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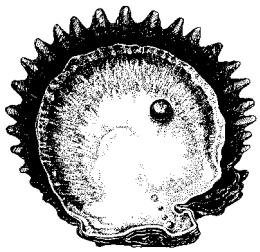

PEARL OYSTER

INFORMATION BULLETIN Number 2 - November 1990

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NOTE FROM THE EDITOR

Thank you all very much for your feedback on the inaugural issue of the P.O.I.B. We are always keen to hear from you, and to hear how your work proceeds. The real merits of the Bulletin will become increasingly apparent as we work and learn together.

This issue is a mite belated. We hope to publish twice yearly, but retain the prerogative of a flexible schedule. Among other things, your Editor has moved to take on a position with a research company in Hawaii. Please note the new address above.

Many have written enquiring about membership of the Pearl Oyster Special Interest Group. To join, you must simply register your interest with the South Pacific Commission. We have included a copy of the Questionnaire on the back of this issue, to simplify the process. If you are not an official member (Was your name on the mailing list in P.O.I.B. #1? Is your name included in this issue's membership update?), you should fill this in, and forward it to Garry Preston or Jean-Paul Gaudechoux, at SPC, Noumea (the full address is on the form). SPC is forming other Special Interest Groups as the need arises, so please also indicate on the Questionnaire your other areas of interest.

There is a lot of exciting news in this issue. The most significant for the long-term development of the industry is the publication by the Indian research team at CMFRI, Tuticorin, of their hatchery success with *Pinctada margaritifera*. This was actually published in early 1989, in *Aquaculture*. We congratulate the Indian authors, and hope to hear more from them in the future.(con't p 2)

Inside this issue

PIMRIS is a joint project of 4 international organisations concerned with fisheries and marine resource development in the Pacific Islands region. The project is executed by the South Pacific Commission (SPC), the South Pacific Forum Fisheries Agency (FFA), the University of the South Pacific's Pacific Information Centre (USP-PIC), and the South Pacific Applied Geoscience Commission (SOPAC). Funding is provided by the International Centre for Ocean Development (ICOD) and the Government of France. This bulletin is produced by SPC as part of its commitment to PIMRIS. The aim of PIMRIS is to improve the availability of information on marine resources to users in the region, so as to support their rational development and management. PIMRIS activities include: the active collection, cataloguing and archiving of technical documents, especially ephemera ("grey literature"); evaluation, repackaging and dissemination of information; provision of literature searches, question-and-answer services and bibliographic support; and assistance with the development of in-country reference collections and databases on marine resources.

PIMRIS

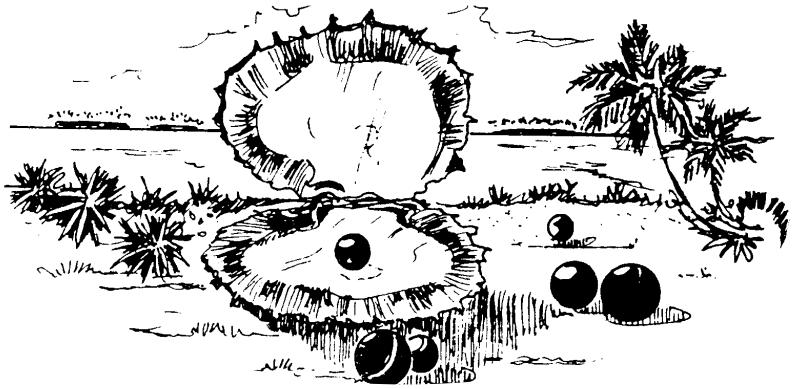
Pacific Islands Marine Resources Information System

It is encouraging to see several contributions on pearl and pearl shell marketing in this issue. Seamus McElroy provides a comprehensive overview of the Pacific pearl market in Japan. Hideyuki Tanaka translated some recent Japanese market figures.

Several snippets refer to the volatility of pearl prices. It is often suggested that over-production causes slumps, but there is a dearth of hard evidence on the relationship between pearl quality, quantities and value. In a short opinion piece here, I suggest it is time for more objective analysis of the economics of the industry. The growing impetus to Pacific pearl culture developments makes the pearl market's stability increasingly important. The last thing needed by developing Pacific Islands is yet another industry beset with the price and production quandaries of other commodity markets.

We also have news of sociological studies on pearl culture developments. Two New Zealand university researchers point out, by suggestion and by example, the need for pearl culture developments to be well planned and for their impacts to be carefully monitored. Pearl culture distinguishes itself from other fisheries development projects by the sheer scale of financial returns which can be generated. This money can have a significant impact on atoll communities whose previous incomes were often based largely on copra. The goals for these developments need to be clearly defined, and the welfare of the target groups should be always carefully considered.

PEARL OYSTER NEWS



Black-lip hatchery developments published

The Indian pearl oyster research team at the C.M.F.R.I. Research Centre at Tuticorin (K. Alagarswami, S. Dharmaraj, A. Chellam, T.S. Velayudhan, and others) have long distinguished themselves with their dedicated research and consistent publication of results with *Pinctada fucata*. The team has recently added a major feather to their cap, by publishing a report of methods used and results obtained in successful hatchery trials with *Pinctada margaritifera*. This is both the first published hatchery success, and the first complete description of larval development in *Pinctada margaritifera*.

This comprehensive paper, published in a high-profile international journal (Aquaculture 76 (1/2): 43-56), is a significant milestone. Black pearl farms in Okinawa have reportedly relied on hatchery-bred spat for many years. There were also other rumours of successful larval culture of *Pinctada margaritifera* and *Pinctada maxima*, but few publications were available. Most of the successful research was either of a proprietary nature, or remained unpublished because of government controls.

The paper provides a thorough account of the methods used. There were no magic wands—all basically good, clean hatchery techniques. 6.3 per cent of larvae settled as spat after day 28. Unfortunately the Tuticorin laboratory is not well sited for black-lip culture. Despite some initial good growth, there was a heavy mortality at 4 months. The last survivor attained a shell diameter of 38.8 mm by 11 months.

Replication of these results in Tuticorin has been prevented by the lack of broodstocks. Only four adults were originally available, and these gradually died off. The nearest sizeable broodstocks are in the Andaman and Nicobar Islands. The baton should now pass to researchers with access to suitable hatchery facilities and plentiful broodstocks. Can these results be repeated? With what predictability? What survivorship might be expected through to seeding age? As the paper concludes, 'It remains to be tested whether hatchery-produced juveniles would have a greater chance of survival in oceanic island conditions.'

