REPORT ON THE SUCCESFUL REARING OF A CALIFORNIA SEALION PUP

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Summary and Introduction

On June 7, 1974, a California sea lion *(Zalophus californianus)* was born in Marineland's community seal pool. The pup was found at approximately 8 : 00 a.m. beside his mother ,who was repeatedly coaxing the animal towards her teats in the abdominal region. The pup was small and very weak. The mother continually barked, but the pup did not respond. At one point, as we were trying to get a closer observation point, the mother became startled and picked up the pup and threw him into the water. She immediately returned to the deck area and again tried to induce the pup to nurse. The pup never raised up on his flippers and appeared to be chilling considerably. The mother finally left the pup and started to swim about with the other sea lions. We then decided to remove the pup from the enclosure and to rear the pup ourselves.

Health

The pup's breathing was extremely labored and congested. 10 mg of Doxapram HCL (Dopram) was administered intramuscularly to help stimulate respiratory activity. We devised a large plastic bag into a tent shape and placed the pup inside. He rested on a small board that was tilted at a 45° angle with his head directed towards the higher elevation. An oxygen bottle was placed next to the table with a tube leading into the plastic bag. The oxygen was turned slightly on and one end of the tent was semi-opened for release of the excess gases. The animal rested in this manner for approximately two hours, and then we substituted the plastic bag and oxygen with a children's vaporizer. The vaporizer was filled with Vicks and water, and the steam was directed at a backdrop surrounding the pup's head. A large box was found and filled with towels and rags for the pup to ride home to our houses. The pup lived in this box for the first two weeks.

The pup experienced a considerable amount of respiratory congestion from the first day he was brought into the laboratory. From the first night until the pup was approximately three and a half weeks old, a vaporizer was used in close proximity to him, or in the room in which he was kept. The first week and a half, he lived in a large box during the day and at night was transferred to a paper-and-towel-lined bathtub. The vaporizer was usually filled with tap water and the steam directed toward the area where the pup was being kept. At the close of the first month, the congestion was very slight and the vaporizer was no longer used.

We experienced problems with the pup's eyes on two occasions. In August 1974, Hulk (named for his small size) began to scratch his whiskers and muzzle area between feedings. At one point in time it appeared that the pup had scratched his eye.

A corneal ulcer appeared and periodically he would close his eyelids. Tevcocin (oral chloramphemicol) was administered at 200 mg, divided into two doses and thoroughly mixed in the formula. Swimming in a salt waterpool seemed to aid in the rapid healing of the eye.

In February 1975, Hulk damaged his left eye by scratching or bumping into something. We could not find the cause of the problem. The eye clouded to a white opaqueness and was shut most of the time. Chloramphenicol (500 mg/2 dosess) was administered but caused Hulk to be inconsistent with his eating. Tevcocin was again used at 500 mg for two doses per day. At this date the eye is open but still is not perfectly clear and he is still on medication.

In September 1974, Hulk developed a fungal problem on his flippers and central part of his body. The hair was lost and the pigmentation of the skin became very light-colored. The skin became inflamed and swollen to the point where he would not walk on his flippers. The sun also contributed to a burn on his poorly-protected flippers. Treatment commenced with Captan in his pool and a mixture of Mineral Oil and Iodine dissolved in Ether was added externally to his flippers for protection. The pigmentation slowly returned to his flippers and the hair has started to grow back after approximately three and a half months of treatment.

Behavior and husbandry

The public feeder pool is where our California sea lion pup was born. The public feeder pool maintains an average of twelve sea lions. The pool is oval in shape with a length of forty feet and a width of fifteen feet. The pool holds 60,000 gallons of filtered sea water. Chlorine is added to the water with levels not exceeding 0.2 ppm. Around the front and sides of the pool is a three-foot-wide ledge. The sea lions stand on this ledge and brace themselves on the front wall with their front flippers while the public leans over the wall and feeds them. The concrete deck behind the pool is twenty feet wide and tapers to each end of the pool. Behind the rear wall of the display is an area with eight kennels that can be used to give animals individualized attention. Of the twelve sea lions, eight are mature females. There are three immature males and a mature bull approximately nine years old ; his weight is estimated at 500 pounds. During the months of May through July, the breeding season, he actively plays his role as harem master. During this period he does not go off feed, nor does he defend the area. It has been our experience that the pups born in this area are all early births in the months of April, May, and early June. We feel that one factor in this could be the nature of the display, with the competitiveness among the animals to be fed. The competitiveness for public feeding is still evident even after the animals have been fed by a keeper.

