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**The
Virginia Tech
SeaGrant
Seafood Tipline
Project**



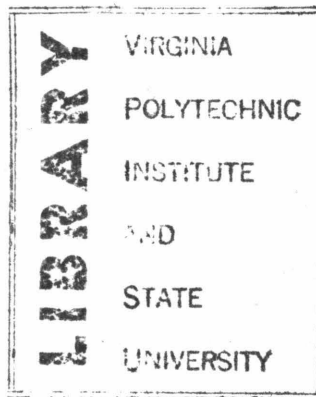
Sea Grant at Virginia Tech
Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061

SEAFOOD TIP-LINE MESSAGE FORMAT

INTRODUCTION -

Hello, this is your Seafood Tip-Line. This week's tip spotlights [tip title] .

TIP OR MESSAGE -



CLOSING -

Please tell your friends and neighbors about our service and remember to call next week for tips on [future tip] . The Seafood Tip-Line is brought to you by the Virginia Tech Sea Grant Program and the Virginia Seafood Council, who wish you a good day.

THE VIRGINIA TECH SEA GRANT
SEAFOOD TIP-LINE PROJECT

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We wish to thank all the individuals involved with this publication. We express special thanks to Mrs. Joan Youngblood, Assistant Executive Secretary of the Virginia Seafood Council, for her participation, ideas, and promotional expertise in writing the messages and for sharing her many delicious and easy to prepare seafood recipes.

Special thanks are also due Mrs. Sherry Ashe who painstakingly recorded the messages for release to the public.

Jeffrey L. Howe
Advisory Seafood Technologist
Virginia Tech Sea Grant

FOREWORD

The idea behind these short messages was to interest and encourage consumers to use more of the food products obtained from the sea and to acquaint the public with the background, preparation, and handling of these products.

A meeting, held in the fall of 1972 between the Virginia Tech Sea Grant Advisory Service and the Virginia Seafood Council, provided the impetus to compile, write, and deliver these messages as the SEAFOOD TIP-LINE. The message delivery mechanism was, and continues to be, a common Code-A-Phone unit available from the local telephone company. Fifty-two weekly messages were prepared, a Tip-Line promotional plan was developed, and the service was initiated in the Hampton Roads area of Virginia on February 1, 1973.

From the beginning, incoming calls were monitored, and the response to the messages was extremely favorable. Requests for the messages themselves was something that was not anticipated however. The large and unexpected public interest and response has resulted in our publication of the Tip-Line scripts, verbatim, to provide information upon which other agencies may base their own programs and from which they may, we hope, get ideas for short articles, newsletters, and other presentations.

TABLE OF CONTENTS

Acknowledgments	ii
Foreword	iii
Introduction	ix
I. SHELLFISH	
General Information	
A. Shellfish Tips	1
B. Shellfish - How Much to Buy	2
C. Storing Shellfish	3
D. Regulation and Control of Shellfish	4
Crabs	
A. Characteristics of Crabs	5
B. Chesapeake Bay Blue Crab - Styles	6
C. Dungeness and King Crabs	8
D. Other East Coast Crabs	9
E. Soft Shell Crab	10
F. Catching Blue Crab	11
G. Dredged Crab	12
H. Buying Crab Meat	13
I. Picking Cooked Crab	14
J. Crab Recipes	15
Oysters	
A. Oysters as Food	16
B. Kinds of Oysters	17
C. Consumer Inspection of Oysters	18
D. Old "R" Rule	19
E. Oyster Roasting	20
F. Oyster Stuffing	21

Shrimp	
A. Market Forms of Shrimp	22
B. How to Boil Shrimp	23
C. Shrimp Salad	24
Scallops	
A. Scallops	25
B. Scallops - Fishing Methods	26
C. Market Forms of Scallops	27
Clams	
A. Clams	28
B. Geoduck Clam	29
C. Gathering Clams	30
D. Shucking Hard Clams	31
E. Steamed and Roasted Clams	32
F. Clam Chowders	33
Lobsters	
A. Lobster Characteristics	34
B. Kinds of Lobsters	35
C. The Virginia Lobster	36
D. Market Forms of Lobster	37
Others	
A. Abalone	38
B. Crawfish	39
C. Mussels	40
D. Squid	41
II. FINFISH	
A. Bluefish	42
B. Croaker	43
C. Eels	44
D. Mullet	45
E. Salmon	46
F. Sardines	47

G.	Sea Trout	49
H.	Striped Bass	50
I.	Summer Flounder	51
J.	Tuna	52
III.	SEAFOOD COOKERY	
A.	Basic Fish Cookery	54
B.	Oven-Fried Fish	55
C.	Broiling Seafoods	56
D.	Fish Portions and Fish Sticks	57
E.	Outdoor Seafood Cookery	58
F.	Seafood Fondue	59
G.	Appetizers	60
IV.	SEAFOOD PREPARATION	
A.	Freezing Fish at Home	61
B.	Packaging Foods for Freezing	62
C.	Salting Fish	63
D.	Spiced and Pickled Seafoods	64
E.	Smoking Fish	65
V.	NUTRITIONAL ASPECTS	
A.	Seafoods for Good Nutrition	66
B.	Staying Slim with Seafood	67
C.	Protein Content of Fish	68
D.	Food Additives Involving Marine Food Products	69
E.	What is a Fat Fish?	71
VI.	SEAFOOD RELATED TOPICS	
A.	Fish Availability	72
B.	Natural Baits	73
VII.	OTHER FACTS ABOUT OCEANS	
A.	Sponges	74
B.	Seashells	75
C.	The Sinister Shark	76
D.	The Elusive Jellyfish	77
E.	Tides and Currents	78
F.	Waves and Surfing	79

INTRODUCTION

This week we would like to mention a few of the exciting tips we will be talking about in the next few weeks. Are you interested in feeding your family a well-balanced diet? We'll let you know how seafood can help.

We've all been hearing a lot about food additives lately. Your Seafood Tip-Line will relate some interesting information on that subject. We will include a kitchen-tested seafood recipe in many of our Tip-Line messages. The Seafood Tip-Line will tell you about market forms, safe handling techniques, and things to look for when purchasing fish or shellfish. We will keep you up-to-date on all the latest developments concerning seafood which affect you. Sound interesting? That is just the beginning.

This week we would like to spotlight a few interesting seafood pointers. Did you know that frozen seafood should never be thawed at room temperature? Partially thaw fillets or steaks in the refrigerator or under cold running water if you are in a hurry. Defrost only until the portions separate easily.

Do you ever have trouble with dry, flavorless fish? One of the mistakes most common in seafood preparation is over-cooking. Fish has no tough connective tissue, and over-cooking will allow the nourishing juices and flavor to escape. The fish should flake easily from the bone when tested with a fork, but is overcooked if it falls apart.

Have you ever tried a soft-shell crab? Soft-shell crabs are molting blue crabs caught just after they shed their shells. Blue crabs shed their shells regularly as they grow. Soft-shell crabs are delicious when cleaned and sauteed or fried in deep fat. For a quick and easy appetizer, try crab claws or fingers

dipped in cocktail sauce or warm lemon butter. Your family and friends will love them.

Did you know that fish at one time was often used as payment for services? In ancient Egypt workers received large amounts of fish as part of their wages. Fish were farmed as early as the fifth century B.C. Ponds were constructed and stocked by rich and poor alike. Throughout history the significant role of seafood in the diet is well documented.

SHELLFISH TIPS

How many times, when you want to enjoy the great eating that shellfish provides, have you been confused about what to buy, what is in season, and what is safe to eat? The following are five (5) easy pointers to keep tucked in the back of your mind when purchasing or harvesting shellfish.

1. With the exception of scallops, shellfish prices are usually lower in winter than summer.
2. If you harvest oysters and clams yourself, be sure the water you obtain the shellfish from is certified as safe by the State Health Department. If you eat shellfish from closed areas you may get infectious hepatitis.
3. Crabs are normally trapped in pots, but from December 1 to March 31 each year they are dredged off the ocean bottom. Thus, winter time is noted for the poorest quality crab meat since sand is usually carried through cleaning and processing into the final product, making it gritty.
4. Usually, oysters obtained in the winter and the spring of the year are superior to those obtained in the summer or early fall, because summer is the spawning season for oysters.
5. The smaller the clam, the higher the price. The larger the shrimp, oyster, or scallop, the higher the price.
6. Oysters, clams, and scallops may be packed in their own liquid in a jar, but must be completely covered by the fluid to prevent darkening.
7. Lobsters, crabs, and shrimps can be frozen but tend to become tough with storage.

SHELLFISH - HOW MUCH TO BUY

The consumer must be aware of many things when purchasing fresh or frozen seafood. Not only should you inspect for freshness and good prices, but you should consider how much to buy to fit your particular needs.

The quantity of shellfish to buy varies considerably with the serving and cooking methods to be used, and the size of the shellfish.

The following is a guide for buying shellfish to serve approximately six people and you can increase or decrease the amounts proportionally.

Crabs: Live - 18 to 36 crabs
 Cooked - 1 to 2 pounds

Lobsters: Live - 4 to 6 pounds
 Cooked - 3/4 to 1-1/2 pounds

Oysters: In Shell - 3 dozen
 Shucked - 1 quart

Scallops: 1 - 2 pounds

Shrimp: Headless, fresh or frozen - 1-1/2 - 3 pounds
 Cooked - 3/4 to 1-1/2 pounds

Obviously, the amount can vary, but use this quick guide in purchasing your shellfish and you should have ample servings.

STORING SHELLFISH

When taking advantage of seafood specials, you need to consider the storage procedures available to you.

Fresh shellfish should be stored at a temperature near 32°F. A temperature even a few degrees higher can cause considerable loss of quality in only a few hours. Fresh shellfish may be kept in the refrigerator in cracked ice or in the meat compartment. Fresh or cooked shellfish meats are easily spoiled, and care must be taken that they are not exposed to bacterial contamination. Ideally fresh shellfish should be cooked within one day.

Frozen shellfish should be maintained at 0°F or lower. Correctly handled and frozen, lobster and crab meat have a shelf life of about two months, shucked oysters, scallops, and clams three to four months, and shrimp six months. Do not refreeze shellfish once it has been thawed.

REGULATION AND CONTROL OF SHELLFISH

Some of the questions most often asked about shellfish concern their quality. Are they safe to eat, how can you tell if they are spoiled, and is it safe for individuals to harvest shellfish?

A rarely-publicized fact, but one which plays an ever-increasing role in the regulation of shellfish, is that there is a National Shellfish Sanitation Program administered through the United States Public Health Service by the Food and Drug Administration. This long-established organization is the watchdog which guards the shellfish we consume in the United States, including shellfish which are imported from foreign countries. Under this watchful eye are all edible species of oysters, clams, or mussels whether shucked or in the shell, fresh or frozen. Scallops and crabs are not regulated by this agency.

Cooperative control has been developed through the various State Health Departments in conjunction with industry to assure that safe, wholesome seafood products reach the market. This is an unusual teaming of state, federal, and industrial resources to preserve and manage a natural resource for beneficial use.

With all these groups doing their part, you can be assured of the high quality of shellfish reaching the market place. The Food and Drug Administration regulates the areas from which shellfish can be taken, industry complies by taking shellfish from these approved areas, and the State Health Departments assure that the product has been harvested and processed in a safe manner. The consumer must also handle the product carefully to complete the last link of the chain.

