buyer and seller shall be demanded within ten business days after the parcel is delivered. Individual samples for arbitration shall be drawn and sealed by a public sampler in the presence of representatives of both parties to the contract and shall be drawn from at least 10 per cent of each chop or invoice. Failure promptly to appoint a representative to supervise sampling will be considered as a waiver of the privilege and samples drawn in good faith by order of the other party, shall be used by the arbitrators.

9. *FORCE MAJEURE*. This contract is subject to Force Majeure. In case the seller is unable to ship within contract time on account of prohibition of exports, fires, strikes, lockouts, riots, war, revolution or other case of Force Majeure, the shipping period is automatically extended one month.

10. *MODIFICATIONS*. Any part of this contract written or inserted on the reverse side hereof, shall modify the rules printed on this side.

For clauses B, C, D, E, F, G, H, I, J, relating to arbitration, see the Standard Arrival Contract.

Standard Grinders Contract
of
The American Spice Trade Association

As amended, effective on and after January 26, 1942

Date..... 19....

.....AGREE TO SELL
andAGREE TO BUY
merchandise herein described, according to the terms and conditions named below.

QUANTITY	ARTICLE	PRICE	PACKING
F. O. B.
Time of Delivery, From.....	To
.....			

Terms and Conditions

If the delivery period for this contract extends over ninety days the prices mentioned herein shall be subject to revision at the end of each ninety day period, based on actual increases or decreases in seller's price list.

The buyer shall give the seller reasonable notice covering shipments and shall take deliveries in approximately equal monthly quantities except as may be otherwise provided herein, and if buyer shall fail during any month to order out such monthly quota, seller may at his option cancel it from the contract, by written notice to the buyer.

Seller shall not be liable for non-delivery hereunder caused by act of God, war conditions, governmental, state or municipal regulations or action, embargo, fire, flood, accident, strike or other labor trouble, transportation difficulty, or, without construing the foregoing as words of limitation, any other cause beyond seller's control.

Seller reserves the right, with respect to all goods undelivered hereunder, by notice to buyer, to increase or decrease the prices

named herein to cover any change in insurance, in excise and/or other taxes and/or any increase or decrease in import duties that may be levied after the date hereof.

Prices in this contract are based on prevailing transportation rates at time of sale and any increase or decrease shall be for account of buyer.

Upon written notification, the seller may decline to make deliveries on this contract, except for cash, whenever the seller shall have reason to doubt the buyer's responsibility.

Disputes. Any question, controversy, or claim whatever, between buyer and seller, arising out of this contract, not adjusted by mutual agreement, shall be settled by arbitration to be held at the point of sale under the rules of arbitration procedure of The American Spice Trade Association, with which rules both parties are familiar.

Subject to other terms and conditions on the back hereof.

BUYER
SELLER

Package Differentials

The following differentials apply to ground spices, seeds or herbs, over the barrel basis:

Bags of 125 lbs.	\$	per lb. less
Drums of 100 lbs.	\$	“ more
Drums of 50 lbs.	\$	“ “
Drums of 25 lbs.	\$	“ “
10-lb. Wooden Boxes	\$	“ “
6-lb. Wooden Boxes	\$	“ “
10-lb. Fibre Boxes	\$	“ “
6-lb. Fibre boxes	\$	“ “

Rules for Arbitration of the Standard Grinders Contract

A. QUALITY. Should a question arise in respect to quality, individual samples shall be drawn and sealed by a disinterested party in the presence of representatives of both parties to the contract within fifteen days of receipt of shipment.

B. ARBITRATORS. Each disputant shall appoint a disinterested party as arbitrator. If either disputant shall neglect to appoint an arbitrator within five days after notice in writing is received by him from the other disputant of the appointment of his arbitrator, the President of The American Spice Trade Association shall appoint the other arbitrator upon a written request from either party to the dispute. Disputants may appoint one person to act as sole arbitrator.

C. UMPIRE. The two arbitrators shall select a third disinterested party as umpire, who shall meet and act with the arbitrators in the decision of the arbitration, and shall act as Chairman thereof. If the arbitrators shall fail to select the umpire within seven business days from their appointment, the President shall appoint the umpire upon request in writing from either arbitrator. Both parties shall be duly notified of the date of hearing and entitled to be present thereat.

D. AWARD. The award of such arbitrators and umpire or sole arbitrator shall be final and binding on both parties, unless within five business days after receipt of the award, an appeal be lodged with the Secretary of The American Spice Trade Association by either disputant. Settlements under an arbitration award or award of the Arbitration Committee shall be made within ten days from the date of such award, and if not so settled, judgment may be entered thereon in accordance with the practice of any Court having jurisdiction.

E. APPEAL. All appeals shall be heard by the Arbitration Committee, which shall consider cases decided by arbitrators and umpires, and shall sustain, reverse or modify same. They shall have the right to remand appeals to the arbitrators and umpires for rearbitration. If, on any appeal, any member of the Arbitration Committee shall be an interested party in the transaction, or contract in question, his place shall be taken for that appeal by the member on the list of Arbitration Committee Alternates next in rotation for service. Three business days' notice of the hearing of the appeal shall be given by the Secretary to the disputants and to the arbitrators and umpire whose award is appealed against,

and they shall be entitled to be present and to be heard upon the matter in question. Not less than five of the Arbitration Committee being present, the decision of the majority shall be the final and binding decision of the appeal.

F. BRIEFS. On appeals, other than those involving quality only, each appellant and respondent shall deliver to the Secretary of the Association seven copies of the brief or statement covering his case, duly sworn to, at least 48 hours before the time set for the appeal.

G. FEES. Unless otherwise divided or awarded by the arbitrators and umpire, or the Arbitration Committee, the fees for arbitration or appeal shall be finally paid by the losing party.

The fees for arbitrators and umpires shall be \$10 each in all cases, and in addition a \$10 fee to the Association. In case the two disputants agree upon a single member, who shall act as the sole arbitrator, instead of two arbitrators and an umpire, the fee for the sole arbitrator shall be \$20 in all cases, and in addition a fee of \$10 to the Association. If an appeal shall be decided in favor of the appellant, the appeal fee of \$50 shall be returned to the appellant and the respondent shall pay the appeal fee of \$50.

Arbitrators and umpires shall be awarded extra fees by the Arbitration Committee, if, in the judgment of the Committee the said arbitrators and umpire shall have performed unusual or extraordinary services during the arbitration on which they shall have served.

H. OATHS. In all arbitrations and appeals, the arbitrators, umpire, and members of the Arbitration Committee, shall, before acting, subscribe to the usual legal oath of office. In all arbitrations and appeal hearings, all witnesses and principals giving oral evidence shall be duly sworn in the usual manner. Awards must be legally acknowledged. All notary fees to be paid as awarded by the arbitrators or Arbitration Committee in case of appeal.

