FISHERIES EDUCATION IN JAPAN*

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ABSTRACT

Japan is one of those rare countries which have a complete system of fisheries education. The system of fisheries education forms a part of the whole organization of the national education system and there are several different levels and types of schools, namely: (1) Senior High Schools; (2) Colleges and (3) Universities. The numbers of these schools are 60, 2 and 14, and the numbers of students are 20,000, 1,500 and 3,000, respectively.

The paper describes how the fisheries education system fits into the whole system of national education, and also explains the details of a specific school for each of the above-mentioned three categories of schools as examples, namely, Toyama Prefectural Fisheries Senior High School; Tokyo University of Fisheries and the Faculty of Fisheries, Department of Agriculture of the University of Tokyo.

The most important part of the paper is the curriculum tables of these schools which could be useful when developing countries plan to establish fisheries training and education systems.

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CONTENTS

1. INTRODUCTION

Education in Japan is nothing new: it already existed in the royal families when the philosophy of Confucius was introduced from China in 285 A.D. Later on, in 522 A.D., Buddhism was introduced in Japan and this also became a subject of education. As the authority of the royal families decreased, several big families took control of their local areas. Some of these big families established schools about 1,000 A.D. to educate members of their families and high officials. Later on, temples were used for school facilities for the common people, but still the number of students was very limited.

When Japan commenced diplomatic relations with foreign countries about a century ago, a compulsory system of 6 years was established for education, starting with six year old children. At that time they had a five year middle school after graduating from the elementary school, and after middle school four years college, or three years high school plus three years university, but these were not compulsory. Under such a system of education, they had a few professional middle schools and one college for fisheries, and many departments of fisheries under the faculties of agriculture in various universities.

This system of education was modified in 1945 and now the compulsory education consists of six years elementary school plus three years, junior high school. After graduation of junior high school the students, if they wish, can go for three years for senior high school and then either a two years postgraduate courses of senior high school or four years course of college or university. Most of the universities have after the four year course of education, additional two year master course, plus two year doctorate course, but numbers of students of those courses are limited.

Education in Japan has been extremely popular, since the compulsory education system was established. Nearly 100 per cent of the children attend the elementary and junior high schools. This is because the parents feel that the education of their children is one of their greatest duties. About 70 per cent of the graduates from junior high schools go to senior high schools and about 25 per cent of the graduates from senior high schools proceed to colleges or universities for four years.

The number of postgraduate courses of senior high schools, colleges and universities reaches about 800. These facilities of education are owned by the central government, local governments, cities, towns or private people. Professional education starts after compulsory education of junior high school.

Fisheries education forms one part of the above mentioned whole system of education and it may be classified as follows:

Senior High Schools: age 15 to 18 3 years general and professional

Postgraduate course of Senior High Schools: age 18 to 20 2 years practical but high education

Normal colleges: age 18 to 22 4 years practical and academic education

Universities: age 18 to 22 4 years academic education

Master course of Universities: age 22 to 24 2 years academic education

Doctor course of Universities: age 24 to 26 2 years highly academic education

Besides the above, various vocational training courses are held by the central and local governments whenever they are needed. Such training courses are temporary in nature and the age of participants varies.

This paper describes the details of the above mentioned fisheries education by giving an example for each category of school.

2. SENIOR HIGH SCHOOL AND ITS POSTGRADUATE COURSE

2.1 General

There are 60 fisheries senior high schools, among which 50 are normally day courses and 10 are evening courses. The total number of students for these 60 fisheries high schools is about 20,000 in which about 750 are girl students. Most of the fisheries senior high school have postgraduate courses with about 750 students in total. Normally fisheries high schools have several different courses, namely:

(1) Fishing Operations
(2) Fish Processing
(3) Fish culture
(4) Fisheries Management
(5) Marine Engineering
(6) Radio and electronics
(7) Fisheries General

One-third of the students are in the course for fishing operations and another one-third are in the course of fisheries processing. These fisheries high schools have training vessels for practical education. The size of the vessels vary from 50 feet to 150 feet and the types of training are dependent on the locality of these schools. For

example, schools located in an area where tuna fishing is popular have training vessels for tuna fishing while those located in base ports for trawling have trawler type training vessels.

Toyama Prefectural Fisheries Senior High School is a good example of the sixty fisheries senior high schools.

2.2 *Principle of Education*

The principle of education of this school is to give higher general and professional education in fisheries based on the education already made in the junior high school.

2.3 *History of the School*

1900 - Established as a one year training course of fishing (1 year).

1907 - Established additional three years course of ocean fishing operation and one year course of fisheries research (1 year + 3 years or 1 year + 1 year).

1925 - Changed the system of education, namely two years basic fisheries education plus one year course of fishing, processing and ocean fishing (2 years + 1 year).

1939 - Extended the basic course from two years to three years and included fishing and processing courses into the basic course. One year ocean fishing course was established on top of the basic course (3 years or 3 years + 1 year).

1942 - Authorised to give 2nd class second navigators licence to graduates of fishing course and 2nd class first navigator's licence to graduates of the ocean fishing course.

1948 - Established new system based on the revised educational system of Japan and became fisheries senior high school of three years.

1954 - Two years postgraduate course for fishing was established.

1961 - Established course of marine engineering in the senior high school.

1964 - Established two years postgraduate course for marine engineering.

2.4 *Target of Education*

(1) Course of Fishing Operations:

To give knowledge and technique concerning fishing operations and navigation.

(2) Course of Fish Processing:

To give knowledge and technique concerning utilisation and processing of fisheries products.

(3) Course of Marine Engineering:

To give knowledge and technique concerning operation, driving and repair of fishing boat engines.

(4) Postgraduate Courses of Ocean Fishing and Marine Engineering:

To give higher education based on the senior high school education of fishing operation or marine engineering, so that the graduates can obtain the licences of 1st class second navigator or 1st class second engineer based on the Japanese Seaman' Law.

These postgraduate courses require training of more than one year on board the training vessel Tsurugi-Maru (six months can be substituted by training in engine manufacturers for students of the Marine Engineering), plus training of more than six months on board commercial fishing vessels.

