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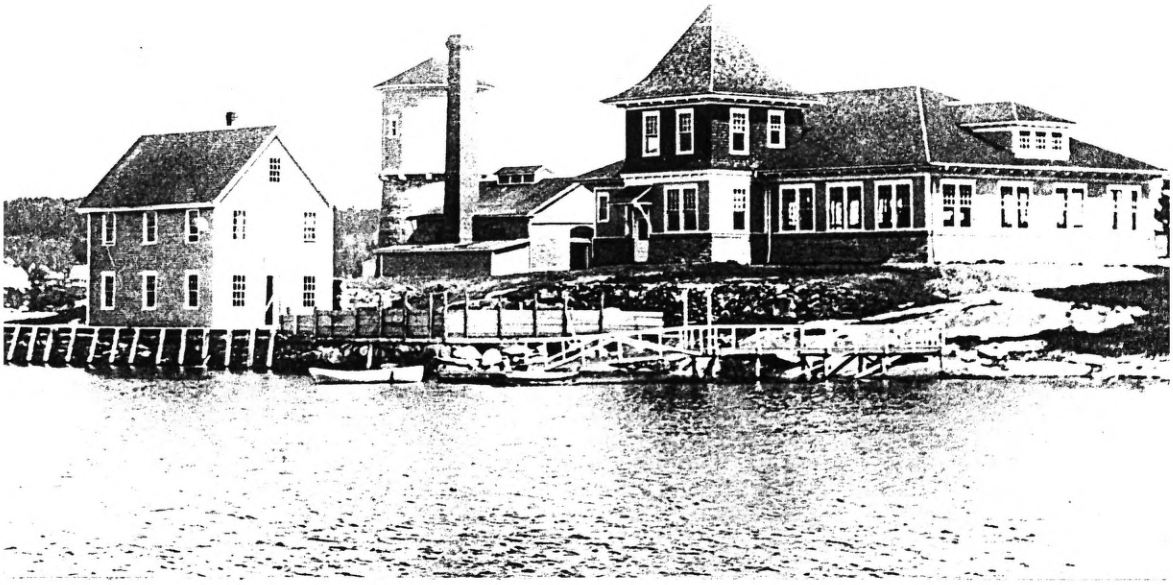
THE HATCHERY--AN EIGHTY YEAR ACCOUNT OF THE FISHERY STATION ON MCKOWN POINT FROM 1904 TO 1984



Alden P. Stickney

Boothbay Region Historical Society

INTRODUCTION

"The condition of the lobster fishery having become such as to occasion much concern on the part of fishermen and State authorities, The U. S. Commission of Fish and Fisheries undertook special inquiries regarding the status and needs of this industry. At that time, no branch of the American fisheries appeared to be more in need of intelligent treatment than the lobster fishery. Notwithstanding the existence of stringent protective laws and the regular prosecution of artificial propagation, the catch of lobsters along the entire coast was steadily diminishing; and it seemed evident that unless active measures were taken to increase the supply, the species would in a comparatively short time become practically extinct." These words were written in 1903 in the Report of the Commissioner for that year.

The concept of assisting nature by hatching lobster eggs and artificially rearing the fry dates back at least to 1875 when several scientists in Norway undertook experiments to this end. The results of these experiments so impressed the noted Norwegian biologist G.O. Sars that he persuaded the Norwegian government to subsidize them. In the early 1880's, similar experiments were conducted at the recently established Marine Biological Laboratory in Woods Hole, Massachusetts. In 1898, Drs. H.C. Bumpus and A. D. Mead of Brown University in Rhode Island took over these studies, and in 1900 transferred most of their work to the newly established laboratory and hatchery in Wickford, Rhode Island.

The United States Fish Commission had been involved with the lobster studies of Dr. Bumpus, who was employed by them at the time. In 1902, the Commissioner, together with Maine congressman C.E. Littlefield and Alonzo Nickerson of the Maine Department of Sea and Shore Fisheries, was able to persuade Congress to provide funds to undertake a lobster hatchery in Maine along the lines of the one in Rhode Island. They were able to obtain an appropriation of $30,000 each year for three years for construction to begin in 1903.

EARLY YEARS

A site in Boothbay Harbor on McKown Point (then known locally as "Cape Cod") was selected because of its proximity to the ocean and its good sea water quality. That Commissioner Nickerson was a resident of Boothbay Harbor may or may not have been instrumental in the site selection. Three parcels of land were purchased, totalling about ten acres; already on the lots were several buildings, including a house (the so-called "Simpson House"), a stable, a storehouse on the waterfront (said to have been moved there

by water some years previous), and a larger house a short distance westward, the "Bartholomew Cottage".

