

radio station, and in the high season of skipjack and albacore from April to June around the Izu peninsula. Similar information is sent to this sea area via the Yaizu fisheries radio station. One of the major functions of the Tohoku Regional Fisheries Research Laboratory is the research on skipjack fisheries, and the research covers the whole Pacific waters. The above-mentioned system will be expanded in the near future to the waters around Kyushu and Formosa, via the Makurazaki fisheries radio station.

The main work of this fisheries guidance system is to broadcast the synoptic isothermal chart, which is made up from data sent in daily from many skipjack fishing boats or whalers operating in these

waters, together with the oceanographic data sent from the fisheries guidance boats of each prefecture and marine observation boats of the National Fisheries Research Laboratories, Central Meteorological Observatory, Hydrographic Office etc. The results are then broadcast and are interpreted by the fishing vessels which make up their own isothermal charts on board so that they may study and investigate the daily oceanographic environmental conditions, such as the distribution of the water mass, ocean currents, up-wellings, current rips etc.

The Tohoku Regional Fisheries Research Laboratory trains fishermen to plot and interpret the isothermal chart, and fishermen have shown great interest in this study.

21

FISHERIES EDUCATIONAL SCHEMES IN JAPAN

by

S. Konda*

The need for increased fish production and the consequent demand for a large number of skilled fishery workers has prompted Japan to organize and maintain fisheries education on a fairly extensive scale. Before the war, averaging the five years 1930 to 1934, the daily protein consumption per person in Japan was 66.7 grs., of which 11.7 grs. were animal protein (aquatic animal protein, 9.5 grs. or 81.2% and terrestrial animal protein, 2.2 grs. or 18.8%). Since it is desirable to take as much as 200 grs. of fish (100 grs. of which is edible, containing on an average 18 grs. of protein) per person per day, the amount of fish to be supplied for the population of 83,000,000 would be 6,059,000 tons a year.

The mechanization and capitalization of Japanese fisheries commenced around the end of the nineteenth century, and soon there grew a demand for trained workers for the industry. In 1898 and 1908 the steam whaler "Orga" (125 G.T.) and the steam trawler "Henne Castle" (169 G.T.) were brought out from Norway and Great Britain, respectively. In 1913 the number of steam trawlers in Japan amounted to 139 vessels. The total number of motor fishing boats was 1,000 in 1912; 8,000 in 1919; 15,000 in 1926; and, increasing rapidly, it amounted to 40,000 in 1932.

As early as 1895, some local fisheries schools were inaugurated, e.g. the Fukui Prefectural Obama Fishery School and the Iwate Prefectural Miyako Fisheries School; and thereafter, the number of such schools increased rapidly. In 1897, the Fisheries Institute of the Ministry of Agriculture and Commerce was inaugurated; this was the origin of the Tokyo University of Fisheries. In 1907, a Department of Fisheries was established in the Sapporo Agricultural School, which has developed into the present Fisheries Faculty of Hokkaido University. In 1908, a Department of Fisheries was instituted in the Agricultural Faculty of Tokyo University.

As of October, 1953, there were altogether fifty-six high schools in which fisheries courses were established. All of those high schools were located at fisheries centres, and the boys passing from local middle-schools entered, as a matter of course, the fisheries high school, which was sometimes the only high school in the area. The total number of such pupils, mostly sixteen to eighteen years of age, was 8,497 in April 30, 1951. All the fisheries high schools were public, mostly being financed by the respective prefectural governments. Fifty of the above fifty-six were full-day schools, the fisheries course of which usually included the three sub-courses, i.e. fishing,

* Professor, Faculty of Fisheries, Kagoshima University.

propagation and processing ; though in some cases the arrangement was different.

As of January, 1953, six of the fisheries high schools were being installed with training boats larger than 100 G.T. The training boats, workshops for processing of products, as well as piscicultural facilities of the high schools, are being rapidly improved and expanded.

At present there are thirteen universities in which Faculties or Departments of Fisheries are established. The list below shows the names of those universities and the details of the Faculties and Departments concerned with fisheries.

Candidates who have passed the high school can, after an entrance examination, be admitted to any one of these departments according to their choice.

Training fishing vessels of not less than 500 G.T. are attached to the Hokkaido University (Oshoro maru), the Tokyo University of Fisheries (Umitaka maru), the Kagoshima University (Kagoshima maru)

and the College of Fisheries, Ministry of Agriculture and Forestry (Shunkotsu maru). The students connected with navigation in those Universities are trained to satisfy the requirements provided by the Enforcement Regulation for the Ship's Officers Law.