Australian industry boom predicted

Australian cultured pearl sales will reach a record A$ 80 million, according to a recent article in the Australian Financial Review ('Record Year Forecast For Cultured Pearl Industry') by David Lague, dated 8 November 1989. This 33 per cent increase is due to stablised production and a strengthening demand, Lague wrote.

Mr Bruce Brown, president of the Pearl Producers Association, indicated in the article that over-production was the major threat to the market. Pearl prices were 'highly volatile' and 'depressed prices would almost certainly follow this period of prosperity'.

Brown was quoted as saying that the 1984 slump in the Australian industry was due to 'over-production' and 'the bacterial disease vibriosis'. Prices at that time dropped 66 per cent in two months. Brown explained that the few buyers and dealers holding pearl stocks in reserve 'reacted immediately to supply fluctuations in the market'. 'Panic sets in like wildfire', he said. 'Everyone tried to quit their pearls and get back into the market at the new prices. Producers have to make provisions for these cycles.'

The director of the WA Fisheries Department, Mr Bernard Bowan (in the same article), referred to the causes of the early 1980's slump as 'a depressed market and vibriosis'. A stronger market has combined with improved husbandry methods to give the industry a brighter future. Mr Bowan was quoted as saying: 'Today we have a situation where there are a number of very good pearl farms all with very good management, better technology, new equipment and a better understanding of the oysters. This means the industry is producing better pearls and getting more pearls from each oyster'.

The article concluded that pearl producers were 'worried that new techniques for growing oysters in hatcheries could threaten the controlled industry and that unrestricted production could undermine prices'. Mr Brown said they were concerned that unrestricted production at hatcheries could flood the market.

Black pearl sales acquire the mark of nobility

A necklace of 119 cultured black pearls from French Polynesia recently sold at auction at Christies in New York for approximatively US$ 880,000 (100 million CFP). An article in 'Les Nouvelles Caledoniennes' (21/2/90) featured a photograph of the necklace, and described the increasing profile of Tahitian pearls. It was reported that the magazine 'Gems and Gemology' , the 'bible' of jewelers of North America and other countries dedicated an entire recent issue to Tahitian pearls. This followed the successes of earlier sales at the New York auctions.

The article asserted that 'the most difficult job of the marketing phase seems to be overcome. What remains now is to convince everyone, both producers and dealers, that one global organisation, rational, honest, 'transparent', from production to marketing of the magnificent jewels, will be in the interest of all, and will preserve the quality and the high value (of pearls). There is no place for small speculative interests nor for the big short-term gains. French Polynesia hopes to take care of their industry, which seems to be a gift from God for these atolls'.

The call for greater co-ordination of production and marketing strategies has also been echoed by other French Polynesian concerns. There is certainly room for greater technical co-operation between Pacific Island countries, but do established producers share the same interest in regulated markets as small-scale or developing producers?

Pearl shell market study

An analysis of pearl shell marketing and processing in Asia was undertaken as part of a recent study of South Pacific marine products. 'The marketing and processing of pearl shell in South Korea, Taiwan and Japan' comprises a single chapter of the volume, published by the Institute of Pacific studies of the University of the South Pacific (Philipson, P.W (ed). 1989. The marketing of marine products from the South Pacific. USP. Suva).

This chapter assesses the viability of further button blank activities in the South Pacific, and covers both pearl shell and trochus shell. Button or button blank enterprises are currently operating in Vanuatu (4), Pohnpei (1) and in Fiji (2). Philipson suggests that the benefits of exporting value-added shell as blanks could include employment for 250 people, and an extra US$ 6 million to the current shell export value from the region of US$ 4 million.

The chapter gives a short history of the industry. Philipson claims that the decline in Pacific shell industries after World War II was not due, as is widely suggested, to the advent of plastic substitutes. This suggests that shell industries are not completely vulnerable to fashion's vagaries. Shell prices had doubled in the eighteen months prior to writing. This was due to both increasingly limited supplies, and continuing strong demand.

Current available export and import data are given. 1,000 million buttons are estimated to be produced

annually from about 6,000 t of shell. 70 per cent of the shell used in the industry is from trochus. An annual total of around 1,500 t of all shell comes from the Pacific Island region.

The Japanese Pearl Market

by Seamus McElroy
FFA, Solomon Islands

World production of pearls is estimated at between 80—100 t/year (not all of which are jewellery grade). Japan is the largest producer of pearls. It is also the largest importer of raw pearls, accounting it would appear for over 90 per cent of such imports in the first instance. Table 1 illustrates the growth in volume and value of pearl production in Japan during the last 11 years. Table 2 presents key information for Japan on the volume and value of pearl imports and exports for the last two years, together with a crude estimate of the 'net balance of trade' (i.e. it is not adjusted for value added on the home market), derived from Japanese production, import and export data.

Table 1. Production of pearls in Japan 1978-1988 (by volume and value)

Year	Freshwater pearls		Seawater pearls		Total		
	Tonnes	Yen M	Tonnes	Yen M	Tonnes	Yen M	US$ M
1978	6.1	2,758	37.0	22,128	43.1	24,886	118
1979	5.8	3,023	40.0	32,176	45.8	35,199	161
1980	6.3	4,608	42.0	46,062	48.3	50,670	223
1981	6.0	5,741	46.0	48,925	52.0	54,666	248
1982	6.1	3,961	52.0	47,817	58.1	51,778	208
1983	6.0	3,355	58.0	59,825	64.0	63,180	266
1984	6.0	3,029	64.0	65,682	70.0	68,711	289
1985	4.0	1,990	62.0	57,833	66.0	59,823	251
1986	2.4	853	67.0	53,571	69.4	54,424	323
1987	2.2	666	66.0	51,413	68.2	52,079	361
1988	1.6	715	70.0	61,163	71.6	61,878	482

Source: Japanese Government Statistics, 1989. (In Japanese)

Notes
1. Note the decline in Freshwater pearl production from 6.1 tonnes in 1978 to 1.6 tonnes in 1988, although the unit value in Yen remained fairly constant e.g. Yen M 452/t in 1978 against Yen M 447/t in 1988.
2. The rapid rate of growth in Seawater pearl production from 37 tonnes in 1978 to 64 tonnes in 1984 has since slowed considerably reaching 70 tonnes in 1988. The unit price has risen from Yen M 598/t in 1978 to Yen M 874/t in 1988. Seawater pearls fetch nearly twice the value of freshwater pearls.
3. The Yen value of total domestic pearl production peaked in 1984 at Yen 68,700 million for 70 tonnes while in 1988 the value had dropped to Yen 61,900 million for 71.6 tonnes. Because of exchange rate changes, the reverse is true for the trend in the US$ value of Japanese production since 1984, it having risen by two thirds.

