MARINE SKILL REPORT SUBMITTED TO THE

UNIVERSITY OF HAWAII MARINE OPTION PROGRAM

Internship at Kewalo Basin Marine Mammal Laboratory Training Dolphins

DURATION

January 15, 1989 - May 10, 1989

*Angela C. Rongotes-Santo*

ADVISOR

Dr. Louis M. Herman
Professor of Psychology
University of Hawaii

REPORT DATE

July 31, 1989

Accepted 8/30/89

# THE SITUATION

The purpose of my internship at Kewalo Basin Marine Mammal Laboratory was to experience the work involved in marine mammal research. Through the guidance of the Marine Option Program, I was able to obtain a position at KBMML as a Psych 499 student. A 499 student is an undergraduate that is enrolled in psychology 499, Directed Reading or Research. As a 499 student, I was required to work three days a week, four hours each day, either morning or afternoon. Once a month I came in on Saturday to clean tanks. I also attended research meetings every Tuesday.

The research meetings are a time when all the planners get together and discuss the progress of each experiment.

499 students are also required to submit a six page report on one of the training paradigms that they were involved in. (See Appendix 31)

Because of my interest in Marine mammal behavioral research this was the perfect opportunity to complete my skills project for the Marine Option Program while also determining if marine mammal research was the career that I would have liked to pursue.

The research mission at KBMML is to examine the cognitive abilities of the dolphin and attempt to determine the range and limitations of the dolphins' linguistic and conceptual abilities. (Johnston, 1988)

I began this internship January 10, 1989 and have decided to stay on through summer and next semester. It took me three months of training practice and supervision to train the dolphins in formal experiments and free feeds (defined in My Work)

499 students have the opportunity to come to the lab on weekends to get trained quicker, KBMML has graduate interns that come from all over the nation each semester, and they have priority in getting training practice during the week. So, I was often at KBMML on weekends.

## MY WORK

As I stated earlier, it has taken me three months to get proficient at training. The first month and a half was spent in training practice. In training practice I got up with a senior trainer who would show me what kind of behaviors to be aware of from the dolphin. This was probably the most difficult part of the internship, for it takes about two weeks to learn all the signs (see appendix 41) tactiles (behaviors of stroking the different body parts of the dolphin), verbs and nouns, but I would estimate that it takes approximately a year to warrant the dolphins' trust and to interpret their moods and needs. The squawking noises dolphins make when they are unhappy are hard to distinguish from other sounds they emit. It takes time and experience with them. This is important for if these sounds are not recognized the trainer could eventually get hurt. Head jerking, jaw clapping, mouthing, spitting and tail flicking are all aggressive behaviors, and it takes experience to notice these sometimes moderate aggressions. These aggressive behaviors warrant discipline and only experiencing the three steps of disciplinary actions with an experienced trainer will reassure you that the right actions are being executed.

The month and a half up with the senior trainer was very important. The dolphins tend to be very manipulative to new trainers and are constantly testing them by demanding fish (mouthing) or not performing their behaviors up to par. Training practice was necessary and I took advantage of it by asking many questions and watching the senior trainers intently.

I attended a few lectures on "Dolphin Behavior" which are held every two weeks to familiarize new trainers and Earthwatchers with the correct disciplinary procedures.

"Earthwatch is an organization based in Boston, Mass., which sends adventurous and enthusiastic people on scientific expeditions in 75 different countries" (Johnston, 1988). Every two weeks a new team arrives.

It was very important for me to attend these lectures, for the "testing period" lasted about two months. Every trainer goes through this period. When the dolphin realize that it is not themselves that are doing the training, they start to gain respect for the trainer and the sessions become quite enjoyable.

When the head trainers felt that I was competent enough, I started to train with only supervision, with a senior trainer standing tankside (beside the tank) or up in in the tower (see appendix 20). After I finished the session, he or she would critique me, and suggest what they believed I should have done in certain situations.

After fivve or six supervised sessions, I was training on my own.

Because of the amount of people who work at the lab, I was not able to train every session, but there were other jobs that had to be carried out.

During a training paradigm, and there was usually three held during one session, I was usually assigned one of these jobs: Object monitor, video operator, recorder or person.

An object monitor is in charge of getting the objects ready, that are needed for a specific paradigm, and placing them in the tank during the session. The wind displaces the object quickly, so the object monitor is constantly running around the tank repositioning objects.

The video operator sets up the camera and records the session. Everyone is instructed on how to set up and use the recorder. Most of the experiments are recorded using video in case valuable information is missed by the data recorder. The tape will contain a permanent record.

A recorder stands by the keyboarder, who is in charge of that particular paradigm and a graduate student She/He records any responses the dolphin gives to the commands. This information is used later in data analysis.

Being a person is perhaps the easiest job. The person just sits tankside with her/his legs in the water. Sometimes the dolphin is asked to spit or mouth the person. The person must be aware at all times of the dolphins' location.

Photography is prohibited during formal training sessions, so I was not able to obtain any photos of the different tasks involved in these sessions.

There are four training sessions in a day. Two in the morning and two in the afternoon.

A training session in which an experiment is taking place is called a formal. In a typical formal, there is a trainer, two object monitors, a keyboarder, and a recorder. The keyboarder will instruct the object monitors to place the objects in the

tank. Then she/he instructs the trainer to put her/his goggles down (cover eyes so the trainers eyes will not cue the dolphin). The keyboarder proceeds in giving the commands, at the word "ready" the trainer signs the command. If the dolphin responds correctly a whistle is blown and the dolphin is given a fish (positive reinforcement). If the response is incorrect, the trainer slaps the wall twice to call back the dolphin and no reinforcement is given. This continues until all trials are pau.

Between sessions there are chores to be done around the lab. There is a chores board hanging on the wall with chores posted for each individual. These chores consist of taking out trash, vacuuming the offices, cleaning the lanai, cleaning rails (on the tank walls), walking the two lab dogs (Fluffy and Moka), answering phones, cleaning bathrooms, watering plants, washing the van, cleaning the tower windows and cleaning the kitty litter boxes. These chores require no training, but a procedures list is available telling how to carry out individual chores (see figures 1 thru 3).

Once every two weeks I was assigned to do fish. There are four dolphins, three females and one male. Two of the females, Akeakamai and Phoenix are eleven years old and each requires 19 pounds of smelt per day. The younger dolphins, Elele and Hiapo are fed 18 pounds of smelt each per day. The smelt are sorted out twice a day. Eight and one half bags are thawed out, and each fish has to be examined and rinsed of dirt. When examining the fish we look for cuts, missing eyes, tumors, worms and excessive bruises. These fish are rejected. (see figure 4)

Akeakamai and Pheonix were captured together in the waters off the coast of Gulfport, Mississippi in June 1978. Both are female bottle nosed dolphins (Tunsiops, Tunncatus). They have lived at KBMML for the past 9 years and weigh about 350 lbs. each.

Hiapo (male) and Elele (female) were also captured off Gulfport in July of 1986. They were about 2 years old at the time. November of 1986 they arrived at Sea Life Park. They were transferred to KBMML in June 1987.

After training one of the dolphins, the trainers are required to log on the computer how the dolphin was behaving and if anything out of the ordinary was observed in or on the dolphin. This requirement has made me more efficient on the computer.

I frequently gave mini-lectures to each new team of Earthwatchers, teaching the signs, and how to play with the dolphins. I also took them up with me on locals (see figure 5).

Locals are feeds where no formal training paradigm is being conducted. It is considered a time where the trainer can work on her/his relationship with the dolphin. During these feeds, the Earthwatchers are able to come up for ten minutes or so to play with the dolphin. I would show the external anatomy of the dolphin, describe how to tell them apart by the dolphins different characteristics, and make sure the dolphin (see figure 5) wouldn't get upset with them. So I put my social communication to work. After every session with an Earthwatcher, my communication skills were noticeably improved.

Most of the jobs at KBMML were not glamorous, but working with the dolphins made it all worth while, and being able to participate in the experiments was very exciting.

While working at KBMML, I have been involved with a few training paradigms. These are anomalies, behavioral memory and gestural body language.

The anomalies paradigm was recently started. This paradigm tests Akeakamai on her understanding of the grammatical and syntactical rules of her language. In this study many objects are placed in the tank with Akeakamai. She is given 19 sequences, in addition to normal sentences, 2 of the 19 are anomalous sentences. Anomalous sentences either instruct Akeakamai to do something she cannot do (e.g. put the speaker, which is attached to the wall, in the basket) or the rules of grammar are broken (e.g. jump ball/hoop over).