Biological study has been the major object of the Department of Fisheries established within the Faculty of Agriculture. There are more than fifteen marine biological laboratories and similar facilities for training the students belonging to the Department or Faculty of Fisheries. Besides these, there are several marine laboratories and similar facilities attached to the Faculty of Science in some universities.

Aquatic chemistry and practical processing of aquatic products are taught in the major universities. Aquatic chemistry is deemed to be an independent field of fisheries science. In the Graduate School of Agriculture, Kyoto University, fisheries chemistry is included in the Doctor's course.

Name of University	Faculty	Department	Fixed No. of Fresh Students	Financed by
Tokyo University of Fisheries	Fisheries	Fishing Propagation Processing	100 50 70	Central Government
Hokkaido University	Fisheries	Fishing High Seas Fishing Propagation Processing	40 40 40 80	do
Kagoshima University	Fisheries	Fishing Processing	80 40	do
Nagasaki University	Fisheries	Fishing Propagation Processing	30 30 30	do
Mie-Prefectural University	Fisheries	Fisheries	90	Mie Prefectural Govt.
Tohoku University	Agriculture	Fisheries	30	Central Govt.
Tokyo University	do	do	20	do
Kyoto University	do	do	45	do
Kyushu University	do	do	10	do
Miyazaki University	do	do	20	do
Hiroshima University	Fisheries and Stock-farming	do	30	do
Nippon University	Fisheries and Veterinary	do	150	Private
College of Fisheries		Fishing Engineering Propagation Propagation	50 30 30 50	Central Government

Two examples of university curricula in fisheries are given below :

The general scheme of educational courses in Japan (*vide* Article 63 of the School Education Law and Ordinance No. 9, 1953, of the Ministry of Education) is as follows :— the Primary (Elementary) School Course of about 6 years, the Middle School

(Junior High School) Course of 3 years, the High School (Senior High School) Course of 3 years and the University Course of 4 years leading up to the Bachelor's title (Gakushi). A further advanced course of 2 years would lead one to the Master's degree (Shyshi) while a thesis on its own merits could win a Doctorate (Hakushi).

Curriculum of the Department of Fishing, Faculty of Fisheries, Hokkaido University (Bachelor's Course).

Subjects	Units (Compulsory)
Outline of Fisheries	3
Outline of Deep Sea Fisheries	6
Special Treaties on Fisheries	8
Theory of Fishing	4
Theory of Aquatic Resources	4
Fisheries Policy and Exercise thereon	4
Fisheries Legislation and Exercise thereon	4
Outline on Maritime Affairs	4
Fisheries Mechanics	4
Dynamics of Fishing Net	4
Designing of Fishing Gear	2
Fishing Boat Engineering	4
Electric Wave Engineering	2
Sound Engineering under Waters	2
Special Exercise of Fishing	4
Special Exercise	3
Designing and Drawing of Machinery	2
Practical Exercise on Board a Vessel	5
Graduation Thesis	4
	73

Subjects	Units (Optional)
Outline of Marine Zoology	4
Outline of Marine Botany	2
Planktonology	3
Biological Statistics	4
Oceanography	4
Meteorology	2
Conditions of the Sea and of the Catch	2
Dyes for Fishing Net	2
Special Lecture on Mechanics	4
Management of Fisheries and Exercises thereon	4
Cooperative Societies	2
Processing of Marine Products	2
Aquatic Propagation	2
Experiment on Aquatic Resources	2
do on Oceanography	2
do on Meteorology	1
do on Fishing Methods	2
do Fishing Net Dynamics and Net Designing	2
do Fisheries Mechanics	2
do Fisheries Electric Engineering	2
	50

Curriculum of the Department of Fisheries, Faculty of Agriculture, Tokyo University (Bachelor's Course).

Subjects	Units (Compulsory)
Outline of Fisheries	1
Aquatic Vertebrates	2
Aquatic Invertebrates	2
Theory of Fishing Operation	2
Theory of Aquatic Resources	1
Theory of Pisciculture	2
Experiments on Aquatic Zoology	6
Fishery Oceanography	2
do Experiments	1
Fishery Bacteriology	1
do Experiments	3
Aquatic Botany	2
do Experiments	2
Theory of Utilisation of Aquatic Products	3
Outline of Fishery Chemistry	1
Fishery Chemistry of Nutrition	2
Experiments on Fishery Chemistry	6
Theory of Fishing Boat	1
Fishery Mechanics	1
Fisheries Laws	1
Marine Practices	4
Graduation Examination Thesis	6
	52

Subjects	Units (Optional)
Fish Pathology	1
Aquatic Animal Physio-Ecology	2
Planktonology	2
Aquatic Plant Physio-Ecology	1
Limnology	2
Marine Meteorology	1
Navigation and Seamanship	2
Training of Fisheries	6
Genetics	2
Aquatic Animal Histology and Embryology	2
Inorganic Chemistry	2
Organic Chemistry	4
Bio-Chemistry	4
Applied Mathematics	2
Agricultural Economics	4
Comparative Agriculture	2
Bio-Statistics	2
Food Hygiene	1
	42

At present facilities for the degrees of Master and Doctor are available in five universities as stated below :—

Thanks to the development and maintenance of fisheries education and research, the fisheries industry of Japan has been able to keep abreast of the progress in the other industries of the country.