About 65 per cent of all jewellery pearls processed in Japan are exported, mainly to the USA and Western Europe (particularly Switzerland and Western Germany). Table 2 (a, b & c) presents key data on recent exports of pearls from Japan. Significantly, the Japanese have operated a fairly successful 'diamond policy', representing virtual monopoly control, for a number of years in both (1) the seeding operation and (2) the processing and international market in pearls.

Table 2a. Japanese imports and exports of pearls by customs category (1988 and 1989)

		IMPORTS			EXPOR	
Year	**Commodity**	**Kg**	**Yen M**	**Commodity**	**Kg**	**Yen M**
	RAW PEARLS (7101)					
88	7101.10-000	137	1,228.5	7101.10-000	472	163.1
89	Natural pearls	162	1,209.0	Natural pearls	207	79.2
88	7101.21-010	3,263	589.5	7101.21-100	803	191.3
89	Unkwd cult FW	2,967	539.8	Unwkd cult FW	1,100	171.6
88	7101.21-090	2,000	11,240.6	7101.21-910	733	2,673.0
89	Unkwd cult SW	2,231	18,284.2	Unkwd cult SW loose pearls	1,651	3,907.0
88				7101.21-990	80,271	363.8
89				Unwkd cult SW other than loose	96,029	
88	7101.22-010	336	242.3	7101.22-100	319	161.2
89	Wkd cult half pearls	512	241.2	Wkd cult FW	372	154.9
88	7101.22-090	176	776.0	7101.22-910	2,329	3,657.7
89	Wkd cult pearls	640	442.9	Wkd cult SW loose pearls	2,496	4,133.0
88				7101.22-920	1,660	1,683.3
89				Wkd cult SW three-quarters prls	2,105	2,255.4
88				7101.22-930	631	1,607.1
89				Wkd cult SW half pearls	808	2,051.9
88				7101.22-990	35,937	202.9
89				Wkd cult SW n.e.s	15,924	123.1
88	**Sub-total**	**5,912**	**14,076.9**		**123,146**	**10,703.**
89		**6,512**	**20,717.1**		**120,692**	**13,347.**
	PEARL STRINGS (7116)					
88	7116.10-011	14,489	983.8	7116.10-110	5,305	1,007.3
89	Graded FW	12,528	828.1	Graded FW	2,702	729.4
88	7116.10-019	372	677.7	7116.10-190	32,840	31,263.7
89	Graded SW	440	812.1	Graded SW	35,550	35,861.6
88	7116.10-090	2,678	195.9	7116.10-900	826	105.5
89	Articles of pearls	8,883	400.8	Articles of pearls	300	426.6
88	**Sub-total**	**17,539**	**1,857.4**		**38,971**	**32,376.**
89		**21,851**	**2,041.0**		**38,552**	**37,017.**

Source: JUMPIA (1989,1990). Japanese import of marine products 1988 and 1989. Japanese Marine Products Importers Association, Tokyo, Japan, 1989, 1990.

Commodity Key FW = Freshwater; SW = other than freshwater, i.e. sea water,

unwkd cult = unworked, cultured; n.e.s = not elsewhere specified

Notes: (i) Imports: raw pearls other than FW (i.e. unworked SW) account for the major portion of pearl imports by value, while 'graded FW' and 'articles of pearl' account for the major portion of pearl imports by volume.

(ii) Exports: 'graded pearls other than FW' (i.e. graded SW) account for the major portion of pearl exports by value, while 'unworked cultured pearls other than FW' account for the major portion of pearl exports by volume.

Table 2b. Graded pearls (other than freshwater pearls) exported from Japan ranked by value, by country of destination 1988 and 1989.

(Customs category 7116.10-190)

	Year	Kg	Yen M	Yen	US$ '000/kg
	US$				
USA	88	13,478	13,143	975	7.60
	89	15,233	14,852	975	7.06
EEC	88	8,864	6,748	761	5.93
	89	9,094	7,941	873	6.32
(of which	88	4,537	3,069	676	5.27
Germany)	89	4,274	3,634	850	6.15
(Italy)	88	1,097	1,202	1096	8.55
	89	1,209	1,451	1200	8.69
(France)	88	1,125	1,025	911	7.10
	89	1,048	1,019	972	7.04
Switzerland	88	5,353	6,264	1170	9.12
	89	5,932	7,037	1186	8.59
H. Kong	88	2,944	3,494	1187	9.25
	89	3,024	4,296	1421	10.29
Others	88	2,201	1,615	734	5.72
	89	2,267	1,736	766	5.55
Total	**88**	**32,840**	**31,264**	**952**	**7.42**
	89	**35,550**	**35,862**	**1009**	**7.31**
% of total	88	20.3	72.6		
exports	89	22.3	71.2		

Exchange rate: Yen/US$ = 128.26 in 1988,
138.11 in 1989.

Source: JUMPIA (1989,1990). Japanese import of marine products 1988 and 1989. Japanese Marine Products Importers Association, Tokyo, Japan, 1989, 1990.

Note 1: Of the 12 customs category for the export of pearls, this single category (7116.10-190) accounts for over 70 per cent by value of all pearl exports from Japan (refer Table 2a).

Table 2c. Balance of production and trade of pearls in Japan in 1988

	Cultured Freshwater		**Others (seawater)**		**Total**	
	Kg	Yen M	Kg	Yen M	Kg	Yen M
Product.	1,600	715	70,000	61,163	71,600	61,878
Import	17,752	1,573	5,699	14,361	23,451	15,934
Exports	6,108	1,199	156,009	41,881	162,117	43,080
Apparent domestic use	13,244	1,089	-80,310	33,643	-67,066	34,732

The value of pearl imports into Japan (mostly for further processing) has more than doubled over the last three years, to reach US$ 162 million in 1989. The volume and value of imports of pearls (raw and in strings) into Japan by country of origin for the years 1988 and 1989 are given in H.Tanaka's article, below.

The main exporter of pearls to Japan is Australia, followed by French Polynesia and Indonesia. China is also a major exporter, with a large part of its exports being routed through Hong Kong, China, incidentally, is the world's largest exporter of cultured freshwater pearls. Other important exporters to Japan are the USA, Philippines, India and Taiwan.

In the Pacific (which includes Australia), seven countries have exported pearls to Japan in the last two years (see H.Tanaka's article below). Their total value was US$ 112 million in 1989 (accounting for about 70 per cent of Japanese pearl imports by value).

