

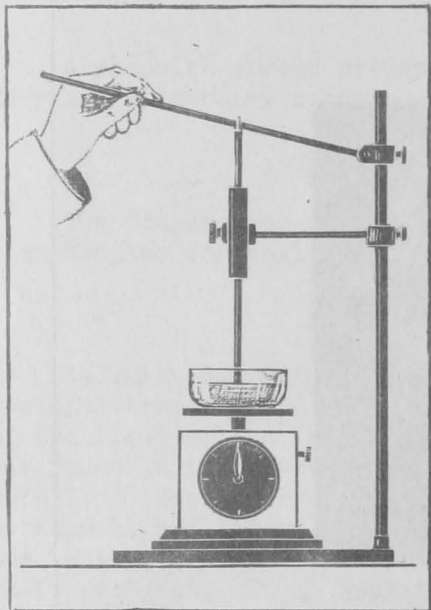


# TRENDS AND DEVELOPMENTS

## Abstract

**STRENGTH MEASUREMENTS OF AGAR GELS:** Fishery Leaflet 306, "Strength Measurements of Agar Gels," by L. S. Stoloff, formerly of the Branch of Commercial Fisheries, summarizes data on factors affecting strength measurements of agar gels and offers a recommended procedure for determining the strength of gels.

The study reported in this leaflet was conducted because of the paucity of research work on factors affecting stress-strain measurements on gels. Assuming that all gels have an elastic property, it becomes evident that a true consideration of gel strength involves breaking load (the force required to break the gel), breaking strain (the displacement of the gel at the elastic limit which is the point of rupture) and the elastic modulus (the displacement of the gel per unit of force). The work accomplished in breaking the gel may be computed from the breaking load and strain. It was found that factors having little or no effect on apparent gel strength are the rate at which the force is applied, the rate of which the gel is cooled, the temperature of the gel while aging, pH of the gel and the presence of sugar or peptone in the gel. Neither does the dimensions of the gel above certain limiting values affect the apparent strength.



Factors affecting apparent strength are the concentration of agar, temperature of gel, and the presence of calcium salts.

All the gels studied had about the same breaking strain for the same agar concentration. It was also found that elasticity is related to the breaking load by a constant inverse ratio so that a measurement of the breaking load alone becomes characteristic of the gel.

The measurement of the breaking load of agar gels of a fixed concentration is the most practical method for comparing the gelation of agars.

**A Recommended Procedure:** For the determination of breaking load, the most simple apparatus consists of a spring balance of one kilogram capacity equipped with an adjustable scale. Above this is attached a support and guide for the plunger. The plunger may be any convenient piece of cylindrical rod, faced off squarely at one end with the edge rounded slightly to prevent cutting of the gel. A plunger approximately 1.1 centimeter in diameter will cover the range of breaking loads ordinarily encountered. The plunger may be actuated by hand or through the medium of any mechanical device.

Gels are prepared by placing agar in a weighed flask together with the amount of distilled water needed to give the desired concentration. A convenient concentration for comparison of breaking strength is 1.5 percent. The agar is dissolved by heating in an autoclave for 20 minutes at 15 pounds steam pressure after which the weight is adjusted to the correct value by the action of distilled water and the solution is mixed thoroughly. The gels are aged a minimum of six hours at room temperature before being tested.

The prepared gel is placed on the pan of the balance which is tared to zero. The plunger is then forced against the surface of the gel until a break is evidenced by a sharp snap back of the balance dial. The maximum balance reading is noted as the breaking load.

The details of experimental work are reported in Fishery Leaflet 306 published by this Service. A copy of this leaflet may be obtained from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

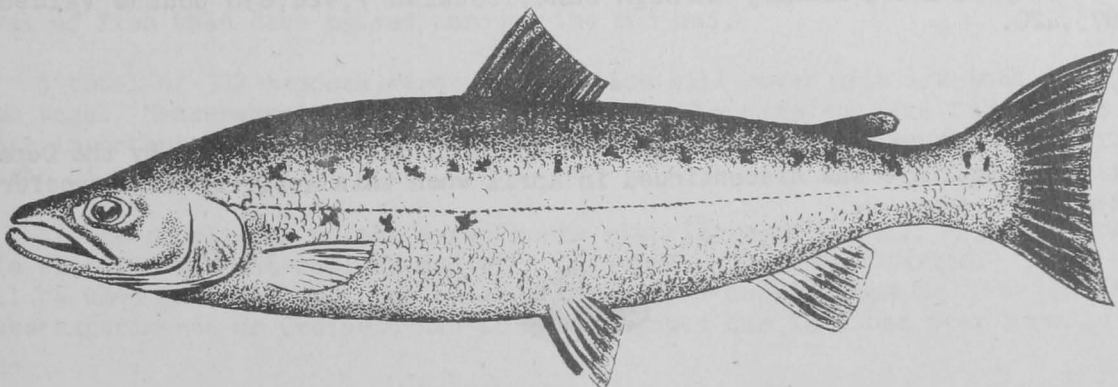


## Agreement for Atlantic Salmon Restoration

The program to restore the Atlantic salmon to commercial importance in New England will be accelerated through a new agreement recently approved by the agencies engaged in the rehabilitation work, the Director of the Fish and Wildlife Service announced on July 15.