The foundation for the new hatchery building was begun at nearly the extreme outer end of McKown Point; the site of the boiler room, pump house and water tower was about ten yards to the east. The foundations were blasted out of the rocky ledges in the area; the broken stone thus obtained was then use as a base for the cut granite block walls of the buildings. Additional blasting was required to excavate a pit for housing the steam pumps and to create a fresh water cistern south of the storehouse. The designer of the new complex was one H. Von Bayer, a government fish culture expert, and the contractor was C. E. Carlisle of Boothbay Harbor. Construction was completed in July 1904. Prior to the completion of the pumping system in 1905, a number of berried lobsters was taken from Maine waters to a Federal fish hatchery in Gloucester, Massachusetts, on the Fish Commission schooner *Grampus*. The eggs and some fry were then returned to Boothbay Harbor for release in 1904. Operation of the new hatchery began in January 1905.

In this first full year of operation, the schooner *Grampus* was used for collecting lobsters to some extent, but a boat stationed locally was needed, so the yacht *Carita* under Capt. George W. Greenleaf was chartered; assistance was also rendered by the Sea and Shore Fisheries boat *Sea Gull* and another chartered boat, *Crustacean.* Lobster fry from the hatchery were placed in wire mesh cages in the live well of the boat, transported to the area of release, then bailed into milk cans and carried in dories to selected locations. If no live well was available on the boat, milk cans were used and the water was changed at frequent intervals.

The fry, or larval, part of a lobster's life consists of four stages, between each of which the young lobster, hardly as big as a house fly, sheds its shell and grows a little. While the earliest experiments showed little success in raising the larvae beyond the third stage, techniques had been developed by this time to carry the growth a stage or two further, and in 1905, 4000 fourth and fifth stage lobsters were reared. During the early years, the superintendent of the hatchery was Everett Hahn; he occupied the Bartholomew Cottage. In 1906, a telephone line was extended to his house and to the hatchery. In the same year, an additional boiler was added to the hatchery facilities.

The operational fleet still consisted of the chartered yacht *Carita* and the State of Maine's *Sea Gull* together with the occasional services of the *Grampus*. Professor Gorham from Brown University joined the staff in the summer of 1906, and some subsequent summers, to conduct biological studies on lobsters. During the second year of operation, 203 million lobster fry and 110 million cod fry were released. In addition, 5000 lobsters were held and reasared to the fourth, fifth and even sixth stages. For the first few years, lobster breeding stock was held either in live cars at the hatchery or in a lobster pound leased in Pemaquid. The pound

was purchased in 1908 and put in charge of Mr. Thomas Dorr.

The *Carita*, the chartered yacht, was purchased outright in 1907, modified for use as a work vessel, and renamed *Gannet*. Built of oak in Boston in 1897, she was 61 feet long with a 12.5 foot beam. Also in 1907, street lights (oil) were installed and seasonal town water was extended to the station.

As early as 1873, attempts had been made to transfer live lobsters from the Atlantic coast with the idea of introducing them into Pacific waters. In 1879 the first such transfer was successful and a few lobsters were transplanted into the Pacific. Although there was little evidence that the introduction was successful, it was an exercise apparently thought worthwhile in those days, as it was undertaken fairly often. A first shipment of 600 was sent from the Boothbay Harbor station in 1907, but no record made of success or failure. Another shipment of live lobsters was sent to the Pacific coast in 1908; 1500 individuals were packed in rockweed, taken by boat to Bath where they were transferred to a refrigerated railway car. Shipments of living adult lobsters were sent to the west coast in 1910 and 1911, and each year from 1914 to 1918.

During the early years, electric power was not available on McKown Point. Lighting was available only in the form of kerosene lamps, and sea water was pumped by steam operated pumps. The boilers for heating and steam generation were fired with coal. The first improvements in these utilities were the installation of a gas (acetylene) generating plant for lighting purposes 1n 1908, and the construction of coal loading facilities on the wharf and a coal storage building in 1909.

Early life at the hatchery can perhaps be exemplified by the information in the superintendent's report for 1909. In that year the permanent staff comprised ten men: the superintendent, a fish culturist, a chief engineer, three firemen, three laborers, and a guardian of the lobster pound. There were, in addition, the captain and crew of the hatchery vessel as well as several seasonal helpers. Besides their duties of rearing lobster and fish fry, the hatchery staff maintained the grounds, buildings and equipment. One of the tasks was cutting hay on the premises, which in a good year was sufficient to feed the horse, the only overland means of transportation to town. The duties of the horse were to haul either a "double seated democrat wagon", a "single seated runabout", or, in winter a sleigh or a pung. Table 1 shows an accounting of the maintenance costs for this transportation, taken from the superintendent's report. Later, the superintendent's report for 1914 complains that "the horse is getting old, and goes lame at frequent intervals, sometimes for long periods" and requests a replacement. This was duly provided the following year. It was not until fourteen years later that a truck finally replaced the horse.

