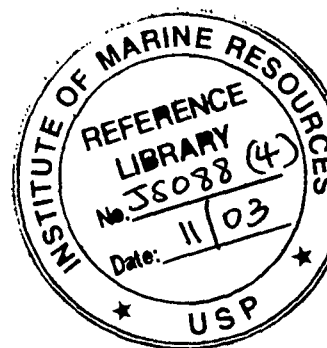


INSTITUTE OF MARINE RESOURCES

ANNUAL REPORT TO THE COUNCIL



by

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## INTRODUCTION

The Institute of Marine Resources was established in January 1978, as an integral part of the University of the South Pacific, with the following objectives:

- (a) research into regional marine resources, including fish stocks and stocks of other kinds of marine life, undersea minerals and exploration of the seabed.
- (b) the development of consultancy services for regional governments.
- (c) development of educational programmes in marine sciences.
- (d) the dissemination generally of information on tropical marine environment.

The task of the IMR is to fulfil the above objectives by being:

- (a) an advisory body for Governments in all questions of the exploration of Marine Resources inside and outside of 200 nautical mile economic zone, and in problems of the protection of the environment.
- (b) a scientific institute carrying out applied scientific study in living and non-living resources of the sea for the island countries of the U.S.P.
- (c) an educational institute, through direct research and indirect means.

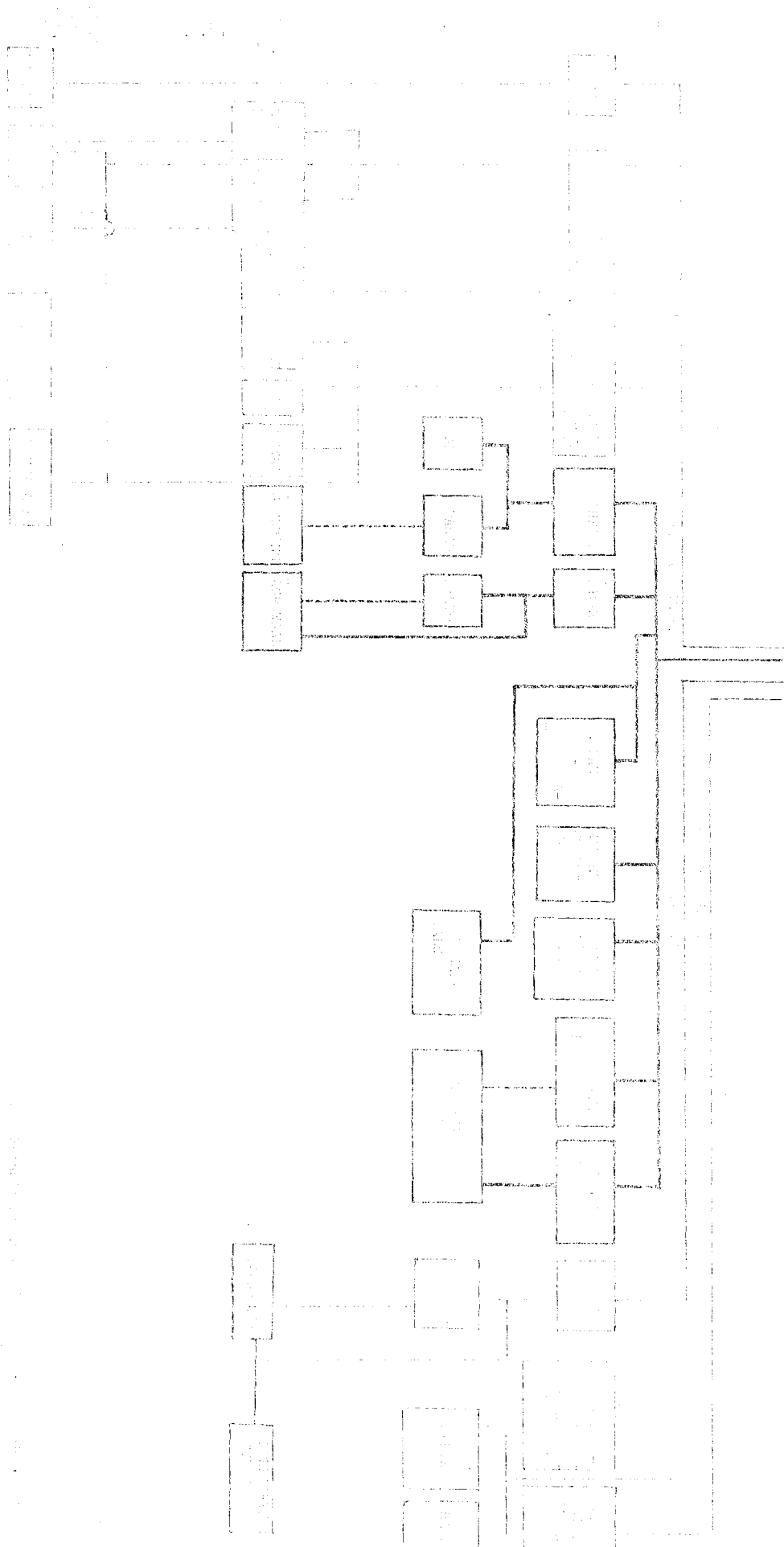
In order to fulfil these tasks the Institute must develop expertise and resources in the following areas:

- marine biology
- fisheries biology
- aquaculture
- food technology as applied to marine products
- marine geology and marine geophysics
- physical, chemical and biological oceanography and related marine meteorology
- marine pharmacology.

When fully established the Institute must have a broad capability in all spheres of marine sciences relating to the exploitation and management of the resources of the 200 mile economic zone of the member countries of USP.

## CURRENT FACILITIES

The main location of the Institute is on the Laucala Campus, Suva, Fiji. The Institute is accommodated in a temporary two-storey building (47m x 7m) which is a converted airforce hangar, with



laboratories, offices and other general facilities. The Institute has one 42 feet fibreglass boat fitted with radar, ecosounder and a hydraulic winch. In addition there are five small boats ranging from 12 to 26 feet in length and driven by outboard motors. From a recent major grant from EEC the Institute is in the process of buying some basic scientific, workshop, fisheries and assorted hydrographic equipment. A major planning exercise for a longterm development of the Institute has been completed by the Architect firm of John Rounds, Lee & Partners (1980) on a commission by the USP and funded by EEC.

The Institute also has an Atoll Research Laboratory and two houses in Tarawa, Kiribati.

## STAFF

A summary of categories of staff in IMR is given in the accompanying table. It is noteworthy that apart from the regular USP appointments staff in IMR are largely funded by special projects, such as EEC, International Seagrants programme and bilateral aid schemes. In addition the Institute derives services of associate lecturers, on part-time basis, from the Ministry of Agriculture and Fisheries, Fiji, Fiji Institute of Technology, Fiji College of Agriculture and other sections of USP, namely, Institute of Social and Administrative Studies and Home Economics (SOE).

## PROGRAMME

### (a) TEACHING

#### 1. Ph.D:

M.G. King - "The Biology of Natantian Decapods of Fiji, with special reference to Heterocarpus spp. and Parapandylus spp."  
Principal Supervisor: Dr. Uday Raj.

#### 2. M.Sc:

- 1) G. Pillai - "The Biology of the mud lobster ("Mana"), Thalassina anomala (Herbst).  
Principal Supervisor: Dr. Uday Raj
- 2) S. Choy - "The Biology of Penaeid prawns in Fijian coastal waters"  
Principal Supervisor: Dr. Uday Raj
- 3) M. Guinea - "The Biology, exploitation and management of the sea turtles of Fiji"  
Principal Supervisor: Dr. Uday Raj.