CHARACTERISTICS OF CRABS

It's nice to know, at times, something about the things we encounter daily, especially the food we eat.

The Chesapeake Bay's blue crab, Florida's stone crab, and Alaska's king crab are some of the most popular foods in the United States.

Crabs are broad-bodied crustaceans, recognized by their hard shells or exoskeletons, and four pairs of jointed walking legs in addition to claws. Most species are found in the sea, from the tide line out to great depths.

There are more than 4,500 species of crabs in the world, ranging in breadth from fractions of an inch to nearly twelve feet. Most are scavengers, though some capture live prey and others filter plankton from sea water.

The female carries her eggs in a mass, called a "sponge," on her underside. In about two weeks they hatch into free-swimming larvae called zoea. After several moltings, zoea become adults.

Crabs generally live three to four years. They may lose one or more legs during their lives, and are able to grow new ones through a regeneration process.

CHESAPEAKE BAY BLUE CRAB - STYLES

Of all the varieties of crab consumed in the United States, the Blue Crab accounts for the greatest percentage. It is abundant in the waters of Chesapeake Bay and ranges from Massachusetts to the northern part of South America. As the name implies, the live, raw crab exhibits a beautiful blue color on its claws and legs. Once cooked, however, they change to the familiar "lobster" red.

Commercially, the meat is hand-picked from cooked crabs, packed, and chilled in half-pound and one-pound cans. There are presently four styles of crabmeat available:

1. Lump or backfin crabmeat is the highest quality and naturally the most expensive of all the styles. It is a large, single piece of white meat picked from the back portion of the crab.
2. Flake or regular crabmeat is all the white meat picked from the body portion of the crab except the backfin piece.
3. Special crabmeat is a mixture of both backfin and flake in normal proportions.
4. Claw crabmeat is the combined meat picked from the claw appendages. This meat is darker and never mixed with the more expensive white meats.
5. Deluxe is a term which is not an official market standard. Consequently, the type of parts and quality may vary considerably among wholesalers and retailers. The term usually indicates a variable mixture of lump and flake.

The serving method will dictate which style of crabmeat to use. Lump or backfin should be used in salads or cocktails when over-all appearance is important. Flake or special crabmeat is fine for casseroles or crab cakes where taste is more important than appearance. Clawmeat can be used for party dips and soups.

DUNGENESS and KING CRABS

Two types of crab and crab meat products once marketed exclusively on the Pacific coast are now becoming standard seafood items in supermarket freezers on the Atlantic coast. These are the dungeness and king crabs. Meat from these crabs can be found in many convenience seafood products, and whole dungeness crabs and king crab legs have recently become available.

The dungeness crab occurs from California to Alaska during the winter and spring. This crab is much larger than the Chesapeake Bay blue crab; it weighs up to 3 pounds and is from 8 to 9 inches wide.

The dungeness crab are marketed whole and the meat can be purchased fresh, frozen, or canned. Canned meat is packed in 6-ounce cans with the most desirable leg meat on the top. Frozen products should not be held more than a few months.

The Alaskan king crab is the giant of the crabs. It may weigh as much as 24 pounds and may span up to 5 feet from tip to tip of its outstretched legs. However, smaller crab of less than 10 pounds are more common. Meat is obtained from the legs and shoulder and is marketed as canned or frozen. In canning the crab, the large leg sections are cut to fit the can and most packs are filled with one layer of leg meat followed by smaller leg sections and shoulder meat.

King crab is more suitable for freezing and storage than other species of crab and can be stored for one year at 0°F. The meat is usually frozen as a large block which is later divided into consumer-size portions.

These legs are excellent grilled. Place them over moderately hot coals about 5 minutes per side, liberally basting with a mixture of butter, lemon juice, and paprika. It is really something special!

OTHER EAST COAST CRABS

Other species of crab besides the blue crab are found along the East coast from Nova Scotia to the Bahamas. These crabs, however, are usually found in deeper waters than the blue crab and are, therefore, not easily harvested.

The Rock Crab is found abundantly along the northern Atlantic states, often mingled with lobsters. The brownish-colored meat is picked and marketed as one grade, has a quality equal to blue crab, and yields more meat per crab.

The Jonah Crab also offers excellent quality meat. Found in the same geographical areas as the rock crab, the larger Jonah crab occurs in deeper waters, is less abundant and, therefore is less available.

The Red Crab, abundant but slow-growing, yields almost twice as much meat as the blue crab.

The Stone Crab, popular in the southern Atlantic states, is scarce and expensive. Most of its meat comes from the claws, and compares favorably in flavor with blue crab.

SOFT-SHELL CRAB

Soft crabs provide the fisherman with an ideal bait. These crabs have a dual role, however, as they are also a delicacy for human consumption.

Soft crabs are in their prime from late spring to early fall, with June and July the most productive months, as molting occurs during the warm months. Soft-shell crabs result from the molting of young Chesapeake Bay blue crabs. Young crabs molt about 15 times, expanding one-third in size each time until they become adults, measuring about 7 inches from tip to tip. Females mate at the last molting, while still soft, ensuring a supply of crab for the next year. A female may mate twice during her lifetime, approximately 3 years.

It takes an expert to recognize a crab which is about to molt, as the back fins change color only slightly. The crabs progress from "green peelers" to "rank peelers" in just a few days and are kept alive in floats or tanks. They remain in the soft condition for only a few hours, so harvesting time is very critical. Only live or frozen crab are shipped to market.

Soft crabs can be eaten whole and are delicious when served with tartar sauce. Wash the crabs in cold water and lift the corners of the top shell to remove the feathery gills. Cut away the face and remove the bottom apron. Soak the crabs in milk for at least 15 minutes, then roll in flour. Place in hot shortening and fry the crabs until crisp and golden brown. They are ideal served as sandwiches.

CATCHING BLUE CRAB

During these days of high food prices, crabbing is an economical and enjoyable recreation. The Blue Crab is abundant from April through November, in the tidal rivers, Hampton Roads, and the Chesapeake Bay. They are found near the bottom of the water and may be caught by wading into shallow waters or from piers, bulkheads, and bridges. Be sure you are crabbing in waters certified safe by the State Health Department.

Tie a piece of chicken or old fish head to a sturdy string, using a weight below the bait. Lower the bait in shallow water. When you feel a nibble, slowly ease the crab into range of your dip net, put the net under the crab, and scoop it up quickly. The dip net is a long-handled net which can be purchased at discount or sporting goods stores. Another way of crabbing is to use a baited crab pot, also available at sporting goods stores, which can be put out from a bridge, pier, or bait.

Crabs should be kept in a container filled with some water from where they were caught, and should be shaded until cooked. Only live crabs should be cooked. It is best to put small crabs back into the water. They are difficult to clean, provide little meat, and will be much better if allowed to grow up! A bushel of crabs may be taken at one time for household use.

DREDGED CRAB

In buying seafood, it is important to know what is in season at that particular time of the year.

For instance, crabmeat may seem to be a good buy for the price during the winter months, but the consumer should know that crabs are not "in season" during the winter.

In cold weather, crabs become immobile and burrow in the mud to hibernate. Since crabs do not free-swim during this time, a dredge is used to physically remove crabs from the mud. Some of this mud or sand remains on the crab as it is handled, and can be transferred from the picker's hands to the crabmeat during the picking process. Thus crabmeat processed during the winter may contain some grit.

This grittiness does not affect taste or safety and should not be regarded as damaging to the crabmeat, which may be used in any crab recipe.

BUYING CRAB MEAT

When purchasing crab meat in markets or restaurants, you will find a variety of forms from which to choose.

First of all, crabs may be purchased as whole crab in the shell either live or frozen. Live crabs bought in the shell react by moving their legs when touched. Whole frozen crabs have been frozen after being heated to a temperature approaching 250°F thus killing the crab and coagulating the protein. At this point, the crabs are either frozen in the shell or the meat is picked from the shell.

Crab meat picked from the shell is sent to market as either fresh, canned, or pasteurized crab meat. Fresh crab meat is packed in ice and shipped to market. If the crab meat is canned before sending to market, it has first been processed at a temperature approaching 250°F. Some crab meat is pasteurized at approximately 180°F. Pasteurized meat is also sold in cans. When pasteurized crab meat has a bluish or blue-gray color, it has been processed at a temperature in excess of 190°F. However, the over-processed meat is safe to consume and does not contain off-flavor or odors. Pasteurized meat can be stored under refrigeration for up to 60 months.

Stuffed crab has been prepared from either fresh, frozen, or pasteurized crab meat, combined in a mixture and stuffed back into the shell.

As you can see, crab meat comes in many forms and is available for many consumer needs. Be selective and determine whether the live or frozen crab - or the fresh, canned, or pasteurized crab meat - is best suited to your recipe or menu.

PICKING COOKED CRAB

When you catch or purchase live crabs, you are going to have to cook and then pick them - a process that has been done for you when you buy the cooked or pasteurized crabmeat. However, picking crab is not difficult and can add to the pleasure of the meal.

(For a right-handed person.) With the left hand, grasp the body of the crab with the large claws to the right. Break off the large claws. Pull off the top shell with the right hand. Cut or break off the legs. Scrape off the gills and remove the digestive and other organs located in the center part of the body. Slice off the top of the right side of the inner skeleton, beginning near the front. Remove any meat on this slice; then, starting with the right back fin pocket, remove the meat from the lower part with a U-shaped motion of the knife. Remove the meat from the other pockets by inserting the knife underneath and prying upward. Cut off the top from the left side of the inner skeleton and remove the meat in the same manner as for the right side.

Dip the pieces of crabmeat in melted butter or a seafood cocktail sauce, and enjoy.

CRAB RECIPES

Blue Crab meat, available at your local seafood market or grocery store, can add a touch of elegance to your family dining or entertaining.

Lump or backfin crabmeat (these solid lumps of crabmeat are the most expensive form) are appropriate for a seafood cocktail or appetizer.

Simply arrange lettuce in cocktail dishes, place crabmeat on top, cover with cocktail sauce, and garnish with parsley and lemon wedges.

Flake meat or claw meat are equally delicious, lower in price, and appropriate for this quick and easy casserole. You will need one pound of meat. Remove any shell or cartilage you may find. It is virtually impossible to remove every bit at the processing plant.

Combine $\frac{1}{2}$ cup cooked peas, one 10 $\frac{1}{2}$ -ounce can condensed mushroom soup, and a dash of pepper. Place in 6 well-greased individual 5-ounce custard cups or a greased casserole dish. Sprinkle with $\frac{1}{2}$ cup grated cheese and paprika. Bake at 350° for 20 to 25 minutes or until brown. Serves 6.

Accompany the casserole with a tossed salad and rolls for a well-balanced, delicious dinner ready in short order.

OYSTERS AS FOOD

The Greeks, Romans, and American Indians enjoyed this flavorful, bite-size mollusk at its natural best - raw. Oysters today are still a favorite dish. They have a special appeal for the busy homemaker because of the ease with which they may be prepared. There is no waste; they are entirely edible, and are easy to serve. Oysters are low in calories and rich in nutrients.

