ISAP SYMPOSIUM

Wildlife Management in the U.S.
Scientific and Humane Issues in Conservation Programs

(Chairman: Dr. Stephen Kellert, Associate Professor, School of Forestry and Environmental Studies, Yale University, New Haven, CT.)

Date: Wednesday, October 14, 1981
Time: 9:00 a.m.-5:00 p.m.
Place: Stockholm Room
Chase-Park Plaza Hotel
212 N. Kingshighway Blvd.
St. Louis, MO 63108

Registration Fee: $15
Topics to be discussed:
The Controversy over Feral and Exotic Animal Control
Natasha Atkins, Wildlife Biologist, The Humane Society of the U.S.

Wildlife Values
Dr. Daniel J. Witter, Resource Planner, Missouri Dept. of Conservation.

Bureaucracy and Wildlife
Dr. Edward Langenau, Jr., Wildlife Research Biologist, Rose Lake Wildlife Research Center, Michigan Dept. of Natural Resources.

Ethical Issues and Future Directions
Dr. Michael W. Fox, Director, Institute for the Study of Animal Problems.

Animal Damage Control: Programs, Consequences, Alternatives
Guy Hodge, Director, Research and Data, The Humane Society of the U.S.

Urban Wildlife
(Speaker to be announced.)

Panel Discussion: Humane Ethics in Management Programs
Dr. Allen Brohm, Director, Missouri Dept. of Conservation;
John A. Hoyt, President, The Humane Society of the U.S.;
Jeff Miller, Executive Director, Animal Aid, St. Louis, MO; and
other speakers to be announced.

HSUS Conference: The annual conference of The Humane Society of the U.S., this year focusing on Animal Welfare: The Present Crisis, will be held in conjunction with the ISAP Symposium on Wednesday through Saturday, October 14-17, 1981 at the Chase-Park Plaza Hotel. A complete program and registration form may be obtained from Ms. Marcia Glaser, HSUS, 2100 L St., N.W., Washington, DC 20037.

Hotel Reservations: Rooms have been reserved at special rates for the ISAP Symposium and for the annual conference of The HSUS. Please secure accommodations directly from the hotel by September 11, 1981.

ISAP Registration: Prior to October 7, 1981 registration forms with an enclosed check can be mailed to ISAP. There will also be open registration at the symposium from 8:30-9:00 a.m. For further information contact:
Ms. Heather McGiffin
Institute for the Study of Animal Problems
2100 L St., N.W., Washington, DC 20037
(202) 452-1184

The Buller-Steer Syndrome
Richard Ulbrich

Bulling among steers is an abnormal behavioral trait and is a common health and economic problem in feedlot operations. Factors associated with the buller-steer syndrome are hormonal implantation, seasonality and environmental conditions, stress, overcrowding, and social interaction between individuals. Research has examined relationships between these and other factors and buller occurrence. Boredom of feedlot cattle may contribute to buller occurrence and other undesirable behavior more than we might suspect. Research is needed to determine the feasibility of enriching the environment of penned livestock in general, the goal of which would be, in theory, the elimination of undesirable behavior as well as increased performance.

Introduction

The buller-steer syndrome is described as an abnormal behavioral trait where steers and bulls are confined in large numbers. The typical buller-steer sexually attracts his penmates, who take turns following and mounting the abnormal animal. To complicate matters, there appear to be various degrees to bulling activity. Some riding activity is relatively harmless and falls under the category of "horseplay." On the other end of the spectrum we have serious bulling activity in which normal steers vigorously pursue the abnormal steer, the buller, who may or may not be receptive to his tormentors. Escape is occasionally made over and through the feedbunk or fence.

Many factors have been associated with the buller-steer syndrome: Hormonal implants, seasonality and environmental conditions, overcrowding, stress, pheromones, and social interaction between individuals. Several of these factors have come into play as a result of the prolonged captivity of ancestral species, which is necessary to the process of domestication. In Hafez's text, The Behaviour of Domestic Animals (1975), domestication is defined as the removal of an organism from some natural selection pressures over generations. Changes in a species which result from domestication are said to be the consequence of the effects of captivity, and eventually bring about a change in genotype. Hafez (1975) suggests that captivity is a more powerful agent of behavioral change than might be imagined. For example, Russian researchers have described a destabilization of genotype in captivity with a rapid breakdown of the system created by centuries of natural selection in mink and silver foxes (Hafez, 1975).