The postgraduate courses require also training of more than nine months in the classroom to master 22 units of lectures concerning sea affairs.

2.5 *Curriculum*

Figures in the total are units of lectures and sign means months.

		Senior High School			Postgraduate course	
		Fishing Operation	Fish Processing	Marine Engineering	Fishing Operations	Marine Engineering
		Grade	Grade	Grade	Grade	Grade
General Education	Lecture	1 2 3	1 2 3	1 2 3	1 2	1 2
National Literature	Modern	3 2 2	3 2 2	3 2 2		
	Classical	2	2	2		
Sociology Ethics	Ethics, Sociology	2	2	2		
	Politics Economy	2	2	2		
	Japanese History	3	3	3		
	Geography	3	3	3		
Mathematics	Mathematics 1	5	5	5		
	Mathematics 2		2 2			
	Applied Mathematics	2 2		2 2		
Physics	Physics	3	3	3		
	Chemistry	3	3	3		
Health	Sports	3 2 2	3 2 2	3 2 2	1 1	1 1
	Welfare	1 1	1 1	1 1		
Music	Music	1	1	1		
Foreign language	English	3 3 3	3 3 3	3 3 3		
Total		21 20 12	21 20 12	21 20 12	1 1	1 1

Professional Education	Lecture	Fishing Operation	Fish Processing	Marine Engineering	Fishing Operation	Marine Engineering
		Grade	Grade	Grade	Grade	Grade
		1 2 3	1 2 3	1 2 3	1 2	1 2
Industrial	Mechanics		2			
Commercial	Bookkeeping		3			
	Accountancy		2			
Fisheries	Fisheries General	2	2	2		
	Fisheries Biology	2	2			
	Oceanography, Meteorology	2 2			1 2	
	Fishing	2 3 2				
	Fishing Vessels General	2		2		
	Navigation	3 2 2			2 3	
	Navigational Equipment	2 2			1 2	
	Seamanship	2 2 3			1 2	
	Marine Regulations	2		2	1 2	1 2
	Fisheries Regulations	2				
	Fish Processing		2 3 6			

Professional Education	Lecture	Fishing Operation			Fish Processing			Marine Engineering			Fishing Operation		Marine Engineering	
		Grade			Grade			Grade			Grade		Grade	
		1	2	3	1	2	3	1	2	3	1	2	1	2
Fisheries (Contd.)	Fisheries Chemistry						3			6				
	Fisheries Bacteriology						3							
	Refrigeration, Freezing						3			2				
	Boiler						3							
	Fish Processing Regulations						2							
	Fisheries Industrial Management						2							
	Fishing Boat Engineering							4	8	5			4	6
	Marine Engine Design							5	4	5			1	2
	Electrical Equipment								3	3			1	2
	Theoretical naval Architecture										1	1		
	Marine English										1	2		

		Fishing Operation	Fish Processing	Marine Engineering	Fishing Operation	Marine Engineering
		Grade	Grade	Grade	Grade	Grade
Profes-sional Education	Lecture	1 2 3	1 2 3	1 2 3	1 2	1 2
Fisheries (Contd.)	Training on Sea	2	2	2		
	Processing Training		2 7			
	Training on Board Vessels	3m		3m	9m 6m	9m 6m
Total		15 15 13 3m	15 16 26	15 15 15 3m	8 14 9m 6m	8 14 9m 6m
Special Education		2 2 2	2 2 2	2 2 2	1 1	1 1
Grand Total		38 37 27 3m	38 38 40	38 37 29 3m	10 16 9m 6m	10 16 9m 6m

2.6 Status of Graduates (recent 5 years)

		Higher Education		Industries			
Year	Number of Graduates	Postgrad-uate course at-tached to the senior High School	Other Colleges or Uni-versi-ties	Fishing	Proces-sing	Related Indus-tries	Others
1959	88	14	2	20	29	15	8
1960	92	12	3	20	40	14	3
1961	72	6	2	18	27	18	1
1962	77	19	0	6	33	17	2
1963	75	23	4	11	18	17	2
Total	404	74	11	75	147	81	16

2.7 Faculty

	For Classroom	For Training Ship	Total
Principal	1		1
Teachers	25	1	26
Assistant teachers	1		1
Instructors	3		3
Technicians	2	6	8
Clerks	4		4
Assistant clerks	2		2
Assistants for training	2		2
Assistants on board Training Ship		7	7
Workers	3		3
Cooks	1		1
Doctor	1		1
Dentist	1		1
Pharmacist	1		1
T o t a l	47	14	61

2.8 *Number of Students*

Course	Senior High School				Postgraduate course		
	Fishing Operation	Fish Processing	Marine Engineering	Total	Fishing Operation	Marine Engineering	Total
1st Grade	31	42 (3)	30	103 (3)	9	19	28
2nd Grade	30	43	33	106	10	14	14
3rd Grade	26	31	29	86			
Total	87	116 (3)	92	295	19	33	52

( ) girls

2.9 *Training Ship - Tsurugi-Maru*

Length 39.01 m
Beam 7.42 m
Depth 3.60 m
GT 318
Maximum Speed 11.4 knots
Cruising Speed 10.4 knots
Main Engine 650 h.p.
Auxiliary Engines 2 sets of 100 h.p.
Generators 2 sets of 75 KVA
Radar 12 inch 1 set
Geiger 1 set
Gyro compass 1 set
Loran 1 set

2.10 *Student activities*

Welfare Committee, Equipment Committee, Health Committee, Library Committee, Table tennis club, Basket ball club, Soccer club, Tennis club, Judo club, Wrestling club, Jujitsu club, Weightlifting club, Fencing club and flower arrangement club.

2.11 Dormitory House

For 32 students who entered the school from distant districts.

3. COLLEGE

3.1 General

Number of this type of college for fisheries is not large. There are only two colleges, namely Tokyo University of Fisheries and Shimonoseki College of Fisheries. These two colleges have played an extremely important role in the development of Japanese fishing industries. The number of students in these two colleges is about 1,500.

The Tokyo University of Fisheries is explained here as an example of this type of college.