They are marketed live in the shell, fresh, frozen, or canned. Oysters sold in the shell must be alive when purchased with shells tightly closed. Occasionally, a small reddish crab - the pea crab - may be found inside the oyster shell. This is perfectly normal and the crab itself is prized as a delicacy.

Oysters are graded and priced according to the number of oysters to the gallon. Counts, the largest size, have fewer than 160 oysters to a gallon, next are extra selects, then selects, and then standards, 301 to 500 oysters per gallon, the smallest size graded.

The common belief that oysters are good only in months which contain the letter "r" is not true. Because of modern cold storage and transportation methods, they may be eaten any month of the year.

Oysters may be served raw, on the half-shell or in cocktails, roasted, cooked in stew or chowders, baked, broiled, fried, creamed, scalloped, and in combination with other foods. To retain the delicate, distinctive flavor of oysters, never cook them too long - just enough to heat through and leave them plump and tender.


For a quick oyster stew for six: add 1 pint of oysters to 4 tablespoons of melted butter and cook for 3 minutes or until the edges curl. Add 1 quart of milk, $1\frac{1}{2}$ teaspoons salt, $\frac{1}{8}$ teaspoon pepper, and bring almost to the boiling point. Garnish with paprika and serve at once.

KINDS OF OYSTERS

The Eastern Atlantic or American oyster (*Crassostrea virginica*) is found along the North Atlantic seaboard from the Gulf of St. Lawrence to the Gulf of Mexico. Commercially, it is by far the most important oyster, accounting for approximately 85 percent of the total production in the U.S.

The Pacific oyster (*Crassostrea gigas*), now the basis of the West Coast industry, was imported from Japan after experimental plantings in Northern California. The biggest production areas for Pacific oysters are now in the state of Washington. The Pacific oyster comprises about 15 percent of U.S. production.

The Western or Olympia oyster (*Ostrea lurida*) is native to the Pacific Coast. It was of commercial importance until about the turn of the century, but the yield of this species has declined because of over-exploitation, predators, pollution, and increased costs of production. Some are still available, and it is hoped that through conservation and aquaculture methods the harvest of this species can be increased.



CONSUMER INSPECTION OF OYSTERS

Oysters are a delicacy that may be purchased in the shell or shucked. To spend his time and money wisely, the consumer should be informed before selecting either market style.

Shell oysters must be alive when purchased. When alive, they have a tightly closed shell. Gaping shells that do not close when tapped indicate that the oysters are dead or nearly so and therefore not fit for consumption.

Fresh shucked oysters should be plump, and should have a natural creamy color (some oysters have a natural tan, brown or black film over the mantle). The liquid should be clear or slightly opalescent, free from shell particles, with no sour smell, and there should not be more than 10 percent liquid by weight in the original container. The oysters should have a mild odor.

Eastern oysters are generally packed and graded according to the number of meats to the gallon: very small, more than 500; small or standards, 301 to 500; select or medium, 211 to 300; extra select or large, 160 to 210; and counts or extra large, under 160. Prices increase with size.

Smaller sizes are appropriate for use in stews and casseroles; larger sizes should be purchased when oysters are to be fried or served on the half-shell or in cocktails or salads.

OLD "R" RULE

It is not true! It is an old wives' tale that oysters should be eaten only during the months containing the letter "r". The belief is not based on fact. Many people, however, still adhere to grandmother's rule.

It is easy to understand how this saying came to be if we look at a couple of important facts. The months that do not contain the letter "r" are May, June, July and August - the hottest months of the year. Before mechanical refrigeration became really effective, oysters exposed to the hot summer weather spoiled during transit from the point of harvest to the consumer.

Furthermore, oysters spawn during the summer months and retain little solid meat from their activities. These lean oysters, although they lack the flavor and consistency equal to their fall cousins, can provide an eating pleasure that's just as tasty. For example, the oyster season on the Gulf Coast extends through the summer months, and people there enjoy fresh oysters the year round.

Processed oyster products, such as frozen breaded oysters, are packed during all months using fresh oysters. Oyster processors know the fallacy of the old "r" rule and most likely at some time you have enjoyed a summer oyster without knowing it.

Surprise your friends and invite them over for an outdoor summer oyster roast. Clean the oyster shells thoroughly and place them on the grill 4 inches above a good bed of coals. Roast them for 15 minutes or until the shells begin to open. Serve in the shells with melted butter for a tasty casual meal.

OYSTER ROASTING

As the weather turns a little nippy and thoughts turn to football and other fall activities, many people think of the traditional oyster roast. Nothing could be simpler or more satisfying for your family or for informal entertaining.

To serve six, you will need at least 36 oysters in the shell. These can be found at seafood markets. Oysters should be alive when purchased and the shells should be closed. Occasionally a small reddish crab may be found in the shell after cooking; this is perfectly normal and the crab should be served and eaten as the delicacy it is.

To prepare roasted oysters, first wash oyster shells thoroughly with water. Place them on a grill about 4 inches from hot coals. Roast for 10 to 15 minutes or until shells begin to open. For a drier oyster cook a little longer. Serve in the shell accompanied by warm melted butter, lemon wedges, cocktail sauce. Serve with a tossed salad, hot rolls, and scalloped potatoes or baked beans.

Oysters can also be roasted in a medium oven by simply placing them in a shallow baking pan that is deep enough to catch any escaping juices. Bake until shells open, as in the outdoor grilling method.

OYSTER STUFFING

If Oyster stuffing is not a tradition in your home, this might be the year to try it. Many people stuff the body cavity of a medium or large turkey with one kind of stuffing and the neck cavity with another, or cook one mixture in a baking dish.

For an easy oyster stuffing you will need:

$\frac{1}{2}$ cup chopped celery	1 tablespoon chopped parsley
$\frac{1}{2}$ cup chopped onion	1 pint shucked oysters,
1 bay leaf	2 beaten eggs
$\frac{1}{4}$ cup butter or margarine	1 teaspoon poultry seasoning
6 cups dry bread cubes	1 teaspoon salt
a dash of pepper, and a small quantity of milk	

Cook celery, onion, and bay leaf in butter until vegetables are tender. Discard bay leaf. Add bread cubes and parsley to the vegetables and mix. Drain oysters, saving liquor. Chop oysters and add to bread mixture with eggs, poultry seasoning, salt, and pepper. Add milk to oyster liquid to make $\frac{1}{3}$ cup. Moisten stuffing with this liquid. This recipe makes enough to stuff a 10 to 12 pound turkey.

Try it this year for a delicious holiday treat.

MARKET FORMS OF SHRIMP

One of the most popular of all seafoods is the shrimp. Many varieties of shrimp are available, including those native to the U.S. as well as some imported species. The most common varieties are brown, pink and white. Contrary to popular belief, once cooked it is impossible to distinguish between varieties by color, taste, texture, or appearance.

Fresh shrimp are sold by the pound with heads removed, the size determining the count per pound, such as jumbo, large, medium, or small. Remember, the cost varies with the size, the largest bringing the highest price.

To remove the vein from fresh shrimp, chill them for several hours to separate the shell from the meat. The shell and vein can then be easily peeled away. Devein before cooking.

Shrimp are available in other market forms such as frozen, breaded, and canned. To help canned shrimp take on the flavor of fresh ones, put the contents of the can in a glass jar and place it under the cold water tap, let the water run for a few minutes. Pour out the water, add a tablespoon of salt, refill the jar with cold water, cover, and place it in the refrigerator for 24 hours. You won't be able to tell the difference.

In common with several other canned seafood products, a can of shrimp sometimes contains crystals which look like broken pieces of glass. These crystals are really struvite, which has formed through a normal chemical reaction. They are completely harmless, so don't throw the shrimp away. To assure yourself that the shrimp are safe to eat, pour a drop of vinegar on the struvite crystals and watch them dissolve.

HOW TO BOIL SHRIMP

Boiling is the basic method of cooking raw shrimp. The shrimp may be boiled, then peeled; or they may be peeled, then boiled. The order is largely a matter of personal preference; about the only difference is in the amount of salt used in the boiling water.

For six servings you will need 1-1/2 pounds of raw shrimp, which will yield about 3/4 pound cooked, peeled, and cleaned shrimp, ready to eat immediately or to be chilled for later use in recipes that call for cooked shrimp.

To Boil Before Peeling

1-1/2 pounds shrimp
1 quart water
1/4 cup salt

Wash shrimp. Place in boiling salted water, Cover and return to boiling point. Simmer 5 minutes. Drain. Peel. Examine for the sand vein (the dark vein running down the back of the shrimp) and if found remove it. Wash. Chill.
Yields 3/4 pound cooked shrimp.

To Boil After Peeling

1-1/2 pounds shrimp
1 quart water
2 tablespoons salt

Peel shrimp. Make a shallow cut lengthwise. Remove any evidence of the sand vein (dark line running down the back of the shrimp). Wash. Place in boiling salted water. Cover and return to boiling point. Simmer 5 minutes. Drain. Chill.
Yields 3/4 pound and serves six.

SHRIMP SALAD

3/4 pound cooked shrimp	1 cup chopped celery
1 tablespoon grated onion	2 tablespoons chopped sweet pickle
1/2 teaspoon salt	
1/4 cup mayonnaise or salad dressing	Dash pepper
	Lettuce

Cut large shrimp in half. Combine all ingredients, except lettuce; chill. Serve on lettuce.

Serves 6.

SCALLOPS

Scallops are one of the most highly prized and sought after seafoods. Europeans enjoy the entire scallop; however, Americans consume only the succulent muscle which opens and closes the shell. Sometimes this muscle is referred to as the "eye."

Scallops come in two varieties. The larger, or sea scallop, has an eye muscle about 2 inches across. It can be found in the deep waters off the northern and middle Atlantic states. Bay scallops, on the other hand, are much smaller and more delicate, having an eye only 1/2 inch across. These scallops are found in bays and estuaries from New England to the Gulf of Mexico.

Scallops are opened, packed, and iced at sea. Fresh and frozen scallops are marketed throughout the year and are available in the form of dressed meats. The eye should be light cream in color, varying to a delicate pink, and carry a sweetish odor. When bought in packages, scallops should be practically free of liquid.

Try a succulent broiled scallop main dish, sure to please everyone! To serve six, you will need one and one-half pounds of scallops. Thaw them ahead, if frozen. Combine 1/3 cup melted butter or margarine, 1/2 teaspoon salt, a dash of pepper and a dash of paprika. Spread the scallops on a greased broiler pan and brush them with the seasoned butter. Broil about 3 inches from the heat source for 3 or 4 minutes. Then carefully turn them over, brush again with the seasoned butter and cook for three or four minutes longer. Sprinkle with parsley and serve with lemon wedges. Quick and delicious!

SCALLOPS - FISHING METHODS

Scallops in shallow water are sometimes taken with a device known as a "pusher." This is simply a long handle with a frame and web bag attached to one end. The user wades in shallow water pushing the device ahead of him, and catches the scallops in the bag when they rise from the bottom.

But most scallops, especially the deep water variety, are now taken with dredges, several of which are pulled behind power boats.

Scallops are usually shucked on board the boat, and the "eye" removed. The remainder may be discarded, or used as bait or fertilizer.

Though scallops are found from Maine to the Gulf of Mexico, the greatest beds known are east of Massachusetts, and the industry is centered in the area from Maine to New York. Scallop fishing is seasonal, since most states enforce a closed season (usually April to October) to protect the scallops from overfishing.