Captivity removes animals from many natural selection pressures and introduces new stresses. Captivity results in boredom, invasion of personal space and ritualized games. The tendency in natural species of cattle for individuals to space themselves apart must either be modified or express itself in abnormal behavior. This can be illustrated by the distinction found between the behavior of penned livestock and those pasturing or on open range, which more closely resemble "natural" conditions. The latter are relatively free to graze and meander, and to maintain a distance between individuals if desired (R. Ulbrich, personal observation). Farmers and ranchers have long recognized the presence of bullers, but under pasture or range conditions the buller-steer presents no serious difficulty. As feedlots have increased in number and size, so have bullers and the resulting problems (Brower and Kiracofe, 1978).

Mr. Ulbrich is pursuing a Master's degree in Animal Nutrition at the Max C. Fleischmann College of Agriculture, University of Nevada, Division of Animal Science, Reno, NV 89557.

INT / STUD ANIM PROB 2(5) 1981
Factors Associated with the Buller-Steer Syndrome

Social hierarchy

One might suspect the underlying cause of this abnormal behavior to be the social hierarchy, or "pecking order" relationships, which are established among individuals. The submissive behavior of the buller-steer may be the result of the adverse effect of the intensity of social interactions, as suggested by the increased occurrence of bulling activity in pens made up of several groups of newly introduced cattle (Irwin et al., 1979). Brower and Kiracofe (1978) report that not all bullers fit into the classical buller syndrome. Some are the target of aggression and may be at the bottom of the social strata. In most cases, however, individual social rank among beef cattle does not appear to be the cause of the buller-steer syndrome. Studies reported by Pierson et al. (1976) indicate that veterinarians and feedlot employees have observed that bullers may be the biggest, most aggressive steers in the pen or, by contrast, the ones at the bottom of the pecking order.

Hormonal implants and oral DES

Cassner et al. (1958) reported that treatment of feedlot steers with estrogen resulted in undesirable side effects including feminization, high tailheads, and bulling. Further, bulling activity occurred 1 to 3 days after DES implantation and continued for 1 to 2 weeks. Pierson et al. (1976) analyzed the relationship between the occurrence of bulling and hormonal implantation in 4 Colorado feedlots (Table 1). Prior to 1971, diethylstilbestrol (DES) was fed at the rate of 10mg per head, and from 1971 to 1974 at the increased rate of 20mg per head. Beginning in 1972, 3 different hormones were used in addition to oral DES. During 1973, the 3 hormones were evaluated by alternately using them on groups of about 400 head until over 160,000 cattle were implanted with 1 of the 3 products. Finally, one of them was selected for its ability to produce efficient weight gains, specifically Synovex-S. During 1974, steers fed for 60 days or less were implanted once. Cattle fed for longer periods were implanted twice. All cattle were given 70mg of antibiotic daily in their feed. Hormone implants and vaccinations for IBR (infectious bovine rhinitis) and leptospirosis were given to all cattle within 10 days of entry at the feedlot.

From 1968 to 1970, when DES was fed as the only anabolic agent, the percentage of bullers fluctuated from 1.27 to 1.78 for the three year period. During this time the daily dosage of DES and hormone implants were used simultaneously. When the 3 different hormones were compared for feed conversion and weight gains in 1973, there was a difference in the occurrence of bulling. The implant associated with the better weight gains appears to produce the greatest incidence of bulling (Pierson et al., 1976). Nevertheless, it was selected and used exclusively in 1974 (Table 2). Irwin et al. (1979) reported that under certain circumstances, the use of growth-promoting hormonal implants has been found to be related to increased incidence of the buller-steer syndrome. The highest percentage of bullers was found to result from implantation of the progesterone-estradiol product Synovex-S, which also produced the most desirable live weight gains, as was the case in the aforementioned study. Similarly, an increase in the oral dose of DES from 10mg to 20mg was found to result in a slight increase in annual incidence, which increased further when the Synovex implant was used while feeding DES at the higher dosage.