Until 1908, only cod and lobster fry were hatched and

Table 1. Expense account for transportation, as printed in the Superintendent's Report for 1909.

1 Horse, for going to town			
2 1/8 tons Hay @ $20		(expended)	$42.50
1 " "	cut on premises	"	5.00
40 bu. Oats	.65 to .66 cts.	"	26.20
24 bu. Corn	.80 to .85 "	"	20.00
1239 lbs. Straw for bedding	.60 & .80 cts.	C	9.41
20 bu. Oats			13.20
8 bu. Corn			6.40
			121.71
Shoeing Horse			8.50
Average cost of keeping horse			120.00

Vehicles

1 Double seated	Democrat Wagon	Cost	$85.00
1 Single "	Runabout	"	55.00
1 " "	Sleigh	"	15.00
1 Double "	Pung	"	50.00
Average cost of maintaining vehicles and harnesses per year			25.00

released. Between 1910 and 1920, however, the hatchery produced eggs or fry of cod, haddock, pollock, flounder and lobsters. During this period, peak numbers reported released of these species were, respectively: 60 million, 59 million, 48 million, 1.3 billion, and 199 million annually. Table 2 shows a complete tally for the years 1906 to 1945. For the most part, these fry were dumped overboard very shortly after they had hatched, but some, especially lobsters, were often held to slightly more advanced stages.

One of the difficulties in rearing these delicate little creatures was the danger of "gas bubble disease", or the "bends", due to supersaturation of nitrogen gas in the water. This condition occurs naturally in local sea water at certain times of the year, but it is aggravated whenever the water is pumped. The pressure in the discharge side of a water pump necessary to force the water from sea level to the hatchery tanks forces any air bubbles that might have been sucked into the intake back into solution, eventually to come back out of solution as bubbles in the delicate tissues of the tiny lobsters, killing many of them. This phenomenon was an almost constant problem, and even today is not always eliminated from aquarium systems.

Although there were no regular biologists on the hatchery staff, frequent visiting scientists would come in the summer to do research at the station. Among these scientists was Professor Gorham, a pioneer in lobster biological research in Rhode Island.

To generate steam to run the pumps, as well as to provide heat in winter, a reliable coal supply was needed. This was usually delivered at dockside by schooner. Once in a while the coal supply failed, as it did, for example, in 1913 when the coal schooner was lost at sea off Cape Cod; or again in 1918 due to wartime conditions, and the superintendent was obliged to borrow five tons from the hatchery supply to keep his house warm. Unfortunately, that year was unusually cold; the harbor froze over during the winter and hatchery operations had to be shut down for most of the year to conserve the coal supply.

Since 1907, the main work boat for the hatchery was the *Gannet*, assisted by various chartered vessels and the State of Maine boats *Shelldrake* and *Sea Gull*. By 1916 the need for a newer and larger vessel was felt and the Bureau of Fisheries in Washington ordered the construction of a new vessel to be built at the Townsend Marine Railway (more recently Sample's Marine Railway) in Boothbay Harbor. The *Halcyon*, a steamer of 320 HP, 108.6 feet long, was launched in 1917, underwent sea trials locally, and within a few months was transferred to the Navy for wartime service. Although returned to the Bureau of Fisheries after the war, she was never based at Boothbay Harbor. Instead, Boothbay Harbor personnel were assigned to her, and she served the needs of the hatchery as well as other Bureau functions operating out Gloucester, Massachusetts. She eventually was sold, and is said to have been destroyed by fire in the

Table 2. Number in millions of fry or eggs (*) of various species released each year from 1906 to 1944

Year	Cod	Haddock	Pollock	Flounder	Lobster
1906	110 million				203 million
1907	49 "				140 "
1908	60 "				141 "
1909	15 "			198 million	116 "
1910	24 "	1 million		456 "	134 "
1911	14 "	43 "		461 "	165 "
1912	10 "	30 "		553 "	185 "
1913	9 "	59 "		432 "	187 "
1914	10 "	6 "	39 million	608 "	173 "
1915	34 "	3 "		487 "	199 "
1916	11 "		49 "	618 "	143 "
1917			7 "	1085 "	113 "
1918				1819 "	70 "
1919	2 "	0.8 "		1326 "	8 "
1920		1 "	35 "	713 "	
1921				909 "	
1922				988 "	
1923				943 "	
1924				1627 "	
1925				2037 "	
1926				1585 "	
1927	217* "			2378 "	
1928	1277* "			2136 "	
1929	1066* "	133* "		2161 "	
1930	1651* "	124* "		2625 "	
1931	1083* "	136* "		2716 "	
1932	916* "	440* "		2493 "	
1933	593* "	509* "		2682 "	
1934	1087* "	102* "		900 "	
1935	729* "	129* "		860 "	
1936	953* "	136* "		1126 "	
1937	678* "	47* "	14* "	809 "	
1938	674* "	136* "		694 "	
1939	1419* "	418* "	371* "	670 "	9 "
1940	1282* "	253* "	1060* "	601 "	7 "
1941	414* "	62* "	299* "	1355 "	5 "
1942	1001* "	121* "	402* "	1791 "	6 "
1943	747* "	141* "	288* "	1856 "	5 "
1944	680* "	293* "	364* "	1916 "	3 "