The behavioral memory paradigm involves Phoenix and Akeakami. This paradigm looks at their memory process using delays. A typical trial involves one dolphin acting as the model, she displays a specific behavior, which was assigned by the trainer. The other dolphin, the observer, is given the sign for "mimic" thus asking her to mimic the model dolphin. Currently, delayed trials are being used, the model exhibits a behavior up to 80 seconds before given the sign. This will further our understanding of their memory processes.

The gestural language paradigm involves the two younger dolphins, Hiapo and Elele. using different objects they are instructed to either spit, jump, toss or mouth a particular object. This is a new paradigm that began in January.

ACKNOWLEDGEMENTS

I would like to recognize Dr. Sherwood Maynard, director of the University of Hawaii Marine Option Program, for his guidance and the Marine Option Program for the funding that was provided to cover necessary supplies.

I would also like to recognize Dr. Louis M. Herman, director of KBMML, John Gory, research director, and the entire staff at KBMML for the opportunity to work with them and all their help and advice in becoming a good trainer and determining if mammal research is the profession I would like to pursue.

## EVALUATION

This project met with my personal objectives "to determine if Marine Mammal Behavioral Research is the career I would like to pursue".

I was able to work with the researchers and experienced some of the problems involved in this type of research. By attending some of the Research meetings (on Tuesday evenings) I witnessed what kind of planning was actually involved in research. Talking with different staff members involved in the research also helped me meet with my personal objectives.

The skills I acquired were not in research, but in training the dolphins and interpreting their needs. From this experience I learned that my interests lie more with dolphin training and husbandry. Although the researchers have an interesting job, I would prefer to interact with the mammals rather than sit at a desk analysing experiment data, designing new paradigms and drawing graphs.

This experience has finally, after five years of searching, given me the profession that I want to pursue and the training experience may have already opened some doors for me with future training jobs.

## REFERENCES


UNPUBLISHED PAMPHLET

Herman, L.M. (1988) Kewalo Basin Marine Mammal Laboratory Information

DOLPHIN LANGUAGE SCHOOL OF HAWAII

Johnston, Rowan (1988) Australian No.26 '88

# University of Hawaii at Manoa

**Kewalo Basin Marine Mammal Laboratory**
1129 Ala Moana Blvd. • Honolulu, Hawaii 96814
Telephone: (808) 538-0067

Dear New Staff Member:

On behalf of the other staff members, I would like to welcome you to KBMML. It requires many people to carry out the studies with Akeakamai, Elele, Hiapo, and Phoenix, and to ensure the dolphins' daily well-being. Your participation can be a big help.

You will meet the rest of the staff soon after your arrival. The development staff directs the daily activities and is often busy behind the scenes, preparing the research, analyzing the results, and writing reports. The training staff -- the graduate and undergraduate students at the University of Hawaii and interns from mainland universities -- work at tankside daily with the dolphins and interact with them socially. Your task as part of the training staff will be to help accomplish the research requirements. When not at tankside, you will be involved in other aspects of the research, such as husbandry, video recording, manual data logging, and computer data entry.

All trainers seem to agree that being with the dolphins is a challenging but highly rewarding, stimulating, and memorable experience. Additionally, we hope you will enjoy the "human" members of our team as well, and the lovely setting of the laboratory at beachside.

It is with enthusiasm that we welcome you here!

Sincerely,

Louis M. Herman, Ph.D.
Professor and Director

LMH:ke

KBMML INFORMATION

The following information is a supplement to your Student Handbook. These guidelines have been developed so that we all may work cooperatively together while providing for the safety of the dolphins.

PERSONNEL

1. The Director of the Kewalo Basin Marine Mammal Laboratory is Dr. Louis M. Herman, a professor in the Department of Psychology at the University of Hawaii. KBMML is located at 1129 Ala Moana Boulevard, Honolulu, HI 96814. The telephone number is (808) 538-0067.

2. The Research Manager is John Gory. Please see him to discuss any questions, problems, concerns, or suggestions. Interns: please meet with John as soon as possible to discuss the research, in which project(s) you will be involved, and what you will be doing.

3. The Administrative Assistant is Kathy Eblen. Please give her as soon as possible your name, address, telephone number, and name and telephone number of someone to contact in the event of an emergency (3x5 index card enclosed). Kathy communicates with staff members by putting notes in their mailboxes in the Diamond Head office (your mailbox is marked either "Interns" or "Other Staff and Students"). She also posts information on the bulletin board above the photocopier in the Diamond Head office. Interns: please meet with Kathy as soon as possible to schedule van training.

4. The Head Trainers are Lori Brown and Sarah Partan. Please meet with them as soon as possible to discuss training, data entry, and tank cleaning. Please give them a completed schedule (form enclosed). Lori and Sarah communicate with trainers by use of the Daily Schedule posted on the bulletin board at the entrance to the Ewa Wing, and by use of the white boards.

5. The Husbandry/Earthwatch Coordinator is C.J. McKinnie. Please meet with her as soon as possible to schedule husbandry training and to be photographed for the KBMML picture board. C.J. communicates with trainers by use of husbandry memos, posted in the fish room. Trainers communicate with each other about husbandry matters by entering notes in the Incident Log, located in the fish room.

GENERAL

1. The morning work period begins at 8:00 AM *sharp*. If you are schedules to prepare morning fish for the dolphins, you must be here no later than 7:15 AM. The afternoon work period begins at 1:00 PM. *sharp*. If you are scheduled to prepare afternoon fish for the dolphins, you must be here no later than 12:15 PM. The work day ends sometime after 5:00 PM. If for some reason you are unable to attend your scheduled session, or you anticipate being late, *please be sure to call the lab <u>well</u> in advance*.

2. As soon as you arrive for your session, check the Daily Schedule posted on the bulletin board at the entrance to the Ewa Wing. This schedule lists not only the experiments to be run, but the chores that must be done in order to keep the lab well maintained.

3. If the doorbell rings, answer the door. If you know the person, let them in. If you do not know the person and they do not have an appointment, *do not let them in.* *At no time* is anyone allowed in "*to just have a look at the dolphins.*" If you do not know the person and they have an appointment, ask them politely to wait outside, then close the door securely. Find the person for whom the visitor is asking. If you are told by someone of the KBMML staff to let the visitor in, stay with them at all times until the staff member actually comes out.

4. Outside of the working day please answer the phone as quickly as you can. If it is between 8:30 AM and 5:00 PM and you hear the telephone ring more than 3 rings, answer the telephone, saying, "Kewalo Basin, --- speaking." If the person is calling for Lou, ask who they are and what the call is regarding. If you can answer the caller's questions, do so. If the caller must speak with Lou personally, put the caller on hold, then tell Lou he has a call. If the call is for another staff member, put the caller on hold, then page the person both indoors and outdoors. See Kathy if you have questions about using the telephone.

5. You are welcome to take pictures of the dolphins during free feeds or play time. However, no one may photograph or film a formal experiment in progress.

6. If you would like to bring a guest into the lab, you must ask Lou *well in advance*. Once the guest arrives, you must stay with them at all times.

TRAINERS

1. Research meetings are held Tuesdays from 5:30 PM. until about 7:30 PM. All staff members are required to attend. During the meeting, the research of the previous week is discussed and research for the coming week is planned. To prepare yourself for the meeting, please read the Research Summaries, located in the folder on the Daily Schedule bulletin board.

2. Trainers meetings are held as needed. All trainers are required to attend. Check the bulletin boards for day and time. During the meeting, training techniques and any problems with the dolphins are discussed.

3. Tank cleaning occurs on Saturdays. Generally you will be scheduled fro tank cleaning once a month. Check the bulletin boards for day and time.

4. Trainers' free feeds occur Saturday and Sunday. This is an opportunity for you to work on your training skills and rapport with the dolphins. Sign up by filling in the schedule posted on the bulletin board in the Ewa office.

5. Earthwatch lectures and videos occur every weekday from 12 noon until 1:00 PM. You should become familiar with all of the material in the lectures and videos. See C.J. for the schedules.

6. Earthwatch parties occur every other Friday from 5:00 PM. until about 7:00 PM. This is a time to just kick back with the other staff members and enjoy pupus and beverages.

7. During the work day, KBMML's personal computers and library are available for your use. Please see David Phillips to schedule computer training.

8. Familiarizing yourself with KBMML's recent publications is highly desirable and will accelerate your progress on research at the laboratory. Please see Kathy for copies of the publications.