Once a pup is born, the display does not encourage a pup/mother relationship. There is no area for the mother to take her pup and feel somewhat isolated but still in contact with the other animals.

The pup we raised was born sometime before 8:00 a.m. on June 7, 1974. We found him lying by his mother, apparently chilled and too weak even to raise his head. The mother appeared to be trying to orient the pup to her abdominal region. The mother

TABLE 1: Formula for Californian sealion pup.

Herring (Pacific)	132 gr
Whipping cream	125 ml
Pure animal lard	28 gr
Lactated Ringers	60 ml
Similac	50 ml
Proto-life protein	17.5 gr
Lecithin	7 gr
Nutrical	4 gr
NaCl	1,5 gr
Sea tab	3/4 caps.

TABLE 2. Composition of Formula.

Ingredients :			Calories :	Protein (gr) :	Fat (lipid) (gr) :	Fatti acids satura- ted (gr) :	Fatti acids unsatura- ted (gr) :	Carbohydra- tes (gr) :
Herring (Pacific)	131,6 gr	(4,7 oz)	287	22	19,7	-	-	-
Whipping cream	120 gr	(1/2 cup)	357	3	37	20	13	4,5
Animal lard	28 gr	(1 oz)	250	0	28	10	14	0
Lactated Ringers	60 gr	(1/4 cup)	-	-	-	-	-	-
Similac	30 gr	(1/8-cup)	40	0,93	2,16	-	-	4,26
Proto-life protein	17,4 gr	(0,62 oz)	63	132,2	0,5	-	-	1,9
Nutri-cal	4 gr	(1/7 oz)	47,5	-	-	-	-	-
Total :	391 gr	13,46 oz	1044,5					
Approximately 77,6 cal/28 gr.								

twice became alarmed and tossed the pup into the water ; she would then return to the deck with the pup. She appeared very nervous and easily frightened. After the pup's second trip to the pool, the decision was made to remove the pup from the display. At that time we felt that the pup had little chance of survival. The pup was brought to the lab for treatment. (See section on Health Problems.) The firstt two days, the pup was basically too weak to attempt nursing behavior and so he was fed by a tube connected to a 60 cc syringe. After the second day, the pup gained strength and began to nurse on everything except on what we wanted him to nurse on. Several methods were tried to get him to nurse on a nipple. Attempts were made to stick a baby nipple through the box in hope that he would nurse on it. Finally, on the third day, he began to nurse on the nipple. Within a day he was conditioned enough to the nipple that it could be removed from the box.

From the first day we felt that the pup needed attentoin on a twenty-four hour basis. At night the pup was taken home by members of the Curatorial Department and during the day he stayed in the lab. At night he was kept in a bathtub with newspapers on the bottom. When he would call out he could easily be heard and food

