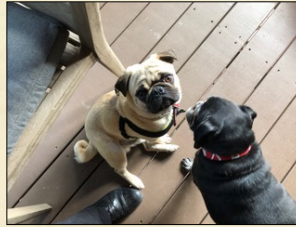


## **Insights Into Animal Behavior and Autism, 2<sup>nd</sup> Edition**

**Temple Grandin, Professor**



**Colorado  
State  
University**

1

## **Animals Live in a Sensory Based World**

- Get away from verbal language to understand animals
- What is the animal seeing, hearing, smelling, and touching?

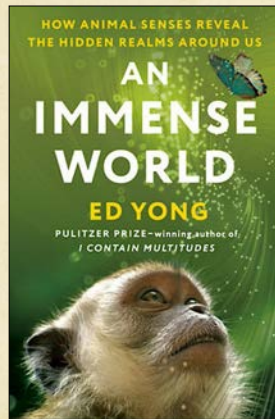
2

## Dog's Nose – Direct Wiring to Visual Cortex



Andrews et al., 2022  
Cornell University

3



It is a mistake  
to yank a dog  
away from a  
tree it is  
smelling.

4



I see movies in my  
imagination and  
this helped me  
understand animals

Little Rainman by Karen Simmons

5

- 
- When I was young, I thought everybody thought in pictures
  - Learning that I thought differently provided great insight
- 

6

**New Things Are *Attractive* When the  
Animal is Allowed to Approach  
Voluntarily and *Frightening* When  
Suddenly Introduced**



7

Sudden new things and  
experiences are  
frightening to both  
animals and people  
with autism

8

## Many Problems With:

- Many dogs lead too sheltered a life and are afraid of new things
- Edwards et al. (2019) Dogs that fear their veterinarian are also afraid of any new situation

9

Objects  
may be  
perceived  
as new  
when  
rotated



Original Position



Rotated Position

Corgan, et al., 2021

10

## These objects are totally different pictures



Learning that the umbrella is safe  
does not transfer to the tarp

11



- ✓ Sharp shadows – Cattle more likely to stop moving
- ✓ Outdoors – Shadows constantly change