The cooperative agreement was signed by the Atlantic Sea-Run Salmon Commission and the State of Maine, the Maine Department of Inland Fisheries and Game, the Maine Department of Sea and Shore Fisheries, and the University of Maine in addition to the U. S. Fish and Wildlife Service. It became effective on June 25, 1948, superseding a more restricted agreement which has been in force since October 10, 1941.

The new agreement provides for a pooling of resources to accomplish the single, long-range objective of Atlantic salmon restoration on the Atlantic Coast and particularly in the Maine rivers where this species formerly was abundant. Under its terms, more efficient use of Federal and State funds, equipment, and personnel can be expected because overlapping functions and duplication of effort will be eliminated.



ATLANTIC SALMON (SALMO SALAR)

To put the new operating plan into effect, the Service has transferred Dr. George A. Rounsefell, Chief of its Atlantic Salmon Investigations, from Washington, D. C., to Orono, Maine, to direct the joint program of Atlantic salmon research, as provided in the agreement. Headquarters of the research staff will be located at the University of Maine.

Dr. Rounsefell will also represent the Service on a three-man research committee which will serve as a coordinating agency for all sea-run salmon restoration and management. The Department of Inland Fisheries and Game and the Department of Sea and Shore Fisheries will each appoint a biologist to serve on this committee.

The research committee will act in an advisory capacity on the joint research program and will develop and recommend to the Atlantic Sea-Run Salmon Commission a general policy on artificial propagation and stocking of salmon. It will also make plans and specific recommendations covering fishways, dams, stocking, fishing regulations, and pollution abatement.

The Service will continue to propagate sea-run salmon at its Craig Brook, Maine, fish hatchery for stocking in the rivers of Maine.

The Atlantic salmon is an example of a resource which, through negligence, has almost been lost. This salmon was once abundant in nearly every river tributary to the Atlantic north of the Hudson. By the late 1930's, the runs in New England had decreased almost to the point of extinction. Today, remnants of Atlantic salmon runs in the United States are found only in a few rivers in eastern Maine.

The principal causes of the decline in the number of salmon were the construction of impassable dams which blocked the adults from the spawning grounds, extensive pollution from industrial developments, and overfishing.



## Federal Purchases of Fish

DEPARTMENT OF THE ARMY: Purchases of fresh and frozen fishery products by the Army Quartermaster Corps for the U. S. Army, Navy, Marine Corps, and Air Force for June 1948 for military feeding amounted to 1,410,309 pounds valued at \$461,212. The total purchases, January through June, totaled 7,924,630 pounds valued at \$2,875,420.

\* \* \* \* \*

DEPARTMENT OF AGRICULTURE: The purchasing of fishery products by the Department of Agriculture was discontinued in April when this activity was transferred to the U. S. Army.



## Flood Damages Fish Hatcheries and Salmon Stocks

Flood waters which ravaged the Columbia River valley during May and June caused at least \$300,000 damage to Federal fish hatcheries.

This estimate was made July 16 by the Chief of the Fish and Wildlife's Branch of Game-fish and Hatcheries.

Fish production in the area has probably been seriously affected. A considerable number of young salmon were trapped on the flooded land when the receding water left them stranded. Others were stranded when the flood waters damaged hundreds of irrigation ditch screens located in the fish-ways of dams along the river.

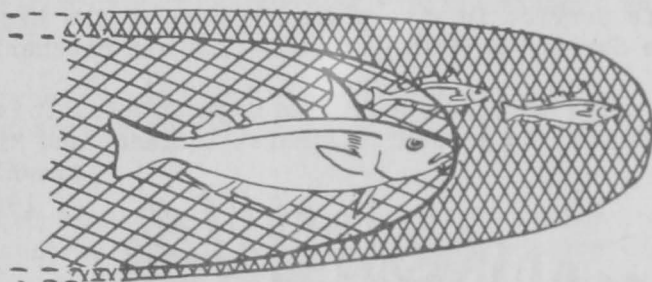
Definite effect on salmon returns will not be evident for three or four years, when the fish hatched this year will return to the area to spawn.