MISCELLANEOUS

1. Dogs, cats, smoking, and shoes are not allowed in the offices. Only people attending lectures/videos during lunch hour may eat in the conference room. Smoking is confined to the lanai, not anywhere near the dolphin's tanks. Similarly, to protect the dolphins' health, glassware, drinking straws, balloons, and plastic bags are not allowed at tankside.

2. You should store your backpack or other belongings in the closet in the walkway that leads in from the parking lot. Please doe not carry much cash or any valuables in with you as the lab is not responsible for them.

3. You may park your car in Ala Moana Beach Park. Please do not leave any cash or valuables in your car. Break-ins are a common problem in Honolulu.

4. You may park your moped in the walkway that leads from Kewalo Basin to Ala Moana Beach Park. Be sure to lock it up, but bring your helmet into the lab.

5. You may park your bicycle inside the lab on the lanai. No bikes are to be parked along the rails of the walkway that leads in from the door. Even though it it inside, be sure to lock your bike.

6. You may use the stove in the kitchen and any cookware, dishes, glasses, and utensils. When you are through, please wipe the stove and counter and wash all of your dishes. The food on the shelves and in the refrigerator belongs to the residents and therefore should not be touched. If you would like to store your lunch in a refrigerator, please use the one in the workshop. The coffee in the pot belongs to the members of the KBMML coffee club. If you would like to join the coffee club, please see Satoru Yamamoto.

7. If during your stay with us you wish to gain a more in-depth understanding of the research, please talk with John Gory, or the graduate student managing the experiment in which you are interested.

ke

01/06/89

KEWALO BASIN MARINE MAMMAL LABORATORY

UNIVERSITY OF HAWAII AT MANOA
1129 ALA MOANA BOULEVARD
HONOLULU, HAWAII 96814
(808) 538-0067

The Kewalo Basin Marine Mammal Laboratory (KBMML) occupies approximately 14,000 square feet fronting the ocean at Kewalo Basin. Its physical plant consists of two large sea-water tanks for housing dolphins, an enclosed equipment and observation tower, an office/research building, seminar room, animal husbandry room, shop, and pump room. KBMML is dedicated to the behavioral study of marine mammals, especially dolphins and whales, including species resident in Hawaiian waters. Its staff includes the Director (Louis M. Herman, Ph.D.), Ph.D. level research associates, graduate students pursuing Masters or Doctoral research in Psychology, part-time University of Hawaii undergraduate assistants apprenticing in research for course credit, full-time undergraduate interns from mainland Universities, and a support staff for administration, maintenance, and animal husbandry, and training. KBMML is unique in the country in the opportunity it provides students and researchers to work with marine mammals in a facility directly associated with a University.

Research at KBMML is supported by Federal grants and contracts and by private contributions. At KBMML's tanks, studies examine sensory processes, communication, and cognition in bottlenosed dolphins. Some representative areas of study are visual memory, perception of melodic sequences, vocal mimicry, behavioral (nonvocal) mimicry, sentence understanding within artificial acoustic and gestural languages, and reporting on the physical contents of one's immediate world.

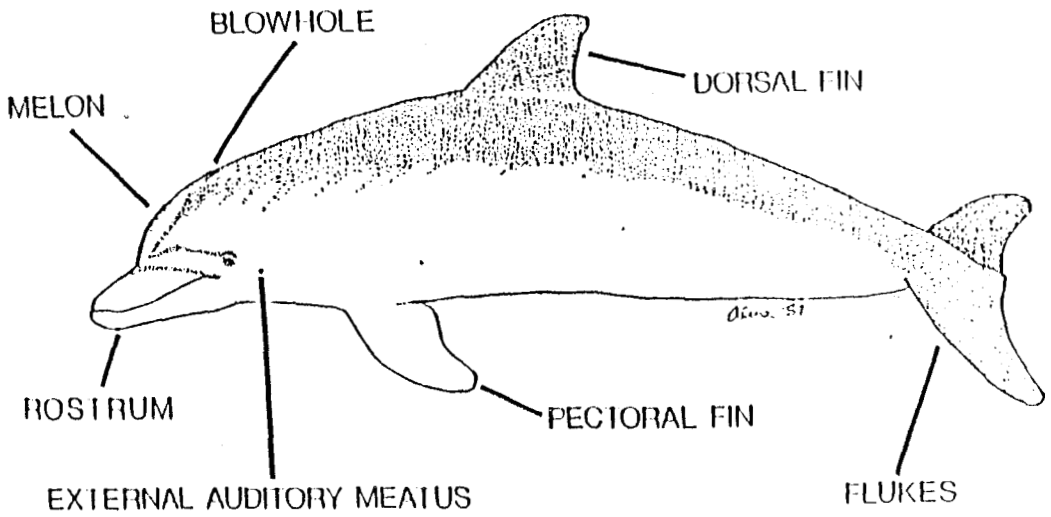
Each winter KBMML carries out studies of the humpback whales that visit Hawaiian waters for breeding and calving. The research in Hawaii is directed toward an understanding of social affiliations, reproductive roles, and the analysis of vocal communication. We also attempt to trace the return and movements of individual whales in Hawaiian waters seasonally and across seasons, as well as in the waters of Alaska during summer months when whales are feeding.

KBMML is recognized, nationally and internationally, as a world-class institution for its studies of dolphins and whales. The results of these studies appear in scientific journals, reports, and theses, and have also been featured extensively in articles appearing in lay magazines and journals, on public radio, and on public and commercial television locally, nationally, and abroad. Undergraduate and graduate students trained by KBMML have been employed by marine parks throughout the country, including Hawaii, by the U.S. Navy at Kaneohe, by State management agencies such as the Department of Land and Natural Resources, by various Federal management agencies such as the National Park Service and National Marine Fisheries Services and Federal research agencies such as the Smithsonian and the National Institute of Health, and by colleges and universities as faculty members or research associates.

Since KBMML's research activities involve the large-scale use of computers, students trained at KBMML have also gone on to employment locally and on the mainland in the computer industry as software engineers or sales specialists.

In addition to the training in research on marine mammals provided to graduate and undergraduate students of the University of Hawaii, lectures and demonstrations are provided, by arrangement, for educational and civic groups of all types, from young children to adults.

Finally, the expertise of laboratory personnel in marine mammal science results in many requests from Federal agencies for consultation and support in their programs of marine mammal conservation and management.




## DOLPHIN HOUSE RULES

1. If you are sick or have been ill and are taking medications, please let C.J. or senior staff know.

2. ALWAYS wash hands with soap and water prior to interracting with dolphins. This prevents unnecessary bacteria transference.

3. Remove rings, necklaces, watches and earrings, these objects can injure the dolphins.

4. Do not use oils or lotions on hands or arms before touching dolphins. Refrain also from wearing lipstick or other heavy make-up on face. These substances tend to stick to the dolphin's skin.

KEWALO BASIN MARINE MAMMAL LAB

VITAL STATS PROFILE

MARINE MAMMAL CLASSIFICATION

Kingdom: ANIMALIA
Phylum: CHORDATA
Subphylum: VERTEBRATA
Class: MAMMALIA
Order: CETACEA
Family: DELPHINIDAE
Genus: TURSIOPS
Species: TRUNCATUS
Common name: Atlantic Bottlenose Dolphin