I. OFFER OF SETTLEMENT. In every case involving dispute, where the arbitrators and umpire decide that the contract has been properly fulfilled by the seller, or, in every case where

the seller has, before the arbitration, offered settlement which is held by the arbitrators and umpire to be sufficient, but which the buyer refused to accept, the fees shall be paid by the buyer; but where the buyer has offered a settlement and the seller has refused to make such settlement, which the arbitrators and umpire finally decide is adequate, the fees shall be paid by the seller; provided all offers as above shall have been made in writing.

TABLE OF DISTANCES

Distances given below are computed from "Table of Distances between Ports, 1943" published by the United States Navy Department, Hydrographic Office.

Distances vary with track and season and the distances given in this table are the shortest for the routes noted. Where no routes are given, the course is direct and the shortest recorded.

Steamer time has been calculated to the nearest hour, i.e., one-half hour and less of time have been disregarded and time in excess of one-half hour has been calculated as one hour.

PORT	LATITUDE	LONGITUDE	To	ROUTE	NAUTICAL MILES	STEAMER TIME		
						—KNOTS—		
					14	16	18	
					D. hrs.	D. hrs.	D. hrs.	D. hrs.
Aden, Arabia	12°47'40"N	44°59'00"E	New York, U. S. A.	Via Suez	6511	19 9	16 23	15 2
			Halifax, N. S., Can.	Via Suez	5985	17 19	15 14	13 20
			Montreal, Can.	Via Suez	6496	19 8	16 22	15 1
Alexandria, Egypt	31°11'00"N	29°52'00"E	New York, U. S. A.	Via Strait of Gibraltar	4999	14 21	13 0	11 14
			Halifax, Can.		4473	13 7	11 16	10 8
			Montreal, Can.		4984	14 20	12 23	11 13
Algiers, Algeria, N. Africa	36°46'30"N	3°04'00"E	New York, U. S. A.	Via Strait of Gibraltar	3615	10 18	9 10	8 9
			Halifax, Can.		3089	9 5	8 1	7 4
			Montreal, Can.		3600	10 17	9 9	8 8
Amsterdam, Holland	52°23'00"N	4°54'00"E	New York, U. S. A.	Via Bishop Rock	3403	10 3	8 21	7 21
			Halifax, Can.		2786	8 7	7 6	6 11
			Montreal, Can.		3162	9 10	8 5	7 8
Antwerp, Belgium	51°14'00"N	4°24'00"E	New York, U. S. A.	Via Bishop Rock	3371	10 1	8 19	7 19
			Halifax, Can.		2754	8 5	7 4	6 9
			Montreal, Can.		3130	9 8	8 4	7 6

Antofagasta, Chile	23°39'00"S	70°25'20"W	San Francisco, U. S. A.	4762	14	4	12	10	11	1
Archangel, U. S. S. R.	64°32'00"N	40°31'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	4216 3663 4165	12	13	10	23	9	18 8 11 9
Auckland, New Zealand	36°50'00"S	174°47'00"E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A. Vancouver, B. C., Can.	6516 5680 6170 6191	19	9	16	23	15	2 4 7 8
Bangkok, Thailand	13°43'00"N	100°31'00"E	Los Angeles, U. S. A.	7948	23	16	20	17	18	10
Barcelona, Spain	41°22'00"N	2°11'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	3712 3186 3697	11	1	9	16	8	14 7 9 8
Basra, Iraq	30°31'30"N	47°50'30"E	New York, U. S. A. Halifax, Can. Montreal, Can.	8482 7956 8467	25	6	22	2	19	15 18 10 19
Batavia, Java, N. E. I.	6°06'00"S	106°53'00"E	San Francisco, U. S. A.	7641	22	18	19	22	17	17
Belfast Ireland	54°37'00"N	5°54'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.	2993 2328 2831	8	22	7	19	6	22 5 9 6
Bergen Norway	60°24'00"N	5°19'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	3367 2664 3167	10	0	8	18	7	19 6 4 7

STEAMER TIME

PORT	LATITUDE	LONGITUDE	To	ROUTE	NAUTICAL MILES	KNOTS		
						14	16	18
						D. hrs.	D. hrs.	D. hrs.
Beyrouth, Syria	33°54'00" N	35°31'00" E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	5217 4691 5202	15 13 13 23 15 12	13 14 12 5 13 13	12 2 10 21 12 1
Boma, Belgium Congo, Africa	5°51'30" S	13°03'00" E	New York, U. S. A.		5591	16 15	14 13	12 23
Bombay, India	18°56'00" N	72°51'00" E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Suez Canal, Port Said and Strait of Gibraltar	8160 7634 8145	24 7 22 17 24 6	21 6 19 21 21 5	18 21 17 16 18 21
Bordeaux, France	44°51'00" N	0°34'00" W	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Bishop Rock	3319 2702 3078	9 21 8 1 9 4	8 15 7 1 8 0	7 16 6 6 7 3
Bremerhaven, Germany	53°33'00" N	8°33'30" E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Bishop Rock	3579 2962 3338	10 16 8 20 9 22	9 8 7 17 8 17	8 7 6 21 7 17
Bridgetown, Barbados, B.W.I.	13°05'00" N	59°37'00" W	New York, U. S. A. Halifax, Can.		1829 1906	5 11 5 16	4 18 4 23	4 6 4 10
Brisbane, Australia	27°28'00" S	153°03'30" E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A.		7687 6193 6471	22 21 18 10 19 6	20 0 16 3 16 20	17 19 14 8 14 23
Britto, Nicaragua	11°21'00" N	85°59'00" W	San Francisco, U. S. A. Vancouver, B. C., Can.		2709 3496	8 1 10 10	7 1 9 2	6 6 8 2

Buenos Aires, Argentina, S. America	34°35'00"S	58°22'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.	5871 5731 6455	17 11 17 1 19 5	15 7 14 22 16 19	13 14 13 6 14 23
Cadiz, Spain	36°32'00"N	6°17'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.	3143 2617 3127	9 8 7 19 9 7	8 4 6 20 8 3	7 7 6 1 7 6
Calais, France	50°58'00"N	1°51'00"E	New York, U. S. A. Halifax, Can. Montreal, Can. New York, U. S. A.	3255 2638 3014	9 16 7 20 8 23	8 11 6 21 7 20	7 13 6 3 6 23
Calcutta, India	22°33'00"N	88°19'00"E	Halifax, Can. Montreal, Can.	9806 9280	29 4 27 15 29 3	25 13 24 4 25 12	22 17 21 12 22 16
Callao, Peru	12°03'00"S	77°10'00"W	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A.	1350 3989 4764	4 0 11 21 14 4	3 12 10 9 12 10	3 3 9 6 11 1
Canton, China	23°07'00"N	113°16'00"E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A.	9201 6132 5829	27 9 18 6 17 8	23 23 15 23 15 4	21 7 14 5 13 12
Capetown, South Africa	33°54'00"S	18°26'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	6786 6490 7118	20 5 19 8 21 4	17 16 16 22 18 13	15 17 15 1 16 11
Cardiff, Wales, U. K.	51°27'20"N	3°09'30"W	New York, U. S. A. Halifax, Can. Montreal, Can.	3051 2422 2808	9 2 7 5 8 9	7 23 6 7 7 7	7 1 5 15 6 12