MARKET FORMS OF SCALLOPS

Scallops are available in many market forms. At the fresh seafood markets on the shore, scallops are usually "plumped" - made larger by soaking in water. However, since scallops spoil easily anyway and "plumping" makes them more susceptible to spoilage, they are not soaked for shipping to inland markets.

Scallops may be shipped to markets fresh, frozen, or precooked, breaded, and then frozen.

Whether purchased fresh or frozen, scallops should be packed practically free of liquid and have a sweetish odor. The meat of the sea scallop should be white; that of the bay scallop should be creamy white, light tan, or pinkish and firm in texture.

CLAMS

Clams are high in protein, minerals, and vitamins, and have no fat. The main types of East Coast clams are the hard clam, referred to in New England as the Quahog, the surf clam, and the soft-shelled clam or Mannose. Large soft-shelled clams are known as "in-shell" clams and small ones as "steamers." "Littlenecks" or "cherrystones" are names for the smaller hard clams. The large hard clams are sometimes called "chowders" and are used mainly in chowders or soups. Almost all canned clams are surf clams.

The smaller varieties of clam are best to use when they are steamed or eaten raw or with very little cooking.

Clams in the shell are very fragile. They should not be dropped or crushed. If the shells are cracked or broken, the clam is worthless.

Clams should be alive when purchased in the shell and remain alive until opened or cooked. Shucked clams are sold by the pint or quart. They should be plump with clear liquid.

Clams may be prepared in a variety of ways. For oven-roasted clams to serve six:

Thoroughly wash 6 pounds of small clams (in the shell). Place in baking pan deep enough to hold escaping juices, and roast in a 450° oven until clams open. Serve hot in the shell with melted lemon butter. Clam juice may be poured over clams or reserved for later use as soup stock.

GEODUCK CLAM

A Pacific coast clam, the geoduck (*Panope generosa*) has been recently utilized as a commercial resource. Geoducks are the most impressive clams in U.S. waters, weighing up to 13 pounds. The average geoduck clam weighs 3 pounds, and yields 1-1/2 pounds of meat. The geoduck is mostly neck. Even the mantle bulges out of the shell, which is always far too small to contain the entire clam. This clam burrows as deep as 4 feet into the sand or mud, and sends its siphon to the surface. Although some scientists disagree, latest opinion is that it takes approximately four years for a geoduck to reach maturity.

GATHERING CLAMS

An exciting excursion to take, perhaps during a vacation, is to gather clams. The experience would be good education and enjoyment for the whole family.

Clams were first harvested by aborigines who waded into shallow waters feeling for clams with their bare feet. This method is still used by individuals. On the Pacific Coast where outrunning tides leave large beaches exposed, clams are located by their siphon holes and dug by hand. In other areas, tongs similar to oyster tongs are used by boatman. A "basket rake" is another device used, similar to tongs but with longer teeth and wire mesh bag to catch and hold the clams as it is dragged along the bottom. Power driven dredges similar to oyster dredges are used in larger operations.

Whatever the fishing method used, clams have a distinctive delicious taste and are well worth the time spent in gathering them.

Preparation of Gathered Clams

Gathering clams can be fun and a rewarding chore. However, after you've gathered the clams, you need to take caution in preparing them for eating.

If you decide to obtain clams from the seashore yourself, it is important that you handle them properly. First, wash off all surface sand with sea water. Cover clams with clean sea water or 2 percent brine (1/3 cup salt to 1 gallon tap water) and let stand for 15 to 20 minutes to allow the clams to cleanse themselves of sand. (Salt is necessary if the clams are to open and discharge sand.) The sand will settle to the bottom of the container. Change the water and let stand a little while; repeat two or three times. This step is important if the clams are to be steamed or eaten from the shell. Clams can then be shucked.

SHUCKING HARD CLAMS

Wash the shelled clams thoroughly, discarding any dead clams or clams with broken shells. To open a hard clam, hold it in the palm of one hand with the shell's hinge against the palm. Insert a slender, strong, sharp knife between the halves of the shell and cut around the clam, twisting the knife slightly to pry open the shell. Cut both muscles free from the two halves of the shell. If to be served on the half shell, remove and rinse the meat. Since soft clams and surf clams do not have tight-fitting shells, they are easier to open.

An alternate method is to place the shell clams, after washing, in a small quantity of boiling water. Cover and steam 5 to 10 minutes, or until they are partially open.

A third method is to first freeze the live clams and then wash them under tap water for several minutes. This removes the sand and causes the shells to open sufficiently wide to permit shucking. This method is probably the easiest and most accepted procedure.

STEAMED AND ROASTED CLAMS

Steamed

6 pounds clams ("steamers"), in the shell
1/2 cup boiling water
Butter or margarine

Wash clams thoroughly. Place in a steamer, add water, and cover. Steam for 5 to 10 minutes or until clams open. Serve hot in the shell with melted butter. Serves 6.

Roasted Clams

6 pounds clams, in the shell
Butter or margarine

Wash clams thoroughly. Place in a baking pan. Roast in a very hot oven 450° for 15 minutes or until clams open. Serve hot in the shell with melted butter. Serves 6.

CLAM CHOWDERS

New England Clam Chowder

1 pint shucked clams	1/4 cup chopped bacon or salt pork
1/4 cup chopped onion	
1 cup diced potatoes	1 cup clam liquor and water
Dash pepper	1/2 teaspoon salt
Parsley	2 cups milk

Drain clams and save liquor. Chop. Fry bacon until lightly brown. Add onion and cook until tender. Add liquor, potatoes, seasonings, and clams. Cook about 15 minutes or until potatoes are tender. Add milk; heat. Garnish with chopped parsley sprinkled over the top. Serves 6.

Manhattan Clam Chowder

1 pint shucked clams	1/4 cup chopped bacon or salt pork
1/2 cup chopped onion	
1 cup diced potatoes	1 cup clam liquor and water
1 teaspoon salt	1/4 teaspoon thyme
2 cups tomato juice	Dash cayenne

Drain clams and save liquor. Chop. Fry bacon until lightly brown. Add onion, green pepper, and celery; cook until tender. Add liquor, potatoes, seasonings, and clams. Cook about 15 minutes or until potatoes are tender. Add tomato juice; heat. Serves 6.

LOBSTER CHARACTERISTICS

When you think of extravagant dining out, you probably think of lobster.

The lobster is possibly the most prized seafood and is bought for its delicious flavor. The large muscle of the abdomen is the most prized. However, some of the edible portion comes from the lobster claws.

There are several families and more than 200 species of lobster. They are crustaceans that live on rocky, sandy, or muddy bottom from the shoreline to the continental shelf. Lobsters live singly in crevices and burrows, and are most active at night, scavenging for mollusks, sea worms, small fishes, and some plants.

They have two claws, a larger one for crushing and a smaller one for cutting, and are capable of swimming backwards swiftly by snapping their abdomens down and under. It is these abdominal muscles that provide the most delicious segment of meat found in the lobster.

KINDS OF LOBSTERS

Lobster is a highly prized and often expensive seafood which has become economically important for the seafood industry. Two species of lobster are common to the U.S.; the northern lobster and the spiny lobster.

The northern or true lobster (*Homarus americanus*) is found in the waters of Great Britain, Canada, New England, and the middle Atlantic states. Primary production is centered in Maine, and this species is thus often called the Maine lobster. The northern lobster may grow to 25 pounds, though market lobsters average about 1-3 pounds.

Spiny or rock lobsters (*Panulirus argus*) are actually sea crawfish, though they are related to lobsters. There are several distinct differences: the spiny lobster does not have the large heavy claws of the true lobster; it is covered with spines on both body and legs; and it has long slender antennae. It is caught off the coasts of Florida, and a similar species (*Panulirus interruptus*) is found off the coast of California.

THE VIRGINIA LOBSTER

A newcomer to the Virginia seafood scene is the delicious American lobster - the same species and identical to the famous New England lobster.

Recently, lobsters have been located on the continental shelf approximately 75 miles off the coast of Virginia at depths greater than 600 feet. New techniques of deep-water trapping on specially equipped off-shore lobster boats are used. Lobsters are also captured by trawling with nets along the ocean bottom. The lobsters normally range in size from 1 to 8 pounds. However, it is not uncommon to capture lobsters greater than 20 pounds.

When a lobster is taken from the water, its shell is dark bluish-green, but the color changes rapidly to "lobster red" during cooking. Lobsters must be alive and active at the time of cooking. The tail should curl under the body and not hang down when the live lobster is picked up.

Plunge live lobsters into boiling water head first and simmer for 15-20 minutes to obtain the true natural flavor of this elegant shellfish. After cooking, the lobster should spring back quickly after it has been straightened out.

Quick frozen raw lobsters retain their quality better than those which have been boiled and then frozen. Prolonged storage of frozen cooked lobster deteriorates the meat, resulting in a direct loss of flavor and toughening of the flesh.

MARKET FORMS OF LOBSTER

While shopping for lobster in the store or at fresh seafood markets, you will find that it is available in many forms - live, whole cooked in the shell, frozen raw, boiled and frozen, fresh cooked meat, frozen cooked meat, or canned cooked meat. The meat comes from the claws and tail, except spiny lobsters which have no claws. Spiny lobster is often marketed as rock lobster and is usually the source of "lobster tails" available in stores and restaurants.

Lobsters frozen raw seem to retain their quality better than those which have been boiled and then frozen. Especially during long storage, the boiled and then frozen meat tends to deteriorate, toughen, and lose flavor.

ABALONE

For many centuries abalone has been a prized food of the orientals, particularly the Chinese, but only recently has it become an important seafood for the American people.

This mollusk is found specifically on the West Coast, ranging from Alaska to California, with the bulk of the fishery concentrated in the area of Monterey Bay, California.

Recently this delicate mollusk has been adapted to culturing in a controlled environment and the future may see fresh abalone soon available on the East and Gulf Coasts.

The abalone, also called "sea ear" or "ear shell," is actually a large marine snail. It has a large muscular foot for movement, allowing it to feed on kelp and other seaweeds. Abalone are found in water 3 to 11 fathoms deep and are harvested by slipping a chisel-like knife underneath them and prying them loose from the bottom.

There are many ways to prepare this seafood, including drying, smoking, or frying. It is also prepared as a canned product for market distribution. Properly cooked it is one of the most delectable of shellfish.

Take a fresh abalone and cut the meat from the shell; separate the large central muscle and cut transversely into strips. These small steaks can then be fried in oil until tender. If you prefer, you can mince the meat and use it in your favorite chowder recipe.

CRAWFISH

One of the most gourmet of all seafoods is the crawfish or crayfish. This crustacean is highly prized in the southern states as well as many European countries. The crawfish season ranges from February until June in the south and from March to August in the more northern states. Although crawfish are still available after June or August, the shell hardens to the point where it is very difficult to peel. Prices for live crawfish will start high at the beginning of the season, but will be quite reasonable toward the end. Peeled tail meat is also available in some localities, but will cost considerably more per pound.

For those who wish to venture catching and cooking their own, the process of preparation is quite simple. For planning purposes, the amount of picked tail meat obtained will be half that of the live weight.