The most important Pacific Island exporters in 1989 were French Polynesia, New Caledonia (presumed to be mostly re-exports originating in French Polynesia) and Cook Islands. The Pacific Island countries alone (i.e. including Australia) accounted for 23 per cent of such imports into Japan by value in 1988, rising to 26 per cent in 1989. However, these six countries accounted for just 6 per cent by weight of total raw pearl imports to Japan in 1988, rising to 8 per cent in 1989. Thus, the unit value (and, hence, quality) of Pacific Island raw pearl exports to Japan is very high.

Most tropical pearls are produced from the goldlip pearl oyster (mostly natural pink, gold, silver and white coloured pearls), but production from the blacklip pearl oyster (which produces a grey to black coloured pearl) is increasing. The main producers of black pearls are in the Pacific Islands; namely, French Polynesia and Cook Islands.

No distinction is generally made between pearls produced from the blacklip and other oysters in export statistics from French Polynesia and Cook Islands. Some natural, baroque pearls from *Pinctada maculata* might also be included in these data.

Philippines, reportedly a small producer compared to the above two Pacific Island countries, and Japan (Okinawa) are the main producers of blacklip pearls outside the Pacific Islands. As almost all the pearl production of the two Pacific Island countries is exported, it is roughly estimated that total world production (outside of Japan) of black pearls (from the blacklip pearl oyster) amounted to just 320 kg in 1988, rising by 60 per cent to 510 kg in 1989 (i.e. about 5—8 per cent of annual world supply of jewellery-quality raw pearls).

Present total world production is reputed to be not substantially above this figure, and well be low 1,000 kg/year.

Techniques for the culture of blacklip pearls were pioneered in French Polynesia in the 1970s. The first exports of black pearls of 6 kg worth US$ 80,000 (US$ 13,333/kg) took place in 1976. By 1983, export value had shot up to US$ 4,182,000 for just 139 kg of pearls (US$ 30,085/kg). Since 1983, black pearls have been the top export earner of this French territory. Total pearl exports to Japan in 1989 were valued at US$ 41.1 million CIF, of which raw pearls accounted for 500 kg (US$ 80,814/kg). Clearly, as the small annual supply of black pearls has grown over the past 14 years, a market for this particular pearl has developed and black pearls have become increasingly sought after.

Some producers believe the acceptability of black pearls on the market depends upon an annual output of at least 1,000 kg jewellery-grade pearls per year being attained. Meanwhile, some Pacific Island producers fear that extending the culture of blacklip pearls to new producers in other parts of the Pacific Islands is likely to result in a lowering of the value of the South Sea pearl. The evidence to date of prices rising with rising production (see above) does not support these fears. Indeed, such a phenomenon is typical of an expanding niche market. The present high price might have only been possible because of aggressive control of the quality of pearl sold. However, if French Polynesia can maintain its present high quality of pearls offered to buyers, it would appear to have nothing to fear (but, perhaps, much to gain) from other producers entering this market.

Cook Islands has adopted the technology and techniques pioneered in French Polynesia, and has been culturing blacklip pearls using these methods since 1987. By 1989, Cook Islands (specifically Manihiki) exported 26 kg of blacklip pearl valued at US$ 350,000 FOB (according to customs figures available at Cook Islands Statistics Office in March 1990).

One pearl farmer has been active producing blacklip pearls in Fiji for a number of years for the more discerning part of the domestic tourist market. With single pearl settings fetching over US$ 3,000, it can be a very lucrative family business.

Interest in pearl culture in the South Pacific is strongest in the low lying atolls of the region, specifically Federated States of Micronesia, Marshall Islands, Kiribati, Tuvalu, Cook Islands, and the high island Melanesian countries of Fiji, Solomon Islands and Papua New Guinea.

The first stage in developing a pearl oyster industry based on wild stocks centres on establishing a large self-sustaining population of pearl oyster shell. Natural stocks are often enhanced through collection and aggregation by divers and/or by the use of spat collectors. Growth and survival rates can be enhanced through the use of suspended culture techniques. The latter techniques have proven successful for the shallow-living blacklip oyster in the Pacific.

Pearl oyster cultivation to this first stage yields a valuable shell. US$ FOB prices ex Solomon Islands in mid-1990 were US$ 8.00/kg for blacklip shell (grade A), and for goldlip shell US$ 11.00/kg (grade A), US$ 9.00/kg (grade B) and US$ 5.00/kg (grade C). By comparison, trochus shell fetched US$ 8.60/kg. It is important to note that these product markets are not identical. For example, blacklip shell, like trochus, is used to make natural buttons, but is more valuable if used in inlay work (a speciality of Korean and Japanese furniture manufacturers and artisans). Given the present shortage of such shell for this industry, the current prices for trochus and blacklip probably reflect these different end-uses.

Another valuable product of the pearl oyster is its meat. This comprises both the adductor muscle and mantle. As with the adductor muscle of giant clam, this may be frozen, bottled or canned, or smoked and dried (the last-named product is known in Japan as kaibashera). However, it is normally eaten fresh by the Pacific islanders at present, as it is considered somewhat of a delicacy by them. Furthermore, the volumes involved are normally too small to justify anything other than the simplest of processing methods.

The second stage is the culture of pearl oyster for the production predominantely of pearls, but where both the shell and meat do or could provide a valuable second source of income. The production of pearls is a separate and distinct industry from the production of shell. It is often a high investment cost industry by private enterprise. However, the present day industry for blacklip pearls in French Polynesia, Cook Islands and Fiji is undertaken by a mixture of commercial companies, individual families and island societies. There is considerable interest currently to extend this pioneer industry within the Pacific Islands.

While for many communities in the South Pacific the major exportable marine resources contributing to the coastal village economy in the 1990s will continue to be mother-of-pearl shell followed by beche-de-mer, it seems likely that the emphasis may shift away from pearl shell collection on the reef, deep water passages and lagoon floor to the culture of the shell for pearls in those communities which either already have good pearl oyster beds or have the potential to build up these stocks quickly through enhancement schemes.

In the Pacific, the prospects are that there will be a real increase in the production of shell from culture activities

to supplement the natural productivity of certain favourable lagoon and pass sites which have traditionally supported a pearl oyster shell industry.