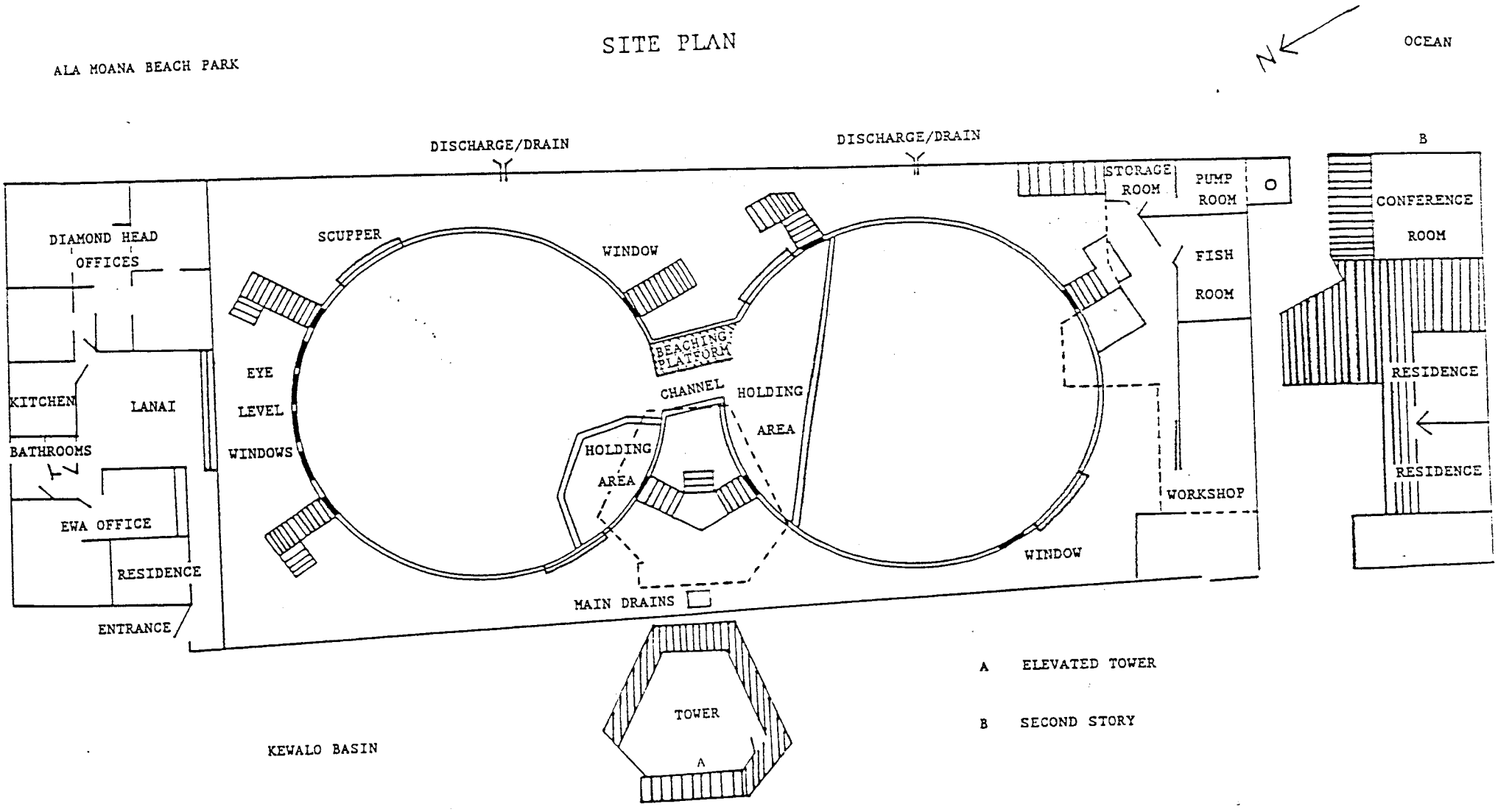
**********

| | HIAPO | ELELE | PHOENIX | AKEAKAMAI |
|---|---|---|---|---|
| AGE/YEARS | 3 1/2 | 3 1/2 | 12 | 12 |
| GENDER | Male | Female | Female | Female |
| PLACE OF BIRTH | Gulfport, Mississippi | ********** | | |
| ARRIVAL KBMML | 11-13-86 | 11-13-86 | 7-7-78 | 7-7-78 |
| OFFICIAL LAB BIRTHDAY | November 13 | November 13 | July 7 | July 7 |
| LENGTH: ft/cm | 7'7.5<br>227cm | 7'0<br>213cm | 7'10<br>239cm | 7'10<br>240cm |
| WEIGHT: lbs/kg | 248lbs<br>112kg | 252lbs<br>114kg | 361lbs<br>163kg | 372lbs<br>168kg |
| DIET/FISH | silver smelt (hypomesus pretiosus)<br>herring (clupea harengus pallasi) | | | |
| VITAMINS & MINERALS | SEATABS | NEPTUNA | VITAMIN E | VITAMIN C |

****indicates same for all mammals

# KEWALO BASIN MARINE MAMMAL LABORATORY

## SITE PLAN




NOT TO SCALE

Appendix 20

## INEXPENSIVE RESTAURANTS

| | | | |
|---|---|---|---|
| Denny's | Sandwiches | ( 1) 2586 Kalakaua | 926-7200 |
| | | ( 2) 2345 Kuhio | 922-9522 |
| | | ( 3) 205 Lewers | 923-8188 |
| Hamburger Mary's | Sandwiches & Salads | ( 4) 2109 Kuhio | 922-6722 |
| Harbor Pub | Sandwiches & Pizza | ( 5) 1765 Ala Moana | 941-0985 |
| Islander Coffee House | Sandwiches | ( 6) Lewers across from Perry's Smorgy | |
| Jolly Roger | Sandwiches | ( 7) 150 Kaiulani | 923-2172 |
| | | ( 8) 2244 Kalakaua | 923-1885 |
| | | ( 9) 226 Lewers | 924-8444 |
| Kyotaru | Sushi | (10) 2160 Kalakaua | 924-3663 |
| Minute Chef | Deli | (11) Kalakaua & Kaiulani | |
| Moose McGillicuddy's | Sandwiches | (12) 310 Lewers | 923-0751 |
| Patisserie | Sandwiches | (13) Edgewater Hotel | 922-4974 |
| | | (14) 2330 Kuhio | 922-9752 |
| Perry's Smorgy | Buffet | (15) Outrigger Waikiki | |
| | | (16) Kuhio across from Jolly Roger | |
| | | (17) 250 Lewers | 923-3881 |
| Pizza Hut | Pizza & Salad | (18) 2154 Kalakaua | 923-1181 |
| | | (19) Kuhio Mall | 926-5025 |
| Pizzeria Uno | Pizza | (20) 2256 Kuhio | 926-0646 |
| Ruffage | Natural Foods | (21) 2443 Kuhio | 922-2042 |
| Sizzler | Sandwiches & Salads | (22) 1945 Kalakaua | 955-4069 |
| Suzy Wong's | Chinese | (23) 131 Uluniu | 926-8288 |
| Wailana | Sandwiches | (24) 2211 Kuhio | 922-4769 |
| Zorro's | Pizza | (25) 2126 Kalakaua | 924-8808 |
| | | (26) 2310 Kuhio | 926-5555 |

*Not Inexpensive*

| | | | |
|---|---|---|---|
| Benihana | Japanese Steakhouse | (27) 2005 Kalia Road | 955-5955 |
| Blue Dolphin | Seafood | (28) 2335 Kalakaua | 923-0711 |
| Tony Roma's | Ribs | (29) 1972 Kalakaua | 942-2121 |
| Trattoria | Italian | (30) 2168 Kalia Road | 923-8415 |

*(over please)*

*For Groceries in Waikiki*

| | | |
|---|---|---|
| 123 Store | (31) Kuhio & Seaside | |
| ABC Stores | various locations | |
| Food Pantry | (32) 2211 Ala Wai | 922-2818 |
| | (33) 2370 Kuhio | 923-9831 |

Ala Moana Center

Anyplace in the Makai Market--Chinese, Korean, Sandwiches, Pizza

Wong's Okazu-ya (Japanese)

*For Groceries in Ala Moana*--Foodland

Ward Centre

Compadre's (Mexican)

Ryan's Parkplace (Everything)

Yum Yum Tree (Everything)

Ward Warehouse

Food Express:
- Juice Stop (Sandwiches)
- Saimin Shop (Japanese)
- Taco Hut (Mexican)

Old Spaghetti Factory (Italian)

If You Have a Car

Auntie Pasto's (Italian) - 1099 South Beretania, 523-8855

Che Pasta (Gourmet Italian) - 3571 Waialae, Suite 101, 735-1777

Greek Island Taverna (Greek) - 2570 South Beretania, 943-0052

Kamigata (Japanese) - 2756 Woodlawn, 988-2107

King Tsin (Chinese) - 1110 McCully, 946-3273

Kim Chee (Korean) - 1040 South King, 536-1426

Suehiro (Japanese) - 1824 South King, 949-4584

T.G.I.Friday's (Everything) - 950 Ward Ave., 523-5841

Wisteria (Japanese) - 1206 South King, 531-5276

*KBMML STAFF LIST, JANUARY 1989*

| | |
|---|---|
| Director: | Dr. Louis Herman (Lou) |
| Faculty Associate: | Dr. Herbert L. Roitblat (Herb) |
| Administrative Assistant: | Kathy Eblen |
| Computer Specialist: | David Phillips |
| Research Associate: | Palmer Morrel-Samuels |
| Research Manager: | John Gory |
| Maintenance Assistant: | Eddie Oslund |