making of a motion picture.

Some time around the year 1915, a need for public approval of the hatchery operation was apparently sensed, perhaps induced by hints of doubts from Washington, and like whistling in the dark, the superintendent's reports frequently contained remarks about how well the work was being received by the public and the industry and how the release of those millions of fry really seemed to be bolstering the natural populations. By way of good public relations a modest exhibit of living marine creatures was opened. Nevertheless, following World War I, the release of lobster fry was halted in 1919, although the rearing of fish fry continued.

BETWEEN WORLD WARS

After World War I, maintenance of building and grounds was continued, as was the public aquarium exhibit, but hatchery work was reduced to the production of flounder fry only; but of these as many as 700 million to two billion annually. By 1925 the permanent staff had been reduced to eight people. The *Gannet* was used for shorter periods of time, was laid up for longer intervals, and was eventually decommissioned in 1927.

In 1928, Everett Hahn, superintendent since the beginning, retired. The following year, Capt. Greenleaf of the *Gannet* also left. Replacing these two were Thomas Dorr as superintendent, returning from a stint at the salmon hatchery in East Orland, and Chester Greenleaf as boat captain. Since the *Gannet* was now out of commission, the new captain mostly had charge of chartered vessels. Two of these, familiar around Boothbay Harbor, were the *Gull* and the *Norman II*.

During these last two years, a change in hatchery policy took place. Although flounder eggs continued to be hatched artificially and fry released, the eggs of cod and haddock were simply stripped from the adults, fertilized with sperm similarly obtained and dumped overboard in numbers of several hundred million to over a billion annually.

A vote of confidence was given the hatchery in the Boothbay Harbor town meeting of 1930, when it was voted to spend $1500 to repair the town road to the hatchery, argued to be one of the town's best resources. During that year a new house was built for the engineer.

Electric power had been brought to the plant in 1926 and electric pumps purchased to supplement the steam ones, but the first electric pumps were used only during the summer for the aquarium exhibit. An electric replacement for one steam pump for regular duty was eventually installed in 1935. A new boat, the 78-foot, diesel-powered *Pelican*, was assigned to the station in 1931, but she proved a bit too big and not very useful, and so she was replaced in 1935 by the more

modest-sized *Grebe*, transferred from the U.S. Customs Service. The *Pelican* left the hatchery in 1937.

The public aquarium, started in 1915, had greatly expanded its functions, and now included the collection of harbor seals for exhibit and for shipment to other institutions. In 1935, for instance, twenty seals were shipped to the University of Toronto and to the Biological Station in St. Andrews, N.B. In that year also, movies were made in the aquarium for showing at the Eastern States Exposition. In 1936 live fish were supplied to the Shedd Aquarium in Chicago and also to the Eastern States Exposition of that year.

Probably the low point for the hatchery during this period was in 1935, when the permanent staff dropped to only six people, and flounder production (then the only species being cultivated) dropped to its lowest level in thirteen years. Things improved somewhat in the next few years, when an additional man was hired, flounder production jumped to over a billion fry annually, and three boats were acquired. Two of these were from the Coast Guard and one was an ex-rum runner.

For seventeen years, no lobster larvae had been produced at the hatchery. The reasons for this are not clear. Perhaps the idea of dumping millions of the tiny creatures into a hostile environment seemed hopeless. Almost certainly most, if not all, of them would be gobbled up by hungry predators before they had any channce of adapting to oceanic life or of reaching the relative security of the bottom. But it was a scheme that seemed right in principle, and like many such ideas, however impractical, people want to try them yet again. Thus it was in 1937 that a cooperative agreement was made between the U.S. Bureau of Fisheries and the Maine Department of Sea and Shore Fisheries to propagate lobsters once more. The State would furnish breeding stock and personnel; the Bureau would furnish the hatchery facilities.