TABLE 3. Composition of ingredients

LACTATED RINGERS SOLUTION		PROTO-LIFE PROTEIN :		SEA TABS :	
100 ml contains :		Protein	76 %	Vitamin A	12.500 I.U.
Sodium chloride	600 mg	Moisture	5 %	D	2.500 I.U.
Sodium lactate, anhydrous	310 mg	Fat	2 %	E	31,2 I.U.
Potassium chloride	30 mg	Minerals	6 %	B1	250 mg
Calcium chloride, U.S.P.	20 mg	Carbohydrates	11 %	B2	6,5 mg
		Caloric equivalent/gr	3,6 %	B6	3,75 mg
SIMILAC :				B12	15 µg
Water		NUTRI-CAL :		Niacin	10 mg
Nonfat milk		Fats (vegetable and animal) ; carbohydrates (malt syrup, corn syrup, molasses) ; proteins (peptones) ;		Vitamin C	125 mg
Lactose				Iron	25 mg
Coconut					
Soy oil		100 gr contains :			
Corn oil					
Mono- and diglycerides		Vitamin A	17.850 U.S.P. units		
Soy lecithin		Vitamin D2	892 ,, ,,		
Carrageenan		Vitamin E	107 I.U.		
Ascorbic acid		Thiamine HC1 (B1)	36 mg		
Niacin		Riboflavin (B2)	3,6 mg		
Alpha-tocopheryl acetate		Pyridoxine HC1 (B6)	17,8 mg		
Vitamin A Palmitate		Vitamin B12	36 µg		
Calcium pantothenate		Nicotinamide	36 mg		
Copric sulfate		Calcium pantothenate	36 mg		
Thiamine		Folic acid	3,6 mg		
Pyridoxine		Iron	8,9 mg		
Riboflavin		Manganese	17,8 mg		
Vitamin D3 concentrate		Magnesium	7,1 mg		
Folic acid		Iodine	8,9 mg		
Cyanocobalamin					

would be administered. After the second week with this procedure, we found that 75% of his feeds were at night. During the day he slept very soundly, even with a lot of activity going on around him. Since he was gaining strength very rapidly, we started to look for a plan to get him off his graveyard shift. We decided that he was strong enough to stay at Marineland at night. For about the first week a member of the staff would come down twice in the evening and feed him. We tried to give him his last feed as close to midnight as possible. This system worked out very well. During the summer we had a young college student, Judy Abraham, who worked in the lab. Her main responsibility was to take care of the pup. The pup developed a strong attachment to Judy over the summer and would consistently eat better from her than from anyone else. Judy first introduced him to the water at about four weeks of age. It took a few swims before he would swim under the water or even stick his head under. We first used a small circular pool (six feet in diameter and twelve inches deep) for the pup to swim. After he felt relaxed in the water, he graduated to one of our holding tanks (twenty-five feet in diameter and three feet deep). We were careful not to allow the pup to chill.

When Judy returned to college in September, we moved the pup down to the Dolphin and Sea Lion Pool and under the care of Art Thomas. Art has a rare talent for the care of sea lions, so we felt that this would be a good match. Since September, Art has been caring for Hulk. The pup has been given goldfish and other small fish in an attempt to get him on solid food. In the first week of January, we eliminated all but fish and water from the formula. We were concerned about the effects of the formula over a long period of time. We were not too concerned that the pup had no interest in eating solid food.

At the time of closing this report (1 April 1975) our pup is ten and a half months old and weighs sixty pounds. He eats about five pounds of blended fish each day. The hole in the nipple of his bottle has been adjusted from a hole approximately 1/16" in diameter to 3/8" in diameter.

Epilogue

About one week after our pup was born, another pup was born in the feeder pool. We separated the mother and pup from the rest of the group. The pup appeared strong and the mother seemed to have every intention of taking care of her pup. Is is interesting to note that when feeding the mother sea lion herring and smelt, if the pup takes a herring and runs away, the mother will retrieve the piece of fish. The body size between the two pups seems to be identical. We have not attempted to restrain the mother-reared pup to weigh him. We felt that unless an obvious problem occurred we would let the mother care for her pup.

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THE PATHOGENESIS AND ETIOLOGY OF ULCERATIVE SHELL DISEASE IN TURTLES

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Summary

The etiologic agent of ulcerative shell disease (Shell rot) of turtles, *Beneckea chitinovora* is isolated and used to reproduce the typical clinical disease syndrome in the laboratory.

The morphology, biochemistry and the natural history of the causative organism of ulcerative shell disease is presented to the veterinary literature.

A control and preventive management program for ulcerative shell disease is presented based on experimental results and the natural history of the causative organism.