#### 3. B.Sc:

Marine Biology (NR335 - final year B.Sc.) - Dr. Raj & Dr. Zann

Fisheries Biology and Management (NR337- final year B.Sc.) -  
Dr. Raj, Dr. Zann & Mr. King

4. Diploma in Tropical Fisheries

Dip.T.F. (Year 1) Courses

Semester A:	Chemistry	)	
	Physics	)	
	Mathematics	)	SNR, USP
	Biology	)	
Semester B:	Refrigeration and	)	
	Operations of National	)	
	Marketing Authority	)	
		)	
	Fish Identification	)	
	and Basic Statistics	)	
		)	M.A.F., Fiji
	General Research	)	
	Library	)	
	Licence and Fish	)	
	Processing	)	
	Outboard and Boat	)	
	Building	)	
		)	
	Laboratory Work	)	
		)	
	Aquaculture	)	

Dip.T.F. Year II)

Invertebrate Zoology	M.G. King, IMR
Ichthyology	M.G. King, IMR
Practical Navigation	
and Boat Handling (Part A)	S.K. Middleton, IMR
Gear Technology	S.K. Middleton, IMR
Practical Fishing (Part A)	S.K. Middleton, IMR
Navigation and Pilotage	S.K. Middleton, IMR
Seamanship and Safety	St. John Ambulance
Human Nutrition	Miss Balaguer, SOE
*Keeping Records	A. Jarvis, ISAS
+Public Speaking	V. Nath/Low, FCA

Dip.T.F. (Year III)

Oceanography & Marine Biology	L.P. Zann, IMR
Fisheries Biology and	
Management	M.G. King, IMR
*Economics Budgeting and	
Costing	Jayawickrama, ISAS
+Extension	V. Nath/Low, FCA
Practical Navigation and	
Boat Handling (Part B)	S.K. Middleton, IMR
Gear Technology (Part B)	S.K. Middleton, IMR
Practical Fishing (Part B)	S.K. Middleton, IMR
Aquaculture	M.G. King, IMR
Marine Engineering Know-	
ledge	Sukanaivalu & Bukarau,
	FIT
Graphical Communication	Rajalingam and
	Tavainavesi, FIT

\* Courses taken together in one semester

+ Courses taken together (equivalent of 2 courses)

A full review of this diploma (Raj, 1980a) has been carried out and copies of this review have been forwarded to each of the 11 Governments of the USP Region.

## RECOMMENDATIONS

Unless there is an added increase and support for this diploma, the resources required to run the programme for such a small number of students are clearly unbalanced. The Governments of the USP region should now indicate clearly the level of support for this diploma. A suggestion made in the review is to replace this three-year diploma with specialised one-two year diplomas in the following major areas:

(i) Diploma in Fisheries Economics and Management  
Dip. F.B.M.

(ii) Diploma in Practical Fisheries and Fisheries Technology  
Dip. P.F.F.T.  
(This Diploma should include post-harvest technology).

(iii) Diploma in Maritime Studies  
Dip. M.S.  
(This should be offered through F.I.T., School of Maritime Studies)

(iv) Diploma in Fisheries Extension and Communications  
Dip. F.E.C.

### 5. Other

- (a) Annual lectures/laboratory on "Marine Animals in Medical cases" for graduating class of Medical doctors of Fiji School of Medicine - Dr. Raj
- (b) Various seminars/workshops relating to marine resources.

### (b) RESEARCH

Research programmes of the Institute are many and varied. Together with visiting scientists the staff are involved in the following aspects of research:

1. Mangrove, lagoon, reef and outer reef community studies.
2. Biology of freshwater Clam, ("Kai") Batissa violacea (Lamarck) in Fiji rivers.
3. Biology of marine bivalves, particularly Donax spp.
4. Fish species composition of inshore waters.
5. Species composition and distribution of compound Ascideans ("sea tulips") in Tropical South Pacific.
6. Traditional fisheries methods and utilization of marine resources.
7. Coral sand studies with particular reference to foraminefera distribution and chemical composition.

8. Deepwater corals. The effects of depth on settlement of benthic organisms. Marine fouling and borers of Fiji.
9. A major Institute research has begun on a study of the deepwater (offshore) fisheries and the related environment.