Under this new program, emphasis was placed on rearing the lobster fry to more advanced stages that would be ready to settle to the bottom immediately. The program involved experiments under the direction of Edward Barnes, whose services were borrowed from the Commonwealth of Massachusetts, and who had worked on lobster culture many years before in Rhode Island. From this research it was learned that advanced stages of lobster larvae could be reared best if the water temperature were raised a few degrees and the larvae fed more frequently. In 1939 a new State hatchery building was built near the shore just southeast of the Federal one.

A TIME OF TRANSITION

Several things were happening in 1940 to change the routine of the hatchery. Another war was imminent, a renewed

interest in lobster culture was taking place with greater involvment on the part of the State of Maine, including the services of a second biologist, and a new element in the lobster rearing procedure was being added: experiment and research. The heating system of the hatchery had been modified the previous year to permit the heating of sea water used for rearing, and the 1940 budget included funds for converting the 40-foot ex-rum runner, to be named *Skimmer*, for research purposes.

Owing to manpower shortages, the permanent staff had been reduced to six people, but with the added facilities of the state, it was possible to turn out two to seven million lobster larvae each year, in addition to the one to two billion flounder fry. The production of the latter, however, created a problem from a new source - the fishermen. Long accepted as a boon to the flounder stocks, the stripping of eggs for rearing from adult flounders and the subsequent mortalities of the latter, coupled with a perceived decline in the flounder population, now brought considerable criticism, even though the decline might equally well have been due to the destruction of their habitat by the eel grass blight of the period.

Meanwhile, emphasis was being placed on more advanced rearing of lobster larvae by making use of heated sea water. To this end, makeshift heating devices were abandoned, and an entire boiler was converted for the purpose. These procedures, however, aggravated the problems with gas supersaturation. A full-time biologist, Leslie Scattergood, was detailed to the lobster rearing program in 1939. A garage for the engineer's house was built in 1942, and in 1944 a two-car garage was built to supplement the old stable, converted to a garage in 1939. Three trucks were available for transportation.

In May 1944, another shipment of live lobsters was made to the Pacific coast. In return for these, 100,000 silver salmon eggs were obtained for the hatchery.

In 1946, Thomas Dorr retired as superintendent, and William Brown temporarily replaced him until the position was filled with the transfer of Gordon Davis from the hatchery in Gloucester in 1948. A burner to use fuel oil as a replacement for coal was installed, and a decision made to have a deep water-well drilled on the premises. According to the superintendent's report, a local citizen volunteered to use a dowsing rod to locate a site for drilling. He was allowed to go ahead, although, unknown to him, the site had already been selected. His rod turned downward about three feet from the previously selected spot.

The *Grebe*, used as the principal workboat since 1935, was condemned in 1948, leaving the station with only the two small motorboats obtained from the Coast Guard in 1937.

The cost of $3.30 per million to produce flounder fry was not greatly different in 1940 from the $2.90 it cost in 1911. The cost of producing a million lobster fry, however, which in 1911 had been about $59, had by 1940 reached $292.

This cost, plus growing doubts on the part of fishery scientists as to the benefits to the fishery, was at least partly responsible for the discontinuation of lobster rearing at Boothbay Harbor in 1949. Hatching and distribution of eggs of other species were also discontinued.

THE RESEARCH LABORATORY - A NEW ERA

During the period of the late 1930's and the early 1940's, a number of natural, probably cyclic, phenomena occurred which drew attention to the need of serious ecological (a seldom heard word in those days) investigation into the marine environment. One of these was the almost total annihilation of eel grass stands along the Atlantic coast from a little understood disease, and the other was a severe decline in the abundance of soft-shell clams, especially in New England. In 1948, the Federal government and the states of Massachusetts and Maine found themselves besieged by the shellfish industry to find answers to the problem of clam stock depletion. In October of that year, Congress appropriated funds for a five-year program of biological studies on clams under Public Law 556. The headquarters of this program was to be the Federal hatchery facility in Boothbay Harbor, with field stations in Newburyport, Massachusetts and Narragansett, Rhode Island. Collaborators were to be Rutgers University in New Jersey, the Federal shellfish laboratory in Milford, Connecticut, Harvard University and the Woods Hole Oceanographic Institution. Three biologists were stationed at Boothbay Harbor, including the director of the project, John Glude.

This new program was independent of the research on herring by Leslie Scattergood, ongoing at the time. (Lobster studies had been taken over entirely by the Maine Department of Sea and Shore Fisheries in 1946.) A marine fungus disease had been attacking the Maine herring (sardines), causing the canners difficulty in marketing the fish.

The interior of the main hatchery building was modified to provide office and laboratory space. A fresh water pipe line from the Boothbay Harbor mains was laid across the harbor in 1951. The first research studies of the Clam Investigations consisted of an analysis of the plankton in local waters to estimate the abundance of clam larvae in several selected study sites, to undertake a thorough census of adult clam populations to determine abundance, growth, reproductive potential and mortality. A scientist from the U.S. Geological Survey was hired to investigate the sedimentary geology of the study sites.