Japanese pearl imports: 1988 and 1989

Translated and converted by Hideyuki Tanaka
SPADP/UNDP, Fiji

Country	Year	Non-processed kg	Non-processed US$ (x 1,000)	Stringed kg	Stringed US$ (x 1,000)	Total kg	Total US$ (x 1,000)
Australia	88	1,068.45	45,209	0.99	163	1,069.44	45,372
	89	1,217.34	70,438	9.97	913	1,227.44	71,351
Fr.Polynesia	88	312.89	24,912	-	54	312.89	24,965
	89	498.63	40,759	4.99	692	503.62	41,451
Indonesia	88	339.98	8,454	0.00	0	339.98	8,454
	89	516.00	11,557	0.00	0	516.00	11,557
Hong Kong	88	770.71	5,559	7,046.16	4,584	7,816.87	10,142
	89	1,542.21	6,099	7,512.91	3,255	9,055.12	9,354
USA	88	113.50	8,520	89.76	667	203.26	9,187
	89	163.89	8,324	59.84	1,000	223.73	9,324
China	88	2,675.45	4,227	7,086.05	3,737	9,761.50	7,964
	89	1,926.06	2,455	4,192.79	3	6,118.85	2,457
Philippines	88	81.40	5,069	-	6	81.40	5,075
	89	70.42	3,790	0.00	0	70.42	3,790
India	88	26.60	132	246.34	64	272.94	196
	89	31.52	604	307.18	2,085	338.70	2,689
Formosa	88	55.47	55	270.28	2,041	325.75	2,096
	89	331.23	159	768.94	114	1,100.17	273
Thailand	88	36.80	589	4.99	786	41.79	1,375
	89	15.98	682	-	103	15.98	785
Malaysia	88	299.02	1,369	-	52	299.02	1,421
	89	25.83	701	0.00	0	25.83	701
Myanmar	88	0.65	75	0.00	0	0.65	75
	89	27.15	629	0.00	0	27.15	629
N. Caledonia	88	21.39	1,857	0.00	0	21.39	1,857
	89	5.89	491	0.00	0	5.89	491
Cook Islands	88	0.00	0	0.00	0	0.00	0
	89	11.40	444	0.00	0	11.40	444
Switzerland	88	5.56	79	28.92	689	34.48	767
	89	2.70	123	11.97	215	14.67	338
New Zealand	88	0.00	0	0.00	0	0.00	0
	89	6.13	324	0.00	0	6.13	324
South Korea	88	51.04	157	0.00	0	51.04	157
	89	89.25	235	9.97	21	99.23	256
West Germany	88	4.60	68	43.88	340	48.48	408
	89	0.97	78	20.94	168	21.92	246
Singapore	88	3.52	22	-	2	3.52	24
	89	0.62	26	11.97	39	12.59	65
Canada	88	0.80	4	0.00	0	0.80	4
	89	2.54	21	1.99	24	4.53	45
U.K.	88	0.00	0	2.00	34	2.00	34
	89	0.76	8	9.97	34	10.73	42
Denmark	88	0.00	0	0.00	0	0.00	0
	89	0.00	0	9.97	26	9.97	26
Austria	88	0.00	0	0.00	0	0.00	0
	89	0.08	11	0.00	0	0.08	11
Belgium	88	0.00	0	0.00	0	0.00	0
	89	4.24	8	0.00	0	4.24	8
France	88	5.71	316	1.99	10	7.70	326
	89	0.00	0	-	5	-	5
Sweden	88	0.00	0	-	2	-	2
	89	0.09	4	0.00	0	0.09	4
Spain	88	1.00	7	0.00	0	1.00	20
	89	0.58	4	0.00	0	0.58	4
Sri Lanka	88	0.00	0	0.00	0	0.00	0
	89	0.31	3	0.00	0	0.31	3
Israel	88	0.00	0	0.00	0	0.00	0
	89	2.80	3	0.00	0	2.80	3
P N Guinea	88	15.66	1,442	0.00	0	15.66	1,442
	89	0.00	0	0.00	0	0.00	0
Tonga	88	1.08	155	0.00	0	1.08	155
	89	0.00	0	0.00	0	0.00	0
Norway	88	0.00	0	-	-	-	7
	89	0.00	0	0.00	0	0.00	0
Kuwait	88	3.49	5	0.00	0	3.49	5
	89	0.00	0	0.00	0	0.00	0
Unidentified	88	0.21	2	0.00	0	0.21	2
	89	0.00	0	0.00	0	0.00	0
Total	**88**	**5,895.00**	**108,284**	**14,821.40**	**13,250**	**20,716.30**	**121,534**
	89	**6,494.60**	**147,979**	**12,933.40**	**8,697**	**19,428.00**	**156,676**

(Source: Weekly Pearl Newspaper, No 1159, 2 March 1990)

Tahitian pearls prices soar

The price of black pearls 'soared' at the annual auctions in Papeete, Tahiti, in October 1989, due to heavy Japanese buying, according to the dealers quoted in an article in The Australian Financial Review ('Black pearls in ascendance: 11 October 1989). Nearly 39,000 black pearls from French Polynesian lagoons were put up for sale, with returns 42 per cent more than predicted. The 121 lots of pearls, weighing 7,700 grams, sold for a total of 30.6 million french francs (A$ 6.15 million). The expected total was 21.6 million francs (A$ 4.35 million).

What causes slumps?

by Neil Sims

Several articles in this issue highlight the volatility of the cultured pearl market, and refer to the role of over-production in pearl price slumps. Although over-production is frequently cited as the cause of industry crashes, there has been no clear evidence of a direct relationship. It has all been by inference and anecdotes. Other factors will often coincide with market crashes. Pollution, poor farm management, or infectious disease losses can often be linked to the industry problems, but their role is usually downplayed;

It is never made clear whether the market falls due to lots of pearls, or because of lots of poor quality pearls. There is a need, when speaking of these issues, to clearly differentiate between over-production causing over-supply in the market-place, and over-crowding of oysters, poor handling, premature harvesting of pearls, and other problems on farms causing declines in product quality.

Established producers in the Pacific sometimes express fears that the pearl culture developments in other island countries could lead to an over-supply of black pearls. Other producers believe that production of black pearls must exceed one tonne per annum before full market acceptability is attained (see S. McElroy's article, above). This is an estimate of only a minimum production rate to optimise prices, but is still double the current level of production.

Closer study of pearl marketing structures is obviously needed. The marketing options available to the new Pacific Island pearl producers certainly need to be identified. The stability of the market should also be evaluated. If over-supply is a real problem in the industry, the development thrust for expansion of pearl farming across the Pacific may need to be re-assessed. If there are benefits to be gained from increased production, what co-operative development and marketing strategies will work best?

Pearl farm development assistance in the Cook Islands

by Julian Dashwood
Ministry of Marine Resources, Cook Islands

The United States Government has agreed to provide US$ 2.4 million for pearl culture developments in the Northern Group of the Cook Islands. The project provides for fostering of local farms on Manihiki, Rakahanga and Penrhyn, and the establishment of a government-owned pearl farm on Suwarrow Atoll. The funds are being provided basically to assist with the provision of farming equipment, transportation, technical expertise, infrastructural development, and training. The project will run for a period of five years.