The college was first established as The Fisheries Institute founded in 1889 by a non-governmental organization, the Japan Fisheries Association.

The Institute came under the administration of the Ministry of Agriculture and Commerce of the Central Government in 1897. In 1947 the administration of the Institute was transferred to the Ministry of Education and the name was changed to Tokyo University of Fisheries.

The College has three faculties, viz; (1) Fishing, (2) Technology and (3) Pisciculture. On matriculating at the college, every student is to be enrolled as a student of the faculty chosen for himself out the three faculties. Consequently, at the application to the college, he should apply to the faculty which provides the special course he wants to take as ultimate object. This, however, does not mean that he learns subjects related to the special course study but he also learns general education subjects irrespective of the faculty he enters.

The course is four years, each year divided into two terms. Generally speaking, general education and basic science subjects are the main subjects for the first two years while special course subjects cover the last two years.

For the graduates of the Fishing faculty who wish to gain the official certificate of competency in seamanship, this college offers a one-year Postgraduate Course.

For the graduates of this college (and those with equivalent qualifications) who wish to pursue advanced studies in fisheries, this college offers a two year Postgraduate Course: the Master Course.

3.2 Number of Students

Name of Course	1st year	2nd year	3rd year	4th year	Total
Faculty of Fishing	100	100	100	100	400
Faculty of Technology	70	70	70	70	280
Faculty of Pisciculture	50	50	50	50	200
Faculty of Fisheries Management*	*	*	*	*	*
Faculty of Fisheries Education	10	10	10	10	40
T o t a l	230	230	230	230	920

Note: *Nearly ten students in all are selected from the applicants of the three faculties.

For the first two years, general education and basic science studies are the main object. On the other hand, for the last two years they study special course subjects as main objects of study.

Choice of special course will be made by the end of the second year to conform with desires and mental and physical conditions of students.

In 1965 the actual number of students registered is as follows:

Faculties of Fishing, Technology, Pisciculture, Management and Education including 44 international students	887
Special Post-Graduate Course including 4 international students	45
Graduate School including 3 international students	18
Non-regular Students including 10 international students	34

3.3 *Qualification for admission*

General qualificative requirement for admission is the completion of the course of the senior high school, viz., to have completed twelve years' school education. It may be desirable that, during the junior and senior high school courses, applicants should get sufficient knowledge in scientific studies, especially mathematical and physical studies for applicants to Fishing Courses, chemicals for Technology Courses and biologicals for Piscicultural Courses.

Usually most of the international students attend for one year the Special Course for International Students to learn the language as well as to enrich their knowledge in fundamental science subjects.

3.4 *Curriculum* (Units in brackets are obligatory and others are non-obligatory)