It should be emphasized that the use of growth promoting hormones, even though they play a significant role in the syndrome, has not been entirely responsible for the occurrence of bulling, as typical buller-steers are observed in feedlots

### TABLE 1 — Annual Percentage of Bullers and Anabolic Agent Used 1968-1974

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cattle fed</th>
<th>Bullers</th>
<th>Anabolic agent used per animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1966</td>
<td>264,174</td>
<td>3,673</td>
<td>10mg DES in feed</td>
</tr>
<tr>
<td>1969</td>
<td>296,782</td>
<td>3,766</td>
<td>20mg DES in feed</td>
</tr>
<tr>
<td>1970</td>
<td>359,683</td>
<td>6,403</td>
<td>10mg DES in feed</td>
</tr>
<tr>
<td>Total Mean (%)</td>
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<td>(1.50)</td>
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1971 15,546 10,782 2.09 20mg DES in feed
1972 554,361 15,532 2.80 20mg DES in feed
1973 431,761 13,639 3.16 20mg DES in feed
1974 407,450 14,960 3.67 20mg DES in feed
Total Mean (%) 1,90,118 54,913 (2.88)

DES = Diethylstilbestrol.

### TABLE 2 — Relationship of Bullers to Brand of Implant

<table>
<thead>
<tr>
<th>Implant</th>
<th>Dosage (mg)</th>
<th>No. of cattle implanted (No.)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>DES*</td>
<td>30</td>
<td>60,886</td>
<td>1,729</td>
</tr>
<tr>
<td>Zearalanol**</td>
<td>36</td>
<td>51,216</td>
<td>1,123</td>
</tr>
<tr>
<td>Progesterone &amp; estradiol†</td>
<td>20</td>
<td>42,020</td>
<td>1,691</td>
</tr>
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*Stilpel, Fort Dodge Laboratories, Fort Dodge, IA.
**Religor, Commercial Solvents Corporation, Terre Haute, IN.
†Synovex-S, Syntex Laboratories, Inc., Animal Health Division, Des Moines, IA.

Taken from "Bulling Among Yearling Feedlot Steers", R.E. Pierson et al., JAVMA 169:512-523.
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estrogenic compound which accumulates in alfalfa when fungal pathogens damage
the leaves [Pierson et al., 1976].)

Brower and Kiracofe (1978) reported more bullers in July and August than any
other months. The type of ration fed was not discussed.

However, the studies of Irwin et al. (1979) demonstrated a marked increase in
buller frequency during November and December, which may have been associated
with the increased number of cattle entering the feedlot at this time.

**TABLE 3—Seasonal Trends for Frequency of Buller Steers 1968-74**

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Feed</th>
<th>Winter Buller %</th>
<th>No. of Feed</th>
<th>Spring Buller %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>87,137</td>
<td>6.3</td>
<td>87,797</td>
<td>.4</td>
</tr>
<tr>
<td>1969</td>
<td>100,713</td>
<td>5.9</td>
<td>103,411</td>
<td>.4</td>
</tr>
<tr>
<td>1970</td>
<td>110,481</td>
<td>7.4</td>
<td>129,713</td>
<td>.8</td>
</tr>
<tr>
<td>1971</td>
<td>170,464</td>
<td>1.10</td>
<td>201,340</td>
<td>.94</td>
</tr>
<tr>
<td>1972</td>
<td>201,116</td>
<td>1.45</td>
<td>216,556</td>
<td>1.48</td>
</tr>
<tr>
<td>1973</td>
<td>195,383</td>
<td>0.90</td>
<td>189,180</td>
<td>0.90</td>
</tr>
<tr>
<td>1974</td>
<td>182,528</td>
<td>1.48</td>
<td>182,068</td>
<td>1.86</td>
</tr>
<tr>
<td>Mean%</td>
<td>1.07</td>
<td></td>
<td>1.05</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Feed</th>
<th>Summer Buller %</th>
<th>No. of Feed</th>
<th>Fall Buller %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>90,393</td>
<td>1.21</td>
<td>102,802</td>
<td>1.61</td>
</tr>
<tr>
<td>1969</td>
<td>102,234</td>
<td>1.07</td>
<td>118,322</td>
<td>1.26</td>
</tr>
<tr>
<td>1970</td>
<td>172,077</td>
<td>1.12</td>
<td>196,424</td>
<td>1.48</td>
</tr>
<tr>
<td>1971</td>
<td>205,201</td>
<td>1.37</td>
<td>212,524</td>
<td>2.00</td>
</tr>
<tr>
<td>1972</td>
<td>223,455</td>
<td>1.81</td>
<td>221,529</td>
<td>2.37</td>
</tr>
<tr>
<td>1973</td>
<td>210,467</td>
<td>2.16</td>
<td>213,186</td>
<td>2.64</td>
</tr>
<tr>
<td>1974</td>
<td>143,814</td>
<td>3.93</td>
<td>221,391</td>
<td>2.21</td>
</tr>
<tr>
<td>Mean%</td>
<td>1.15</td>
<td></td>
<td>1.77</td>
<td></td>
</tr>
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</table>