Most of the personnel who receive fisheries education in Japan generally continue to serve the indus-

and standard of living is an important measure more or less common to the Indo-Pacific countries. Mechanization and organization of the fisheries industry are hence being planned and earnestly pursued in all these countries. It is for this reason that the Expanded Technical Assistance Programme of the specialized agencies of the United Nations and other schemes of international cooperation are active in the field of fisheries of the Indo-Pacific region.

<i>University</i>	<i>Subject</i>	<i>Degree</i>
Hokkaido	Fisheries do	Doctor Master
Tohoko	Agriculture, Fisheries do	Doctor Master
Tokyo	Biology, Fisheries do	Doctor Master
Kyoto	Agriculture, Fisheries, Chemistry Fisheries	Doctor Master
Kyushu	Agriculture, Fisheries do	Doctor Master

try directly or indirectly. Thus, of the total 809 graduates of Tokyo University of Fisheries who are living in Tokyo, 244 are now employed in fishing or related companies; 95 in universities and other research organizations; 49 in societies and associations relating to fisheries; and 100 are officials of the Fisheries Agency and of the Fisheries Section of the Tokyo municipal government. Besides these, several are members of the Fisheries Standing Committee of the Diet, and many are businessmen managing their own fisheries trade.

The increase of fisheries production and consumption with a view to raising the levels of nutrition

The training of personnel is one of the most fundamental steps in fishery development. International cooperation in the matter of fisheries education and training, and exchange of students and fishery workers would prove highly valuable in the achievement of this object.

It is noteworthy that as of 1 July, 1953, there were 97 foreign students of 10 nationalities studying in Japan. Among the subjects studied were fisheries, boat building, etc. Some of them had been admitted to the Tokyo University of Fisheries and to other universities.

The main difficulty confronted by students from

State of Employment of the Graduates of certain Universities and Fishery High Schools.

	Fishery Faculty, Hokkaido Univ.	Obama Fishery High School	Otaru Fishery High School	Yaizu Fishery High School
Total number of graduates except deceased.	2,496 (100)	1,645 (100)	965 (100)	1,577 (100)
Fisheries owners	18	73	147	..
Employees of companies relating to fisheries.	736	313	283	..
Employees of fisheries societies, etc.	93	95	76	..
Total	847 (33.9)	481 (29.2)	506 (52.4)	511 (34.9)

abroad is that of language, and they are advised to study Japanese at the International Students' Institute, Tokyo. Japanese language classes are held by this Institute to meet the needs of students from abroad, and as of September, 1953, seventy-six students of six nationalities were studying in such classes. I know several cases of young foreign students who studied one year at the Japanese language class of the above Institute, who were admitted to a fisheries college, and graduated from it with good record.

The above Institute also operates the International Students' House. According to information, the two-storey main building can provide the students with twenty-five clean, bright, comfortable living rooms together with other facilities. The monthly fee for each student for room and board, two to a room, is ¥10,000 (about US \$28), subject to change according to circumstances.

Qualifications for admission to the university are provided for by the School Education Law and by the Enforcement Regulation of the same Law as follows :

Article 56 of School Education Law : Those who can enter the university shall be those who have graduated from high school or completed the twelve-year schooling with

the regular course (including those who have completed schooling equivalent to this, with a course other than the regular one), or those who have been recognized to have the scholastic attainments equal to the persons mentioned above under the provisions laid down by the competent authorities.

Article 69 of Enforcement Regulation of School Education Law : Regarding the admission into the university, those who are recognized to have scholastic attainments equal or superior to high school graduates will, in accordance with the provision of Article 56 of School Education Law, be those who come under one of the following categories :

1. Those who have completed 12 years schooling in a foreign country.
2. Others designated by the Education Minister.
3. Those who are recognized by the university concerned as having scholastic attainments equal or superior to high school graduates.

Some universities are giving special consideration to the admission of students from abroad. There is growing enthusiasm in university circles in Japan to welcome foreign students who desire to pursue fisheries education in this country.