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
General Education	Human culture	Philosophy	4 - - -	4 - - -	4 - - -	4 - - -	4 - - -
		Ethics	4 - - -	4 - - -	4 - - -	4 - - -	4 - - -
		Psychology	4 - - -	4 - - -	4 - - -	4 - - -	4 - - -
		Logics	- 4 - -	- 4 - -	- 4 - -	- 4 - -	- 4 - -
		History of culture	4 - - -	4 - - -	4 - - -	4 - - -	4 - - -
		Literature	- 4 - -	- 4 - -	- 4 - -	- 4 - -	- 4 - -
	Social studies	Laws	4 - - -	4 - - -	4 - - -	4 - - -	4 - - -
		Economics	- 4 - -	- 4 - -	- 4 - -	- 4 - -	- 4 - -
		History	- 4 - -	- 4 - -	- 4 - -	- 4 - -	- 4 - -
		Sociology	4 - - -	4 - - -	4 - - -	4 - - -	4 - - -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
General Education (Contd.)	Social studies	Human geography	4 - - -	4 - - -	4 - - -	4 - - -	4 - - -
	Sciences	Mathematics	(4)- - -	(4)- - -	(4)- - -	(4)- - -	(4)- - -
		Physics	(4)- - -	(4)- - -	(4)- - -	(4)- - -	(4)- - -
		Chemistry	(4)- - -	(4)- - -	(4)- - -	(4)- - -	(4)- - -
		Biology	(4)- - -	(4)- - -	(4)- - -	(4)- - -	(4)- - -
		Statistics	- 4 - -	- 4 - -	- 4 - -	- 4 - -	- 4 - -
		Physical geography	5 - - -	5 - - -	5 - - -	5 - - -	5 - - -
	Language	English	(4)(4)(4) -	(4)(4)(4) -	(4)(4)(4) -	(4)(4)(4) -	(4)(4)(4) -
		French	4 4 - -	4 4 - -	4 4 - -	4 4 - -	4 4 - -
		German	4 4 - -	4 4 - -	4 4 - -	4 4 - -	4 4 - -
		Chinese	4 4 - -	4 4 - -	4 4 - -	4 4 - -	4 4 - -
		Spanish	- - - -	- - - -	- - - -	- - - -	- - - -
	Physical Education	Physical culture	(1)- - -	(1)- - -	(1)- - -	(1)- - -	(1)- - -
		Health and sanitation	(1)- - -	(1)- - -	(1)- - -	(1)- - -	(1)- - -
		Physical training	(2)- - -	(2)- - -	(2)- - -	(2)- - -	(2)- - -
Special Education	Basic	Mathematics	- - - -	- - - -	- - - -	- - - -	- - - -
		Mathematics I	(4)(2)- -	(4)(2)- -	- - - -	- - - -	- - - -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Basic	Mathematics II	(2)- - -	- - - -	- - - -	- - - -	- - - -
		Applied Mathematics	- 2 2 -	- 2 2 -	- 2 2 -	- - - -	- - - -
		Drawing	- 2 - -	- - - -	- - - -	- - - -	- - - -
		Ditto, practice	- 2 - -	- - - -	- - - -	- - - -	- - - -
		Physics I	-(6)- -	- - - -	- - - -	- - - -	- - - -
		Physics II	- - - -	-(4)- -	- 4 - -	- - - -	- - - -
		Ditto, laboratory	-(2)- -	- - - -	- 2 - -	- - - -	- - - -
		Applied physics	- - - -	- - 4 -	- - - -	- - - -	- - - -
		Mechanics	- 4 - -	- - - -	- - - -	- - - -	- - - -
		Hydraulics	- - 4 -	- - - -	- - - -	- - - -	- - - -
		Organic chemistry	- 4 - -	-(4)- -	- 4 - -	- - - -	- - - -
		Ditto, laboratory	- 2 - -	-(2)- -	- 2 - -	- - - -	- - - -
		Inorganic chemistry	- - - -	-(4)- -	- - - -	- - - -	- - - -
		Analitic chemistry	- - - -	-(4)- -	- - - -	- - - -	- - - -
		Ditto, laboratory	- - - -	-(2)- -	- - - -	- - - -	- - - -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Basic	Physical chemistry	- - - -	- -(4)-	- - - -	- - - -	- - - -
		Ditto, laboratory	- - - -	- -(2)-	- - - -	- - - -	- - - -
		Biological chemistry	- - - -	- -(4)-	- - - -	- - - -	- - - -
		Ditto, laboratory	- - - -	- -(2)-	- - - -	- - - -	- - - -
		Industrial chemistry	- - - -	- -(4)-	- - - -	- - - -	- - - -
		Zoology I	- 3 - -	- - - -	- - - -	- - - -	- - - -
		Zoology II	- - - -	- - - -	-(4)- -	- - - -	- - - -
		Ditto, laboratory	- - - -	- - - -	-(2)- -	- - - -	- - - -
		Ditto, training	- - - -	- - - -	- -(1)-	- - - -	- - - -
		Aquatic zoology I	-(4)- -	- - - -	- -(4)-	- - - -	- - - -
		Ditto, laboratory	- - - -	- - - -	- -(1)-	- - - -	- - - -
		Ditto, training	- - - -	- - - -	- -(1)-	- - - -	- - - -
		Aquatic zoology II	- - - -	- - - -	- -(4)-	- - - -	- - - -
		Ditto, laboratory	- - - -	- - - -	- -(1)-	- - - -	- - - -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Basic	Aquatic zoology III	- - - -	- 1 - -	- - - -	- - - -	- - - -
		Botany	- 2 - -	- - - -	- - - -	- - - -	- - - -
		Botany II	- - - -	- - - -	- -(4)-	- - - -	- - - -
		Ditto, laboratory	- - - -	- - - -	- -(2)-	- - - -	- - - -
		Ditto, training	- - - -	- - - -	- -(1)-	- - - -	- - - -
		Aquatic botany	- - - -	- - - -	- -(4)-	- - - -	- - - -
		Ditto, laboratory	- - - -	- - - -	- -(2)-	- - - -	- - - -
		Ditto, training	- - - -	- - - -	- -(1)-	- - - -	- - - -
		Aquatic botany II	- - - -	- - 1 -	- - - -	- - - -	- - - -
		Aquatic botany III	- - 1 -	- - - -	- - - -	- - - -	- - - -
		Ecology of animals for fishing	- -(2)-	- - - -	- - - -	- - - -	- - - -
		Ditto, laboratory	- - 2 -	- - - -	- - - -	- - - -	- - - -
		Geology	- - - -	- - - -	- 2 - -	- - - -	- - - -
		Ditto, training	- - - -	- - - -	- 1 - -	- - - -	- - - -
		Oceanography	- -(4)(2)	- - - -	- - - -	- - - -	- - - -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Basic	Oceanography II	- - - -	- - - -	- -(2)-	- - - -	- - - -
		Ditto, training	- - - -	- - - -	- -(1)-	- - - -	- - - -
		Limnology	- - - -	- - - -	- 2 - -	- - - -	- - - -
		Ditto, training	- - - -	- - - -	- 1 - -	- - - -	- - - -
		Planktonology	- - - -	- - - -	- - 2 -	- - - -	- - - -
		Ditto, training	- - - -	- - - -	- - 1 -	- - - -	- - - -
		Microbiology	- - - -	- -(4)-	- - 4 -	- - - -	- - - -
		Ditto, laboratory	- - - -	- - 2 -	- - - -	- - - -	- - - -
		Applied microbiology	- - - -	- - - 2	- - - -	- - - -	- - - -
		Fisheries resources	- -(4)-	- - - -	- - - -	- - - -	- - - -
		Fisheries resources physics	- - 2 -	- - - -	- - - -	- - - -	- - - -
		Ditto, practice	- -(1)-	- - - -	- - - -	- - - -	- - - -
		Fisheries resources I	- - - -	- - - -	- -(2X3)	- - - -	- - - -
		Ditto, training	- - - -	- - - -	- -(1X1)	- - - -	- - - -

			Fishing				Technology				Pisciculture				Management				Education			
		Grade	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Special education (Contd.)	Basic	Fisheries resources II	-	-	-	-	-	-	-	-	-	-	(2)	(2)	-	-	-	-	-	-	-	-
		Freshwater fish culture	-	-	-	-	-	-	-	-	-	-	(2)	(3)	-	-	-	-	-	-	-	-
		Ditto, training	-	-	-	-	-	-	-	-	-	-	(1)	(1)	-	-	-	-	-	-	-	-
		Mechanical engineering	-	4	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ditto, laboratory	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Mechanical drafting I	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Mechanical drafting II	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Mechanical drafting III	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Chemical engineering	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Electrical engineering I	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Electrical engineering II	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Heat engineering	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Introduction to fisheries	4	-	-	-	4	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-
		Fisheries laws	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	-	-