Sydney market for south sea pearls

South Sea pearl prices in Sydney increase each year because of the short supply and high demand, according to a Potts Point jeweller quoted in an article in the Sydney Morning Herald ('A taste of the South Sea Pearl—from A$ 3,000 to A$ 1 million', by Robin Hill, 7 July 1988). The jeweller, Tony White, claimed that although people in Sydney will pay up to A$ 250,000 for a string of South Sea Pearls, enthusiasts in New York or Geneva will pay up to A$ 1 million.

'South Sea Pearls' is the trade name for pearls produced from *Pinctada maxima*, the gold-lip or silver-lip pearl oyster cultured in Northern Australia and South East Asia.

Winged pearl shell newly found in Tonga

by Hideyuki Tanaka
SPADP/UNDP, Fiji

A number of grown winged pearl shell were found attached to the ropes of a FAD on Vava'u, Tonga. It was previously believed that winged pearl shell were not found in Vava'u. These specimens might have originated from the pearl culture trial carried out by a Japanese pearl firm, Tasaki Pearl Co. This firm introduced winged pearl shell, gold-lip pearl shell, black-lip pearl shell, and Japanese pearl shell from Japan. The project consisted of introductions in 1975,1976, 1977, and 1979, at the request of the King of Tonga. Winged pearl shell cannot currently produce round pearls, because its gonad (in which pearl nucleus in inserted) is too small, and too complicated in organ structure for successful surgery.

Winged pearl shell can, however, produce "blister" pearls. The colour and size of these *mabe* pearls is renowned. Consequently, its market price is considerably higher than that of other pearls shells, and its production is currently increasing remarkably. Artificial seed (hatchery) production of winged pearl shell has been carried out successfully only by Tasaki Pearl Co. in Amami, Japan in 1970's. The seed introduced to Vava'u from Japan was supplied from this hatchery.

There is no evidence that the winged pearl shell found in Vava'u is from these Japanese introductions. This may need an amino-acid analysis by electrophoresis or a comparative study of genes. Tonga Fisheries Division carried out a stock survey of this newly-found resource in Vava'u in November 1989 in association with FAO South Pacific Aquaculture Development Project. The survey aimed to assess the feasibility of winged pearl shell culture and pearl production. As a result of the survey, experimental spat collection was encouraged to increase settlement in the area.

This programme started in December with three sets of spat collectors deployed in different locations off Vava'u. The collectors will be examined and re-installed periodically. Spat collection, materials of collectors, spawning season, and growth rate of shell will be examined.

Survey of Pearl Oyster Resources at Nukulaelae Atoll, Tuvalu

G.L. Preston, SPC, New Caledonia

A survey of pearl oyster stocks was carried out in April, 1990, to determine the potential for pearl oyster culture in the lagoon.

The survey involved intensive searching for pearl oysters, by free-diving or SCUBA diving, at 19 sites in and around the lagoon. The survey was carried out by a 4-man diving team (G. Preston, South Pacific Commission; T. Gentle, Tuvalu Fisheries; M. Kamatie, Kiribati Fisheries and M. Naseli, Tuvalu Fisheries), assisted by local residents with local experience of pearl oyster collection. Good coverage of the different habitat types in the lagoon, and a comprehensive distribution of sampling effort, was achieved. Consultations were also held with local residents to gather anecdotal information on the abundance and exploitation history of the resource.

Pearl oyster stocks were determined to be low, especially relative to other countries where pearl oysters have been commercially exploited or cultured. Only four live specimens were found during the field work, although it was possible to examine other live and dead shell that had already been collected by island residents. Present stock levels are not adequate to support the establishment of farming activities on even a very small scale. There is no evidence that stocks were ever vastly more abundant than they are now, or that they have been greatly reduced by human collection activity.

Despite the low abundance of pearl oysters, Nukulaelae lagoon appears to present some localised areas of suitable pearl oyster habitat. The fact that these are populated by other bivalve species suggest that physical, chemical or biological conditions in the lagoon are limiting pearl oyster population growth. In the report of the survey, it is speculated that the limitation may be acting at an early point in the pearl oyster life cycle, since the few adults taken from the lagoon during the survey, as well as shells belonging to private individuals, appeared to demonstrate good growth and to reach relatively large sizes.

Further research is required to determine whether pearl oyster population growth could be promoted by enhancing larval settlement and growth using spat collectors and juvenile husbandry methods. The constraints of initiating such a project on Nukulaelae are discussed in the report, and an alternative approach suggested. This involves initial deployment of spat collectors in Funafuti for research purposes, and the gradual extension of this research to Nukulaelae and perhaps other Tuvaluan atolls depending on results, logistics and institutional arrangements.