## Haddock Tagging Continued by "Albatross III"

The Albatross III, on its fourth cruise, June 21 to 27, continued the tagging of haddock on Georges Bank. This cruise continued the experiments with larger mesh nets and the tagging of haddock captured by these nets started on Cruise 3. The work of Cruise 3 was interrupted because bad weather made it impossible to obtain live fish for tagging.

Cruise 4, the longest made so far by the newly-commissioned research vessel of the U. S. Fish and Wildlife Service, took the ship to eastern Georges Bank. Fourteen stations were occupied at various locations on the bank to obtain live haddock. A 1-1/2 Iceland net fitted with a 4-5/8-inch mesh cod end was used on all tows. The cod end was covered with a fine-mesh netting, so that all fish which escaped through the 4-5/8-inch mesh cod end were captured. Haddock from the fine-mesh cover and from the large-mesh cod end were tagged to test the survival of fish that have passed through the cod end.



COD END

A total of 332 haddock were tagged on the gill cover with 1/2-inch celluloid disc tags. Measurements of fish length and scale samples were taken from the other important species of fish captured. These data will be used to study the growth of these fish.

At the conclusion of the experiments with large-mesh nets, a comparison of nets with and without rollers and with fine-mesh liners was started. These nets will be used in later work for sampling the fish populations on Georges Bank. These experiments on Cruise 4 had to be postponed due to a bad tear made in one net.



## Imports of Groundfish, Including Rosefish, Fillets

Imports of cod, haddock, hake, pollock, cusk, and rosefish fillets during the first six months of 1948 amounted to 25,319,450 pounds, 13,500,000 pounds more than the receipts during the first six months of 1947. However, the total imports for the first half of 1948 were only about 800,000 pounds greater than those received during this period in 1946.

Imports of Groundfish, Including Rosefish Fillets

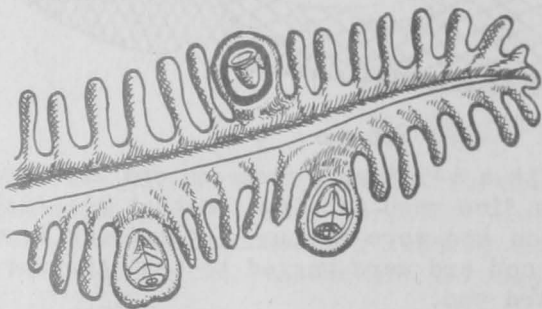
Country	Six months ending with June		
	1948	1947	1946
	Pounds	Pounds	Pounds
Canada .....	15,248,362	8,879,000	19,634,000
Newfoundland .....	7,583,000	1,992,000	2,125,000
Iceland .....	2,479,248	944,000	2,763,000
Denmark .....	8,800	-	-
Sweden .....	40	-	-
Norway .....	-	-	1,756
Total .....	25,319,450	11,815,000	24,523,756



## Mussel-breeding Program

Fresh-water mussels are being bred artificially by the U. S. Fish and Wildlife Service in rivers and streams of the Mississippi River basin, the Chief of the Service's Branch of Game-fish and Hatcheries announced on July 14.

The propagation program began in June. It is operating in Oklahoma, Mississippi, Arkansas, Tennessee, Illinois, Indiana, and Missouri. Investigation for suitable spawning areas was started in the fall of 1947.



GLOCHIDIA ATTACHED TO THE GILLS OF A FISH  
(VERY STRONG ENLARGEMENT)

In addition to the breeding work, the Service is seeking abundant sources of adult mussels to provide the glochidia (microscopic-sized infant mussels) with which to infect host fish in their experiments.

Fresh-water mussels are an important source of shells for the button industry. The production of mussel shells for button manufacturing once supported a large industry in the Mississippi River valley.

During the past decade, however, sewage and erosion polluted many of the rivers in which mussels dwelt. The mussels decreased sufficiently to make necessary artificial propagation by Federal authorities. This work was begun in 1940, but was discontinued because of the lack of funds.

In resuming the work this year, the Fish and Wildlife Service is using improved methods of propagation. Smaller numbers of infant mussels and host fish are being used. The breeding process is as follows:

Fish are taken from river waters which are considered clean enough to provide a habitat suitable for the growth of fresh-water mussels. The fish are placed in small tanks containing a chemical solution making them antiseptically clean.

Glochidia (infant mussels) are then removed from the pouches of adult female mussels, and are put into the small tanks with the fish. The infant mussels attach themselves to the gills and fins of the fish and live as parasites.

After they have been infected with the infant mussels, the host fish are returned to their native waters. In a week or two, the infant mussels fall off the fish, and settle at the bottom of the river.