The investigation had not proceeded very far when it became very apparent that the common shore, or green, crab was a fierce predator on the soft-shell clam and was making inroads in their numbers. Thus it became important to study the biology of the crab as well as the clam. Experimental

"clam farms" were started in several localities in efforts to fence the crabs out, or otherwise protect the clams.

To coordinate the research being done by the various state, federal and private agencies, including several in Canada, annual symposia where progress reports were given and informal talks held were sponsored by the Boothbay Harbor facility in 1952, 1953, 1954, and 1955.

A "new" research boat was transferred to the station from the Federal hatchery in Gloucester, Massachusetts in 1954 to be used for inshore work. It was given the name *Gemma* (a tiny clam), the first vessel attached to the station not named after a bird.

During this period, other research was taking place at the laboratory as well. Studies of diseases and parasites of herring and other fish were expanded, and a graduate student from Harvard, Carl Sindermann, was added to the staff. In 1954 several other activities and new personnel had become a part of the laboratory. A biologist from the U.S. Bureau of Sport Fisheries and Wildlife had undertaken a study of Atlantic salmon in relation to the ecological complex of the Sheepscot River system, at that time the westernmost river on the Atlantic seaboard to have a population of salmon. A statistician was brought in to systematize the catch records of sardines along the Maine coast, and a team of fishing gear technologists was employed the following year to conduct surveys along the coast to locate schools of herring and to develop gear improvements for catching them.

Having reached the conclusion that the single most important factor in the depletion of the clam population was the predation by the green crab, and that the abundance of this predator had increased dramatically as a result of a warming trend in sea water temperatures, the Clam Investigations turned its attention to methods of green crab control, and to more general aspects of clam biology. The funding originally provided under P.L. 556 was extended for this work. Although the headquarters for the program was eventually transferred to Oxford, Maryland in 1957, clam research continued in Boothbay Harbor until 1963.

THE YEARS OF PROSPERITY

Although some budget paring in Washington reduced the number of personnel briefly in the early 1950's, it was not long before the work of the laboratory began to feel a new prosperity. A second story was added to the old "hatchery" building to provide more office and storage space, and a new shop-garage complex was built on the site of the old stable-garage. As a result of the recently enacted Saltonstall-Kennedy Law, which provided that money derived from import duties on fishery products would be used to fund government efforts to assist domestic fisheries, funds became available for additional research on herring. Moreover, in 1956,

interest in a joint U.S.-Canadian project to harness the tides in Passamaquoddy Bay was renewed after having been abandoned after an abortive attempt in the 1930's. Money was made available for a three-year study of the hydrography and biology of the Passamaquoddy area to determine the impact of the various proposed dams on the fisheries. The laboratory at Boothbay Harbor was to study the herring populations. Leslie Scattergood, who had recently returned from a Fulbright scholarship in Norway studying their herring fishery, became the project leader and the first director of the laboratory. Some of the projects undertaken by the Herring Investigations included tagging herring to learn more of their migration patterns, studies of herring parasites and diseases, identification of possible races by blood typing techniques, stock assessments, sampling for larvae in the plankton, and laboratory studies of behavior.

To accomplish those aspects of the work to be done at sea, the research vessel *Theodore N. Gill* was assigned to the laboratory in 1956, but she proved less than satisfactory for the job, and over the years a number of other vessels were used, including the government research vessels *Delaware* and *Albatross IV*, and the chartered fishing vessels *Silver Bay* and *Metacomet*. A small boat for inshore work, the *Blueback*, was based at the laboratory. This was later replaced by the *Phalarope*, a venerable 40-foot wooden dragger transferred from her recent hard clam surveys in Rhode Island.

Thre old laboratory dock, rebuilt several times in the past, was again rebuilt in 1959. To facilitate laboratory experiments, a new, direct-pumping sea water system was installed; this eliminated the need for the old sea water reservoir, which was removed. The new system featured dual pumps and distribution lines, whose service could be alternated at prescribed intervals, always leaving one set stagnant to kill incipient fouling growth before it was flushed out and used again.

The Passamaquoddy study was terminated in 1959; the grand scheme for harnessing the tides stirred up more political problems than scientific ones, and like its predecessor, died in limbo. The Atlantic salmon studies in the Sheepscot River were also discontinued in 1959. The following year, Dr. Carl Sindermann, who had been carrying out the disease and blood group studies on herring, replaced Leslie Scattergood as laboratory director when the latter was transferred to Washington, D.C. Sindermann himself left in 1962 to take the job of director of the recently established shellfish laboratory in Oxford, Md., and in 1963 Bernard Skud, who had worked at Boothbay Harbor earlier on the Passamaquoddy project, returned here from Galveston, Texas to become the next director.