(South of
Aleutians)

PORT	LATITUDE	LONGITUDE	To	ROUTE	NAUTICAL MILES	STEAMER TIME		
						KNOTS		
						D. hrs.	D. hrs.	D. hrs.
Casablanca, Morocco	33°37'00"N	7°36'00"W	New York, U. S. A.		3160	9 10	8 6	7 8
Catania, Sicily, Italy	37°29'30"N	15°06'30"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	4259 3733 4244	12 16 11 3 12 15	11 2 9 17 11 1	9 21 8 15 9 20
Cherbourg, France	49°39'00"N	1°37'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Bishop Rock	3199 2502 2878	9 16 7 11 8 14	8 8 6 12 7 12	7 10 5 19 6 16
Civitavecchia, Italy	42°05'30"N	11°47'15"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	4083 3557 4068	12 4 10 14 12 3	10 15 9 6 10 14	9 11 8 6 9 10
Colombo, Ceylon	6°57'00"N	79°51'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Suez Canal, Port Said and Strait of Gibraltar	8592 8066 8577	25 14 24 0 25 13	22 9 21 0 22 8	19 21 18 16 19 20
Constanta, Rumania	44°10'00"N	28°40'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	5212 4686 5197	15 12 13 23 15 11	13 14 12 5 13 13	12 2 10 20 12 1
Copenhagen, Denmark	55°42'00"N	12°36'06"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via The Skaw and Pentland Firth	3671 2968 3471	10 22 8 20 10 8	9 13 7 17 9 1	8 12 6 21 8 1
Darien, Kwantung, Manchukuo	38°56'00"N	121°39'00"E	Panama, Pan. San Francisco, U. S. A.	Via Tsugaru Kaikyo	8627 5456	25 16 16 6	22 11 14 5	19 23 12 15

Dakar, Senegal, Africa	14°41'00"N	17°26'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.	Seattle, U. S. A.	5192	15 11	13 12	12 0
Danzig, Free State	54°22'00"N	18°40'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via The Skaw (Via The Great Belt) and Pentland Firth	4054 3351 3854	12 2 9 23 11 11	10 13 8 17 10 1	9 9 7 18 8 22
Djibouti, French Somaliland	11°36'30"N	43°08'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Suez Canal, Port Said and Strait of Gibraltar	6430 5904 6515	19 3 17 14 19 2	16 18 15 9 16 17	14 21 13 16 14 20
Dublin, Ireland	53°20'45"N	6°13'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Fastnet Via Fastnet Via Fastnet	3028 2399 2785	9 0 7 3 8 7	7 21 6 6 7 6	7 0 5 13 6 11
Durban, South Africa	29°52'00"S	31°02'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Cape of Good Hope	7565 7266 7898	22 12 21 15 23 12	19 17 18 22 20 14	17 12 16 20 18 7
Famagusta, Cyprus	35°07'20"N	33°56'40"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	5171 4645 5156	15 9 13 20 15 8	13 11 12 2 13 10	11 23 10 18 11 22
Fiume, Italy	45°19'30"N	14°26'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	4843 4315 4826	14 10 12 20 14 9	12 15 11 6 12 14	11 5 10 0 11 4

PORT	LATITUDE	LONGITUDE	To	ROUTE	STEAMER TIME			
					KNOTS			
					NAUTICAL MILES	14 D. hrs.	16 D. hrs.	18 D. hrs.
Genoa, Italy	44°24'00"N	8°55'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	4053 3527 4038	12 1 10 12 12 0	10 13 9 4 10 12	9 9 8 4 9 8
Glasgow, Scotland	55°51'45"N	4°18'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Fastnet Via Fastnet Via Fastnet	3181 2552 2938	9 11 7 14 8 18	8 7 6 15 7 16	7 9 5 22 6 19
Habana, Cuba	23°08'00"N	82°20'30"W	New York, U. S. A. Halifax, Can. Montreal, Can.		1199 1640 2453	3 14 4 21 7 7	3 3 4 6 6 9	2 19 3 19 5 16
Haifa, Palestine	32°49'30"N	35°00'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	5204 4678 5189	15 12 13 22 15 11	13 13 12 4 13 12	12 1 10 20 12 0
Hakodate, Japan	41°47'00"N	140°43'00"E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A.	S. of Aleutians	7417 4247 3982	22 2 12 15 11 20	19 8 11 1 10 9	17 4 9 20 9 5
Hamburg, Germany	53°32'30"N	9°59'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Bishop Rock	3639 3022 3398	10 20 9 0 10 3	9 11 7 21 8 20	8 10 7 0 7 21
Hamilton, Bermuda	32°17'30"N	64°47'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.		697 756 1572	2 2 2 6 4 16	1 20 1 23 4 2	1 15 1 18 3 15

Helsinki, Finland	60°09'20"N	24°55'40"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via The Skaw and Pentland Firth	4338 3635 4138	12 22 10 20 12 8	11 7 9 11 10 19	10 1 8 10 9 14
Hong Kong, China	22°17'00"N	114°10'00"E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A.		9195 6044 5768	27 9 18 0 17 4	23 23 15 18 15 0	21 7 14 0 13 8
Honolulu, Territory of Hawaii	21°18'30"N	157°52'15"W	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A. Vancouver, B. C., Can.		4685 2091 2409 2423	13 23 6 5 7 4 7 5	12 5 5 11 6 7 6 7	10 20 4 20 5 14 5 15
Hull, England	53°44'30"N	0°18'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Bishop Rock	3453 2836 3212	10 7 8 11 9 13	9 0 7 9 8 9	8 0 6 14 7 10
Istanbul, Turkey	41°01'00"N	29°00'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	4995 4469 4980	14 21 13 7 14 20	13 0 11 15 12 23	11 13 10 8 11 13
Jaffa, Palestine	32°03'30"N	34°44'30"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	5209 4683 5194	15 12 13 22 15 11	13 14 12 5 13 13	12 1 10 20 12 1
Karachi, India	24°49'00"N	66°58'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Suez Canal, Port Said and Strait of Gibraltar	7976 7450 7961	23 18 22 4 23 17	20 18 19 10 20 18	18 11 17 6 18 10
Kingston, Jamaica, B. W. I.	17°57'30"N	76°47'00"W	New York, U. S. A. Halifax, Can.		1474 1795	4 9 5 8	3 20 4 16	3 10 4 4