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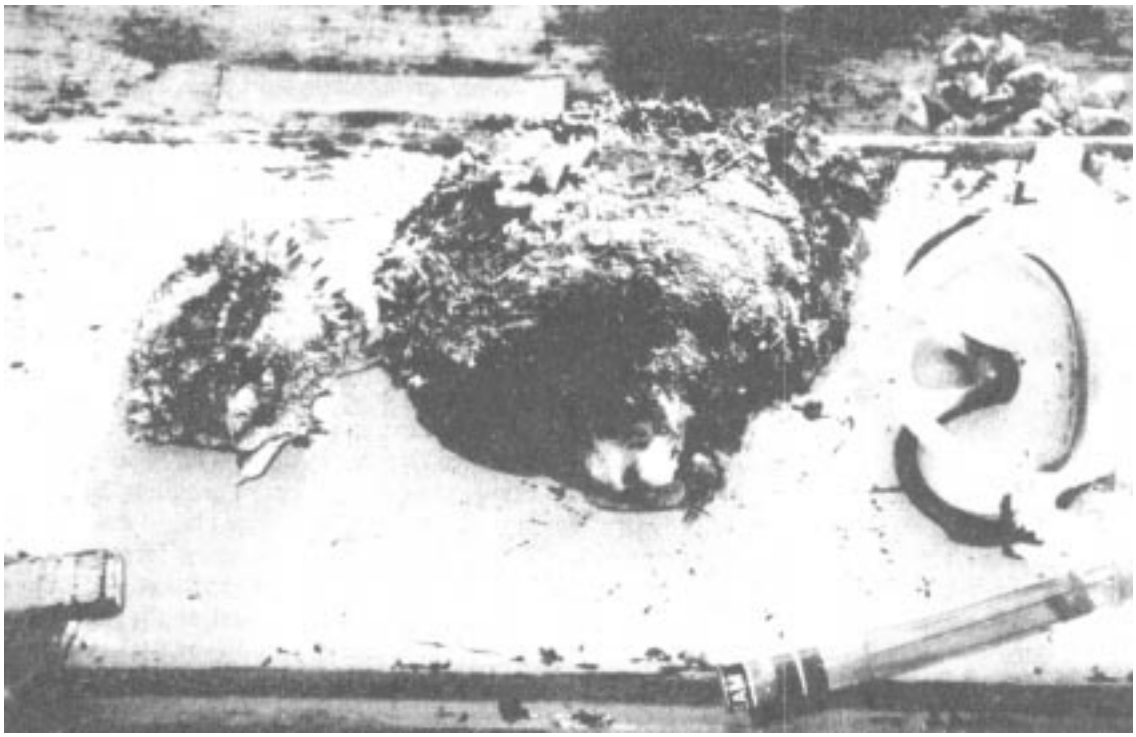
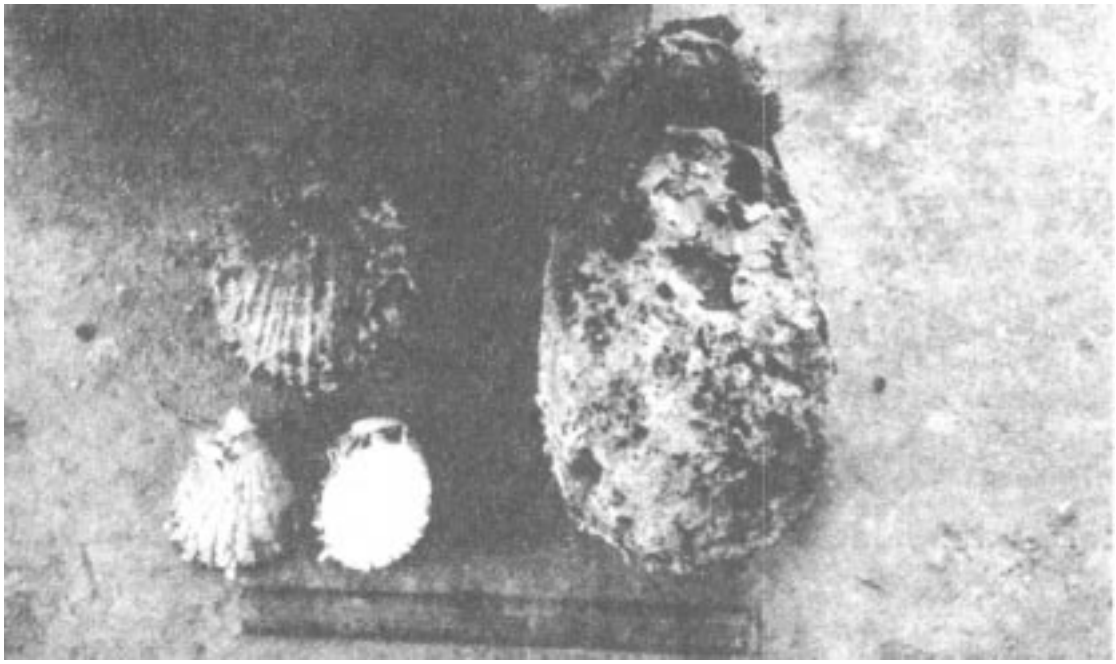


Pearl shell appears rare in Nukulaelae, but the few specimens found nevertheless showed good growth



Other bivalves, such as these thorny oysters and jewel-box clams, are abundant within the lagoon, indicating that environmental conditions are generally suitable for bivalves

Drafting a management plan in the Cook Islands

by Julian Dashwood
Ministry of Marine Resources, Cook Islands

A "Pearl Culture and Pearl Shell Fisheries Management Plan" for the Cook Islands was drafted in January - February, 1990, to provide a coordinated management approach for the booming pearl industry there. Culture developments in the Cook Islands have long been marred by conflicts between farmers, foreign interests, Island Councils, and the Government's Ministry of Marine Resources. Resolution of these conflicts, rational development of the industry, and prevention of overfishing or disease problems all require management mechanisms to be agreed upon by all industry participants.

The draft was prepared by Neil Sims, as part of a consultancy for the United States Agency for International Development. The drafting process centred on Manihiki, where the pearl culture industry is developing most rapidly. Public meetings and discussions with Island Councils were also held on Rakahanga and Penrhyn Atolls, to explain the goals of the Plan, and to review the decisions made in Manihiki. Input was also obtained from Marine Resources officials, pearl farmers, and other concerned parties on Rarotonga.

The Plan was drafted through a process of introductory villlage meetings, which outlined the need for and function of the Plan, followed by in-depth consultations with individual farmers, divers, and Island Councillors. A range of options were then presented to the Island Council. Unresolved issues were taken back to further village meetings, for more consideration. Discussion and reviewing will continue, to allow a consensus to be reached among all parties before final approval.

The need for management is widely recognised on Manihiki, where there was a strong awareness of the limits of the pearl shell resource, and the inherent ceilings on pearl farm growth. Three areas of concern were particularly emphasised: controlling access by outsiders, minimising conflicts between farmers, and between farmers and divers, and preventing the establishment of disease problems. Pearl farming licenses are now reserved exclusively for Manihikians, yet even they must fulfill residence requirements and maintenance obligations. The legal procedures and administrative processes of acquiring farm licenses and lease areas were also more clearly defined. There was wide support for regulating farming and culture activities to minimise conflicts and help prevent diseases. Opinions diverged on the need for a formal pearl farmers' association, and what such a body's functions might be.

The people and Island Councils on Rakahanga and Penrhyn were keenly aware of the potential for pearl culture, but their attitudes towards farming and management were less clear. They considered themselves minor players in the Management Plan drafting, but were very interested in further technical assistance to expand their farming efforts.

Western Australian research programme funding

The following extract from *Australian Fisheries* (November,1989, pp 47-49) details two components of the West Austrailian Fisheries Department pearl oyster research programme. The description is taken from a listing of projects funded in 1989 under the Fishing Industry Research and Development Committee account (FIRDC).

89/60: On-growing Mariculture Techniques for the Pearl Oyster *Pinctada maxima* Spat in Western Australia

Period: July 1989 - June 1990

Supervisor: Dr. J. Penn, Western Australian Department of Fisheries

Contact Officer: Mr. R. Dybdahl (09) 477 1366

Support: 1989-90 : A$ 103,390

Objectives: To enhance the cultured pearl industry in Australia by increasing the supply of pearl oysters through the use of artificial propagation methods.
To further test and develop equipment for growing 0 year class oysters.
To further develop and document husbandry protocols for 0+ and 1+ year oysters.