Taken from "Bulling Among Yearling Feedlot Steers", R.E. Pierson et al., JAVMA 169:521-523.

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R. Ulbrich—Buller—Steer Syndrome Review Article

Weather

A questionnaire to assess the occurrence, economic impact, and possible
causes of the buller-steer syndrome was sent to members of the Kansas Cattle
Feeders Council. According to the response, occurrence of bullers was associated
with a seasonal or environmental factor such as changing or wet, stormy weather
(Brower and Kiracofe, 1978). The number of steers represented was about 20% of
the steers on feed in Kansas according to a 1971 United States Department of
Agriculture reference (USDA, 1971).

Irwin et al. (1979) report findings to the contrary, however. Weather conditions
during each day of the week prior to and on the first day of bulling were found to
have no relationship to the occurrence of bulling.

Entry weight or size

The entry weight of steers has no effect on buller frequency. The major occurrence
was in the same weight range as that for most of the incoming steers (Irwin et al.,
1979).

Overcrowding

Three years of records for ten pens of varying sizes involving nearly 11,000
steers were analyzed to determine the effect of overcrowding. Buller frequency was
not significantly increased by pen space per head or weight of cattle. For every 10
head increase in total head per pen, the buller incidence increased .05%. For every
9.3 square meters increase in pen size the buller rate decreased .05% (Brower and
Kiracofe, 1978).

Irwin et al. (1979) found no statistical correlation between buller occurrence
and either pen size or square meters per head. Results suggested that as the number
of steers per pen increased, irrespective of pen space available, there was a cor­
responding increase in buller occurrence.

Stress

Stress factors which contribute to buller incidence include changes in environ­
ment, routine, and diet, plus handling and transportation of steers to the feedlot.
Once cattle are acclimated to feedlot conditions, contributory factors include
switching pens, changes in feed routine, and lack of feed (Brower and Kiracofe,
1978).

When the feedman is unable to perform his duties, during a feed mill break­
down, for example, many cattle line up to empty feedbunks in anticipation and are
easily excitable. Riding activity is seen to increase and usually persists until the feed
situation is corrected (R. Ulbrich, personal observation).

Pheromones

The pathogenesis of the buller-steer syndrome has been considered to involve
increased blood concentration of estrogenic hormone, with expression of estrous
mounting behavior (Brower and Kiracofe, 1974). Brower and Kiracofe (1972)
reported buller-steers to have higher urinary estrogen levels than normal steers. The
empheminate behavior of the buller-steer suggests an estrogenic influence, which is
supported by the observation of high serum and urinary total estrogens in previous
investigations (Brower and Kiracofe, 1974).

Gassner et al. (1958) implicated a sex odor as an attractant to penmates by
where implants are not used (Irwin et al., 1979). In any event, it should be noted that administration of DES to beef cattle in the research cited above had taken place before the 1 November 1979 ban on implantation and oral dosing of DES in food animals by the Food and Drug Administration (FDA). Although Synovex-S has been approved by the FDA for use in feedlot cattle with implantation at least 60 days before slaughter (USDA Agricultural Research 29(9), May 1981), this factor should play a lesser role in more current analyses of the syndrome.