STEAMER TIME

KNOTS

PORT	LATITUDE	LONGITUDE	To	ROUTE	NAUTICAL MILES		KNOTS	
					D. hrs.	D. hrs.	14	16
Kobe, Japan	34°40'00"N	135°12'00"E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A. Vancouver, B. C., Can.		7964	23 17	20 18	18 10
					4819	14 8	12 13	11 4
					4527	13 11	11 19	10 11
					4541	13 12	11 20	10 12
Kotar, Yugoslavia	42°25'30"N	18°46'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	4619	13 18	12 1	10 17
					4093	12 4	10 16	9 11
					4604	13 17	12 0	10 16
Lagos, Nigeria, Africa	6°27'00"N	3°23'00"E	New York, U. S. A.		4883	14 13	12 17	11 7
Larnaka, Cyprus	34°54'30"N	33°39'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	5124	15 6	13 8	11 21
					4598	13 16	11 23	10 15
					5109	15 5	13 7	11 20
Leghorn, Italy	43°33'00"N	10°18'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	4074	12 3	10 15	9 10
					3548	10 13	9 6	8 5
					4059	12 2	10 14	9 9
Le Havre, France	49°29'00"N	0°06'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Bishop Rock	3185	9 11	8 7	7 9
					2568	7 15	6 16	5 23
					2944	8 18	7 16	6 20
Leningrad, U. S. S. R.	59°55'00"N	30°15'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via The Skaw (Via The Great Belt) and Pent- land Firth	4492	13 9	11 17	10 10
					3789	11 7	9 21	8 18
					4292	12 19	11 4	9 22

Lisbon, Portugal	38°42'00"N	9°08'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.	2964 2433 2940	8 20 7 6 8 18	7 17 6 8 7 16	6 21 5 15 6 19
Liverpool, England	53°27'00"N	3°01'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.	3100 2471 2857	9 5 7 8 8 12	8 2 6 10 7 11	7 4 5 17 6 15
London, England	51°30'00"N	0°01'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	3335 2718 3094	9 22 8 2 9 5	8 16 7 2 8 1	7 17 6 7 7 4
Lourenco Marques, Mozambique, E. Africa	25°58'30"N	32°34'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	7858 7559 8191	23 9 22 12 24 9	20 11 19 16 21 8	18 5 17 12 18 23
Madras, India	13°06'00"N	80°18'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	9159 8633 9144	27 6 25 17 27 5	23 20 22 12 23 19	21 5 20 0 21 4
Malta, (Veletta Harbor)	35°54'00"N	14°30'30"E	New York, U. S. A. Halifax, Can. Montreal, Can.	4183 3657 4168	12 11 10 21 12 10	10 21 9 13 10 20	9 16 8 11 9 16
Manila, Philippine Islands	14°35'00"N	120°58'00"E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A. Vancouver, B. C., Can.	9347 6221 5959 6019	27 20 18 12 17 18 17 22	24 8 16 5 15 12 15 16	21 15 14 10 13 19 13 22
Manzanillo, Mexico	19°03'30"N	104°19'50"W	San Francisco, U. S. A.	1538	4 14	4 0	3 13

PORT	LATITUDE	LONGITUDE	To	ROUTE	NAUTICAL		KNOTS	
					MILES	D. hrs.	14	16
Marseille, France	43°18'00"N	5°21'30"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	3888 3362 3873	11 14 10 0 11 13	10 3 8 18 10 2	9 0 7 19 8 23
Melbourne, Australia	37°49'15"S	144°56'00"E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A.		7928 6970 7332	23 14 20 18 21 20	20 15 18 4 19 2	18 8 16 3 16 23
Mersin, Turkey	36°47'00"N	34°39'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	4053 3527 4038	12 1 10 12 12 0	10 13 9 4 10 12	9 9 8 4 9 8
Messina, Sicily, Italy	38°11'30"N	15°34'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	4222 3696 4207	12 14 11 0 12 12	11 0 9 15 10 23	9 19 8 13 9 18
Montevideo, Uruguay, So. America	34°54'30"S	56°13'30"W	New York, U. S. A. Halifax, Can. Montreal, Can.		5749 5617 6344	17 3 16 17 18 21	14 23 14 15 16 12	13 7 13 0 14 16
Mozambique, Mozambique, E. Africa	15°01'00"S	40°43'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Cape of Good Hope	8608 8309 8941	25 15 24 17 26 15	22 10 21 15 23 7	19 22 19 6 20 17
			New York, U. S. A. Halifax, Can. Montreal, Can.	Via Suez Canal, Port Said, and Strait of Gibraltar	8633 8107 8618	25 17 24 3 25 16	22 12 21 3 22 11	20 0 18 18 19 23

Murmansk, U. S. S. R.	68°58'30"N	33°03'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via North of Iceland	3844 3368 3870	11 11 10 1 11 12	10 0 8 18 10 2	8 22 7 19 8 23
Nagasaki, Japan	32°44'30"N	129°52'15"E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A.	S. of Aleutians	8200 5030 4765	24 10 14 23 14 4	21 8 13 2 12 10	19 0 11 15 11 1
Naples, Italy	40°50'00"N	14°16'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	4175 3649 4160	12 10 10 21 12 9	10 21 9 12 10 20	9 16 8 11 9 15
Newcastle- on-Tyne, England	54°58'00"N	1°35'00"W	New York, U. S. A. Halifax, N. S., Can. Montreal, Can.	Via Bishop Rock	3538 2921 3297	10 13 8 17 9 19	9 5 7 15 8 14	8 5 6 18 7 15
Novorossisk, U. S. S. R.	44°43'45"N	37°48'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	5473 4947 5458	16 7 14 17 16 6	14 6 12 21 14 5	12 16 11 11 12 15
Odessa, U. S. S. R.	46°29'30"N	30°45'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	5367 4841 5352	15 23 14 10 15 22	13 23 12 15 13 22	12 10 11 5 12 9
Oran, Algeria, N. Africa	35°43'00"N	0°38'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	3427 2901 3412	10 5 8 15 10 4	8 22 7 13 8 21	7 22 6 17 7 22
Oslo, Norway	59°54'20"N	10°44'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Pentland Firth	3595 2892 3395	10 17 8 15 10 2	9 9 7 13 8 20	8 8 6 17 7 21