(c) SPECIAL PROJECTS

In addition to the above programmes the Institute is involved in several special programmes:

(I) EEC MARINE RESOURCE DEVELOPMENT PROJECT

This project is being executed on behalf of the Governments of Fiji, Tonga and Western Samoa with a funding of \$1.2 million from EEC. The main research projects under this project are:

1. Deep Sea prawns and snappers
2. Tuna baitfish biology (for livebait and pole fishery)
3. Sedimentary mineral deposits
4. Traditional knowledge on marine fisheries and environment
5. Gear technology development for tropical fisheries
6. Sea Wave Energy potential

The first six-monthly report (Raj, 1980b) of this project has already been circulated in August, 1980.

(II) HANNS SIEDEL FOUNDATION SURVEY

The Institute is carrying out the following surveys on behalf of the Hanns Siedel Foundation:

1. Survey - Training and Technology in Fisheries
2. Small vessels in the South Pacific
3. Manpower Training Requirements in Fisheries
4. Survey of traditional fish processing methods

Reports of all surveys are in the process of being published or in preparation to be published in January, 1981.

(III) INTERNATIONAL FOUNDATION FOR SCIENCE PROJECT ON FRESHWATER CLAM

The tropical freshwater clam, Batissa violacea (Lamarck) is being experimented on with a view to seeding the higher reaches of the rivers, outside its normal range of distribution.

(IV) IMR/UNIVERSITY OF HAWAII INTERNATIONAL SEAGRANTS PROGRAMME

The Institute now has entered into an arrangement with University of Hawaii with the following objectives:

1. To conduct a joint faculty exchange program between USP and UH designed to achieve improved tropical marine science course offerings and overall professional improvement within the programs.
2. To establish a functional marine extension service with offices at the University of South Pacific-Institute of Marine Resources (USP-IMR) and one other USP regional center:

- a) To train two local people to serve as marine advisory agents
  - b) To conduct a pilot technology transfer project using a multidisciplinary team of UH and USP personnel after the extension agents have identified a high priority solvable problem
  - c) To develop specialized expertise within the USP-IMR marine extension agents through the technology transfer project and through exposure to the UH Marine Advisory Program which will retrieve and disseminate information to the agents.
3. To evaluate the program and develop a follow-up plan to complete the advisory network and professional improvement programs.

(V) IMR/UNITED NATIONS UNIVERSITY PROGRAMME

The Institute will be carrying out a first joint programme (workshop on beach processes) with UNU under UNU Natural Resources Programme.

(d) CONSULTANCY

Some of the most recent consultancy work carried out by the Institute are as follows:

1. King, M.G. & Zann, L.P. (1980)  
"A preliminary examination of Fanga'uta Lagoon and surroundings - Kingdom of Tonga."
2. Brock, R. and Raj, U.;  
"Baseline study in the vicinity of oil drilling in Bligh Water - Hole No. 1. For Division of Lands and Mineral Resources, Government of Fiji."
3. Raj, U.; Stone, R. and Southwick, G.  
"Baseline study on Pascoe Reef oil drilling operations - Hole No. 2, Bligh Water. For the Division of Lands and Mineral Resources, Government of Fiji."

(e) ADVISORY

Advisory services were provided on numerous occasions to Fiji National Trust, Fisheries Division of MAF (Fiji) and several private firms.

#### FURTHER DIRECTIONS AND DEVELOPMENTS OF IMR

The projected long-term developments of IMR are contained in the recent study document, 1980, by the firm of John Rounds, Lee & Partners. *Data of Many + Development - Rod Trayvand*

A recent delegation of French scientists representing the French Government has promised to assist the Institute in the development of the following studies:



Oceanography, marine geology and geophysics, aquaculture and energy from sea, through provision of experts, technicians and equipment.

A recent agreement between the University of Kagoshima in Japan and the Institute will enable exchange of students, staff and joint research programmes in fisheries sciences. Similar agreements have been reached with ORSTOM in Noumea and CNEXO in Tahiti for joint efforts.

