

TABLE 1 Research Materials Used in NIH Extramural Research Projects — FY 80

<table>
<thead>
<tr>
<th>Classification</th>
<th>Dollars (%)</th>
<th>Projects and Subprojects (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humans</td>
<td>669,231,383</td>
<td>8,960 (28.7)</td>
</tr>
<tr>
<td>Mammals</td>
<td>741,665,162</td>
<td>8,904 (28.5)</td>
</tr>
<tr>
<td>Humans and mammals</td>
<td>334,207,609</td>
<td>3,612 (11.6)</td>
</tr>
<tr>
<td>Other categories involving humans and some combination of vertebrates and invertebrates</td>
<td>34,816,814</td>
<td>378 (1.2)</td>
</tr>
<tr>
<td>Mammals and nonmammalian vertebrates</td>
<td>36,830,720</td>
<td>620 (2.1)</td>
</tr>
<tr>
<td>Mammals and invertebrates</td>
<td>23,551,005</td>
<td>297 (1.0)</td>
</tr>
<tr>
<td>Mammals, nonmammalian vertebrates and invertebrates</td>
<td>5,949,903</td>
<td>59 (0.2)</td>
</tr>
<tr>
<td>Nonmammalian vertebrates</td>
<td>55,404,312</td>
<td>760 (2.4)</td>
</tr>
<tr>
<td>Nonmammalian vertebrates and invertebrates</td>
<td>6,902,837</td>
<td>80 (0.3)</td>
</tr>
<tr>
<td>Invertebrates</td>
<td>53,863,116</td>
<td>733 (2.4)</td>
</tr>
<tr>
<td>Non-animal</td>
<td>896,667,500</td>
<td>6,831 (21.9)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2,838,694,181</td>
<td>37,264 (100.3)</td>
</tr>
</tbody>
</table>

Total: Dollars = 2,838,694,181
Projects and Subprojects = 37,264

Comments

Effects of Psycho-physiological Stress on Captive Dolphins

Nick Carter

Introduction

Morgane (1978) has stated that: Man sees all other creatures through the narrow focus of his own knowledge and sees the whole image in distortion. We patronize animals for their incompleteness and dependence and for their fate in having taken form so far below ourselves... a great mistake, for animals should not and cannot, be measured by man. Many are gifted with many extensions of senses we have lost or never attained... They live by voices we may never hear. Some may not be our accepted brethren, but also they are not our underlings. If this "narrow focus on human knowledge" can be said to distort the image of the whole, it follows that an overly rigid adherence to orthodox scientific criteria, when attempting to measure the intelligence and behavior of dolphin "specimens" (particularly in the abnormal situation of confinement) will diminish, not increase, our ability to understand these creatures. An approach to studying dolphins is as harmful to our interests as it is to those of the dolphins if the procedures used involve capture and confinement for entertainment or "education." In this process, the animal is demeaned, so that its natural character cannot be appreciated. And the educational experience that accrues is hardly a wholesome source of learning, because the knowledge of the teachers themselves is distorted, since it is based on experiences with abnormally conditioned animals.

In fact, dolphins are phenomenal beings, with complex behavior patterns and capabilities that, so far, have been recognized by very few people. Those who have begun to appreciate these animals are almost unanimous in agreeing that familiarity breeds awe at the potential abilities of dolphins. For example, Jerison (1978) comments:

If being human means being receptive to new ideas, it surely requires us to recognize that, although unique in many ways, human intelligence has counterparts in other species... If we define intelligence as encephalization, we have to consider humans as part of a set that also includes some cetacean species...

It is therefore reasonable to postulate that the conditions of capture and confinement might be as stressful and harmful to dolphins as they would be to humans. This hypothesis is supported by the following evidence.
Stress from Handling in Wild Animals

N. Carter

Conrad Lorenz, Nobel Prize winner and the “father” of animal ethology observes:

...Similarities and analogies in the nervous processes of animals and men are sufficiently great to justify the conclusion that higher animals do indeed have subjective experiences which are qualitatively different from but in essence akin to our own (Lorenz, 1967).