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Basic	Fisheries international laws	- - - -	- - - -	- - - -	- - - 4	- - - -
		Ditto, practice	- - - -	- - - -	- - - -	- - - 2	- - - -
		Fishery law	- - - -	- - - -	- - - -	- - 4 -	- - - -
		Ditto, practice	- - - -	- - - -	- - - -	- - - 2	- - - -
		Maritime law	- - - -	- - - -	- - - -	- - 2 2	- - - -
		Industry management	- - 4 -	- - 4 -	- - 4 -	- - 4 -	- - - -
		Ditto, practice	- - - -	- - - -	- - - -	- - - 2	- - - -
		Fisheries management	- - 4 -	- - 4 -	- - 4 -	- - 4 -	- - - -
		Ditto, practice	- - - -	- - - -	- - - -	- - - 2	- - - -
		Fisheries administration	- - - -	- - - -	- - - -	- - - 4	- - - -
		Fisheries policy	- - - -	- - - -	- - - -	- - 4 -	- - - -
		Cooperation	- - - -	- - - -	- - - -	- - - 4	- - - -
		Accounting	- - - -	- - - -	- - - -	- - 4 -	- - - -
		Ditto, practice	- - - -	- - - -	- - - -	- - 2 -	- - - -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Basic	Fisheries economics	- - 4 -	- - 4 -	- - 4 -	- - 4 -	- - - -
		Ditto, practice	- - - -	- - - -	- - - -	- - - 2	- - - -
		History of fisheries	- - 4 -	- - 4 -	- - 4 -	- - 4 -	- - - -
		Fisheries geography	- - - -	- - - -	- - - -	- - - 4	- - - -
		Ditto, practice	- - - -	- - - -	- - - -	- - 4 -	- - - -
		Fisheries sociology	- - - -	- - - -	- - - -	- - 4 4	- - - -
		Ditto, practice	- - - -	- - - -	- - - -	- - 2 -	- - - -
		Ditto, training	- - - -	- - - -	- - - -	- - 2 -	- - - -
		History of fishing village culture	- - - -	- - - -	- - - -	- - 2 -	- - - -
		Ditto, practice	- - - -	- - - -	- - - -	- - 2 -	- - - -
		Fishermen's psychology	- - - -	- - - -	- - - -	- - 2 -	- - 2 -
		Ditto, practice	- - - -	- - - -	- - - -	- - 2 -	- - - -
		Seminar	- - -(2)	- - -(2)	- - -(2)	- - -(2)	- - -(2)
		Graduation thesis	- - -(6)	- - -(6)	- - -(6)	- - -(6)	- - -(6)