To properly cook crawfish, drop them in boiling water containing salt, and other seasoning if desired, and cook for 10 to 15 minutes. Allow the crawfish to cool before removing the head from the tail. After this top layer of skin is removed, the vein can be easily extracted. The tail meat can now be used to make a variety of gourmet dishes such as crawfish jambalaya or fili gumbo. If you prefer, crawfish can be broiled. In some parts of the country, crawfish broils are regarded as a form of social activity.

MUSSELS

Both U.S. coasts boast large populations of mussels. Mussels grow in large beds on the mud, sand, or rocks along the low tide mark. They are easy to recognize by their dark midnight blue color. For some reason these shellfish are seldom harvested and the market is poorly developed. However, the internal structure is similar to clams and other bivalves. They are nutritious, easily digested, and equal to clams in protein.

If you plan to harvest your own mussels (they are at their peak from December to July), check to be sure there are no posters closing the area to shellfishing, and take only the mussels that would be submerged at the low tide mark. Mussels spoil quickly after removal from the water, as do scallops, so they must be shucked or cooked as soon as possible. Twenty-four hours is about maximum for refrigerated shucked mussels.

The whole mussel can be eaten raw, steamed, fried, roasted, or added to chowders.

Here is a famous French mussel recipe. Soak one bushel scrubbed, unshelled mussels in a strong mixture of water and dry mustard for 4 hours. Pour off the water and scrub the mussels again in fresh water and put them in a large covered pan with 1 cup white wine, a garlic clove, a bay leaf, and a sprig of parsley. Steam, covered, until the shells are open. Take the mussels from the shells. Strain the stock into another pan and boil, reducing to half its volume. Add the mussels, 3 tablespoons butter, and 2 cups light cream. Stir and heat without boiling. Salt and pepper to taste.

SQUID

Squid is one of the under-utilized seafoods in the United States, but it has many nutritional advantages and could well be a valuable addition to the American diet.

Preparing squid is easy. To clean squid, hold the tube-like body in one hand and twist off the head with the other. The intestines will pull right out with the head. Second, pull out the long, clear shell. Third, grasp one of the wings and pull downward to remove the speckled skin. You may want to scrape off the remainder of the skin with a knife. Pop out the beak from between the legs. Wash thoroughly.

The body can be stuffed or sliced into rings or strips. Legs can be cut into bite-size pieces. Allow about one-half pound squid per serving. It may be fried, baked, stuffed, or cooked in sauces. Do not overcook since squid cooks quickly and becomes tough when overcooked.

Large squid may need a little tenderizing. Pound lightly with a mallet until it is limp and satiny. Or boil the meat for two minutes in wine or water with the lid on, and then cool.

Here is one of the many ways to cook squid.

Fried Squid

2 lbs. squid, fresh or frozen	1 teaspoon salt
1 cup flour	oil for frying
	lemon wedges

Clean squid, cut into pieces. Cut legs into 1-inch pieces. Combine flour and salt. Roll squid in flour. Place squid pieces in a single layer in oil heated to 350°F. Fry 3 to 5 min. Turn carefully. Fry 3 to 5 min. longer or until lightly browned. Drain on absorbent paper. Serve with lemon wedges.
(3 to 4 servings)

BLUEFISH

If you should ask a fisherman what's biting, you can be fairly sure that bluefish will be the answer. Bluefish are abundant along the Middle Atlantic from early spring to late fall.

Bluefish, frequently referred to as skipjacks or snappers, range throughout the Atlantic ocean. Blues as large as 45 pounds have been caught off North Africa and a midget strain (5 pounds maximum) lives off the coast of Brazil. Virginia bluefish will range up to 20 pounds.

Bluefish winter along the east coast of Florida and usually congregate around inlets free of mud or silt close to the Gulf Stream. At the approach of spring, they follow the Gulf Stream northward. In the vicinity of Cape Fear, North Carolina, they desert the Gulf Stream and move closer to shore, near the Virginia coast. In the fall the migration reverses and the blues again provide fabulous fishing from September through November.

It is a good estimate that each bluefish will eat several times its own weight in food everyday. They move in large schools and are one of the most voracious marine species on our coast.

The Atlantic bluefish is one of the greatest-fighting and best-eating fish you can encounter. Try placing bluefish fillets skin-side down in a shallow buttered baking dish. Sprinkle with salt and pepper and add a liberal amount of lemon juice. Place slices of tomato on top of the fish and garnish with oregano. Bake in a pre-heated 350° oven until the flesh turns flaky. The taste is something you won't forget.

CROAKER

It hums, it drums, it purrs, it whistles, it creaks, it hisses. No, it's not a new toy on the market or a bug in your hearing aid. It snorts, it croaks. Now, that should have given it away! A man standing on a boat could hear the sound of the croaker 60 feet below water level. The sound the croaker produces has helped make the croaker a familiar name in fish, and its tasty flavor is becoming a favorite in seafood menus.

Croaker are for the first time since the mid 1940's, becoming more abundant in the Chesapeake Bay and Mississippi River Delta areas. They grow to be 12 to 18 inches long and weigh from 1 to 4 pounds. Croakers are caught commercially from March through October usually by nets and trawls.

A good reason for selecting croaker over other fish in the market is its high protein and low oil content. This makes it a healthy selection and you will find it to be very tasty also. Croaker makes an excellent low-calorie dinner.

But in order to obtain all the nutrients, do not overcook. Croaker (as with some other fish) offers a good source of iodine, niacin, riboflavin, and vitamins A, B₁₂, and D. Cook croaker only until the flesh gets white and opaque and separates easily.

EELS

The eel may travel one hundred miles from his freshwater home to spawn in salt water and never return again. Since only the glass-clear elvers (baby eels under 3 inches long) return to the fresh water, it is believed that the adult eel, which can be up to 20 years old, dies upon spawning. Two kinds of eel are known to spawn in the North Atlantic - the European and the American. Each species of elvers returns to its own natal fresh waters.

Sixteen species of freshwater eels live in lakes, ponds and tributaries that lead to salt water. U.S. eel farms export a considerable amount of their catch to Japan and Europe.

The first step in preparation of the eel, after catching, is to remove the slime layer by soaking the eel in salt water. Then skin it with a knife and pliers and clean the insides out. If you find the eel too slippery and difficult to handle, let the nearest fresh-fish market clean it for you.

Eel meat is firm in texture, high in protein, and low in carbohydrates - a good nutritional value. Eels may be frozen, but the high fat content does not allow long home-freezer storage. However, the relatively high fat content does permit success in smoking eel meat. Other good preparation methods are baking, broiling and frying. Eel meat is found in markets as fresh, smoked, pickled, or canned meat.

MULLET

Mullet (also known as the "Lisa" in Spanish) is a fish caught primarily off the southern coast of the United States with the state of Florida landing the largest quantities. Mullet prefer warm coastal waters, but can also tolerate fresh water, so that they are extremely adaptable to fish culturing in ponds throughout the world.

Until recently, this species played a minor role in the U.S. catch as it was dubbed a "trash" fish by most people. The Japanese have caused us to take a second look at the mullet because of their interest in the roe, or eggs, a delicacy in the Orient. This has opened up a new market for both the roe and of course the mullet. They are an appealing fish, dark blue with silver sides, averaging between 2 and 3 pounds. Available from April to November, they run the heaviest during September.

Mullet are a fine eating fish, with tender firm-textured flesh that has a mild nut-like flavor.

To serve a tasty holiday treat for 6, take 2 pounds of skinned fillets (fresh or frozen) and sprinkle with salt and pepper. Spread 1/4 cup tartar sauce over the fillets and place pieces of thinly sliced cheddar cheese on top. Roll fillets around the cheese, secure with toothpicks, and place in a well-greased baking dish. Combine 1 cup of chili sauce, 1 tablespoon of worchestershire and a dash of hot sauce and pour over the fillet rolls. Now combine 2/3 cup of bread cubes with 1 tablespoon butter or margarine (melted) and sprinkle on top of the sauce. Bake for 20-25 minutes in a preheated 350° oven.

SALMON

Salmon are intriguing fish which spend most of their growing time in the ocean but, when mature, return to the freshwater stream of their origin. For this reason they are known as anadromous fish, similar to shad and smelt. Some travel just above tidewater to spawn while others may venture 2,000 miles inland. They are harvested on this return to freshwater and sadly enough the salmon expire after spawning, making way for a whole new generation.

The flesh of the chinook varies from a deep red to white and is used for curing and canning, as well as fresh and frozen products. The sockeye salmon has beautifully firm flesh, deep orange-red in color, and is canned or sold fresh. The silver salmon (better known as the Coho) has a light-red colored flesh and is used primarily for the fresh and frozen markets. The pink salmon, also known as the humpback, is canned and accounts for about one-third of the U.S. salmon packed. The flesh is a light pink color with a very delicate flavor. The chum salmon, similar to chinook, has a deep-pink to nearly white colored flesh and is canned, although substantial amounts are sold on the fresh and frozen market.

Canned salmon is available in pound, half-pound, and quarter-pound cans, with approximately 1 percent salt added for flavor.

Smoked and cured salmon, once an ethnic food, is now enjoyed by many people. Mild-cured salmon are fillets dredged in very fine salt and held at 37°F for 30 days. Some are smoked, utilizing a process similar to that

SARDINES

What is a sardine? Contrary to what most of us think, in the U.S. the word sardine does not name any specific species of fish. Instead, it is a collective name that includes several different species of tiny, soft-boned fish.

The name sardine was probably first used for similar, tiny fish, called French sardines, found and caught in great abundance off the island of Sardinia in the Mediterranean. Today, the term sardine refers more particularly to a method of preparation than to any specific fish.

The U.S. sardine canning industry, located primarily in Maine and California, uses two particular species of fish - the pilch and the small sea herring. The Maine sardine, a small sea herring, is a member of the Atlantic herring family. Small herring, sprats, and pilchards may be packed and sold as sardines under the U.S. interpretation of the marketing term sardine.

Sardines are a valuable source of the high quality protein needed for building and repairing body tissue. They contain the iron needed for healthy, red blood, and provide useful amounts of the B vitamins, thiamine, niacin, and riboflavin.

With the heads, tails, and viscera removed, fish for sardines are packed in several different styles. They can be salted, smoked, or oil fried, and are packed in olive, soybean, peanut, or cottonseed oil with or without special sauces.

Sardines in sour cream, sardines in wine, or sardines in tomato or mustard sauce are some of the special packs available. Packed in small, flat 4-ounce cans, they are delicious as appetizers used directly from the can or combined into a dip.

of ham. In fact, the taste is similar. If you like the taste of ham, you will enjoy smoked salmon.

No matter what your choice of salmon, it is available on a year-round basis and can be found in most stores or fish markets.

SEA TROUT

Warm weather brings saltwater fishing into full swing, as various species begin to arrive again in Virginia waters. One which always returns is the sea trout, or weakfish. With an increase in water temperature, they migrate in single-sex schools from Florida to as far north as Massachusetts. Sea trout are very temperature-sensitive and prefer water about 60°F.

Anglers named this species "weakfish" because its fragile jaw and mouth tissue are easily torn by hooks.

Two species predominant in Virginia are the spotted trout and the grey trout. Both are members of the Drum family which includes the familiar croaker. In spite of its name, this fish is not related to the freshwater trout family.