For instance, shock is a condition of collapse that may follow severe psychological or physical pain or injury. Stress, resulting from fright, anxiety, frustration, and apprehension, as well as boredom and isolation, may result in degenerative psychological and physical changes that may lead to prolonged illness and death. Dolphins suffer shock in captivity, in addition to stress during and after landing, transport, and eventual confinement.

For reasons unknown, some individual animals, like certain individual human beings, have a greater ability to endure stress than others. For example, off the North Pacific coast of the U.S. and Canada, between 1962 and 1973, 50 killer whales (Orcinus Orca) were caught and kept for oceanaria. (This total does not include 12 that died during capture operations.) The 2-year mortality in captivity was reported to be 25 percent in immature whales and 87 percent in adults (Bega and Wolman, 1975). It is noteworthy that the data show that the captive females had a considerably higher mortality rate than did the males. Another intriguing finding was that the females who died showed a higher growth rate than those that survived (Ridgway, 1979).

While domestic animals, doubtless due to adaptation, suffer decreased trauma, and possibly less shock, after restraint and transport, it is well recognized that shock elicits a more violent and severe reaction among wild animals (Harthoom, 1979; Thorpe, 1986). Often, mortality may be related to a combination of stresses that are experienced in rapid succession. Further, the possibility that death may be an emotional response to stress cannot be avoided (Kisker, 1964).

Recognition of the problem of mortality among live wildlife prompted the drafters of the Convention on International Trade in Endangered Species (CITES) to include clauses stipulating that “specimens will be so prepared and shipped as to minimize the risks of injury, damage to health or cruel treatment.” Additional recognition of the stresses imposed on dolphins in traveling to show prompted the South African Minister of Economic Affairs, Chris Heurns, in 1977, to amend Section 16() of the Sea Fisheries Act 1973 to ban the importation of dolphins and killer whales for display purposes.

Capture Shock and Confinement Stress in Dolphins

There is no longer any question that psycho-physiological effects have been, and continue to be, prime causes of the sufferance and consequent high-mortality rates among captive dolphins. Many of the psycho-physiological disorders have been classified on the basis of the bodily symptoms by which they are commonly expressed among both humans and animals (Kisker, 1964). The symptoms noted in necropsy studies performed to determine the immediate physical cause of death among captive killer whales demonstrate a striking correspondence with those of psycho-physiological disorders (Ridgway, 1979).

In attempts to alleviate the trauma and subsequent effects that induce “shock” diseases, dolphins are on capture injected with cortisone and a prophylactic, broad-spectrum antibiotic (Saysman and Taylor, 1973). Despite this treatment, however, mortality rates remain high, and the number of dolphins that successfully endure captivity for long periods of time is commensurately low. Of 21 dusky dolphins (Lagenorhynchus obscurus) captured for display off Hout Bay (South Africa) between 1961 and 1978, only one survives. The longevity of the dusky dolphin in its natural state is estimated to be 25 to 30 years. In dolphinaria abroad it is, in many cases, difficult to form a true idea of mortality rates because deaths of dolphins and whales have not been announced, and replacement animals have been given the same names as the dead animals, so that the public will not become aware of the deaths (Greenpeace, 1980). However, in 12 years of operation (1966-1978), the Napier Marineland's (New Zealand) admits that their death tally for dolphins stands at 68, and this number does not include those dolphins that were dead when brought aboard or that were maimed during catching. Nor does this figure include those that died while being brought into port. In 1980 Marineland's in New Zealand decided to discontinuine keeping dusky dolphins for display, because they did not adapt well to captivity (Robson, 1978).

Frank Robson (1978), a gold medalist for his scientific work on behalf of the Amsterdam Museum of Natural History, and the chief trainer at Napier Dolphinarium for 4 years, has expressed his concern at the lack of recognition that almost every disease contracted by captive dolphins has a strong causal link with psycho-physiological factors. He bases his claim on 14 years’ experience with both practical and scientific research on the disastrous relationship between psycho-physiological reactions and the health of dolphins in captivity.