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Fishing	General principles of fishing	-(2)- -	- - - -	- - - -	- - - -	- - - -
		Fishing meteorology	- - 4 -	- - - -	- - - -	- - - -	- - - -
		Fishing mechanism	- - 2 -	- - - -	- - - -	- - - -	- - - -
		Fishing boats	- -(4)-	- - - -	- - - -	- - - -	- - - -
		Ditto, practice	- - 1 -	- - - -	- - - -	- - - -	- - - -
		Fisheries measuring	- - 2 -	- - - -	- - - -	- - - -	- - - -
		Fishing gear physics	- -(4)-	- - - -	- - - -	- - - -	- - - -
		Ditto, training	- -(1)(1)	- - - -	- - - -	- - - -	- - - -
		Fishing gear (1)	- -(3)-	- - - -	- - - -	- - - -	- - - -
		Fishing gear (2)	- -(3)-	- - - -	- - - -	- - - -	- - - -
		Ditto, training	- -(2)-	- - - -	- - - -	- - - -	- - - -
		Fishing gear materials I	- -(2)(2)	- - - -	- - - -	- - - -	- - - -
		Ditto, laboratory	- -(1)(1)	- - - -	- - - -	- - - -	- - - -
		Fishing gear materials II	- - -(1)	- - - -	- - - -	- - - -	- - - -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Fishing	Fishing gear design	- -(2)(2)	- - - -	- - - -	- - - -	- - - -
		Ditto, practice	- - -(2)	- - - -	- - - -	- - - -	- - - -
		Principles of fishing methods	- -(2)-	- - - -	- - - -	- - - -	- - - -
		Gathering and detection of fish	- -(2)-	- - - -	- - - -	- - - -	- - - -
		Ditto, laboratory	- - 2 -	- - - -	- - - -	- - - -	- - - -
		Fishing method physics	- -(2)-	- - - -	- - - -	- - - -	- - - -
		Fishing I	(2)(2)(2)(3)	- - - -	- - - -	- - - -	- - - -
		Trawl net fishing	- - (1)(1)	- - - -	- - - -	- - - -	- - - -
		Angling	- -(2)-	- - - -	- - - -	- - - -	- - - -
		Place net fishing	- - -(2)	- - - -	- - - -	- - - -	- - - -
		Gill net fishing	- - -(1)	- - - -	- - - -	- - - -	- - - -
		Purse net fishing	- - -(2)	- - - -	- - - -	- - - -	- - - -
		Fishing training I	- -(1)-	- - - -	- - - -	- - - -	- - - -
		Fishing II	(1)(1)(2)(2)	- - - -	- - - -	- - - -	- - - -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Fishing	Whaling	- - (2)(1)	- - - -	- - - -	- - - -	- - - -
		Mother ship fishing	- - (2)(1)	- - - -	- - - -	- - - -	- - - -
		Fishing training II	- - (1) -	- - - -	- - - -	- - - -	- - - -
		General fishing	- - (4)(2)	- - - -	- - - -	- - - -	- - - -
		Ditto, training	- - (1)(1)	- - - -	- - - -	- - - -	- - - -
		Fishing ground	- - (2)(2)	- - - -	- - - -	- - - -	- - - -
		Ditto, practice	- - (1)(1)	- - - -	- - - -	- - - -	- - - -
		Navigation	- - (6)(2)	- - - -	- - - -	- - - -	- - - -
		Ditto, training	- - (1)(1)	- - - -	- - - -	- - - -	- - - -
		Radar navigation	- - - 2	- - - -	- - - -	- - - -	- - - -
		Maritime instruments	- - (2)(2)	- - - -	- - - -	- - - -	- - - -
		Ditto, laboratory	- - - (1)	- - - -	- - - -	- - - -	- - - -
		Seamanship	- - (4)(4)	- - - -	- - - -	- - - -	- - - -
		Ditto, training	- - (2) -	- - - -	- - - -	- - - -	- - - -
		Loading of fishing catch	- - - 2	- - - -	- - - -	- - - -	- - - -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Fishing	Fishing training on training boat	- (1)(1)(2)	- - - -	- - - -	- - - -	- - - -
		Investigation of fishery	- - -(2)	- - - -	- - - -	- - - -	- - - -
	Technology	Seasoning	- - - -	- - 4 -	- - - -	- - - -	- - - -
		Fisheries manufacturing materials	- - - -	- -(2)-	- - - -	- - - -	- - - -
		General fisheries manufacturing machines	- - - -	- 2 - -	- - - -	- - - -	- - - -
		Ditto, training	- - - -	- 3 - -	- - - -	- - - -	- - - -
		Advanced fisheries manufacturing machinery	- - - -	- - - 2	- - - -	- - - -	- - - -
		General fisheries manufacture	- - - -	- - - 2	- - - -	- - - -	- - - -
		Fisheries chemistry I	- - - -	- -(2)(3)	- - - -	- - - -	- - - -
		Ditto, laboratory	- - - -	- - -(2)	- - - -	- - - -	- - - -
		Fisheries chemistry II	- - - -	- -(4)(3)	- - - -	- - - -	- - - -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Technology	Ditto, laboratory	- - - -	- - -(2)	- - - -	- - - -	- - - -
		Fisheries manufacture I	- - - -	- - (1)(6)	- - - -	- - - -	- - - -
		Ditto, laboratory	- - - -	- - -(2)	- - - -	- - - -	- - - -
		Fisheries manufacture II	- - - -	- - (2)(3)	- - - -	- - - -	- - - -
		Ditto, laboratory	- - - -	- - -(2)	- - - -	- - - -	- - - -
		Refrigeration	- - - -	- (1)(2)(3)	- - - -	- - - -	- - - -
		Ditto, laboratory	- - - -	- - -(2)	- - - -	- - - -	- - - -
		Training in fisheries manufacture	- - - -	- - -(6)	- - - -	- - - -	- - - -
		Investigation of fisheries manufacture industry	- - - -	- - (1)(1)	- - - -	- - - -	- - - -
	Pisciculture	Animal embryology	- - - -	- - - -	-(2)- -	- - - -	- - - -
		Ditto, laboratory	- - - -	- - - -	-(1)- -	- - - -	- - - -
		Ditto, training	- - - -	- - - -	-(1)- -	- - - -	- - - -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Pisciculture	Animal histology	- - - -	- - - -	-(2)- -	- - - -	- - - -
		Ditto, laboratory	- - - -	- - - -	-(1)- -	- - - -	- - - -
		Aquatic animal physiology	- - - -	- - - -	-(4)- -	- - - -	- - - -
		Ditto, laboratory	- - - -	- - - -	-(2)- -	- - - -	- - - -
		Aquatic animal ecology	- - - -	- - - -	- 2 - -	- - - -	- - - -
		Genetics and breeding	- - - -	- - - -	- - 3 -	- - - -	- - - -
		Fish culture civil engineering	- - - -	- - - -	- - 2 -	- - - -	- - - -
		Ditto, training	- - - -	- - - -	- - 1 -	- - - -	- - - -
		Fish diet	- - - -	- - - -	- -(2)-	- - - -	- - - -
		Ditto, laboratory	- - - -	- - - -	- -(1)-	- - - -	- - - -
		Chemistry of water	- - - -	- - - -	- -(2)-	- - - -	- - - -
		Ditto, laboratory	- - - -	- - - -	- -(1)-	- - - -	- - - -
		Marine water fish culture	- - - -	- - - -	- - (2)(3)	- - - -	- - - -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Pisciculture	Ditto, training	- - - -	- - - -	- - -(1)	- - - -	- - - -
		Seaweed culture	- - - -	- - - -	- - -(2)	- - - -	- - - -
		Ditto, training	- - - -	- - - -	- - -(1)	- - - -	- - - -
		Fish diseases	- - - -	- - - -	- -(2)-	- - - -	- - - -
		Ditto, laboratory	- - - -	- - - -	- -(1)-	- - - -	- - - -
		Ditto, training	- - - -	- - - -	- -(1)-	- - - -	- - - -
		Investigation of fish culture	- - - -	- - - -	- - -(1)	- - - -	- - - -
		Industry (A)	- - - -	- - - -	- - -(1)	- - - -	- - - -
		Ditto (B)	- - - -	- - - -	- - -(1)	- - - -	- - - -
	Fisheries management	Bookeeping	- - - -	- - - -	- - - -	- - 4 -	- - - -
		Ditto, practice	- - - -	- - - -	- - - -	- - - 2	- - - -
		Commercial English	- - - -	- - - -	- - - -	- - - 4	- - - -
		Ditto, practice	- - - -	- - - -	- - - -	- - - 2	- - - -
		Fisheries finance	- - - -	- - - -	- - - -	- - - 2	- - - -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Fisheries management	Fisheries marketing	- - - -	- - - -	- - - -	- - - 4	- - - -
		Ditto, practice	- - - -	- - - -	- - - -	- - - 2	- - - -
		Fisheries trading	- - - -	- - - -	- - - -	- - - 4	- - - -
		Civil Law	- - - -	- - - -	- - - -	- - 2 2	- - - -
		Commercial law	- - - -	- - - -	- - - -	- - 2 2	- - - -
		Fisheries marketing law	- - - -	- - - -	- - - -	- - - 2	- - - -
		Investigation of fisheries industry	- - - -	- - - -	- - - -	- - - 2	- - - -
	Fisheries education	Principles of education	- - - -	- - - -	- - - -	- - - -	- 4 - -
		History of education	- - - -	- - - -	- - - -	- - - -	- 4 - -
		Curriculum	- - - -	- - - -	- - - -	- - - -	- - 2 -
		Educational sociology	- - - -	- - - -	- - - -	- - - -	- - 4 -
		Fishing village education	- - - -	- - - -	- - - -	- - - -	- - - 2
		Evaluation	- - - -	- - - -	- - - -	- - - -	- - 2 -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Congd.)	Fisheries education	Educational administration and finance	- - - -	- - - -	- - - -	- - - -	- - - 4
		Practice in pedagogy	- - - -	- - - -	- - - -	- - - -	- - 2 2
		Psychology of education	- - - -	- - - -	- - - -	- - - -	- 4 - -
		Psychology of youth	- - - -	- - - -	- - - -	- - - -	- - 2 -
		Psychology of school study	- - - -	- - - -	- - - -	- - - -	- - 2 -
		Industrial psychology	- - - -	- - - -	- - - -	- - - -	- - 2 -
		Practice in psychology	- - - -	- - - -	- - - -	- - - -	- - 2 -
		Experiment in psychology	- - - -	- - - -	- - - -	- - - -	- - 2 2
		Vocational guidance	- - - -	- - - -	- - - -	- - - -	- - 2 2
		Method of vocational guidance	- - - -	- - - -	- - - -	- - - -	- - 2 -
		Method of science education	- - - -	- - - -	- - - -	- - - -	- - 3 -