Spotted trout locate in water 2 to 6 feet deep with a grassy bottom, and feed on shrimp or small fish. The slightly larger grey trout also feed on shrimp or small fish; however, they prefer to locate in areas around breakwaters, docks, and jetties.

Trout are handsome fish and extremely good on the table as well as on the end of a fishing line. Stuff the body cavity with crabmeat and wrap the fish in foil. Bake over the hot coals for 10 to 15 minutes and season to taste. It is a combination hard to beat.

STRIPED BASS

Fishing for the striper, or rockfish, is almost a disease with some fishermen. It attacks with a vigor that makes you wonder if these people have taken leave of their senses. They will trudge miles across beaches, risk life and limb on slippery rocks or boat decks, and fish - rain or shine, day or night.

The magnetic attraction that these fish hold is somewhat a mystery, but is probably due to their general overall appeal. They are large, somewhat difficult to catch, will eat most anything put in front of them, and are very good on the table.

Stripers abound along the entire Atlantic Seaboard as well as the Gulf and West coasts, with Chesapeake Bay being the largest hatching area on the Atlantic coast. Some stay in groups circulating throughout the Bay, but the majority enter the ocean in the spring to join schools of larger fish which are bound for the cooler waters of the north.

Rockfish are dark green along the top with silver sides, a white belly, and a series of seven or eight horizontal stripes down the sides from behind the gills to the anal fin. The females, larger than the males, are known as "bulls." The largest striper ever taken was netted in North Carolina. It weighed 125 pounds and was over 6 feet long.

Regardless of their size or sex, stripers contain very high-quality white, flaky meat which is extremely nutritious and lends itself handily to any of the basic fish cooking techniques.

SUMMER FLOUNDER

This odd-looking flat fish is a member of the halibut family and has saved many a fisherman from coming home empty-handed. Summer flounder, or fluke, dwell in great numbers along the shallow shoreline and frequent both sandy and muddy bottoms. They are often captured where the water is moderately brackish and have the ability to camouflage themselves by changing colors.

Mother Nature has given the fluke a very interesting and unique characteristic. Young fluke, for a brief time, swim upright and have eyes on each side of their heads. As they develop they lie on their right or left side, depending on the species, and the eye on the lower side migrates to the upper side of the head - a very wise provision as the eye would not be very useful buried in the mud. The summer flounder has eyes and color on the left side whereas the winter flounder's eyes and color are on the right side. Look next time to see if yours is the summer or winter variety.

Fluke in the Chesapeake Bay average 1 to 3 pounds. They are notorious for feeding directly after a storm or just before dusk until shortly after dark. They are very inquisitive and will investigate any silvery or flashing movement in the water. Minnows are dynamite for bait.

Although the flesh is somewhat dry, it has good flavor when baked or fried. Dip fillets in a mixture of 2 beaten eggs and 1/2 cup milk and roll in a seasoned cornmeal mixture. Heat some shortening until it just begins to steam, then cook the fish until it turns golden brown. Place on absorbent paper to remove the excess oil.

TUNA

Canned tuna in the United States is basically prepared from four species: Albacore, Yellowfin, Skipjack, and Bluefin. Although only these four species are used for canning in the U.S., several others are known and recognized by the U.S. Federal Standard of Identity. However, these standards do not include the yellowtail or bonito, which are generally classified as "tuna-like" fishes.

Albacore is regarded as the premium fish because of its light color when cooked. Next comes the yellowfin, which also gives a light color meat and is generally more acceptable than the skipjack or the dark-fleshed bluefin. More yellowfin is canned in the U.S. even though it is darker-fleshed, stronger-flavored, and oilier than the albacore.

All canned tuna sold in the U.S. must comply with the Federal Standard of Identity. This standard lists and regulates the nature and quality of the pack. It defines the optional forms of pack, such as solid chunk or grated, and also states the size of the pieces for each style. The regulations specify four color designations: white (for which only albacore may be used), light, dark and blended. The meat may be packed in cottonseed, soybean, or corn oils, with most imported tuna packed in water. Optional flavorings and seasonings are also permitted, such as garlic, lemon flavoring, and vegetable broths.

If you find glass-like crystals in your canned tuna, don't throw it out. The crystals are probably a harmless mineral, struvite. To find out, place them in a little vinegar. Glass won't be affected but struvite will dissolve.

For an easy Tuna Coleslaw -

Shred a medium cabbage,
combine it with a can of tuna,
and half a cup of Thousand Island Dressing.
Mix thoroughly for 4 quick servings.

BASIC FISH COOKERY

Fish cookery is easy and quick. Once the basic techniques are acquired, there is really only one rule to remember - don't overcook. Fish are cooked and ready to eat as soon as the flesh flakes easily when touched with a fork.

Here are a few basic cooking methods:

Baking. To bake fish, place steaks, fillets, or whole fish in a greased baking dish. Brush with butter, vegetable oil, or margarine. Bake at a moderately-high temperature (350°) until fish flakes easily when tested with a fork.

Broiling. Fresh or thawed steaks or fillets are placed in a pre-heated broiler approximately 4 inches from the broiling unit and cooked until fish flakes easily when tested with a fork. The fish may be brushed with oil or butter, and sprinkled with pepper, paprika, or lemon juice.

Sauteing or Pan Frying. Bread the fish by dipping first in milk and then in flour, crackers, or bread crumbs. Butter may be used to fry with if fish are quite small, but vegetable oil is less likely to overheat or overbrown the fish. Fry fish until light brown, then turn and fry the other side. Too high a temperature will cause shortening to smoke and will cause an unpleasant odor.

Look in your cookbook for various stuffings or sauces to use with the fish.

Don't be afraid to try unfamiliar types of fish. In fact, try any fresh fish which happens to be in season. It will be less expensive and should offer a new taste treat.

OVEN-FRIED FISH

Any time of year, these days, is a good time to include fish in your menu. A wide variety is available in seafood markets and grocery stores.

Oven-frying is not true frying, but has the especially good feature that the fish don't require turning, basting, or careful watching.

To serve six you will need 2 pounds of fish fillets or steaks (fresh or frozen), 1/2 cup milk, 1 teaspoon salt, 1-1/2 cups cereal crumbs or toasted dry bread crumbs, and 1/4 cup melted fat or oil.

First, thaw fish if frozen. Cut into 6 portions. Combine milk and salt. Dip fish in milk and roll in crumbs. Place the fish in a single layer, skin side down, on a well-greased baking pan. Pour fat over fish. Bake in an extremely high oven, 500 degrees, for 10 to 15 minutes or until fish are brown and flake easily when tested with a fork. The crumb coating and the high temperature prevent the escape of flavorful juices and give an attractive brown crust. Your family or guests will love it!

BROILING SEAFOODS

More and more fishery products are becoming available in U.S. stores. In these days of high food prices, fish is still a good buy. It is just as nourishing as red meat.

Basic broiled fish is simple and delicious. To serve six, use 2 pounds of fish fillets; thaw in the refrigerator or under cold running water if frozen. Place fish in a single layer, skin side down, in a well-greased baking pan. Combine 2 tablespoons of melted fat or oil with 2 tablespoons lemon juice, 1 teaspoon salt, 1/2 teaspoon paprika and a dash of pepper. Mix well and pour this sauce over the fish. With the baking pan 4 inches from the broiling unit, broil for 10 or 15 minutes or until fish flakes when tested with a fork.

For a different sauce with an interesting flavor, try mixing together 1/4 cup garlic French dressing, 3 tablespoons soy sauce, and 3/4 teaspoon ground ginger. Pour over fillets and baste once. It's delicious!

Remember to check broiled fish often. Overcooking makes it dry and less flavorful.

For more free seafood recipes write to the Virginia Seafood Council, P. O. Box 687, Newport News, VA 23607.

FISH PORTIONS AND FISH STICKS

Convenience seafoods like fish sticks account for a large part of the fish consumed in this country, not only in homes but also in schools and fast food restaurants.

Fish portions and sticks are cut from frozen blocks of high quality fish such as cod, haddock, or pollock. They are dipped in batter, coated with breading, rapidly frozen, and packaged for distribution. Fish portions range from 1-1/2 to over 5 ounces and come in a variety of shapes. Raw breaded portions must be at least 3/8 inch thick and contain at least 75% fish - the rest is breading. Partially cooked portions must also be 5/8 inch thick and at least 65% fish. Fish sticks must also be 3/8 inch thick and at least 60% fish. The smaller portions have a lesser percent of fish because they have a greater surface covered with breading.

Inspection of these fishery products by government inspectors is on a voluntary basis, by request of the packer. If the product states it has been packed under federal inspection or bears a U.S. inspection seal, you can be assured of a safe, clean, wholesome product. Sticks and portions are also divided into Grades A and B, Grade A being the top of the line.

Here are a few purchasing suggestions to follow so you can be assured of enjoying top quality fish sticks and portions:

1. Make sure the container is intact.
2. Take only packages which are solidly frozen and are clear of drips, or ice on the package. Such icing or frosting indicates partially thawed, refrozen fish.
3. Check see-through packages for any discoloration.

Fish portions and sticks make excellent cornerstones for quick meals and can be served in many imaginative ways with creative sauces and side dishes.

OUTDOOR SEAFOOD COOKERY

With the approach of spring and summer, thoughts often turn to cooking on the grill. Seafoods are versatile and easily adapted to barbecuing. Because charcoal broiling is a dry heat cooking method, thicker cuts of fish are preferable as they are less likely to dry out. To insure juicy flavorful fish, baste generously with a sauce that contains some fat, both before and during cooking.

To give seafoods a smoky flavor, use wood chips from apple, oak, hickory, or cherry. Soak the chips in water at least an hour before using so they will give maximum smoke and not burn too rapidly. Add a few chips at a time to the charcoal while cooking.

For an easy 10-minute dish, marinate scallops, pineapple, mushrooms and green pepper in your favorite sauce for 1 to 2 hours. Alternate the ingredients on skewers and grill about 10 minutes, turning frequently.

SEAFOOD FONDUE

Fondue cookery is an easy, delightful way to enjoy a leisurely family dinner or to entertain. For this purpose, fresh fishery products are more satisfactory than frozen. A fondue pot and forks will be necessary. Most ceramic pots cannot sustain the high temperatures needed for cooking seafood and other meats. Since very hot oil is used in cooking seafood fondue, extreme care should be taken to prevent accidents, particularly when small children are involved. The pot should be in the center of the table.

For a mixed seafood fondue, purchase enough fresh shrimp, filleted fish, and oysters to allow 1/3 to 1/2 pound per person. You will also need approximately one quart cooking oil, 1 teaspoon salt, 3/4 cup flour, and 7 or 8 slices bacon.

To prepare, peel shrimp leaving tail, cut fish into bite size portions, drain oysters well. Roll just the oysters in flour and wrap each in 1/3 slice of bacon, secure with wooden pick.

Pour oil into the fondue pot at least 2 inches deep but no more than half the capacity of the pot. Add salt to the oil. Heat oil to 375°. Use a deep-fat thermometer to check temperature. Oil may be preheated and transferred to the fondue pot. The prepared seafood is then selected by each person, who spears his choice with a fondue fork and cooks it in the fondue pot at the table.

Suggested sauces to serve with the seafood fondue are cocktail, tartar, herb-butter, and curry. Include a tossed salad and garlic bread or rolls for a delicious seafood dinner.