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<th>Buller %</th>
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Mean % 1.07

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<tr>
<th>Year</th>
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<th>Buller %</th>
<th>No. of Feed Fall</th>
<th>Buller %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>90,393</td>
<td>1.21</td>
<td>102,802</td>
<td>1.61</td>
</tr>
<tr>
<td>1969</td>
<td>102,234</td>
<td>1.07</td>
<td>118,322</td>
<td>1.26</td>
</tr>
<tr>
<td>1970</td>
<td>172,077</td>
<td>1.12</td>
<td>196,424</td>
<td>1.48</td>
</tr>
<tr>
<td>1971</td>
<td>205,201</td>
<td>1.37</td>
<td>212,524</td>
<td>2.00</td>
</tr>
<tr>
<td>1972</td>
<td>223,455</td>
<td>1.85</td>
<td>221,529</td>
<td>2.37</td>
</tr>
<tr>
<td>1973</td>
<td>210,467</td>
<td>2.16</td>
<td>213,166</td>
<td>2.64</td>
</tr>
<tr>
<td>1974</td>
<td>143,814</td>
<td>2.93</td>
<td>151,391</td>
<td>2.21</td>
</tr>
</tbody>
</table>

Mean % 1.85

**Weather**

A questionnaire to assess the occurrence, economic impact, and possible causes of the buller-steer syndrome was sent to members of the Kansas Cattle Feeders Council. According to the response, occurrence of bullers was associated with a seasonal or environmental factor such as changing or wet, stormy weather (Brower and Kiracofe, 1978). The number of steers represented was about 20% of the steers on feed in Kansas according to a 1971 United States Department of Agriculture reference (USDA, 1971).

Irwin et al. (1979) report findings to the contrary, however. Weather conditions during each day of the week prior to and on the first day of bulling were found to have no relationship to the occurrence of bulling.

**Entry weight or size**

The entry weight of steers has no effect on buller frequency. The major occurrence was in the same weight range as that for most of the incoming steers (Irwin et al., 1979).

**Overcrowding**

Three years of records for ten pens of varying sizes involving nearly 11,000 steers were analyzed to determine the effect of overcrowding. Buller frequency was not significantly increased by pen space per head or weight of cattle. For every 10 head increase in total head per pen, the buller incidence increased 0.15%. For every 9.3 square meters increase in pen size the buller rate decreased 0.05% (Brower and Kiracofe, 1978).

Irwin et al. (1979) found no statistical correlation between buller occurrence and either pen size or square meters per head. Results suggested that as the number of steers per pen increased, irrespective of pen size available, there was a corresponding increase in buller occurrence.

**Stress**

Stress factors which contribute to buller incidence include changes in environment, routine, and diet, plus handling and transportation of steers to the feedlot. Once cattle are acclimated to feedlot conditions, contributory factors include switching pens, changes in feed routine, and lack of feed (Brower and Kiracofe, 1978).

When the feedman is unable to perform his duties, during a feed mill breakdown, for example, many cattle line up to empty feedbunks in anticipation and are easily excitable. Riding activity is seen to increase and usually persists until the feed situation is corrected (R. Ulbrich, personal observation).

**Pheromones**

The pathogenesis of the buller-steer syndrome has been considered to involve increased blood concentration of estrogenic hormone, with expression of estrous mounting behavior (Brower and Kiracofe, 1974). Brower and Kiracofe (1972) reported buller-steers to have higher urinary estrogen levels than normal steers. The effeminate behavior of the buller-steer suggests an estrogenic influence, which is supported by the observation of high serum and urinary total estrogens in previous investigations (Brower and Kiracofe, 1974).

Gassner et al. (1958) implicated a sex odor as an attractant to penmates by...
showing that bulling behavior increased when the buller was injected with estrogen, but decreased with treatment of testosterone. The sexual stimulation of the rider is due indirectly to the olfactory stimulation associated with the release of pheromones by the buller (Irwin et al., 1979). However, the visual stimulus of the buller’s stance may be responsible for provoking the mounting behavior, as seen with bulls mounting tethered steers for semen collection (Hafez, 1969).

Serum estradiol and testosterone values were obtained from Synovex-S implanted buller-steers by Irwin et al. (1979) at the time of bulling and during a recovery phase. Both gonadal hormones assayed were lower while the steers were bulling than at the end of three days’ isolation. The conclusion reached was that the expression of a gonadal hormone may not be responsible for the abnormal behavior.

A pheromone investigation was conducted by Brower and Kiracofe (1978). Urine and feces were collected from overt bullers and normal steers. Buller and nonbuller urine were applied in bags to the tailheads of normal steers. Response of penmates ranged from attempted mountings to no recognition. The latter seemed to be mostly curious about the bags on the steer’s rumps. However, more attention was paid to the steers with the buller urine. In all cases experimental steers resisted mounting and engaged in aggressive butting. Buller feces applied to normal steers resulted in minor attention but no attempted mountings.