Graduate Students:
Lisa Fosbender, Heidi Harley, Kathy Mardon, Adam Pack, David Phillips, Beth Rettig, Melissa Shaw, Satoru Yamamoto

Coordinators:

| | |
|---|---|
| Training and Scheduling: | Lori Brown & Sarah Partan |
| Earthwatch and Husbandry: | C.J. McKinnie |

Interns:
Marcia Benshoof, Wayne Boring, Rowan Johnston, Dietrich Nebert

Trainers:
Pam Barnes-Palty, Lori Brown, Mike Hoffhines, Diva Magpayo, Alina Niemi, Naomi Nishida, Sarah Partan, Bob Post, Jennifer Shaw, Chris Warholic, Eliza Wille

Dolphins:

| | |
|---|---|
| Sub-adults: | Akeakamai (Ake), Phoenix (Pho) |
| Youngsters: | Elele, Hiapo |

Carnivores:

| | |
|---|---|
| Cats: | Art, Bob, Fraidy, Rover |
| Dogs: | Ehu, Fluffy, Mocha |

Laboratory Associates:

| | |
|---|---|
| Dr. Gordon B. Bauer: | Dolphins and Humpback Whales |
| Dr. Paul Forestell | Dolphins and Humpback Whales |
| Dr. Joseph R. Mobley, Jr.: | Dolphins and Humpback Whales |
| Dr. James Ralston: | Dolphins |
| Dr. James P. Wolz: | Dolphins |

Whale Researchers:
Adam Frankel, Chris Gabriele, Dave Helweg, Hilary Maybaum

KBMML, Phone List, January 1989

STAFF AND STUDENTS

| | |
|---|---|
| Lori Brown | 988-4902 |
| Kathy Eblen | 293-5042 |
| Lisa Fosbender | 536-4546 |
| Heidi Harley | 988-4526 |
| Mike Hoffhines | 523-3768 |
| Diva Magpayo | 732-5221 |
| Kathy Mardon (R) | 247-2036 |
| (B) | 257-5448 |
| C.J. McKinnie | 926-1493 |
| Palmer Morrel-Samuels | 988-6588 |
| Alina Niemi | 988-4902 |
| Naomi Nishida (R) | 261-6955 |
| (B) | 257-5238 |
| Eddie Oslund | 732-0318 |
| Sarah Partan | 988-4902 |
| David Phillips | 942-1860 |
| Bob Post | 942-7985 |
| Beth Rettig | 536-4546 |
| Herb Roitblat (HR) (R) | 395-6296 |
| (B) | 948-6727 |
| (L) | 948-8027 |
| Jennifer Shaw | 947-7301 |
| Melissa Shaw | 536-4546 |
| Chris Warholic | 949-6703 |
| Eliza Wille | 734-5000 |
| LAB RESIDENTS | 538-0067 |
| John Gory | |
| Adam Pack | |
| Satoru Yamamoto | |
| INTERNS | |
| Marcia Benshoof | |
| Wayne Boring | |
| Rowan Johnston | |
| Deitrich Nebert | |
| 499 STUDENTS | |
| Julie Kushima | |
| Martin Piette | |
| WHALE OFFICE (HB) | 948-7020 |
| Adam Frankel | 941-6822 |
| Chris Gabriele | 946-6153 |
| Dave Helweg | 533-0629 |
| Hilary Maybaum | 734-7492 |

LAB ASSOCIATES

| | |
|---|---|
| Gordon Bauer (BA) (R) | 545-2529 |
| *or leave message in Psy* | *541-1548* |
| Paul Forestell (R) | 242-1627 |
| (B) | 879-8811 |
| Joe Mobley (J1) (R) | 261-2926 |
| (B) | 735-4812 |

LAB ASSOCIATES (cont'd)

| | |
|---|---|
| Joe Mobley (J1) (W) | 735-4793 |
| Jim Ralston (R) | 812/837-9257 |
| (B) | 812/335-2722 |
| Humphrey Williams (HW) (R) | 672-8881 |
| (B) | 527-8703 |
| Jim Wolz (JW) (R) | 942-9558 |
| (B) | 527-8681 |

CAMPUS NUMBERS

| | |
|---|---|
| Herbert Ouchi (HO) | 948-7020 |
| Psychology Dept. (DP) | 948-8812 |
| RCUH (CU) | 955-6344 |
| UH Foundation (FO) | 948-8849 |
| Fiscal Dept. | 948-6993 |
| Zoology Dept. | 498-8617 |
| EARTHWATCH (EW) Jenny | 617/926-8200 |
| EAST-WEST CENTER (EC) Pat | 944-7807 |
| Hale Aloha (Wendy) | 948-6844 |
| Hale Kuahine (dorm) | 944-7813 |
| Hale Manoa (dorm) | 944-7960 |
| Lincoln Hall (studios) | 944-7814 |

ANIMAL CARE

| | |
|---|---|
| Howard Blatt, DVM | 948-8770 |
| *(R) for emergency use only* | *235-0469* |
| Blue Cross Animal Hosp. | 537-2534 |
| Nick Palumbo, DVM | 948-8096 |
| *(R) for emergency use only* | *732-6290* |
| Sam Perri | 948-8770 |
| Pete Schroeder, DVM | 257-5425 |
| Office | 257-5427 |
| *(R) for emergency use only* | *262-8985* |

OTHER

| | |
|---|---|
| Bank of Hawaii (BH) | 538-4800 |
| Beeper Number (BN) | 425-3394 |
| Bus Information | 531-1161 |
| Charley's Taxi | 531-1333 |
| Coffee Works | 545-1133 |
| Harbors Division Police | 548-2065 |
| *After Hours* | *548-2359* |
| Honolulu Federal (HF) | 536-5265 |
| International Travel (IT) | 526-2611 |
| Juice Stop | 545-4022 |
| **Kewalo Basin Marine Lab** | **531-3538** |
| Kewalo Marine Services | 533-2619 |
| Kewalo Ships Galley | 521-6608 |
| Look Lab | 521-6412 |
| SSRI | 948-8930 |
| | 948-8817 |
| Recompression Chamber | 523-9155 |

KEWALO BASIN MARINE MAMMAL LABORATORY
UNIVERSITY OF HAWAII AT MANOA
1129 ALA MOANA BOULEVARD
HONOLULU, HAWAII 96814
(808) 538-0067

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TELEVISION AND RADIO PROGRAMS

*NEWSWEEK TV*: Short segment on laboratory dolphin work.

*PBS CHILDREN'S TELEVISION WORKSHOP*: Full-length feature on laboratory dolphin work, Fall 1979.

*DEPARTMENT OF EDUCATION, STATE Of HAWAII*: Segment about laboratory dolphin work or distribution to public schools, Fall 1980, and thereafter.

*KHON-TV (Honolulu) NEWS*: Two short specials on laboratory dolphin work, 1980, 1981.

*KGMB-TV (Honolulu) NEWS*: Short segment on laboratory dolphin work, 1981.

*TODAY SHOW (NBC)*: Six-minute segment featuring laboratory dolphin work, August 1981.

*NBC MAGAZINE*: Segment on laboratory dolphin work incorporated in program on animal communication, Spring 1982.

*A-V PRODUCTION, TOKYO, JAPAN*: Longer segment about laboratory dolphin work shown on Japanese national television, Spring 1982.

*PM MAGAZINE*: 10-minute segment on laboratory dolphin work, February 1983.

*PBS NOVA*: "Signs of the Apes, Songs of the Whales" one-hour program that included segments of KBMML's work with dolphins and whales, October 1983.

*KYODO TELEVISION CO., LTD.'S "SUPER TV" TOKYO, JAPAN*: "Dolphin's Lessons" 15-minute segment on laboratory dolphin work shown on Japanese national television, January 20, 1984.

*BBC HORIZON, UNITED KINGDOM*: "Animal Language" segment on laboratory dolphin work, March 1984.

*KGMB-TV (Honolulu) NEWS*: Segment on laboratory whale work, March 1984.

*NBC NIGHTLY NEWS (National)*: Short segment on laboratory dolphin work, January 1985.

*NATIONAL PUBLIC RADIO*: "All Things Considered" evening news program, 16-minute segment on laboratory dolphin work, July 1985.

*PBS INNOVATIONS*: "Animals: How Smart Are They?" short segment on laboratory dolphin work, March 1986, in New York metropolitan area and August 1986, nationally.