Although the research on clams was producing valuable results, and considerable money had just been spent on the installation of a sophisticated controlled temperature and salinity seawater system for rearing and physiological experiments, all clam research was transferred to the Oxford

laboratory.

In the mid-1960's, several significant events led to greater bureaucratic attention to the work of the laboratory and an increase in its funding. Increasing quantities of large lobsters were being harvested from the offshore canyons and slopes of the Continental Shelf, and questions were raised concerning the possible effect that this might have on inshore lobster populations. Similar questions were being asked about the growing fishery for adult herring on Georges Bank. Substantial funds were therefor alloted to the laboratory to help in finding a scientific basis for answering these questions. Studies on the age, growth and mortality of adult herring and on their fecundity an spawning habits were undertaken while research on behavior, blood groups, parasites and population statistics of the juveniles (sardines) was continued. An interesting scheme to ascertain the limits of migration and intermixing of populations of herring (and lobsters as well) by an analysis of their parasites was initiated. In response to growing concerns about the effects of heated water discharged from electric generating plants along the coast, lobster larvae were reared and studied in laboratory experiments to determine their tolerance to temperature extremes. A curious phenomenon incidental to these experiments was the discovery that occasional lobster larvae were born without eyes, and these freak individuals, always red in color, grew several times faster than their normal brethren.

Other lobster studies included field surveys on abundance and population statistics in offshore canyons and tagging studies on both inshore and offshore lobsters to determine migrations.

During this period of prosperity and productive research, the laboratory maintained two vessels: the RV *Rorqual* a converted Army tug, and the old *Phalarope* for research on local and coastal waters, while more distant cruises were made on the Woods Hole based RV *Albatross V.* In the early months of 1965, the fresh water supply line from the Boothbay Harbor water mains across the cove to the laboratory was replaced.

The United States Coast Guard after abandoning its Damariscove Island life saving station had for several years been occupying temporary quarters in town. In 1964 it leased the building which had for so long been the quarters of the hatchery and laboratory directors. Not long afterwards, the Coast Guard acquired a piece of the hatchery property on the north shore of McKown Point and there built a new permanent quarters and boat house, opening for business in June 1967.

In the early morning hours of August 11, 1967, a fire destroyed the upper story of the aquarium building; staff offices in that facility contained many valuable research records that were lost. A fire alarm system, installed in the 1950's, helped avert an even greater loss.

CLOUDS ON THE HORIZON

One of the changes initiated by the new administration in Washington in 1970 was the complete reorganization of those Federal agencies dealing with the ocean and fisheries. The Bureau of Commercial Fisheries, created in 1956, the U. S. Fish and Wildlife Service, and the Bureau of Fisheries before it under which the Boothbay Harbor laboratory had functioned, had been agencies of the Department of the Interior since 1940. In 1970, all aspects of marine fisheries were incorporated into a new agency , the National Marine Fisheries Service, a part of the newly created National Oceanic and Atmospheric Administration (NOAA) under the Department of Commerce. In the past, the Federal fishery laboratories functioned more or less independently of one another; under the new system, groups of laboratories in certain geographic regions were designated as units of larger "Fishery Centers", administered by one of the larger laboratories in a particular region. Thus Boothbay Harbor came under the control of what had once been its "rival" in Woods Hole.

Since, at the time of this reorganization, intense foreign fishing was going on within 200 miles of our coastline and major international agreements on fishery affairs were pending, it was decided by the Northeast Fishery Center in Woods Hole that studies to assess the size and potential yield of fish stocks in the northwest Atlantic were of paramount importance, and that in the face of imminent budget cuts, several of the basic research programs in ecology, physiology, and aquaculture going on in Boothbay Harbor would have to be curtailed or assigned elsewhere. By 1972, NOAA and the Northeast Fishery Center had decided to close entirely the Boothbay Harbor laboratory, and in 1973 the staff was either transferred to other stations, or had retired or resigned; property was transferred to Woods Hole, or returned to the General Services Administration for ultimate disposal.

A NEW BEGINNING

In 1972 the Maine Department of Sea and Shore Fisheries moved from its old quarters in the State lobster hatchery building to a brand new laboratory building built just west of the Federal laboratory. Under the direction of Commissioner Spencer Apollonio, the Department had embarked on several programs of basic biological research on fishery problems, and the facilities of the abandoned Federal laboratory- its sea water system, its wharf, its office space and its library- seemed to be too valuable an asset to be lost.