PORT	LATITUDE	LONGITUDE	To	ROUTE	STEAMER TIME			
					KNOTS			
					NAUTICAL MILES	14	16	18
	D. hrs.	D. hrs.	D. hrs.	D. hrs.	D. hrs.	D. hrs.		
Pago Pago, Samoa	14°16'30" S	170°41'00" W	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A. Vancouver, B. C., Can.		5656 4150 4611 4637	16 20 12 8 13 17 13 19	14 17 10 19 12 0 12 2	13 2 9 15 10 16 10 18
Palermo, Sicily, Italy	38°07'30" N	13°22'15" E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	4114 3585 4096	12 6 10 16 12 5	10 17 9 8 10 16	9 13 8 7 9 12
Panama, Panama	8°53'00" N	79°31'00" W	New York, U. S. A. Halifax, Can. Montreal, Can. San Francisco, U. S. A. Seattle, U. S. A. Vancouver, B. C., Can.		2018 2338 3203 3245 4020 4032	6 0 6 23 9 13 9 16 11 23 12 0	5 6 6 2 8 8 8 11 10 11 10 12	4 16 5 10 7 10 7 12 9 7 9 8
Papeete, Tahiti	17°32'00" S	149°34'00" W	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A.		4493 3663 4296	13 9 10 22 12 19	11 17 9 13 11 4	10 10 8 11 9 23
Pernambuco, Brazil	8°03'00" S	34°52'00" W	New York, U. S. A. Halifax, Can. Montreal, Can.		3698 3558 4283	11 0 10 14 12 18	9 15 9 6 11 4	8 13 8 6 9 22
Piraeus, Greece	37°56'30" N	28°38'00" E	New York, U. S. A. Halifax, Can. Montreal, Can.		4698 4172 4683	14 0 12 10 13 22	12 6 10 21 12 5	10 21 9 16 10 20

Plymouth, England	50°21'40" N	4°09'10" W	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Bishop Rock	3007 2390 2766	8 23 7 3 8 6	7 20 6 5 7 5	6 23 5 13 6 10
Port au Prince, Haiti	18°33'30" N	72°21'30" W	New York, U. S. A. Halifax, Can. Montreal, Can.		1372 1671 2650	4 2 4 23 7 21	3 14 4 8 6 22	3 4 3 21 6 3
Port Elizabeth, S. Africa	33°57'40" S	25°38'00" E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Cape of Good Hope	7191 6892 7524	21 10 20 12 22 9	18 17 17 23 19 14	16 15 15 23 17 10
Port Said, Egypt	31°16'00" N	32°19'00" E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	5111 4585 5096	15 5 13 15 15 4	13 7 11 23 13 6	11 20 10 15 11 19
Port of Spain, Trinidad, B. W. I.	10°33'45" N	61°31'00" W	New York, U. S. A. Halifax, Can. Montreal, Can.		1939 2059 2801	5 18 6 3 8 8	5 1 5 9 7 7	4 12 4 18 6 12
Punta Arenas, Chile	53°10'00" S	70°54'00" W	Panama, Pan. New York, U. S. A. Halifax, Can. Montreal, Can.		3932 6934 6,99 7513	11 17 20 15 20 6 22 9	10 6 18 1 17 17 19 14	9 2 16 1 15 18 17 9
Riga, Latvia	56°57'30" N	24°05'30" E	San Francisco, U. S. A. Seattle, U. S. A. Vancouver, B. C., Can.		6188 6964 6978	18 10 20 17 20 18	16 3 18 3 18 4	14 8 16 3 16 4
			New York, U. S. A. Halifax, Can. Montreal, Can.	Via The Skaw (Via The Great Belt) and Pent- land Firth	4272 3565 4068	12 17 10 15 12 3	11 3 9 7 10 14	9 21 8 6 9 10

PORT	LATITUDE	LONGITUDE	To	ROUTE	STEAMER TIME			
					NAUTICAL MILES	KNOTS		
					14	16	18	
					D. hrs.	D. hrs.	D. hrs.	
Rio de Janeiro, Brazil	22°53'30"S	43°11'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.		4762 4630 5354	14 4 13 19 15 22	12 10 12 1 13 23	11 1 10 17 12 9
Rostov, U. S. S. R.	47°09'30"N	39°43'30"E	New York, U. S. A. Halifax, Can. Montreal, Can.		5649 5123 5634	16 19 15 6 16 18	14 17 13 8 14 16	13 2 11 21 13 1
Rotterdam, Holland	51°54'00"N	4°28'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Bishop Rock	3376 2759 3135	10 1 8 5 9 8	8 19 7 4 8 4	7 20 6 9 7 6
Saigon, Fr. Indo-China	10°46'00"N	106°42'15"E	Panama, Pan. San Francisco, U. S. A.		10017 6878	29 19 20 11	26 2 17 22	23 4 15 22
San Jose, Guatemala	13°55'00"N	90°49'45"W	Panama, Pan. San Francisco, U. S. A.		886 2395	2 15 7 3	2 7 6 6	2 1 5 13
San Juan, Puerto Rico	18°27'50"N	66°06'40"W	Panama, Pan. New York, U. S. A. Halifax, Can.		1036 1399 1580	3 2 4 4 4 17	2 17 3 15 4 3	2 10 3 6 3 16
St. George, Grenada, B. W. I.	12°03'00"N	61°45'00"W	New York, U. S. A.		1842	5 12	4 19	4 6
Sevastopol, U. S. S. R.	44°37'00"N	33°31'30"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	5318 4792 5303	15 20 14 6 15 19	13 20 12 11 13 19	12 7 11 2 12 7

Shanghai, China	31°14'00"N	121°29'30"E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A.	8566 5396 5131	25 12 16 1 15 6	22 7 14 1 13 9	7 19 12 12 11 21
Singapore, Straits Settlements	1°16'00"N	103°50'00"E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A. Vancouver, B. C., Can.	10505 7353 7062 7078	31 6 21 21 21 0 21 2	27 9 19 4 18 9 18 10	8 24 0 17 8 16 9 16
Soerabaja, Java	7°12'00"S	112°44'00"E	San Francisco, U. S. A.	7343	21 20	19 3	17 0
Southampton, England	50°53'00"N	1°23'30"W	New York, U. S. A. Halifax, Can. Montreal, Can.	3147 2530 2906	9 9 7 13 8 16	8 5 6 14 7 14	7 7 5 21 6 17
Spezia, Italy	44°05'30"N	9°49'30"E	New York, U. S. A. Halifax, Can. Montreal, Can.	4076 3550 4061	12 3 10 14 12 2	10 15 9 6 10 14	9 10 8 5 9 10
Stockholm, Sweden	59°19'30"N	18°05'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	4216 3513 4016	12 13 10 11 11 23	10 23 9 4 10 11	9 18 8 3 9 7
Suva, Fiji Islands	18°08'00"S	178°25'00"E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A.	6325 4749 5162	18 20 14 3 15 9	16 11 12 9 13 11	14 15 11 0 11 23
Sydney, Australia	33°51'30"S	151°13'00"E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A.	7674 6448 6810	22 20 19 5 20 6	20 0 16 19 17 18	17 18 14 22 15 18