Depending on the water and food conditions, the mussel matures on the river bottom in three to five years.

Because of the lengthy period required for growth, the Fish and Wildlife Service will not be able to survey the success of their mussel-breeding work until at least 1951. At that time the Service will determine whether to abandon or expand its activities.



## Qualified Personnel Shortage Handicaps Fishery Study

Lack of qualified personnel is restricting the study of Pacific fishery resources, according to the Director of the Fish and Wildlife Service.

The Service needs trained fishery biologists and oceanographers for work in a new research program which received an appropriation of \$1,000,000 under the Farrington Act, Public Law 329.

The program is primarily concerned with developing a profitable fishing industry by American fishermen in the central Pacific oceanic area, including the former Japanese-mandated regions.

Construction of a laboratory on the University of Hawaii's campus and the outfitting of three vessels for experimental fishing and scientific research is planned. Eighteen fishery biologists and oceanographers, a similar number of specialists in commercial fishing and the processing of fishery products, and necessary vessel crews will be employed for the program.

Honolulu will serve as headquarters. From there, exploration and research will be conducted in the Line, Marshall, Marianna, Caroline, and Palau Islands.

Positions are available for fishery biologists and oceanographers in grades P-2 to P-5 with annual salaries from \$3,727 to \$6,235, plus a pay differential up to 25 percent for service in Hawaii. Additional personnel is also needed for continuing and expanding activities in the United States and Alaska.

Applicants for the fishery biologist positions require a bachelor's degree in biological science, with emphasis on the study of aquatic organisms, and a minimum of one year of fishery experience.

Applicants for the oceanographer positions require a bachelor's degree in one of the physical sciences, and a minimum of one year of experience in one of the oceanographic fields.

Qualified persons who are interested in employment in the Pacific or in the United States and Alaska should write to the Director, U. S. Fish and Wildlife Service, Department of the Interior, Washington 25, D. C.

### Third Quarter Quota for Groundfish Fillets Filled

In accordance with the provisions of the tariff regulations enacted on January 1, 1948, concerning imports of cod, haddock, hake, pollock, cusk, and rosefish fillets, etc., the Bureau of Customs increased the duty from 1-7/8 cents per pound to 2-1/2 cents per pound, effective on July 27, 1948. Heavy imports in recent weeks made it apparent that the third quarter's quota of 6,232,000 pounds at the reduced tariff of 1-7/8 cents per pound would be filled on or shortly after that date.

Since the quota is now on a quarterly basis, it won't be until after October 1, 1948, that these fillets can again enter at the reduced tariff of 1-7/8 cents per pound. Imports received after October 1 will again enter at the reduced tariff until the 12-months' quota of 24,930,188 pounds is exhausted, of which amount 6,231,188 pounds comprises the quota for the fourth quarter.

The total imports of these fillets through July 27, 1948, is estimated at 31,000,000 pounds, of which amount 18,699,000 pounds entered at the rate of 1-7/8 cents per pound and the balance at the rate of 2-1/2 cents per pound.

### Wholesale and Retail Prices

Wholesale prices for all commodities and for all foods continued to rise at about the same rate during the period from May 15 to June 15, although the rate was not as great as earlier in the year, according to the Bureau of Labor Statistics, U. S. Department of Labor. The Retail Price Index again increased for all foods and was 1.5 percent higher than the preceding month, when the gain was 1.4 percent. This occurred in spite of the seasonal decrease in the retail price index for fresh and frozen fish which had the largest drop in any month this year. However, the fresh and frozen index was 11.5 percent higher than on June 15, 1947. The price of canned pink salmon also showed an increase and reflected the higher 1948 prices for salmon for canning.

#### Wholesale and Retail Prices

Item	Unit	Percentage change from--		
		June 12, 1948	May 15, 1948	June 14, 1947
<u>Wholesale: (1926 = 100)</u>				
All commodities	Index No.	164.9	+0.9	+11.7
Foods	do	180.1	+0.7	+10.9
Fish:				
Canned salmon, Seattle:		June 1948	May 1948	June 1947
Pink, No. 1, tall	\$ per doz. cans	5.27	+1.9	+71.7
Red, No. 1, tall	do	6.40	0	+16.7
Cod, cured, large shore, Gloucester, Mass.	\$ per 100 lbs.	14.50	0	+ 7.4
<u>Retail: (1935-39 = 100)</u>				
All foods	Index No.	214.1	+1.5	+12.4
Fish:				
Fresh, frozen, and canned	do	299.3	-1.9	+17.5
Fresh and frozen	do	251.0	-4.1	+11.5
Canned salmon: Pink	¢ per lb. can	53.2	+1.5	+31.7