*TODAY SHOW (NBC)*: Segment featuring the language comprehension work aired nationally July 18, 1986.

*NATIONAL GEOGRAPHIC EXPLORER (WTBS)*: Feature segment entitled "Dolphin Talk" aired November 2, 3, and 8, 1986.

*PM MAGAZINE*: Segment featuring laboratory humpback whale work aired April 22, 1987.

*HAWAIIAN MOVING COMPANY*: Segment featuring laboratory dolphin work aired May 17, 1987.

*KHON-TV (Honolulu) NEWS*: Short segment on laboratory dolphin work aired May 21, 1987.

*DISCOVER: THE WORLD OF SCIENCE (PBS)*: Segment featuring laboratory dolphin work aired nationally on December 9, 1987.

*SCIENCE HAWAII (KTUH-Honolulu)*: Two segments featuring laboratory dolphin work aired in January and February 1988.

*WTTW-TV (Chicago)*: Laboratory dolphin work will be represented in "Dolphins of the Seven Seas," a program about the Brookfield Zoo in Chicago, and also about dolphins in general, Spring 1988.

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Angela C. Rongotes-Santo

Psychology 499

Lateralization

## PURPOSES/GOALS

There is much conflict over cerebral asymmetries. Some believe that the right hemisphere is an "unconcious automation", while our left hemisphere controls everything. (M.C. Wittrock, Jackson Beatty, Joseph E. Bogen, 1977) While others agree that the left hemisphere has dominance over language abilities and calculations, and the right hemisphere in sensory information and motor skills.

Cerebral asymmetries do exist in humans, it was at one time believed to be a unique human trait, but these brain asymmetries are now found in lower animals, though not as extensive as in humans. (Jerne Levy, 1988)

Kewalo Basin Marine Mammal Laboratory was established for the purpose of examining the cognitive abilities of the dolphins and determination of their conceptual abilities. With this in mind, the lateralization paradigm was established to find out if the dolphin brain is similar to mans' in cerebral asymmetries.

The next variable that will be looked at in the lateralization experiment will be "familiarity", through the cognitive process using the repetition of a stimuli through a video monitor.

In my opinion there will be a right hemisphere advantage, for the complexity of a familiar stimuli is next to nothing.

## SUBJECTS

The dolphin that is being utilized for this experiment is Akeakamai, a twelve year old female who was captured off of Gulfport, Mississippi in 1978. Akeakamai is seven foot ten inches and weighs 372lbs.

Akeakamai was trained in gestural language when she first arrived at KBMML for communication purposes. (Herman,Richards and Wolz,1984) Later training was divided between comprehension and mimicry. Akeakamai is fed 19.0lbs of smelt per day and fed vitamins every morning.

A typical day for Akeakamai is three formal training sessions and one free feed. Lateralization is not being ran now so Akeakamai is participating in the Anomalies paradigm, Vidoe Mimicry and Eye Cup Mimicry paradigm.

DATA

Reaction times were taken from both blind observers and averaged. It was clear that there was a right hemisphere advantage for the simple strings and that there was a left hemisphere advantage for the complex strings.

A graph was made of the results, out of 12 complex strings, 10 had a left hemisphere advantage with a delta reaction time between 0 and 2 seconds. Two of the complex strings had a right hemisphere advantage between 0 and -2 seconds. With the simple strings, 7 out of the 8 strings were found to have a right advantage with the delta reaction time between 0 and -1 seconds. One of the simple strings showed a left hemisphere advantage at approximately 0.5 seconds.

Palmer Morrel-Samuels, Louis Herman, and Beth Rettig (1989, April). CEREBRAL ASYMMETRIES IN PROCESSING GESTURAL LANGUAGE IN BOTTLENOSED DOLPHIN. Paper presented at the meeting of the Animal Language Conference, April 8th, 1989, Honolulu, Hi.

In my opinion, the right hemisphere is not completely obsolete in the task of complex thinking, it is logical to believe that it would be easier for the left hemisphere to draw on the right hemisphere for specific information, instead of having to search for it, and vice versa.

What can be concluded from this data is that the right hemisphere requires little analysis and the left hemisphere requires a level of analysis associated with language.

It would be safe to implicate that dolphins use their left hemisphere as humans do in processing language and calculations.

## GENERAL METHODS/PROCEDURES

The training was conducted using video taped gestures, one set containing simple strings and the other set containing complex strings. The simple strings contained two gestures (e.g. surfboard under) and the complex strings contained three gestures (e.g. basket ball in).

A monitor was placed in an underwater window and Akeakamai "was stationed in a rostrum cup so that only one eye could see the screen"(Morrel-Samuels,Herman,Rettig,1989).

The basic design of the research was that since "dolphins have no ipsilateral connections between the retina and the visual cortex a stimulus viewed by the right eye reaches the left hemisphere first, and vice versa"(Morrel-Samuels,et al,1989). By timing the dolphin from the moment the gestural string ended til the time she left the rostrum cup would tell us which hemisphere was used.

"Each gestural string was videotaped with a stopwatch counter appearing on the screen running in hundredths of a second. As the dolphin viewed these prerecorded gestures, she was being taped, and this was combined with both the stimulus and her response simultaneously on one screen"(Morrel-Samuels,et al,1989). Two independent blind observers who were not aware of the "experimental hypothesis"(Morrel-Samuels,et al,1989), viewed the tapes and judged the reaction times.