USP has also submitted a request for an extension of EEC funding under Lome II to enable IMR programmes to be extended to South Pacific countries which are now signatories to the Lome II Convention.

It is hoped that the Council will fully endorse the development of the Institute as a major Institution in the South Pacific Region and actively support the implementation of recommendations contained in the recent study.

The operations of an Institute of this nature will always be expensive and unless clear support for its existence is given it will be difficult to systematically develop and fulfil the objectives of the Institute as outlined in the Introduction.

## PUBLICATIONS

### PUBLISHED

#### A. INTERNATIONAL

1. King, M.D. (1980)

Food webs. In Sea Shores of South Australia.  
Australia Roy. Soc. Sth. Aust.

2. Kott, P. (1980)

Algal-bearing didemnid Ascidiarians in the Indo-West Pacific.  
Mem. Qd. Mus. 20(1) 1-47, pls. 1-4.

3. Paj, U. & Fersusson, J.E. (1980)

Osmotic and ionic Composition of a tropical freshwater mussel, Batissa violacea Lamarck (Lamellibranchia: Sphaeriidae)

New Zealand Journal of Science, Vol. 23, 199-204.

4. Zann, L.P. (1980)

Living together in the Sea.

F.F.H. Publ., New Jersey. 415 pp.

B. TECHNICAL AND CONSULTANCY REPORTS, COURSE TEXTS

5. Bott, A.N. (1980)

The results of a reconnaissance stage survey into the potential and development of seawave energy along the Coral Coast of Viti Levu - the main island of Fiji.

12 pp, 6 Appendices.

6. \_\_\_\_\_ (1980)

A report on the results of a reconnaissance stage survey into the potential and development of seawave energy in Western Samoa.

99 pp, 4 appendices. Ibid

7. \_\_\_\_\_ (1980)

Preliminary assessment of seawave energy potential and development prospects for Tongatapu Island Kingdom of Tonga.

9 pp, 4 appendices. Ibid

8. \_\_\_\_\_ (1980)

Fiji Modular Wave energy converter.

4 pp, 9 Figs. Ibid

9. King, M.G. (1980)

A preliminary trapping survey for deepwater shrimp (Decapoda: natantia) in the New Hebrides. Tech. paper Instit. Mar. Resources. USP.

10. \_\_\_\_\_

The water hyacinth, Eichhornia crassipes in the Ba river, Western Viti Levu, Fiji. Tech. paper Instit. Mar. Resources, USP. Ibid

11. \_\_\_\_\_

A trapping survey for deepwater shrimp (Decapoda: natantia) in Western Samoa. Tech. paper Instit. Mar. Resources USP. Ibid

12. Middleton, S.K. (1980)

Self Examiner (International Maritime Law) Vol. I, 16 pp.; Vol. II, 27 pp. - Dip.T.F. text.

13. \_\_\_\_\_

Chartwork and Pilotage. Vol. I, 47 pp. Dip.T.F. text. Ibid.

14. Morton, J.E. and Raj, U. (1980)  
The Shore Ecology of Suva and South Viti Levu. NR335 text, 1980 Ed. 182 pp, 16 pls.
15. Nolan, T.W. (1980)  
Annual Flora and Fauna: Issue of 4 postage stamp designs featuring mammals of Papua New Guinea, Govt. of P.N.G.
16. Raj, U. & Brock, R. (1980)  
Baseline study in the vicinity of oil drilling in Bligh Water - Hole No. 1. For Division of Lands and Mineral Resources, Government of Fiji.
17. Raj, U.; Southwick, G. & Stone, R. (1980)  
Baseline study of Pascoe Reef oil drilling operations - Hole No. 2, Bligh Water. For the Division of Lands and Mineral Resources, Government of Fiji.
18. Southwick, G. (1980)  
Deep Sea Shrimp - Commercial feasibility study.  
7 pp, 1 pl.