PORT	LATITUDE	LONGITUDE	TO	ROUTE	NAUTICAL MILES	STEAMER TIME		
						KNOTS		
						14	16	18
	D. hrs.	D. hrs.	D. hrs.	D. hrs.	D. hrs.	D. hrs.	D. hrs.	
Tamatave, Madagascar	18°09'00"S	49°25'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Seuz Canal, Port Said and Strait of Gibraltar	8734 8208 8719	26 0 24 10 25 23	22 18 21 9 22 17	20 5 19 0 20 4
			New York, U. S. A. Halifax, Can. Montreal, Can.	Via Cape of Good Hope	8856 8557 9189	26 9 25 11 27 8	23 1 22 7 23 22	20 12 19 19 21 6
Toulon, France	43°06'30"N	5°55'30"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	3901 3375 3886	11 15 10 1 11 14	10 4 8 19 10 3	9 1 7 19 9 0
Trieste, Italy	45°39'30"N	13°45'50"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	4886 4360 4871	14 13 12 23 14 12	12 17 11 8 12 16	11 7 10 2 11 7
Tripoli, Libya, N. Africa	32°54'00"N	13°12'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.		4314 3788 4299	12 20 11 7 12 19	11 6 9 21 11 5	10 0 8 18 9 23
Tunis, Tunisia, N. Africa	36°49'00"N	10°21'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	3995 3469 3982	11 21 10 8 11 20	10 10 9 1 10 9	9 6 8 1 9 5
Valencia, Spain	39°27'00"N	0°19'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.	Via Strait of Gibraltar	3589 3063 3574	10 16 9 3 10 15	9 8 7 23 9 7	8 7 7 2 8 7

Valparaiso, Chile	33°02'00"S	71°38'00"W	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A.	2616 5140 5916	7 19 15 7 17 15	6 19 13 9 15 10	6 1 11 22 13 17
Venice, Italy.	45°26'00"N	12°18'30"E	New York, U. S. A. Halifax, Can. Montreal, Can.	4893 4367 4878	14 13 13 0 14 12	12 18 11 9 12 17	11 8 10 3 11 7
Vigo, Spain	42°14'30"N	8°44'00"W	New York, U. S. A. Halifax, Can. Montreal, Can.	2912 2358 2860	8 16 7 0 8 12	7 14 6 3 7 11	6 18 5 11 6 15
Yokohama, Japan	35°27'00"N	139°39'00"E	Panama, Pan. San Francisco, U. S. A. Seattle, U. S. A. Vancouver, B. C., Can.	7682 4536 4276 4262	22 21 13 12 12 17 12 16	20 0 11 19 11 3 11 2	17 19 10 12 9 22 9 21
Zanzibar, Zanzibar Island	6°10'00"S	39°11'00"E	New York, U. S. A. Halifax, Can. Montreal, Can.	9159 8860 9492	27 6 26 9 28 6	23 20 23 2 24 17	21 5 20 12 21 23

TABLE OF DISTANCES

PART II

JUNCTION POINTS

ATLANTIC AREA JUNCTION POINT	LATITUDE	LONGITUDE	To	ROUTE	NAUTICAL MILES	STEAMER TIME K N O T S		
						14	16	18
					D. hrs.	D. hrs.	D. hrs.	D. hrs.
Bishop Rock (approx. off Land's End, England)	49°45'00"N	6°35'00"W	Halifax, Can. Quebec, Can.	Track F Track G (Via Str. of Belle Isle)	2305 2542	6 21 7 14	6 0 6 15	5 8 5 21
			New York, U. S. A. Panama, Pan. Straits of Florida	Track C Via Mona Passage Track C	2922 4388 3859	8 17 13 1 11 12	7 15 11 10 10 1	6 18 10 4 8 22
Cape of Good Hope	34°22'00"S	18°23'00"E	Halifax, Can. Quebec, Can. New York, U. S. A. Panama, Pan. Straits of Florida	Via Cabot Strait	6502 6995 6801 6487 6770	19 8 20 20 20 6 19 7 20 4	16 22 18 5 17 17 16 21 17 15	15 1 16 5 15 18 15 0 15 16
Fastnet (South of Ireland)	51°20'00"N	9°36'00"W	Halifax, Can. Quebec, Can. Montreal, Can. New York, U. S. A. Straits of Florida	Track F Track G (Via Str. of Belle Isle) Track G Track C Track C	2176 2400 2562 2805 3715	6 11 7 3 7 15 8 8 11 1	5 16 6 6 6 16 7 7 9 16	5 1 5 13 5 22 6 12 8 14

Inishtrahull (North of Ireland)	55°25'00"N	7°30'00"W	Halifax, Can. Quebec, Can.	Track F	2231	6 15	5 19	5 4
				Track F (Via Cabot Strait)	2595	7 17	6 18	6 0
Pentland Firth (North of Scotland)	58°42'00"N	3°20'00"W	Halifax, Can. Quebec, Can.	Track C	2896	8 15	7 13	6 17
				Track C	3837	11 10	10 0	8 21
Port Said (Egypt)	31°16'00"N	32°19'00"E	Strait of Gibraltar	Track F	2368	7 1	6 4	5 12
				Track F (Via Cabot Strait)	2732	8 3	7 3	6 8
				Track C	3071	9 3	8 0	7 3
				Track C (Westbound)	4012	11 23	10 11	9 7
The Skaw (Denmark)	57°48'00"N	10°44'00"E	Bishop Rock Pentland Firth	1935	5 18	5 1	4 11	
				851	2 13	2 5	1 23	
Strait of Gibraltar	35°57'00"N	5°45'00"W	Halifax, Can. Quebec, Can. New York, U. S. A. Straits of Florida	450	1 8	1 4	1 1	
				2650	7 21	6 22	6 3	
				3022	9 0	7 21	7 0	
				3176	9 11	8 6	7 8	
Straits of Florida	24°25'00"N	83°00'00"W	Halifax, Can. Quebec, Can. New York, U. S. A. New Orleans, U. S. A. Norfolk, Va., U. S. A.	4009	11 22	10 11	9 7	
				1642	4 21	4 7	3 19	
Straits of Florida	24°25'00"N	83°00'00"W	Halifax, Can. Quebec, Can. New York, U. S. A. New Orleans, U. S. A. Norfolk, Va., U. S. A.	2328	6 22	6 1	5 9	
				1197	3 13	3 3	2 18	
Straits of Florida	24°25'00"N	83°00'00"W	Halifax, Can. Quebec, Can. New York, U. S. A. New Orleans, U. S. A. Norfolk, Va., U. S. A.	524	1 13	1 9	1 5	
				997	2 23	2 14	2 7	