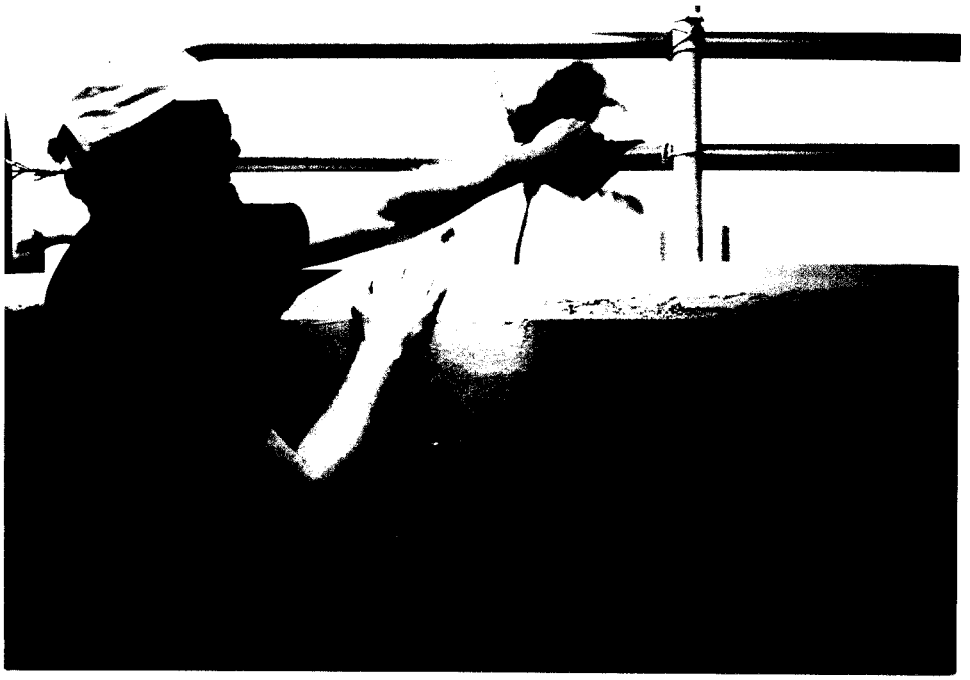


Figure 1. An earth watcher cleaning the tank rails

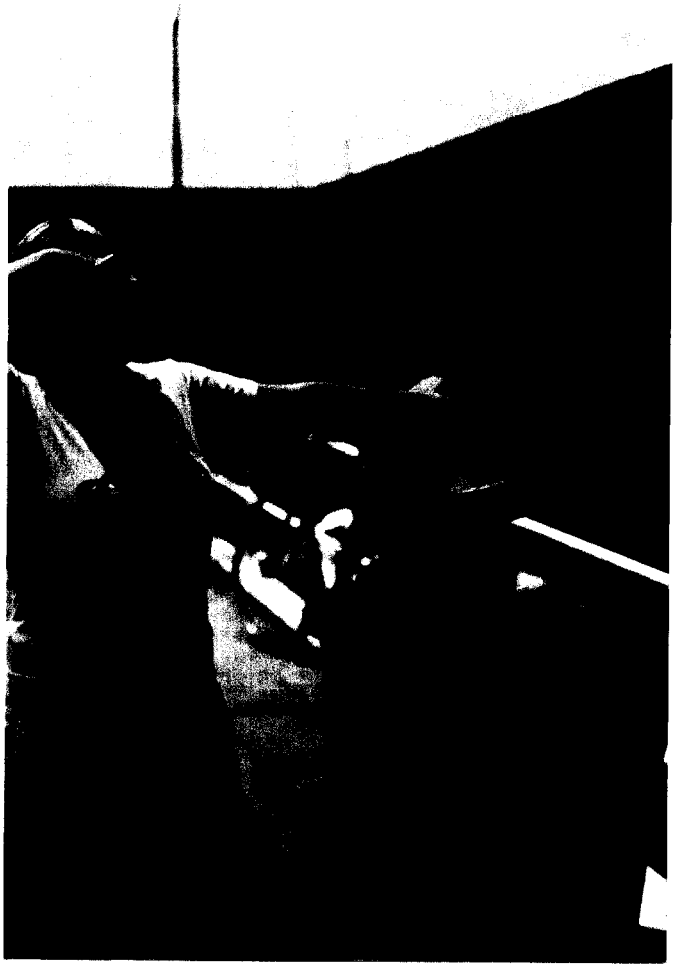


Figure 2. Lisa Fosbender collecting trash

Figure 3. Dorthy Toni taking respirations from Phoenix and Ake.

Figure 4. Manning Watkins sorting fish

Figure 5,6. Trainer Ange Rongotes-Santo on a local with Phoenix

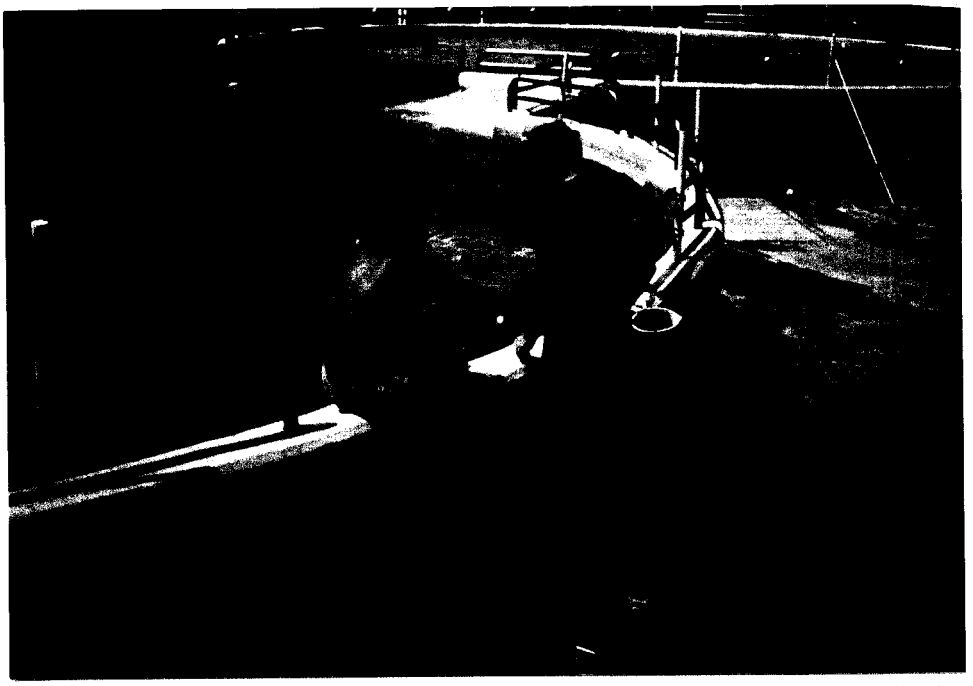
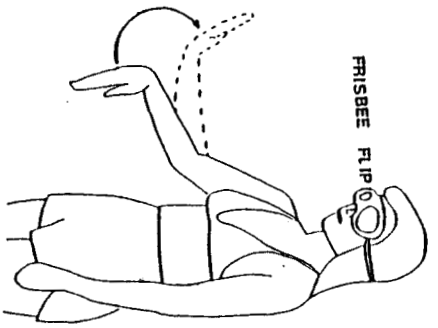
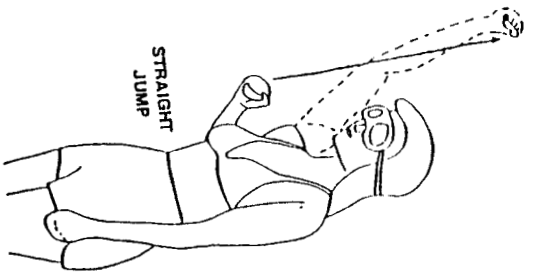
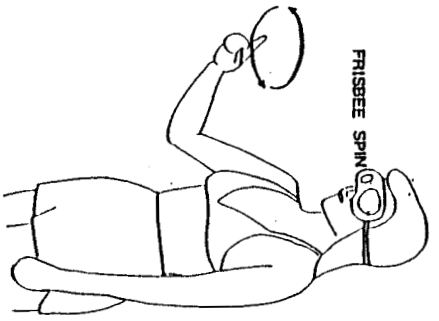


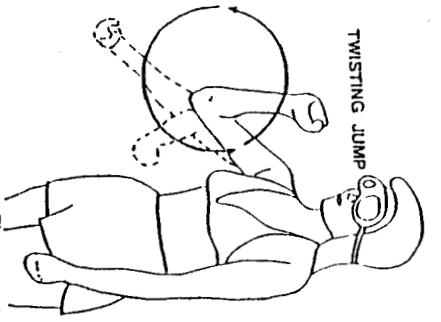
Figure 7. Trainer Chris Warholic taking an earth watcher on a local

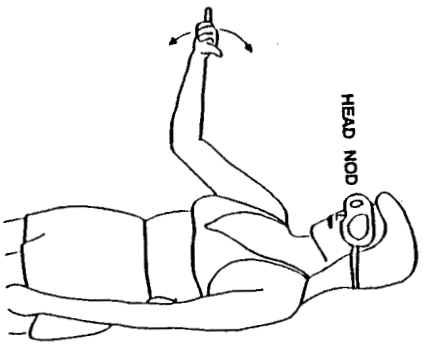
Figure 8. Earth watcher setting up video for a formal