APPETIZERS

Seafood lends itself well to a variety of appetizers. Angels on Horseback is a simple appetizer which will delight your guests. To make approximately thirty, you will need 1 can (12 oz.) oysters, fresh or frozen, 2 tablespoons chopped parsley, 1/2 teaspoon salt, 10 slices bacon cut in thirds, paprika, and pepper. Drain the oysters and sprinkle with parsley and seasonings. Place an oyster on each piece of bacon. Wrap bacon around the oyster and secure with a toothpick. Place oysters on a broiler pan. Broil about 4 inches from the source of heat for 8 to 10 minutes or until bacon is crisp. Turn carefully. Broil until bacon is crisp on the other side. Remove and place on a serving dish.

Another pre-dinner treat is Crab Fingers. There is nothing simpler or more enjoyable. Purchase fresh or pasteurized crab fingers at your local grocery store or seafood market. Remove from container and place on a platter. Serve with cocktail sauce or warm lemon butter. Your friends and family will love them!

For more seafood recipes, write to the Virginia Seafood Council, P. O. Box 687, Newport News, VA 23607.

FREEZING FISH AT HOME

If you want to freeze seafoods by some method other than wrapping, you might consider ice glazing. Glazing with ice is used widely in commercial methods of freezing and storing, but is usually considered impractical for home freezing.

However, glazing can be done at home by packing fish in suitable containers and filling the containers with water. A good container for this purpose is a tin can such as a two-pound coffee can. When using such a container, be sure to have at least one-half inch of water over the fish. A clean waxed cardboard milk carton is also satisfactory.

Always remember, whatever the method of freezing, to exclude as much air as possible from the package since air causes oxidation and slows the freezing process. Also, it is a good practice to mark frozen food with a label or grease pencil. Label each package with the data, type of seafood, weight, and number of servings or pieces. A record kept near the freezer will also be helpful and should carry the same information included on the packages as well as the location of each package in the freezer, the package size, and a current record of the number of packages put into or removed from the freezer. This prevents unnecessary searching for a particular package and the harmful warming of contents while the freezer door is open.

PACKAGING FOODS FOR FREEZING

If you have been using discarded bread bags for wrappers to store frozen foods, you may be exposing your foods to excessive moisture loss, resulting in severe dehydration and, therefore, loss of quality.

Take care in packaging food, especially for freezing, to choose strong, moisture-proof, air-tight materials.

Of the plastic films, polyester, polyvinylidene chloride (saran) and polyvinyl chloride (P.V.C.) are all good barriers to oxygen, and also rank high in most other desirable characteristics of an ideal package. Both saran and P.V.C. will adhere to fresh fish and provide a good fit, if you are careful to crowd out air bubbles. However, saran is not strong at low temperatures. It is a good idea to overwrap saran packages with a protective paper.

So, remember, in buying, preparing, and storing your foods, consider the quality of the material you use for packaging. The package could make the difference in the final quality of the food being served.

SALTING FISH

Salting fish is one of the oldest and simplest methods of preservation. It requires few materials, but does take some time. There are two methods of salting: (1) brine salting, and (2) dry salting. Both methods involve some similar procedures such as cleaning the fish and using a crock to pack the fish in alternating layers of salt and fish. However, some steps differ. Brine salting involves soaking the fish in a brine solution, and dry salting involves draining the solution and laying the fish out to dry. Also, the time involved in each process differs.

Materials that might be needed in salting are pure salt (amount varies with amount of fish), water, a stoneware crock with loose wooden top, and (for dry salting) a hardware-cloth screen.

Be sure to obtain a pure salt, choose and prepare fish carefully, and observe temperature and moisture changes.

Salting fish results in a distinct flavor, but when freshened, the fish can be used in nearly any standard recipe calling for fish or fillets.

For a detailed description of salting fish methods, write for "Salting Fish" by Sharon Turner, Sea Grant at Virginia Tech, VPI&SU, Blacksburg, VA 24061.

SPICED AND PICKLED SEAFOODS

If you are tired of the common salt, pepper, and butter additives for your seafood meals, an added touch of spice or pickling might stir up your taste buds.

Pickling with vinegar and spices is an ancient form of food preservation and has been encouraged through the generations because of the delicate flavor derived.

Vinegar and spices are used in pickling. Vinegar differs from salt as a preservative agent in that it does not preserve by osmosis, but enters into chemical combination with the product and inhibits bacterial activity. The active principle in vinegar is acetic acid, but because of the dilute amount, fish products put up in vinegar are only temporarily preserved. However, vinegars containing at least 3 percent acetic acid will preserve fish for months.

So, for a twist in the routine of storing seafoods, try pickling as a good and tasty preservation method.

For more detailed information, write Sea Grant at Virginia Tech, VPI&SU, Blacksburg, VA 24061.

SMOKING FISH

Practically all saltwater fish and shellfish are adaptable to smoking, especially the fatter species such as herring, mackerel, shad, and salmon. Smoking is a simple technique and can be easily done at home.

A simple backyard smoker can be fashioned from any clean 55 gallon oil drum or similar container. Cut a fire door in the bottom and attach a coarse screen baffle inside halfway to the top. This screen will allow only the smoke to filter through. Another screen should also be attached inside about 6 inches from the top to rest the fish on. The container should be covered with a ventilated lid to release the smoke.

First clean the fish, leaving the small ones whole and filleting or steaking the larger ones into 1 pound pieces. Marinate them overnight in the refrigerator in a brine solution made by putting 1-1/2 cups salt into 1 gallon of water.

Place the fish in the smoker and smoke for about 12 hours with low to medium heat (approximately 120-180°F.) Experience, and the amount of saltiness preferred, will tell whether to smoke the fish for longer or shorter periods of time. A smudge fire of the proper wood is essential to impart a particular smoke flavor. Sawdust or wood chips of hickory, oak, or apple work especially well. Soaking the chips in water will enhance their smoking. The idea is to cook the fish slowly in warm and fragrant smoke.

For detailed plans and recipes, write for "Smoking Fish at Home" by Cherrie Kassem, Sea Grant at Virginia Tech, VPI&SU, Blacksburg, VA 24061.

SEAFOODS FOR GOOD NUTRITION

With today's high prices, it's a real problem to plan meals which provide enough of the proteins, minerals, and vitamins needed and still serve a tempting variety. A serving as small as 3 to 4 ounces of lean fish will supply about half of the total amount of protein required each day. Seafood is also a valuable source of vitamins and minerals.

If you're counting calories, low-fat fish and shellfish usually contain fewer than 100 calories in a 4-ounce serving. A similar portion of many cuts of beef contains over 300 calories.

You might try this delicious Oriental Fish Steak. For this recipe you will need 2 pounds of fresh or frozen fish steaks or you may use fillets. Thaw the fish, if frozen, cut into serving size portions, and place in a single layer in a shallow baking dish. Combine 1/4 cup orange juice, 1/4 cup soy sauce, 2 tablespoons catsup, 2 tablespoons melted fat or oil, 2 tablespoons chopped parsley, 1 tablespoon lemon juice, 1 clove garlic finely chopped, 1/2 teaspoon oregano, and 1/2 teaspoon pepper. Mix well and pour this sauce over the fish. Let it stand for 30 minutes, turning once. Remove the fish, and place it on a well greased baking pan. Save the sauce for basting. Broil 4 inches from the broiler for 10 to 15 minutes, or until the fish flakes easily when tested with a fork. Baste once during broiling with the sauce. This recipe serves six.

STAYING SLIM WITH SEAFOOD

To stay slim, feel better, and enjoy dieting, turn to the harvest of the sea. The delicate flavor of fish and shellfish plus their low-calorie, high-nutrient content make dieting with seafood a natural. Seafoods are good any day of the week for any meal. Northern Europeans, for example, enjoy skippers for breakfast.

Try the following official Weight Watcher's recipe for a delicious low-calorie main dish. You will need:

- 1 lb. fish fillets, fresh or frozen
- 1 teaspoon onion flakes
- 3 cups tomato juice
- 1 teaspoon curry powder
- $\frac{1}{2}$ teaspoon onion powder
- $\frac{1}{4}$ teaspoon garlic powder
- 1 bay leaf, broken
- pinch of thyme
- $\frac{1}{8}$ teaspoon pepper
- 2 teaspoons Worcestershire sauce

First thaw fish if frozen. Combine all ingredients except fish in a large covered saucepan. Heat well. Add fish, making sure it is covered with sauce. Simmer until fish flakes easily when tested with a fork, which will be in about twenty minutes. Remove fish and serve. This recipe makes two 6-ounce servings.

PROTEIN CONTENT OF FISH

People in charge of planning menus today, whether housewives or school dieticians, must be aware of nutritional values of different foods. Amounts of protein in various foods is one of the major concerns. For years, seafood has been recognized as a main source of animal protein.

The amount of protein in a species of fish varies with feeding habits, age and sex of the fish, and fat and water content of the flesh. On the average, the muscle of finfish will contain 18 to 22 grams (g) of protein per 100 g of edible portion. Molluscs contain less protein while crustaceans contain more than do finfish.

The protein content of the various muscles in the fish body is not always the same. For example, the white muscle of the albacore will be higher in protein than the dark meat, which contains more fatty tissue. The nutritive value of the protein in fish flesh is equal to or better than milk protein (casein).

Unless fish is badly handled during processing or cooking, the nutritive quality of the protein does not change markedly. There is scientific evidence that fish muscle is highly digestible.

All of the essential amino acids needed for man's good protein nutrition are present in fish muscle. It is high in lysine and therefore is a good supplement to a cereal diet. All of man's protein requirements may be met by a diet with fish as its sole protein source.

FOOD ADDITIVES INVOLVING MARINE FOOD PRODUCTS

Food additives have been in use since man began to prepare or cook his food. Primitive man was using one of the oldest additives known when he used salt to preserve his fish.

Additives come from natural or synthetic sources and are classified in two categories: Intentional Additives and Incidental Additives. We will concern ourselves with the Intentional group related to marine food products.

There are many food additives derived from the sea that are intentionally added to food products to improve our everyday foodstuffs.

Salt is the most widely used food additive in the world, and our supply of salt originated in the sea. Sea salt is nutritionally sound since it contains all the trace elements in the proper ratio. In this way it enhances the natural taste of foods.

Emulsifiers and stabilizers derived from seaweeds give our foods the desired consistency and texture. They permit the dispersion of liquids so we may have, for example, a salad dressing that requires no shaking before use. Ice creams also incorporate these seaweed stabilizers to prevent the formation of large ice crystals which would impair their creamy texture.

Essential vitamins also come from the sea. Most fish oils contain Vitamin A and Vitamin D. Recently it has been shown that the use of Cod-liver oils will lower the cholesterol level of the blood.

Looking at food additives another way, many are intentionally added to marine fish and shellfish to provide appealing, flavorful and stable products.

Alumina is added to tuna fish and canned shrimp to prevent the formation of struvite, a harmless crystal-like substance. Many times housewives mistake this crystal for broken glass and discard the whole can. However, a drop of vinegar on struvite crystals will dissolve them.

Smoke, like salt, is one of the earliest food additives known. Primarily, its use as a seasoning imparts a characteristic flavor such as that of a delicately smoked oyster. Kippered herring from Scotland were originally smoked with oak sawdust to give them their unique flavor.