JUNCTION POINT PACIFIC AREA	LATITUDE	LONGITUDE	To	ROUTE	NAUTICAL MILES			STEAMER TIME KNOTS		
					D. hrs.	D. hrs.	D. hrs.	14	16	18
Lombok Strait (Dutch East Indies)	8°50'00"S	115°43'00"E	Balik Papan, Borneo Batavia, Java Belawan, Sumatra Darwin, Australia Linkas, Borneo Makassar, Celebes Menado, Celebes Sabang, Sumatra Saigon, Fr. Indo-China Semarang, Java Soerabaja, Java	S. of Java	472 615 1342 1623 830 339 967 1575 1408 416	1 10 1 20 4 0 4 20 2 11 1 0 2 21 4 16 4 5 1 6	1 5 1 14 3 12 4 5 2 4 0 21 2 12 4 2 3 16 1 2	1 2 1 10 3 3 3 18 1 22 0 19 2 6 3 15 3 6 0 23		
Singapore, Straits Settlements	1°16'00"N	103°50'00"E	Sunda Strait Balik Papan, Borneo Bangkok, Thailand Batavia, Java Belawan, Sumatra Makassar, Celebes Malacca, Str. Set. Penang, Str. Set. Sabang, Sumatra Saigon, Fr. Indo-China Soerabaja, Java	Via Rhio Strait Via North of Java	275 677 1053 842 525 368 1070 117 367 601 649 763	0 20 2 0 3 3 2 12 1 13 1 2 3 4 0 8 1 2 1 19 1 22 2 6	0 17 1 18 2 18 2 5 1 9 0 23 2 19 0 7 0 23 1 14 1 17 2 0	0 15 1 14 2 10 1 23 1 5 0 20 2 11 0 6 0 20 1 9 1 12 1 18		

Sundra Strait (Dutch East Indies)	6°04'00"S	105°50'00"E	Balik Papan, Borneo Batavia, Java Belawan, Sumatra Darwin, Australia	837 77 870 926 1191	2 12 0 5 2 14 2 18 2 13	2 4 0 5 2 6 2 10 3 2	1 22 0 4 2 0 2 3 2 18
Linkas, Borneo Lombok Strait Makassar, Celebes Malacca, Str. Set. Menado, Celebes Sabang, Sumatra Semarang, Java Singapore, Str. Set. Soerabaja, Java Wetar Passage				677 861 619 1351 1103 289	2 0 2 13 1 20 4 0 3 7 0 21	1 18 2 6 1 15 3 12 2 21 0 18	1 14 2 0 1 10 3 3 2 13 0 16
Via Bank and Berhala Strait				532 450 1308	1 14 1 8 3 21	1 9 1 4 3 10	1 6 1 1 3 1
Torres Strait (South of Papua, New Guinea)	10°33'00"S	142°08'00"E	Batavia, Java	2175	6 11	5 16	5 1
Belawan, Sumatra Darwin, Australia				2839	8 11	7 9	6 14
Malacca, Str. Set. Panama, Pan. Sabang, Sumatra Saigon, Fr. Indo-China Soerabaja, Java				749 2588 8451 3072 2629	2 5 7 17 25 4 9 3 7 20	1 23 6 18 22 0 8 0 6 20	1 18 6 0 19 13 7 3 6 2
Via Wetar Pas- sage, South of Madura Island				1784	5 7	4 15	4 3
Via Wetar Pas- sage, North of							

JUNCTION POINT	LATITUDE	LONGITUDE	To	ROUTE	NAUTICAL MILES	STEAMER TIME						
						K			N O T S			
						14	16	18	D. hrs.	D. hrs.	D. hrs.	
Wetar Passage (Dutch East Indies)	8°19'00"S	127°27'00"E	Sydney, Australia	Madura Island	1814	5 10	4 17	4 5				
			Wetar Passage		1754	5 5	4 14	4 1				
					881	2 15	2 7	2 1				
Wetar Passage (Dutch East Indies)	8°19'00"S	127°27'00"E	Balik Papan, Borneo		870	2 14	2 6	2 0				
			Batavia, Java		1247	3 17	3 6	2 21				
			Darwin, Australia									
			Linkas, Borneo	Bathurst Island	326	0 23	0 20	0 18				
			Makassar, Celebes		1161	3 11	3 1	2 16				
			Menado, Celebes		614	1 20	1 14	1 10				
			Semarang, Java		672	2 0	1 18	1 13				
			Singapore, Str. Set.		1067	3 4	2 19	2 11				
						Via Rhio and Karimata Straits	1587	4 17	4 3	3 16		
						Via North of Madoera Islands	928	2 18	2 10	2 4		
			Via South of Madoera Islands	980	2 22	2 13	2 6					
Sundra Strait Torres Strait					1308	3 21	3 10	3 1				
					881	2 15	2 7	2 1				

DIFFERENCE IN STANDARD TIME BETWEEN PRINCIPAL NORTH AMERICAN PORTS AND THE LEADING PORTS OF THE WORLD

The hours and minutes of time not underlined in the table must be added to the standard time existing in the North American port concerned and the hours and minutes of time underlined in the table must be deducted. This will give the standard time in the port selected.

DIFFERENCE IN TIME

BETWEEN	AND	BETWEEN	AND
New York, U. S. A. Montreal, Can. San Francisco, U. S. A. Seattle, U. S. A. Vancouver, B. C., Can.	Aden, Arabia Alexandria, Egypt Algiers, N. Africa Amsterdam, Holland Antwerp, Belgium Antofagasta, Chile Archangel, U. S. S. R. Auckland, N. Z.	New York, U. S. A. Montreal, Can. San Francisco, U. S. A. Seattle, U. S. A. Vancouver, B. C., Can.	Bangkok, Thailand Barcelona, Spain Basra, Iraq Batavia, Java Belfast, Ireland Bergen, Norway Beyrouth, Syria Boma, Bel. Congo, W. Af.
8.00 7.00 5.00 5.20 5.00 1.00 9.00 16.30	11.00 10.00 8.00 8.20 8.00 4.00 12.00 19.30	12.00 5.00 8.00 12.30 5.00 6.00 7.00 6.00	15.00 8.00 11.00 15.30 8.00 9.00 10.00 9.00
Montreal, Can. San Francisco, U. S. A. Seattle, U. S. A. Vancouver, B. C., Can.	Bombay, India Bordeaux, France Bremerhaven, Germany Bridetown, Barbados Brisbane, Australia Brito, Nicaragua Buenos Aires, Arg. Cadiz, Spain	New York, U. S. A. Montreal, Can. San Francisco, U. S. A. Seattle, U. S. A. Vancouver, B. C., Can.	10.30 5.00 6.00 1.00 15.00 1.00 4.00 5.00

