

## Marine Mammal Research Opportunities in Oceanariums, Aquariums, Marine Parks and Zoos

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A brief description of the value of and opportunity for marine mammal research in public display facilities is presented. Examples of the successful collaboration of researchers and display facilities in acquiring knowledge of marine mammal social behaviour, physiology, medicine, reproduction, echolocation, and communication are given. Display facilities involved in such support to researchers are mentioned from around the world.

### Marine mammal research opportunities in oceanariums, aquariums, marine parks and zoos

Marine mammals maintained in captivity provide the opportunity to conduct basic and applied research that can expand our capacity to understand, care for and preserve them. Norris (1985)<sup>1</sup> in his paper 'The Use of Captive Marine Mammals in Behaviour Studies' stresses that studies both at sea and in captivity are required to gain a full understanding of behaviour. He points out that at sea observations can provide broad outlines of behaviour while captive studies can produce very detailed data about individual or small group processes. It is the combination of the two that produces knowledge that can aid in the protection and conservation of the animals under study.

Historically a close cooperation between scientists and animal display facilities has produced considerable information concerning marine mammals. Wood (1986)<sup>2</sup> reminds us that just 50 years ago virtually nothing was known about the social behaviour of dolphins. It was the successful maintenance of bottlenose dolphins in captivity at Marine Studios, Florida (a display facility) in 1938 that provided a beginning to our present level of knowledge. At Marine Studios from observations made in the circular oceanarium came such important papers as McBride and Kritzler's 'Observations on Pregnancy, Parturition and Post Natal Behaviour in the Bottlenose Dolphin' (1951).<sup>3</sup> It was followed by contributions by Kritzler on Pilot Whales (1952),<sup>4</sup> Essapian on birth and growth (1953)<sup>5</sup> and skin changes during

swimming (1955)<sup>6</sup> of Bottlenose dolphins, and Tavolga and Essapian on mother-infant behaviour in Tursiops (1957).<sup>7</sup>

With support from the same facility first Kellogg and Kohler (1952)<sup>8</sup> and later Schevill and Lawrence (1953)<sup>9</sup> (1954)<sup>10</sup> made very important contributions to our understanding of audition in the Bottlenose dolphin.

On a medical note, the first papers on erysipelas in dolphins came from studies at Marine Studios; Seibold and Neal (1956)<sup>11</sup> and Simpson, Wood and Young (1958).<sup>12</sup>

With the opening of the new oceanarium in early 1954, Marineland of the Pacific Palos Verdes, California, supported researchers Brown and Norris (1956)<sup>13</sup> who observed behaviours of dolphins in the oceanarium tank and at sea from the Marineland collection boat. The landmark paper by Norris *et al.* on echo navigation by a blindfold porpoise followed (1961).<sup>14</sup> Other research supported by Marineland included the work of Dave Brown on the behaviour and health problems of juvenile walrus.

A few years later with the opening of Sea Life Park on the island of Oahu, Hawaii, researchers with interests in behavioural studies received encouragement and support. These included Pryor *et al.* (1969),<sup>15</sup> Bateson (1966),<sup>16</sup> Batteau (1967),<sup>17</sup> and Herman *et al.* (1966).<sup>18</sup>

There is, of course, a rich history of research aided and conducted by dolphinariums and zoos in Europe: Dudok Van Heel's (1972)<sup>19</sup> close association with Harderwijk; Dral's (1975)<sup>20</sup> continuing work with the eyes of cetacea; Manton's (e.g. 1975)<sup>21</sup> work on the care, housing and feeding of marine mammals; Kamminga's (1976)<sup>22</sup> continuing echolocation work at a variety of dolphinarium; Gewalt's (1979)<sup>23</sup> first introduction of a number of marine mammals into captivity for public display and research at Duisberg; and Harrison and Ridgway's (1972)<sup>24</sup> work on diving in marine mammals supported by the small Skegness Aquarium, England, and others.

In the last three years a wide variety of support by display facilities has aided researchers. For example, the Vancouver Public Aquarium aided

Hooper *et al.* (1985)<sup>25</sup> in recording killer whale electrocardiograms; the Sealand Aquarium in Brewster, Massachusetts, helped Tyack (1985)<sup>26</sup> to record vocalizations in Tursiops; Sea World, San Diego, assisted Williams (1985)<sup>27</sup> in hydrodynamic studies, and Defran *et al.* (1983)<sup>28</sup> in studies of Beluga whale behaviour; and the Waikiki Aquarium, Honolulu, Hawaii, supported Withrow (1984)<sup>29</sup> in monk seals studies. Other examples are Kamogawa Sea World support to Nishiwaki *et al.* (1983),<sup>30</sup> Minnesota Zoological Garden help to Seal *et al.* (1983)<sup>31</sup> and Kirtland (1984).<sup>32</sup>

Today we find display facilities supporting such on going efforts as the work by Diana Riess at Marineworld Africa USA, Vallejo, California, on the development of vocalization and echolocation in small cetaceans; and the research of Randy Brill at the Brookfield Zoo in defining the role of the lower jaw in receiving echolocation signals in the Bottlenose dolphin.

A report by the American Association of Zoological Parks and Aquariums (1984)<sup>33</sup> stated that 112 of their member institutions in North America were exhibiting 1341 marine mammal specimens representing 27 species. Clearly there is potential for much valuable research in these display facilities and those throughout the world.

Opportunities abound for observational studies of behaviour and social interactions in oceanarium tanks, particularly in species other than Tursiops. Such facilities offer opportunity for observations that cannot be made in any other way. Obviously, much can also be done to support veterinary medicine, general husbandry and, of course, breeding. Important efforts in anatomy, taxonomy, and physiology can be supported by facilities which provide researchers with specimens, measurements and records. The key appears to be the joining together of enlightened display facility management and the competent scientist. When such collaboration occurs both benefit greatly; our knowledge increases and our ability to conserve and preserve marine mammals is improved.

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