			Fishing	Technology	Pisciculture	Management	Education
		Grade	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Special education (Contd.)	Fisheries education	Method of fisheries education	- - - -	- - - -	- - - -	- - - -	- - 2 -
		Practical training of education	- - - -	- - - -	- - - -	- - - -	- - - 3
		Moral education problems	- - - -	- - - -	- - - -	- - - -	- - - 2

3.5 *Graduation and Title*

On those who have been in attendance not less than four years and completed the course of a faculty, the University degree is awarded.

The number of units needed for the university degree is as follows:

General Education	52 units
Special Education	98 units

3.6 *Post graduate seaman course*

The course admits forty graduates for studying and training on board a training ship. The object of this course is mainly to make students acquire the qualifications for the national examination of ship's officers.

It is required that students have to acquire thirty units to complete the Post graduate course.

3.7 Post graduate Master Course

The objectives of the course are to give the graduates of the college an opportunity for a profound research in the field of fisheries.

The course is two years, and a Master's degree is awarded to the graduates.

3.8 Non-regular Student

To those who want to study certain matters in fisheries the college may, so far as facilities permit, give admission to take some subjects chosen by themselves.

The duration of study of the non-regular student is normally one year, but can be extended under special circumstances.

Applicants should have the same general qualifications as those of the regular student.

3.9 Local Laboratories and Training Stations

Training in the field are one of the specific features of the education of the college.

The college has one local laboratory and five training stations where experiments or training are practiced through the year, especially during school holidays in Summer.

(1) Tateyama Training Station

A training station of the faculty of fishing, fronting on the Bay of Tateyama near the mouth of Tokyo Bay. Two weeks training for new students is done here for swimming, rowing and sailing.

(2) Namazu Training Station

A training station of the faculty of fisheries technology, which provides manufacturing equipment for various fisheries products.

(3) Kominato Marine Biological Laboratory

The laboratory is, like the following three training stations, provided for use of the faculty of pisciculture.

Here various experiments on marine organisms and training in the marine-water fish-culture are practiced. It is also equipped with a public acquarium.

(4) Yoshida Training Station

(5) Oizumi Training Station

The above two are both training farms for freshwater fish-culture with culture farms and experimental and training apparatus; the former of temperate water fish as eels, carps and goldfish and the latter of cool water fish as trout.

(6) Kisarazu Training Station

This training station is used for training in culture of shallow sea organisms such as shell fish and laver.

3.10 Training ships

The college has three training ships as follows:

(1) Umitake-maru

Steel vessel, length = 73m, Width - 11.3m. GT = 1452.91 ton
Engine = 21,000 H.P. Diesel engines. Speed = 13 knots.

(2) Shinyo-maru

Steel vessel. GT = 382.07 ton
Engine = 400 H.P. x 2, Diesel engines. Speed = 11.5 knots.

(3) Hayabusa-maru

Wooden vessel. GT = 140.86 ton
Engine = 250 hp. Diesel engine. Speed = 8 knots.

These ships are equipped with apparatus for oceanographical surveys and biological experiments and engage in various surveys as well as in training of navigation and fishing.

3.11 Library

Books in library - 106,610 among which
Books in the Japanese language - 82,820
Books in Foreign languages - 22,790
Science Periodicals bound in books - 1,000
Books on fisheries and sciences will be numbered up to 36,500.

3.12 Faculties

Professors	30
Assistant Professors	35
Instructors	13
Assistants	12
Part-time Instructors	23
Other Personnel	197

4. UNIVERSITIES

4.1 General

There are ten national, one prefectural and three private universities which offer courses of fisheries. Five of these universities have independent Department of Fisheries and the other nine have the Faculty of Fisheries under Department of Agriculture.

Distinction between these courses of fisheries in universities and the fisheries colleges mentioned in the preceding section is not necessarily clear in the contents of education.

However, generally speaking, the education of the colleges is more practical and aims to educate students for industry. On the other hand the education of the Universities is rather academic and therefore the graduates are engaged more in research work after graduation.

The total number of students of fisheries in these fourteen universities is around 3,000. This number is very small compared with the number of students in the two fisheries colleges. This difference reflects the difference in the system of education, one academic and another practical.

The University of Tokyo is a good example of this type of University. Here fisheries education belongs to the Department of Agriculture.

4.2 *Historical Outline*

The institution of the faculty of agriculture of the University of Tokyo had its start in 1890 as a College of Agriculture, Imperial University forming part of the National University Organisation.

In 1897, the institution was reorganized and became the College of Agriculture, Imperial University of Tokyo.

Graduates of these divisions were granted the University degree of Agriculture of Forestry and of Veterinary Science respectively. However, in April 1910, a new Division of Fisheries was added, graduates of which course were granted the University degree of Fisheries.

In 1919, the University was re-organized and five divisions of the University formed the Department of Agriculture, Imperial University of Tokyo.

Since 1922, all graduates of these divisions were granted the University degree in Agricultural Science, irrespective of the courses concerned.

In 1947 the University changed its old name to the University of Tokyo.

4.3 *Students*

Qualified candidates who have completed the first two years in the Department of General Education, after passing the entrance examination, may be admitted to the Department of Agriculture.

4.4 *Auditors*

Qualified auditors in the Department of Agriculture may be allowed to sit in any course, however, auditors are not allowed to take examinations.

4.5 *Research Students*

Anyone who passes the recognized examination and desires to continue his research under the instruction of the Faculty may be allowed to study as Research Student, the period being one year in principle.