These and countless other examples illustrate how additives from the sea and those used with seafood products help make our foods nutritious, wholesome, convenient, varied, safe, and good-tasting.

WHAT IS A FAT FISH?

What do we mean when we speak of a flounder as a lean fish, or a bluefish or salmon as a fat fish? We need to know, because freezing methods, in particular, differ depending on the fat content.

Fatty fish are more susceptible to rancidity due to exposure to oxygen. With fish such as tuna, the high fat content of the raw fish will oxidize when exposed to even a small amount of air and gradually cause the frozen fish flesh to become strong (even "fishy") and eventually taste rancid.

The presence of oxygen can cause other changes, including a discoloration or browning of the meat. Also, fatty fish do not absorb salt as readily - in the process of salting fish - and are thus more likely to spoil. Therefore, it might be better to can rather than freeze or salt certain fish determined to be fat fish -- or, if freezing, to cook before freezing.

Since few analyses have been completed, it is difficult to define what is meant by a fat or lean fish. The quantity of fat content varies from fish to fish, even in the same species, and may vary with the seasons of the year or temperatures of the waters where the fish are found. Most statistics that we have are based on relatively small samples, sometimes on only one fish.

However, Sea Grant at Virginia Tech personnel have assigned some categories that may be used to classify fish as fat or lean, until further information is available.

A fish may be categorized as LEAN when the content of fat is less than 2.5 percent. It is classified as MODERATE if its fat content falls between 2.5 and 6.5 percent, and FAT if the fat content is over 6.5 percent.

Therefore, shad, Atlantic mackerel, and Atlantic herring may be classified as fat fish, while cod, flounder, croaker, and haddock are lean. It is interesting to note that some

fish such as halibut, which seem to be oily and might be thought of as high in fat content, are actually classified as lean and very low in fat content. The discrepancy could be due to the small samples taken to establish these levels rather than the actual fat content of halibut.

FISH AVAILABILITY

Fish is a natural for the budget-minded consumer, and provides a nourishing, high protein, low-fat dish.

Fish are marketed both fresh and frozen, and a variety of fresh fish is easily obtainable in most areas of Virginia. Most varieties of fresh fish are more abundant during certain seasons of the year. Lesser known species are often as satisfactory as the better known species and are usually more economical. Your local seafood dealer can provide you with information concerning the different varieties available in your area.

For guaranteed fresh fish, look for firm flesh with bulging bright eyes and reddish to pink gills. The fish should also have a fresh characteristic odor, but not be sour or strongly fishy. The amount to buy varies somewhat with the species; however, approximately 3 to 4 ounces of boneless fish will provide one serving.

The Virginia Seafood Council has developed a 7-day meatless menu which is available by writing the Virginia Seafood Council, P. O. Box 687, Newport News, VA 23607.

NATURAL BAITS

Peelers, beak throwers, sea arrows, and prawns -- sound like Greek? Actually, these are the names of various baits used for saltwater angling.

Peelers, also known as soft-shell or shedder crabs, are most highly prized as bait. They are young blue crabs that are molting for growth and are vulnerable as they can be eaten whole. Because they are soft and delicate, they must be tied to the hook. This bait will attract a variety of species, especially bluefish, trout and rockfish, and, if kept in a cool spot, will last several days out of water.

Beak throwers, or bloodworms, are found in coastal mud flats and will grow as long as 10 inches. The name refers to their red-hued bodies. When handled they extend four tiny black jaws. This bait can be kept in a cool bed of rock moss or on ice and is a sure bet for flounder, weakfish, and croaker.

Sea arrows, better known as squid, are among the best all-around baits. Usually found in deeper water, squid sometimes venture close to shore where they can be caught in hand nets. Squid are difficult to keep alive, so are usually frozen. The whole squid is used for larger fish such as rock, and strips or pieces are used for cod, sea bass, and other small fish.

Prawns are shrimp and can be caught with nets in shallow water. They will remain alive for a short while if kept in salt water or on ice packed in sawdust. This is another all-purpose bait, ideal for flounder, mackerel, sheepshead, and channel bass. For best results, prawns should be hooked through the tail.

SPONGES

As with many other marine products, the unique properties of natural sponges were recognized ages ago by the Greeks who developed a large industry and a lucrative trade in the Mediterranean area. These Mediterranean sponges dominated the U.S. market until the mid 1800's when Florida sponges began to enter the market. In one year, more than 600,000 pounds were harvested, worth 1.2 million dollars. However, due to the lack of scientific management, the sponge resource in Florida drastically declined after only a few productive years.

Sponges are naturally living animals found in warm, salty water. They in no way look like what you have at home, which is only the skeleton or supporting framework from which the living animal has been separated. This skeleton consists of a material called spongin which is comparable physically and chemically to silk.

Once the sponges are brought up from the bottom, they are killed and kneaded to remove the fleshy portion from the skeleton. They are next washed very thoroughly in clean sea water, sorted by size, and compressed into bales for shipment to the market.

Sponges which are used for washing vehicles and other fragile surfaces are of the sheep's wool variety, relatively soft but extremely durable. The finest sponges are used in the bath and come from the coast of Syria. They are appropriately called silk sponges and are expensive. A perfect specimen may bring as much as \$50, but will last a lifetime.

SEASHELLS

For years, shells and the creatures they contain have fascinated man and played an important part in his life - as food, money, tools, and objects of art.

Seashells are the outer skeletons of soft-bodied creatures called molluscs - snails, clams, oysters, squid, octopus, and the spiral-shelled whelk. There are one hundred thousand (100,000) different kinds of living molluscs.

The study of seashells or conchology is a hobby enjoyed by both beginners and experts. The great variety of edible molluscs that abound here in Virginia provide an almost inexhaustible and interesting supply.

A stroll along the beach will reveal shells of all shapes, sizes, and colors. The large, conspicuous shells probably have been washed up on the beach by the waves. However, a closer examination will reveal many delicate small shells directly underfoot.

Once home, shells should be cleaned and treated to prevent unpleasant odors and to preserve their beauty. Shells that are alive can be boiled or frozen to allow easy removal of the meat. Whichever process you choose, raise or lower the temperature gradually so that fine cracks will not develop in the enamel of the shell. The shell exterior can be brushed with detergent and warm water in most cases, but an overnight soaking in full strength bleach will do a first-rate job. Once dry, using baby oil sparingly will enhance the color and provide the finishing touch.

THE SINISTER SHARK

Because of their sinister looks and even more sinister reputation, it is hard to find anyone that shows true affection for sharks. Occasionally you will find an angler who regards them as a genuine sport fish, or a gourmet who prizes its swordfish-like flesh.

About 47 different species inhabit the Atlantic coastal waters off North America, at various depths and salinities. Sharks sometimes travel in schools, and differ from other fishes in that their skeleton is composed of cartilage instead of bone. They must also swim constantly to move water through their gills for life sustaining oxygen. Should they stop to sleep, they would soon drown for lack of oxygen.

Believe it or not, sharks have many enemies, the most dangerous of which is man. Giant squid, killer whales and porpoises are given a wide berth by most sharks. Porpoises, to protect themselves, will repeatedly bump the shark at top speed, damaging the shark's abdomen or gills.

Each summer the papers tell of many accidents occurring along the Atlantic coast involving sharks. Presently there is no totally effective system to protect bathers from a shark attack. Their fearless attitude and unpredictable actions make them extremely dangerous. It is best to stay out of the water if sharks have been sighted close to shore.

Should you encounter a shark while surfing or diving, the best protection lies in swimming slowly while moving easily through the water, avoiding any abrupt changes in position. Don't panic, remain calm, and above all, don't try to out-distance him.

THE ELUSIVE JELLYFISH

Although they are not classified as seafood in the United States, jellyfish frequent our beaches each summer and are a very abundant marine species. The jellyfish is neither jelly nor fish but a very primitive form of marine animal. They are found from the Arctic to the tropics, mostly in shallow waters. Contrary to belief, jellyfish do not migrate, but are moved about by the tides and currents. The jellyfish lie dormant during the winter in the unrecognizable polyp stage and begin to grow again with the advent of warm weather.

Most jellyfish are translucent, umbrella-shaped masses with tentacles of various lengths suspended from the edge or underside of the body. They are either male or female and their life cycle is quite short - about one year. Their diet consists of small marine animals and fish.

One of the greatest concerns swimmers and fishermen have is the ability of jellyfish to sting. Although some of the species can sting, most have little or no effect on man. Some can cause noticeable irritation; however, the application of a little meat tenderizer should take away the discomfort.

TIDES AND CURRENTS

Seventy percent of the earth's surface is covered with water. Two of the more interesting and familiar forces which govern this mass of water are tides and currents. They affect everything associated with the sea and have a distinct relationship with the fish and shellfish we are accustomed to eating.

Tides are produced by the gravitational pull of the sun and the moon. This gravitational pull causes the water on the surface of the earth to be attracted toward the sun and the moon, thus creating a slight bulge. As the earth rotates, this bulge changes position, raising and lowering the level of the oceans.

The Bay of Fundy between the Canadian Provinces of New Brunswick and Nova Scotia has the greatest range of tide in the world - 70 feet when the tides are their strongest. Here along the Virginia Tidal Plain, the range will be from 3-5 feet - a distinct difference.

Tidal surges, also known as bores, are famous throughout the world. The one on the Amazon River in South America is no exception - this bore travels 200 miles inland. It is like a waterfall 16 feet high moving approximately 10 miles per hour with a roar that can be heard for miles.

Currents, although affected by tides, are stable moving bodies of water. One of the largest currents in the world is the Gulf Stream, which moves up the Atlantic coast and warms the waters of Virginia. This vast "river" within the ocean transports 1,000 times the volume of the Mississippi River each minute.

Swimmers and surfers on Virginia beaches are constantly being warned of currents which can pull them under and carry them out to sea. Presently there is no known current which

flows from the beach seaward that is capable of this feat. However, when the surf is rough, caution must always be exercised, and swimmers should avoid being caught in a rip tide.

WAVES AND SURFING

The surface of the ocean is literally a mess. Waves going every which way, with no apparent order, give the surface a ragged and confused look. Mathematicians have just recently been able to predict waves and surface conditions for boating enthusiasts, but the process is complex and not entirely accurate.

Waves generally fall into two categories: "seas" which are waves of various shapes and sizes stirred up by the wind, and "swells" which are waves that run beyond the wind and have a regular pattern.

Seas and swells play an important role in mixing the surface waters of the oceans, providing oxygen and food to the various marine animals.

Waves are difficult to explain, as they are not moving walls of water, but are a rhythm moving through the water. As the rhythm passes, the water particles move up and down and inching slowly forward, similar to a car spinning its wheels on an icy road. These waves don't normally affect the deeper waters, which explains why submarines can cruise smoothly under the water.

The slow, gradual, upward-sloping bottom of Virginia Beach creates smooth spilling-type breakers, ideal for surfing. By balancing a surfboard on the advancing wave face, one can actually ride downhill. A surfer's skill is critically tested by the control he must maintain on the board. Because the rear of the board is high on the wave, it is therefore traveling faster than the front of the board and will tend to "broach-to", or swing parallel to the wave. The secret is to keep the board headed toward the beach.