Background: Disease and availability of ntural stock limit the pearl oyster culture industry, currently valued at A$ 55 million. Hatchery-produced pearl oysters are required for future economic expansion and to alleviate any recruitment effects on the wild stock fishery. This projuct continues the development of on-growing techniques for hatchery-produced spat.

89/61: Studies on the development of hatchery and nursery culture of the silver-lipped pearl oyster (*P. maxima*).

Period: July 1989 - June 1990

Supervisor: Dr. J. Penn, Western Australian Department of Fisheries.

Contact Officer: Dr. R. Rose (9) 447 1366

Support: 1989-90 : A$ 107,500

Objectives: To perfect hatchery culture techniques for the silver-lipped pearl oyster to provide an alternative source of pearl oysters for the pearl culture industry.
The project will attempt to:
- refine the techniques developed in 1988-89 for the field selection and maintenance of broodstock for hatchery spawning;
- further develop and improve the culture methodologies for optimising growth and survival and settlement of pearl oyster larvae; and
- further improve the newly developed handling protocols for nursery stage pearl oyster spat.

Background: The pearl culture industry is currently valued at A$ 55 million per annum.
Hatchery-produced oysters are required for future economic expansion and to alleviate variable recruitment effects on the wild stock fishery. A FIRTA-funded hatchery at Broome (FIRTA 87/82) has produced spat in pilot-scale quantities.

Funds are provided to complete this work

Western Australia test-fishing programme

Test fishing of a new pearling ground off the north Kimberly coast was permitted under a 1989 agreement between the Australian federal government and the Western Australian government. Western Australia's Minister for Fisheries, Mr Hill, and the Federal Minister for Primary Industries, Mr Kerin, signed the agreement in early June, 1989, allowing a fleet of boats to 'test-fish' the area until February 1990.

Mr Hill was quoted in a newspaper article as saying 'The tests will show the location, density and size of pearl oysters in the area. If the results are positive, the new pearling zone will allow an expansion of the pearling industry in this State' ('Federal State pact opens up potential pearling ground', by Martin Thomas. The Weekend Australian, 3 June 1989). The data collected by the pearling boats was to be used to assess the sustainability of the resource. 'Each of the 14 parties participating in the tests will be restricted to 7,500 pearl oysters and any mother-of-pearl shells taken must be greater than 200 mm in size', he said.

Pearl fishing in the Tuamotus: social aspects

by Nancy Pollock
Victoria University, Wellington, New Zealand

Pearl fishing brought a new supply of cash and altered the pattern of labour in Takapoto in the northern Tuamotus in French Polynesia in the mid 1970s. This change brought about a number of wider social changes which I am interested in following up.

The original research was conducted as part of a UNESCO Man and the Biosphere (MAB) study of Takapoto atoll to assess the impact of human needs on the atoll biosphere. The existence of a research station run by the Service de la Peche and CNEXO to look into ways of propagating spat for the *Pinctada* pearl fishing provided a base from which I conducted a study of dietary needs and health concerns, under the programme headed by Dr. Bernard Salvat. Pearl fishing was one reason that Takapoto atoll was chosen as a base for the MAB study.

Pearls were fished in two ways. The traditional practice of collecting shells from the lagoon bottom and seeding them was used by the members of the cooperative formed under the auspices of the Service de la Peche. But five fishermen had decided to break away and were following a programme under the guidance of Mikimoto advisers from Japan, growing their own spat, and farming pearls close to the lagoon shore. I was particularly interested in the differential impact of the two modes of organization both on the fishery, and on the social orgaization and income of the members community. The fishing season was limited to two weeks a year, at which time a number of persons who did not have residence rights on Takapoto came in to sell their services on a commercial basis to those families who did not have enough persons to dive for themselves.

Some of the questions that emerged from that acquaintance with the pearl fishing programme are:

1. Organization of work. Women were the main divers, and particularly those who were of large body size. This has interesting implications for my current study of obesity in Polynesian populations.

2. Economic returns. How have these been handled? To what degree have they been reinvested in the atoll or elsewhere? To what extent have they contributed to a group of nouveau riche?

3. Ecological impact. To what extent is the community concerned about conserving this pearl fishing rescource? What are their benefits and practices of conservation?

4. Technological impact. Has the interest in improving families technological skills become more widespread? To what extent are Mikimoto, or other outside agencies maintaining an interest in assisting the people with developing the pearl fishery? What is the return to Japan? Is aid money being given?

5. To what extent is the air link essential to pearl fishing, to bring in fisher persons and to bring in expertise, and to ship out pearls?

6. Marketing. What percentage returns to the fisher people? What are the grading mechanisms for pearls? What is the potential for marketing the rest of the shell, and for the "blister" pearls?

7. Competition. To what extent is competition increasing in the industry, with adequate controls? To what extent is expertise interchanged between the Tuamotus and the northern Cook Islands? How has the Manihiki fishery affected social relationships with Tahiti and the Tuamotus?

The social impact of this new resource needs urgent evaluation in order to further our understanding of the impact of the fishery at both the village level and the national level of those island nations that have commenced to exploit this resource. The concern must be for both the ways in which the fishery brings new dimensions to the lifestyle of those involved in the fishery, including the extented family and village; and it must also address the issue of maintenance of the fishery over long term periods, such as 20 years and 50 years. A third concern is the amount of outside aid and technological advice that will be needed to maintain the fishery as a viable economic venture.

Sociological study of pearl culture developments on Manihiki

Mr.Ray Newham, of Manihiki, Cook Islands, divides his time between pearl farming and sociological studies. Ray has recently completed his M.A. thesis in Sociology through the University of Canterbury, New Zealand. His thesis is titled "Pearls and Politics" - the impact of the development of the cultured pearl industry on Manihiki."

The thesis will be published in the near future, and interested workers can write to Ray for inclusion on a reprint list. We hope to include a synopsis in the next Pearl Oyster Information Bulletin.

Ray continues to work on his family pearl farm in Manihiki lagoon. His address is: Tauhunu Village, Manihiki, Cook Islands**.**

Welcome to new members

Jean-Paul Gaudechoux
SPC, New Caledonia

The Pearl Oyster Special Interest Group is growing. We had received additional completed questionnaires from the individuals listed below. The previous list of members is available in the first SPC Pearl Oyster Information Bulletin.

If you are on the list and your name and address is wrong, please send us a correction. If you are not on the list and want to be, fill in the form enclosed with the bulletin or write to us for a new one.

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