The results of this experiment would seem to indicate the presence of pheromones. The mechanism by which DES and other growth promoting products result in pheromone secretion is unclear.

**Economic Impact**

Although the buller-steer syndrome has been known to exist for several years, it has only recently been reported to be of significant monetary importance (Irwin et al., 1979). A 2 to 3% annual incidence is reported in steers fed in Colorado (Pierson et al., 1976) and in Kansas feedlots (Brower and Kiracofe, 1978). Respondents to the Kansas questionnaire estimated that the bullers represented a minimum loss of $23.00 each. Financial loss involved not only additional labor, facilities, bookkeeping, rations and injury, but also unfavorable public relations. The feedlot operators indicated that buller-steers were enough of a problem to justify spending 5 to 6 dollars per head if a treatment were available (Brower and Kiracofe, 1978).

Pierson et al. (1976) report that although riding may continue until the bullers become exhausted, collapse, and die, the main economic loss results from injury of the buller and stress to both buller and rider, and the necessity of early isolation of the victim. However, in the case of a buller fatality, not only does the owner forfeit the animal’s cost or worth, someone must stand the loss of the dead animal’s accumulated feed—possibly as much as $200 if nearly finished (R. Ulbrich, personal observation).

Percentage of injuries from bulling coincided with the seasonal occurrence in 4 Colorado feedlots. During 1974, out of almost 2,000 necropises, it was determined that 63 steers (3.8%) died from riding injuries—18 immediately and 65 after treatment for fractures, contusions, cellulitis, and pneumonia (Pierson et al., 1976). It should be noted that the above figures would not include possible carcass losses upon slaughter of surviving bullers, due to bruises and discoloration, which necessitate trimming of the carcass especially in the loin area, the most valuable carcass component (E. Snyder, feedlot operator, personal communication).

**General Observations**

The Kansas survey indicated that the syndrome was not associated with a particular breed, an age or weight class or origin of cattle. Not all bullers fit into the classical buller syndrome. Some are the target of aggression and may be at the bottom of the social strata. In spite of the traumatic experience, the bullers, once segregated, gained as rapidly as their original penmates and were marketed at the same time. Once bullers are removed to a separate pen very little riding occurs, even though the number and density of bullers may be relatively high (Brower and Kiracofe, 1978).

Some steers become bullers because they are debilitated by disease. Once mounting is initiated, it usually continues until the buller is removed (Pierson et al., 1979). The behavior of the buller-steer should not be confused with brief random mounting of individual steers under close confinement (Irwin et al., 1979).

**Prevention**

Other than common sense management practices, such as adherence to feeding routines and rations, proper handling, and taking steps to avoid stress, the literature suggests little in the way of prevention.

Simple boredom of feedlot steers may play a larger role in the buller-steer syndrome than we may realize (R. Ulbrich, personal observation). Such a notion would be difficult to prove. Conner is cited (Hafez, 1975) as remarking that no controlled studies of behavior have been conducted to separate genetic and environmental factors of domestication. Animals in their natural state are seen to spend a large portion of their waking hours in the procurement of food. In our ever increasingly intensive livestock systems, we have provided animals with an adequate food supply, without paying much attention to their behavioral needs (Adler, 1976). The barren, monotonous environment of a corral or pen provides an ideal setting for the development of undesirable, sometimes destructive abnormal behavioral traits, as seen with “cribbing” horses and feedlot buller-steers (R. Ulbrich, personal observation). The domestication process has not sufficiently addressed itself to the problem of boredom.

Background music is recommended for all types of livestock in stockyards and slaughter plants to relax animals and cover machinery noise (Grandin, 1980). Perhaps we should apply this type of treatment to the buller-steer problem and thus proceed one step further.

There is a need for the development of a practical manner in which to entertain or at least engage the attention of feedlot cattle and penned livestock in general. In theory, research in this area would have as its goal the elimination of undesirable, abnormal behavior as well as increased performance.

**Conclusions**

The buller-steer syndrome is a common health and economic problem in feedlot operations, and appears to be increasing in annual incidence. Intangible monetary losses per buller are estimated at about $23. If unchecked, bullers perform poorly, if indeed they survive, and the agitation of their penmates undermines the performance of the entire pen. Research has demonstrated the abnormal behavior to be associated with the following: hormonal implants, improper implantation technique, the feeding of fresh alfalfa, stress, and pheromones in some cases. Incidence has been shown to be unrelated to weather conditions, overcrowding, and...
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and weight of cattle. Upon detection, bullers are segregated and treated for injury or illness. In most cases, subsequent riding and injury in “buller pens” is minimal.