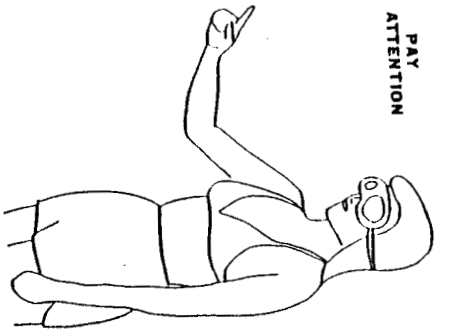

FRISBEE FLIP

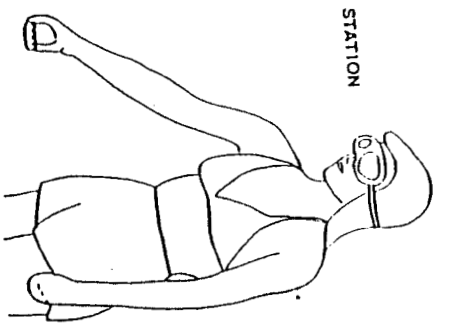

STRAIGHT JUMP

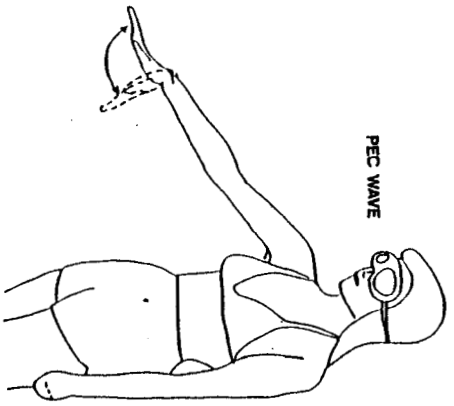

FRISBEE SPIN

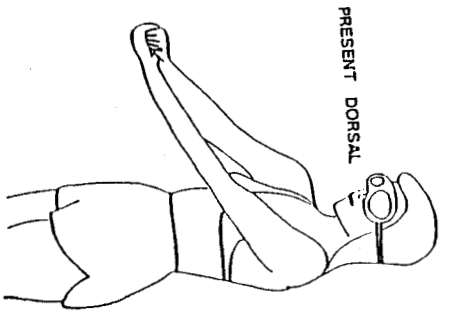

TWISTING JUMP

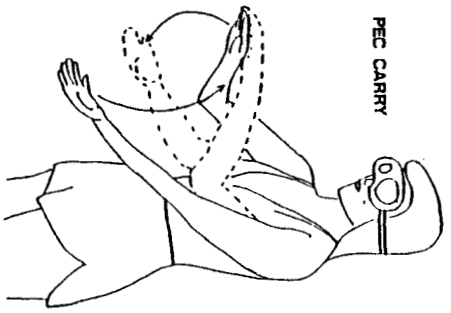

HEAD NOD

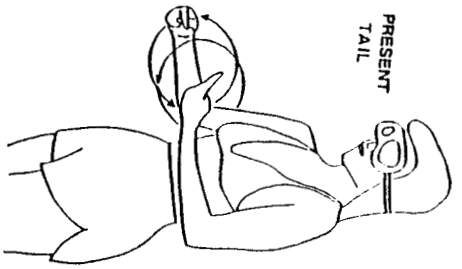

PAY ATTENTION

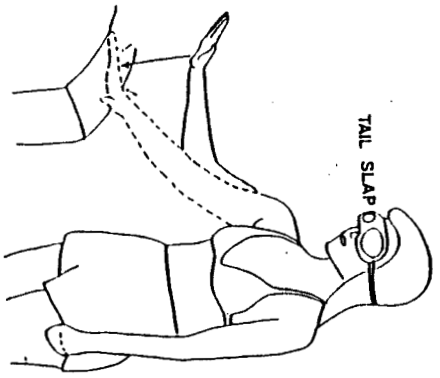

STATION


PEC WAVE


PRESENT DORSAL


PEC CARRY


PRESENT TAIL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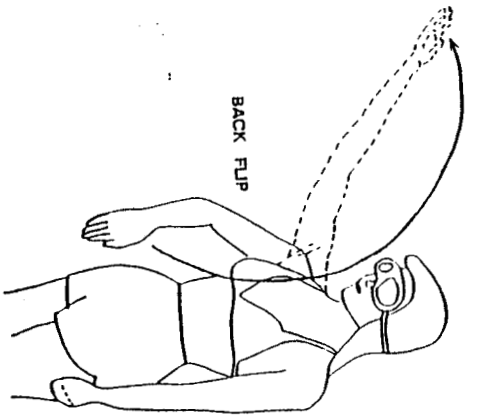
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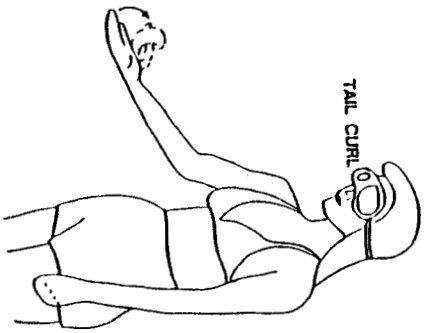
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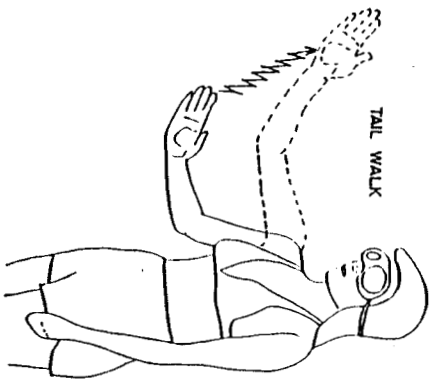
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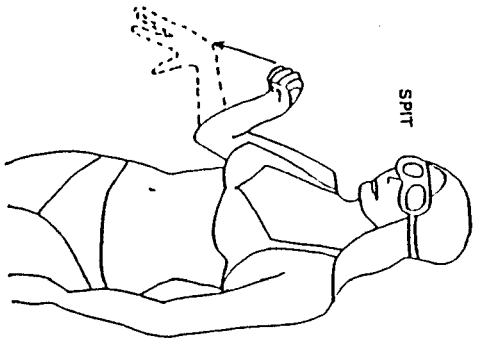
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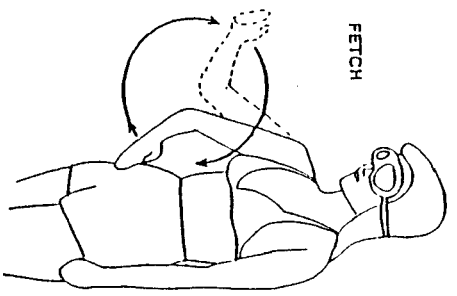
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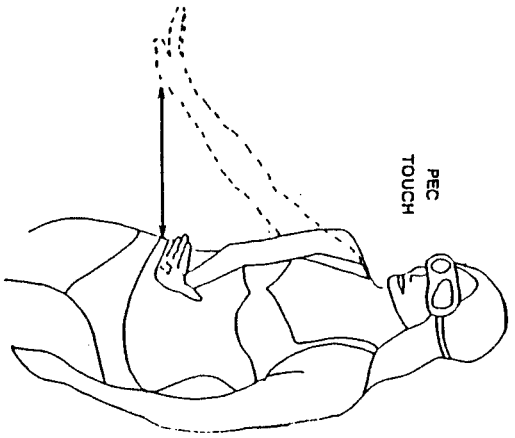
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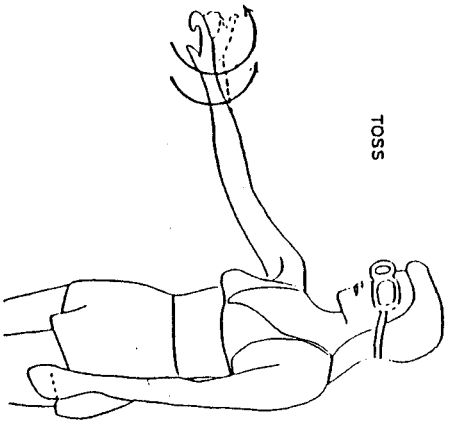
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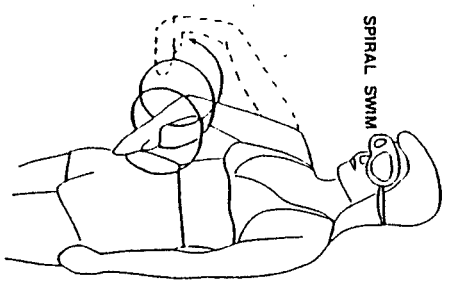
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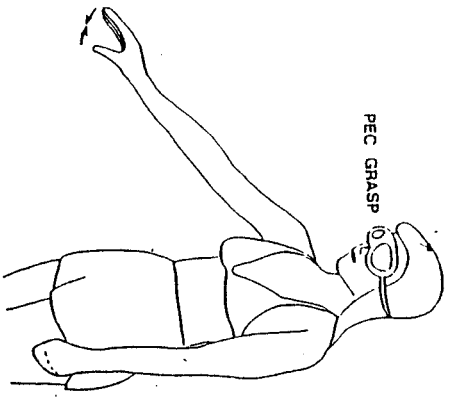
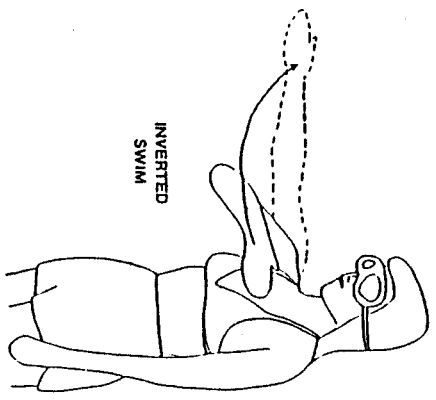
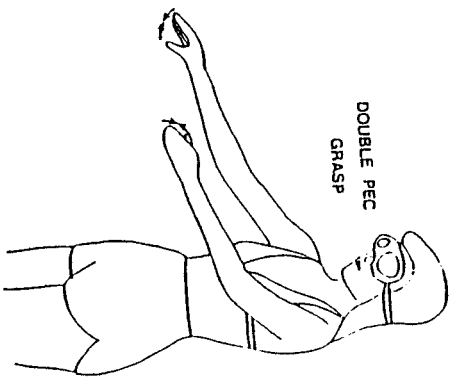

PEC GRASP


INVERTED
SWIM


DOUBLE PEC
GRASP