Robson noted the sudden deaths of perfectly healthy dolphins, who had their blowholes tightly closed while out of the water. This indicated to him that death was due to psycho-physiological shock reaction incurred while enduring “stress” that had advanced to severe shock. When this stage is reached, processes that control the dolphin's natural breathing function of “blowing” are blocked by the effects of its disturbed emotional state.

The opportunity to test this assumption came when Robson investigated the reason why hundreds of dolphins were accidentally captured in trawl nets in waters near New Zealand during 1970-1974. The examination of these unfortunate victims revealed that they were physically healthy; few had died as a result of drowning. Only 5 percent were found to have water in the lungs; 92 percent had died from the ravages of psycho-physiological shock reaction, and the remaining 3 percent had died from internal hemorrhage of the heart—another type of shock reaction, since no water was found in the lungs.

Robson divided deaths in dolphins caused by psycho-physiological reactions into three categories.

Category 1: Sudden death, such as described above.

Category 2: Death of dolphins that survived the catching and transportation to pools, but died within a month of being caught.

Category 3: Dolphins that died, usually from respiratory problems, after being held captive for varying lengths of time—many were found to be suffering from pneumonia.

Robson considers that the inability of dolphins to deal with mental-emotional disorders, usually attributable to captivity, was responsible in many cases for the pneumonia or other respiratory problems.

He states that the first symptoms of the presence of these psycho-physiological states is a gradual or spasmodic decline in appetite. The effect of this is a reduction in blubber thickness, thereby...
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decreasing the dolphins' natural insula-
tion. This, in turn, causes a lowering in
death temperature and is responsible for
promotion of pulmonary affliction and
the ante-death behavior of afflicted dol-
pins, we can conclude that little doubt
sufficient control over respiration due to
inhibitory emotional disturbances.

The foregoing observations tend to
be supported by those of K.S. Norris,
Professor of Natural History, University
of California, an internationally recog-
nized authority on free-ranging dol-
phins. Writing in 1976, he states:

Confinement compresses natural ac-
tivity so tightly that it may be dis-
torted beyond recognition. The cap-
tive poseforms unnatural life
atains body heat in the chilly water. This
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the mid-1979, the former dolphin trainer and
nized authority on free-ranging dol-
pins, who were his only companions,
died he swam round his tank for days,
clasping each of his dead companions
with a flipper. He refused food and lost
20 percent of his 4,500-lb weight. Dr.
M.E. Webber, a physician, suggested he
had become psychoneurotic: in human
terms, a manic-depressive.

The observations of Norris have
been endorsed by many former workers
gle, with the consequences of the stress
caused by the capture, holding, and
transport of wildlife amply confirm
that these procedures result in a tragic wast-
age of life. Some extremes are accurate-
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Yves Domalain in his well-known book
The Animal Connection. Through visits to
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Notwithstanding the useful captive
breeding work done by a number of re-
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ies by IUCN/SSC/TRAFFIC 1980 and
others (Burton and Barzdo, 1980) show
that, overall, zoos continue to be con-
sumers rather than conservators of wildlife,
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tive wild animal populations for educa-
tional and research purposes may alleviate
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But the evidence shows that the profit-
motivated use of animals in circus-type
displays merely consumes animals, it
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References
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Case Histories

A popular attraction at the Califor-
nia Academy of Sciences is the dolphin
tank. Officials, noticing that one of the
dolphins occasionally bled from the in-
testine, conducted tests and found that the
animal had developed a duodenal
ulcer. He was treated on the anthropo-
morphic premise that the cause was anx-
ity. At length, it was found that this an-
imal alone, of the entire group, had
become nervous because of the crowds
that prered at him through a glass wall.
When the glass wall was covered up, the
condition cleared up (Cousteau, 1975).

Dan, a male bottlenose dolphin (Tursi-
ops aduncus) became so agressive after
8 years of captivity in Port Elizabeth
Oceanarium, that he had to be released
in August 1976. Not only did he threaten
his female companion, but recovered after treat-
ment.