To the extent that boredom of feedlot cattle results in abnormal behavior, research should be initiated to explore the feasibility of enriching the environment, possibly by visually engaging the attention, in some manner, of feedlot cattle and penned predators in general.

References

FORTHCOMING ARTICLES
Equine Behavior Problems in Relation to Humane Management—Katherine A. Houpt
Attitudes Toward Animal Suffering—John and Valerie Braithwaite
Laboratory Animals: Unification of Legislation in Europe—H. Rozmold
Experiences on the Protection of Large Predators in Finland—Erkki Pulliainen
Injuries to Birds of Prey Caught in Leghold Traps—Katherine Durham
Effects of Ethostasis on Farm Animal Behavior—Andrew F. Fraser and Michael W. Fox
Volume 2 Number 6: Zoo Issue
The Role and Responsibility of Zoos: An Animal Protection Viewpoint—John E. Cooper
Zoo Philosophy, Goals and Exhibition Principles—Randall L. Eaton
People at Zoos: A Sociological Approach—Edward G. Ludwig

Legislation & Regulation
ASZ Cannot Support HR 556
The American Society of Zoologists (Thousand Oaks, CA) has issued a statement on HR 556, the Research Modernization Bill (see 2(2):103, 1981), which is reproduced below:
The American Society of Zoologists supports efforts to improve the lot of laboratory animals. It does so, not only on humanitarian grounds, but also for the practical reason that badly maintained animals do not give reliable results. Nonetheless, while sharing many of its goals, the Society cannot give its support to HR 556, due to a number of practical problems in the Bill. Among them are the following:
1. Scientists have been quick to adopt cheaper substitutes, such as the Ames test, for live animal research. The declining budget for scientific research should accelerate this trend even more. Yet it is misleading to suggest that tests on bacteria or computer simulations can replace 30-50% of all advanced live animal research. In medical research, this assumption is particularly erroneous. A bacterium may be used to screen for genetic mutations, but it cannot tell much about the likelihood of a drug’s producing nausea in a human digestive tract. Nor are computer simulations a panacea: a computer model requires an exceedingly thorough understanding of the organism. Developing the model itself requires animal experimentation. Without accurate input, the model would be useless: garbage in, garbage out.
2. At the largest research institutions, new methods are used upon publication, if not before. But in smaller institutions, or in student exercises, assistance would be very useful. The ASZ would like to see short courses, such as those in NSF’s Chataqua (sic) program, which would instruct labs, from laboratory scientists and classroom teachers in techniques or lab exercises which avoid the use of live animals. This constructive aid would probably pay off in one or two semesters. Thus, Sec. (a and b) of HR 556 is a step forward, though consolidation within one agency would probably lead to economies of scale. Even so, it is worth emphasizing that up until now, the National Science Foundation has been empowered to carry out programs of this type; only money has been lacking.
3. “Publish or perish” is the rule of scientists. But journals will not publish material unless it is new. Thus, scientists have the strongest possible incentive to avoid duplication. If they don’t, the result is less likely to be published. When this rule is violated, the researcher usually has a very good reason. He or she probably thinks the original work was badly done, or left out some important factor. Due to the calculated risk to one’s career, duplicate research is never carried out capriciously. Any law forbidding duplication of research (as in Sec. 10(b)) is pointless or counterproductive, since scientists have had such a “law” for years.
4. The bill affects only federally-funded research. At present, this research ranges from studies of the breeding of pandas at the National Zoo to tests of cancer drugs on live animals. It does not cover Draize tests of new types of mascara or hair dye, for example. These latter tests are funded by cosmetic companies, and would be unaffected by this bill. Does it make sense to slash federally-funded research, and leave industrially-oriented experiments unscathed?
5. As zoologists who study a broad range of species in the animal kingdom, we are concerned that the definition of “alternative methods of research and testing” includes “the use of... lower organisms.” By conservative estimate, there are over a million species of animals on the planet, consorts to koalas. Is an intelligent octopus a higher organism, while a dull lab rat is a lower