Normally, excess government property of this sort must

be offered for transfer to any other Federal government agencies that might have a use for it, and if none are interested, it must then be offered for sale or lease to state or municipal agencies, or to charitable organizations. Finally, if none of these alternatives can be found, the property is put on the open market. In the case of the laboratory property, the latter alternative would almost certainly allow it to fall into the hands of private developers, and its future as a scientific institution would be very dim. No serious requests from other government agencies were received, but the chance for acquisition by the State of Maine seemed good. The General Services Administration, however, appeared to want assurances that the State would be able to make use of the facilities to their full capacity.

Early in 1974, a research group associated with the University of Massachusetts and headed by Dr. Charles Yensch was considering dissolving this affiliation and was looking for new laboratory facilities. Commissioner Apollonio, one of the founders of a corporation known as the Northeastern Research Foundation, prevailed on Dr. Yensch, under the auspices of that corporation, to apply for a grant from the Maine legislature to establish a new marine biological and oceanographic laboratory in the facilities of the erstwhile Federal fisheries laboratory buildings.

Meanwhile, although the State had its own recently built research facilities, several of its programs were quartered in the old Federal laboratory, and also in the public aquarium building. One of the more important of these programs was the environmental monitoring station, originally started in the late 1960's by the Bureau of Commercial Fisheries to monitor and record sea water temperatures at two depths, air temperature, barometric pressure, tidal levels and wind direction and velocity. Harbor water temperatures had been recorded daily at this station since 1905, making this the longest continuous record of its kind on the Atlantic coast. The instrumentation and the records remained at this location even in the wake of the closure in 1973.

A new controlled temperature sea water system, supplying both warmed and refrigerated sea water for laboratory experiments, was installed in 1975, providing facilities for numerous experiments on the life history of Gulf of Maine shrimp. The old Federal building was also the headquarters of the field research on the distribution and abundance of larval herring. Two vessels were available for this field work, the converted World War II air-sea rescue boat *Guardian* and the new, Blount-built steel research-patrol vessel *Challenge*, which replaced her in 1975. During this period, the public aquarium was redesigned and redecorated, greatly improving its appearance and the quality of its exhibits.

In 1977, under a newly-appointed commissioner, Vinal Look, and with the focus of attention in fishery affairs turning more and more toward assessment of fish populations, the direction of research in the Department (recently re-

named Department of Marine Resources) changed somewhat. This was in response to problems arising out of the recently-enacted 200 mile fishery limit on the United States coasts. Now it was the responsibility of the United States to manage unilaterally the fish stocks in this zone, and precise knowledge of abundance, distribution, age structure and reproductive potential of many commercial species was necessary. In this situation, it was possible for the State of Maine to lose by default its own management perogatives in coastal waters if it did not provide acceptable management plans based on sound scientific data. As a result, more attention than heretofore was given to groundfish biology, including tagging studies and surveys with a chartered fishing vessel.

In the late 1970's, a number of drug smuggling incidents occurred in nearby waters, and several impounded smuggling boats were kept at the station, two of which were seriously considered for conversion to research vessels.

In the meantime, the other research organization, given the name "Bigelow Laboratory" after the pioneer oceanographer Professor H. B. Bigelow of Harvard, took over as its headquarters the old Federal hatchery building. Focussing its interest chiefly on physical and chemical oceanography and on primary production in the sea, the new research group was supposed to complement the more applied fishery research of the State. During the first winter of their tenancy, a major tragedy occurred when a visiting research team from Florida and their ship, the *Gulf Stream*, were lost at sea.

Perhaps the most significant area of cooperation between the Bigelow Laboratory and the Department of Marine Resources was the study of the so-called "red tide" organism in shellfish. For many years, clams and mussels in parts of the New England coast were rendered dangerous to eat because because in their feeding process they filtered from the water toxic micro-organisms. The expertise in phytoplankton biology of the Bigelow scientists provided knowledge about the poisonous organisms themselves, while a comprehensive coastwise monitoring program by the State kept the public advised as to when and where outbreaks of the toxins were affecting the shellfish.

Little by little, the physical layout of the laboratory was changing as well. The library, once in the old hatchery building, now occupied what had recently been the garage, renovated for the purpose and for additional office and laboratory space. The old coal bunker, more recently a workshop, was converted to a "greenhouse" for the culture of pure strains of hundreds of different kinds of phytoplankton. Finally, in 1984, the very heartbeat of the old hatchery, the sea water system that had served its needs for eighty years, was removed from all but the public aquarium, giving way to the more sophisticated technology of the nuclear age.

FIGURE 1

Top: U.S. Fishery Steamer HALCYON, early 1920's in Gloucester
Bottom: U.S. Fishery Steamer GANNET, about 1907