At length, it was found that this an-
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be
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(sive)
idiographic
-8
-depressive.
power against a glass port, shattering it.

One month later, because of his deter-
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ear a pod of other pilot whales. An
"emotional convict" returned to free-
dom, he was not seen again (Cousteau,
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decreasing the dolphins' natural insula-
tion. This, in turn, causes a lowering in
body temperature and is responsible for
the dwindling ability of dolphins to re-
tain body heat in the chilly water. This
phenomenon is a critical factor in the
promotion of pulmonary affliction and
pneumonia. Based on observations of
the ante-death behavior of afflicted dol-
phins, we can conclude that little doubt
remains that, while pneumonia may have
been the direct cause of death, this condi-
tion resulted from the psycho-physio-
llogical inability of the dolphin to main-
tain pulmonary function. After the capture
of three new bottlenose dolphins in 1979, she
returned to free-ranging life. This return was
endorsed by many former workers
at dolphinaria, as well as others who
had become psychoneurotic: in human
beings, this situation is characterized by
anxiety, depression, and a range of
behaviors that are typical of the disease.

The foregoing observations tend to be
supported by those of K.S. Norris, Pro-
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phins. Writing in 1976, he states:
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patterns, like the antelope in a zoo,
used naturally to range many miles
a day which now is replaced by a
stereotyped figure of eight around
his cage until the single track is
ruled a foot below the surrounding
soil... Rigid daily routines such as
dolphin show routines are especial-
ly stressful."

The observations of Norris have
been endorsed by many former workers
at dolphinaria, as well as others who
have studied these animals closely. In
mid-1979, the former dolphin trainer and
curator of the Port Elizabeth Oceanarium,
Colin Tayler—who was employed at
the oceanarium for 10 years, during
which time he was responsible for build-
ing up the famous dolphin shows—said
he believed stress was the main cause of
three recent dolphin deaths (Cape Argus
August 14, 1979).

Case Histories

A popular attraction at the Califor-
nia Academy of Sciences is the dolphin
tank. Officials, noticing that one of the
dophins occasionally had become nervous because of the crowds
that peered at him through a glass wall.
When the glass wall was covered up, the
dolphin's behavior improved (Cousteau, 1975). The symptoms prior to death, which was
believed to be due to respiratory dis-
ease, conformed very well with Frank
Robson's description of disease induced
through psycho-physiological disturbance.

Conclusion

The author's 25 years' experience with
the consequences of the stress caused by the capture, holding, and
transport of wildlife amply confirm that
these procedures result in a tragic wast-
age of life. Some extremes are accurate-
ly described by the former dealer Jacques
Yves Domanain in his well-known book
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captive animal facilities in many parts of the
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The Judeo-Christian Tradition and the Human/Animal Bond

James A. Rimbach

This paper surveys the role of animal imagery in the literature of the Old Testament and in post-biblical Jewish literature, discusses biblical materials that speak to the relation of humankind to animals, and assesses the subsequent use of these traditions to support or negate specific attitudes toward the natural environment.

A righteous man has regard for the life of his beast, but the mercy of the wicked is cruel (Proverbs 12:10).

It is always perilous to some degree to ask a modern question of an ancient text or tradition. The obvious danger is that the investigator will shape the tradition to suit his or her own predetermined purposes and ignore or explain away that which does not fit those aims. The Judeo-Christian tradition has had that sort of treatment on the very question that we will investigate here. Interpretations based on self-interest have been all the more easy to arrive at because the human/animal companion bond is a subject that has not received a great deal of self-conscious reflection in the Judeo-Christian tradition and its literatures, and because many of the ecological conditions within which the contemporary inquiry is raised did not obtain in the ancient world.

Dr. Rimbach is Pastor of the Concordia Lutheran Church and Student Center, N.E. 1015 Orchard Drive, Pullman, Washington 99163. He is also a frequent writer and lecturer on Old Testament subjects. This paper is adapted from an oral presentation made in Spring 1981 to the School of Veterinary Medicine of Washington State University in a new course designed by Dean Leo K. Bustad entitled “Reverence for Life.”

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