IN PRESS

A. INTERNATIONAL

19. Kott, Patricia  
Algal-bearing didemnid Ascidiarians of Fiji  
Mem. Qd. Mus.
20. Nolan, T.W.  
A Review of Rainforest trees of North Queensland:  
Engenia spp. and Callophyllum spp.  
In C.S.I.R.O. Forest Division Research by B.P.M. Hyland  
pp. 200, 60 illus.
21. Nolan, T.W.  
Card Index and Manual of the identification of  
Rainforest trees of Queensland.  
In C.S.I.R.O. Forest Division Research by B.P.M. Hyland.  
pp. 200, 20 illus.

22. Raj, U.

The freshwater clam, Batissa violacea Lamarck  
(Lamellibranchia: Sphaeridae) of Fiji Islands.

Veliger

23. Zann, L.P.

Traditional and modern fishing craft in the South  
Pacific.

Trans. Fiji Soc.

B. TECHNICAL AND CONSULTANCY REPORTS, COURSE TEXTS

24. Zann, L.P.

The Energy Crisis and Fisheries Development in  
the South Pacific Report 1. (Survey of small fishing  
craft, outboards and effects of Energy crisis in South  
Pacific).

25. \_\_\_\_\_

Canoes of Tuvalu.  
Report 3. Ibid.

26. \_\_\_\_\_

Subsistence Fisheries of Tuvalu.  
Report 4. Ibid.

IN PREPARATION

27. Boulton, L. and Zann, L.P.

Corals of Tarawa Atoll.

28. Zann, L.P.

Canoes of Kiribati.  
Report 6.

29. \_\_\_\_\_

Subsistence Fisheries of Kiribati  
Report 7. Ibid.

30. \_\_\_\_\_

Fishing vessels and fisheries of Tonga  
Report 8. Ibid.

31. \_\_\_\_\_

Subsistence fishing in the atolls of Tuvalu and  
Kiribati. To be delivered to 4th International Coral  
Reef Symposium in Manila, May 1981, and to be published  
in proceedings. Ibid.

32. \_\_\_\_\_  
Fishing craft of Kiribati.  
Ibid.
33. Raj, U.; Stone, R. and Nolan, T.W.  
A manual of Deepwater Fisheries of the Tropical Pacific.
34. Raj, U.; Stone, R.; Southwick, G. and Nolan, T.W.  
A manual of Tuna bait fishes and fishery of the  
Tropical Pacific.
35. Stone, R.; Southwick, G. and Ram, N.  
A manual of fisheries gear appropriate for tropical  
fisheries.
36. Middleton, S.K.  
Prawn processing techniques appropriate to tropical  
species.
37. \_\_\_\_\_  
Chartwork and Pilotage Vol II.  
Dip.T.F. text. Ibid.
38. \_\_\_\_\_  
Celestial navigation. Dip.T.F. text.  
Ibid.
39. \_\_\_\_\_  
Fishing gears of the Pacific  
Ibid.
40. \_\_\_\_\_  
Commercial Fishing using electronic aids. Ibid.
41. Raj, U. and Nolan, T.W.  
Common fishes and edible marine organisms of Fiji.
42. Hassal, D.; Vodonaivalu, S. and Raj, U.  
Flora and Fauna of Mangroves of Fiji, W. Samoa and  
Tonga.

NOTE: Publications of Atoll Research Unit staff have not been included owing to difficulties of communication in good time. It is pertinent to note that G. Groves is studying the circulation patterns and sand budget of Tarawa and L. Boulton is working on a marine reference collection, general ecology of Kiribati reefs and Biology of Anadara sp.

REFERENCES

1. Institute of Marine Resources (1980)  
Feasibility study  
on the proposed developemnt of the Institute of Marine  
Resources, The University of the South Pacific, Suva, Fiji  
Islands.  
John rounds, lee & partners. Architects, pp 76, 20 illus.
  2. Raj, U. (1980a)  
A review of the Diploma in Tropical Fisheries  
Programme at the University of the South Pacific. 9 pp.
  3. Raj, U. (1980b)  
Development of Marine Resources Centre, Fiji.  
Progress Report for the first six months, August 1980, 14 pp.
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