BETWEEN	AND	BETWEEN	AND	BETWEEN	AND
New York, U. S. A.	Montreal, Can.	San Francisco, U. S. A.	Vancouver, B. C., Can.	Seattle, U. S. A.	San Francisco, U. S. A.
5.00	8.00	5.00	8.00	8.00	11.00
10.53	13.53	0.00	3.00	5.00	8.00
0.00	3.00	7.00	10.00	5.00	8.00
13.00	16.00	14.00	17.00	5.00	8.00
7.00	10.00	1.00	4.00	7.00	10.00
5.00	8.00	1.00	9.00	10.30	13.30
5.00	8.00	1.00	4.00	6.00	9.00
6.00	9.00	7.00	10.00	13.00	16.00
5.00	8.00	13.00	16.00	1.00	2.00
6.00	9.00	5.30	2.30	5.00	8.00
10.30	13.30	5.00	8.00	15.00	18.00
7.00	10.00	7.00	10.00	7.00	10.00
6.00	9.00	7.00	10.00	6.00	9.00
14.00	17.00	10.30	13.30	1.30	4.30
4.00	7.00	0.00	3.00	0.00	3.00
6.00	9.00	14.00	17.00	7.00	10.00
5.00	8.00	6.00	9.00	8.00	11.00
7.00	10.00	6.00	9.00	14.00	17.00
6.00	9.00	6.00	9.00	6.00	9.00
6.00	9.00	5.00	8.00	5.00	8.00
San Francisco, U. S. A.	Vancouver, B. C., Can.	New York, U. S. A.	Montreal, Can.	Seattle, U. S. A.	Vancouver, B. C., Can.
8.00	11.00	8.00	11.00	8.00	11.00
Leningrad, U. S. S. R.	Lisbon, Portugal	Liverpool, Eng., U. K.	London, Eng., U. K.	Lourenco Marques,	Mozambique, E. Africa
Madras, India	Malta (Veletta)	Manila, Phil. Isls.	Manzanillo, Mexico	Marseille, France	Melbourne, Australia
Mersin, Turkey	Messina, Sicily, Italy	Montevideo, Uruguay	Montreal, Canada	Mozambique, E. Africa	Murmansk, U. S. S. R.
Nagasaki, Japan	Naples, Italy	Newcastle-on-Tyne, U. K.	Glasgow, Scot., U. K.	Habana, Cuba	Haifa, Palestine
Hakodate, Japan	Halifax, N. S., Canada	Hamburg, Germany	Hamilton, Bermuda	Helsinki, Finland	Hongkong, China
Honolulu, Hawaii	Hull, England, U. K.	Istanbul, Turkey	Jaffa, Palestine	Karachi, India	Kingston, Jamaica
Kobe, Japan	Kotor, Yugoslavia	Lagos, Nigeria, Africa	Larnaka, Cyprus	Leghorn, Italy	LeHavre, France

0.00	New York, N. Y., U. S. A.	11.00	Riga, Latvia	6.00	9.00	Spezia, Italy
9.00	Novorossisk, U. S. S. R.	5.00	Rio de Janeiro, Brazil	6.00	9.00	Stockholm, Sweden
8.00	Odessa, U. S. S. R.	12.00	Rostov, U. S. S. R.	17.00	20.00	Suva, Fiji Islands
5.00	Oran, Algeria, N. Afr.	8.20	Rotterdam, Holland	15.00	18.00	Sydney, Australia
6.00	Oslo, Norway	15.00	Saigon, Fr. Indo-China	8.00	11.00	Tamatave, Madagascar
0.00	Panama, Panama	0.00	San Francisco, U. S. A.	5.00	8.00	Toulon, France
5.00	Papeete, Tahiti	1.00	San Jose, Guatemala	6.00	9.00	Trieste, Italy
2.00	Pernambuco, Brazil	1.00	San Juan, Puerto Rico	6.00	9.00	Tripoli, Libya, N. Afr.
7.00	Piraeus, Greece	1.00	St. George, Grenada	6.00	9.00	Tunis, Tunisia, N. Afr.
5.00	Plymouth, Eng., U. K.	3.00	Seattle, Wash., U. S. A.	5.00	8.00	Valencia, Spain
0.00	Port-au-Prince, Haiti	0.00	Sevastopol, U. S. S. R.	1.00	4.00	Valparaiso, Chile
7.00	Port Elizabeth, So. Afr.	11.00	Shanghai, China	3.00	0.00	Vancouver, B. C., Canada
10.00	Port Said, Egypt	13.00	Singapore, Str. Sett.	6.00	9.00	Venice, Italy
1.00	Port of Spain, Trinidad	12.20	Soerabaja, Java	5.00	8.00	Vigo, Spain
1.00	Punta Arenas, Chile	12.30	Southampton, Eng., U. K.	14.00	17.00	Yokohama, Japan
6.00	Palermo, Sicily, Italy	5.00		7.45	10.45	Zanzibar, Zanzibar Isls.

GLOSSARY

ANNULATE	Having rings or ring-like segments.
AROMATIC	Fragrant, spicy.
CORDATE	Heart-shaped.
CRENATE	Having the margin round-toothed, scalloped.
ELLIPTICAL	Similar to oblong but with continuously rounding sides.
LANCEOLATE	Widening above the base and gradually tapering upwards to a point. Much longer than broad, lance-shaped.
MERICARP	One of the two carpels that compose the fruit of a plant of the parsley, or carrot family.
OBLONG	When nearly twice or thrice as long as broad and of uniform breadth.
OBTUSE	With a blunt or rounded apex.
OVAL	Broadly elliptical.
OVATE	Shaped like a lengthwise section of a hen's egg. Somewhat oval with broader end downward.
PALMATE	Resembling the open hand.
PEDICEL	The stalk that supports one flower only.
PEDUNCLE	A flower-stalk.
PERICARP	The wall of the ovary or ovaries when developed or ripened into fruit; the matured ovary.
PETIOLE	The foot-stalk of a leaf.
PUBESCENT	Covered with down or soft hairs.
RENIFORM	Kidney-shaped.
REVOLUTE	Rolled backward from the margins of the leaf.
RHIZOME	A root-like stem growing under the ground.
RUGOSE	Covered with or full of wrinkles; corrugate.
SPATULATE	Rounded above and gradually tapering down to a narrow base.

- SUFFRUTESCENT Having the character of an undershrub or suffrutex; slightly shrubby.
- SUFFRUTEX An undershoot having a decidedly wooden stem.
- SULCATE Having long narrow furrows or channels; grooved, or fluted.
- TRUNCATE Having the end square, appearing as if cut off.
- UMREL A flower cluster in which the flower-stalks spring from the same point.
- UMBELLIFEROUS Having the mode of flowering called an umbel; a plant which bears umbels.
- UNDULATE Wavy; rippling.

FOREIGN WEIGHTS

	CHINA		JAPAN
Catty	= 1½ lb.	Kin	= 1.3228 lb.
Picul	= 133⅓ lb.	Kwan	= 8.2673 lb.
		Koku	= 2240 lb. (Long Ton)
	EGYPT	(of capacity)	
Oke	= 2.75136 lb.		
Canbar	= 99.05 lb.		
	GREECE		RUSSIA
Libre	= 1.1 lb.	Pood	= 36.11 lb.
Ocque	= 2.84 lb.		
Quintal	= 132.2 lb.	Oka	= 2.828 lb.

METRIC WEIGHTS

The GRAM is the weight of 1 cubic centimeter of pure distilled water at its temperature of maximum density, 39.2° F.

28.35 grams	= 1 ounce	1 kilogram	= 2.2046 lb.
10 milligrams	= 1 centigram	10 grams	= 1 decagram
10 centigrams	= 1 decigram	10 decagrams	= 1 hectogram
10 decigrams	= 1 gram	10 hectograms	= 1 kilogram
	1000 kilograms		= 1 metric ton

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