4.6 *Foreign Students*

Students or graduates of foreign nationality may be admitted as regular students in the Department of Agriculture or in Graduate School, or as auditors, special students or as research students.

The University is open to foreign students to study the specific course of their interest and to help them acquire more advanced education and techniques.

For those who graduated from schools outside Japan, special examination testing their ability in Japanese language, is given orally, after considering their background, personality, health condition, etc.

4.7 Number of students registered December 1964

Undergraduate			Post-graduate			Foreign Research Students
Faculty	Faculty Students	Research Students	Courses	Master Course	Doctor Course	
Agrobiology	20	8	Agronomy	18 (6)*1	11 (4)	5 (5)
Agricultural Chemistry	98 *4	44 *5	Agricultural Chemistry	57 (12)*2	36 (6)*4	3 (3)
Forestry	30	6 *1	Forestry	5 (2)	7	3 (3)
Fisheries	34	10 (1)*1	Fishery	18 (2)*2	16 (11)	1 (1)
Agricultural Economics	44	4	Agricultural Economics	15 (5)	17 (4)*2	6 (6)
Agricultural Engineering	45 *2	1	Agricultural Engineering	5	8 (1)	1 (1)
Zootechnical and Veterinary Science	12	13	Zootechnical Science	7 (2)	2	1 (1)
			Veterinary Medicine	13 (2)*3	6 (1)	
Forest Products	37	8	Forest Products	14 (5)	5 (4)	
Total	330 *6	94 (2)*7	Total	152 (36)*8	108 (31)*4	20 (20)

Remarks: Figures in Parenthesis represent foreign students, and figures accompanied with * represent female students. Number of foreign and female students are included in each total number.

4.8 *Post-graduate course*

Graduates of the Department of Agriculture, or any others of equivalent qualification, may be admitted to the Graduate School.

The Graduate School was established with the purpose of offering opportunities for students to study, research, and to accomplish profound knowledge in theoretical and applied sciences.

A Master's Degree may be granted to the students who have attained the required number of Units which are 30 or more in a two year course.

A Doctor's Degree of Agriculture may be granted to the students who have successfully completed the course of three years, attaining the required number of Units, not to be less than 20, and who have passed the Final Examination after presentation of a thesis for a Doctor's Degree.

4.9 *Teaching and Researching Staffs*

Professors	57
Associate Professors	58
Lecturers	117
Assistants	152

4.10 *Curriculum*

Obligatory lectures	Units
Physics I	2
Organic Chemistry I	2
Biological Chemistry I	2
Outline of Fisheries	1
Aquatic Invertebrates	2
Aquatic Vertebrates	2
Anatomy of Aquatic Animals	2
Physiology of Aquatic Animals	2
Aquatic Botany	2
Fisheries Microbiology	2
General Biology of Fisheries	2
Fisheries Oceanography	2
Water Quality	2
Fish Population and Conservation	2
Fishing Methods and Gears	2
Aquiculture	3
Biochemistry of Aquatic Organisms	2

Obligatory lectures	Units
Technology of Marine Products	3
Laws of Fisheries	1
Experiments in Fisheries Zoology I	1
Experiments in Fisheries Zoology II	1
Experiments in Fisheries Zoology III	1
Experiments in Aquatic Botany	1
Experiments in Fisheries Microbiology	1
Experiments in Fisheries Oceanography	1
Experiments in Fisheries Chemistry I	3
Experiments in the Marine Biological Station	5
Graduation Thesis	6
Total	58

Non-obligatory lectures	Units
Physics II	2
Physical Chemistry I	2
Physical Chemistry II	2
Inorganic Chemistry	2
Organic Chemistry II	2
Organic Chemistry III	1
Biological Chemistry II	2
Agricultural Analytical Chemistry	2
Nutrition	2
Chemistry of Food	2
Genetics	2
Biometrics	2
Applied Mathematics	2
Meteorology	2
Introduction to Agricultural Economics	2
Comparative Study of Agriculture	2
Economics I	2
Economics II	2
Embryology of Aquatic Animals	2
Fish Pathology	1
Planktology	2
Physiology of Aquatic Plants	1
Food Chemistry of Marine Products	2
Seafood Hygiene	2
Oceanographical Method	1
Navigation and Seamanship	2
Fishing Boats	1
Fishing Mechanics	1
Seafood Production Engineering	2
Utilization of Coastal Seawater	1
Fisheries Engineering	1
Experiments in Fisheries Biology	2
Experiments in Fisheries Chemistry II	2
Fisheries Practices	2
Total	60

4.11 *Fisheries Laboratories*

(1) Fisheries Laboratory - Shimmaiko, Chita-machi
Chita-gun, Aichi-Prefecture

(2) Attached Aquarium - Shimmaiko, Chita-machi
Chita-gun, Aichi-Prefecture

(3) Attached Branch - Atsumi-machi, Atsumi-gun,
Aichi-Prefecture

5. VOCATIONAL TRAINING

Besides the education mentioned in the proceding sections, there are vocational trainings in fisheries. These are not permanent facilities but are in accordance with the need from time to time. They are organized by the Central Government, local governments, fisheries co-operative associations and any other organizations concerned.

The main purpose of this training is to give knowledge of all newly established laws and regulations, to study newly developed fishing methods, fishing gear and engines, etc.

6. COMMENTS

System of fisheries education in Japan is quite elaborate. However this is nothing compared with systems in other fields of industry. The fact is simply that education has traditionally been quite popular in any field in Japan.

People engaged in education are rather academic compared with other nations, but on the other hand people in industry are extremely practical.

Students are therefore trained in an academic atmosphere in school and after graduation they are re-trained by experienced staff in the field on the practical application of their knowledge.

This combination of academic study and very practical training have been the bases of the industrial development of Japanese fisheries.

In fact, such combination is often very difficult especially in developing countries because people there have a tendency to pay more respect to academic professions than practical ones.

Such a feeling in society itself may be a criterion by which to judge if the society is developed or underdeveloped from an industrial standpoint, and as long as such feeling exists the development of any industry is hopeless, and especially true for the fishing industry.