Willson et al., 2021

12



13

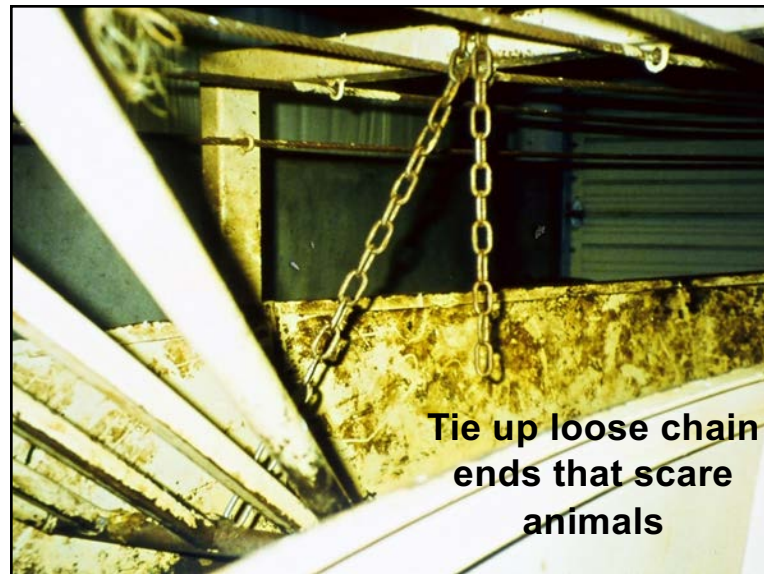


14



**Cattle may refuse to move when they see the white jug and the red car**

15



**Tie up loose chain ends that scare animals**

16

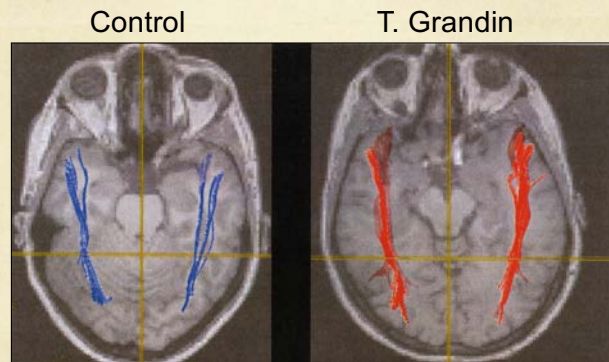


## Lack of Outer Solid Side Cattle See Truck Loading



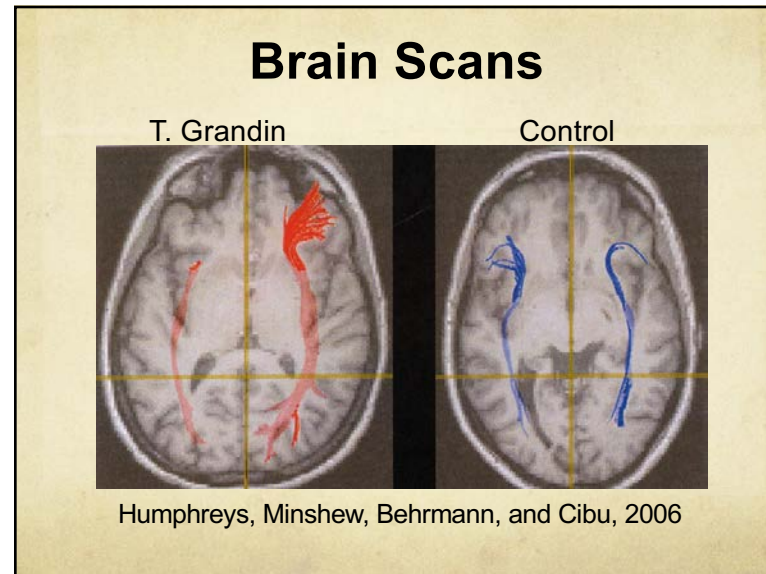
17

## Brain Scans of Large Visual Thinking Circuit

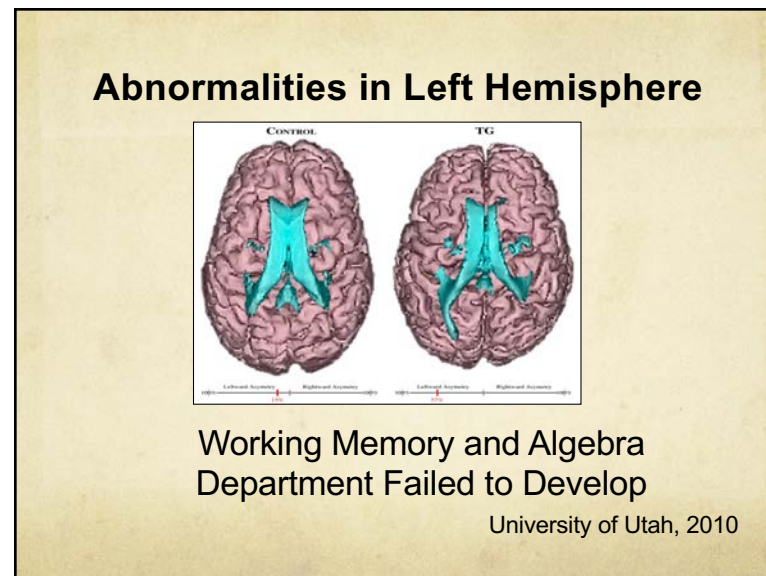


Humphreys, Minshew, Behrmann, and Cibu, 2006

18



19



20

## Develop Talents in the Individual's Specialist Brain

1. Photo Realistic Visual Thinking – Object Visualizer - Poor at algebra
2. Pattern Thinker Music and Math – Visual Spatial - Poor in reading
3. Verbal Thinker has thoughts in words – Poor at drawing
4. Auditory Thinker – Learns better with hearing words



There can be mixtures of these thinking types

21

**This horse is afraid of black cowboy hats because he was abused by a person wearing a black hat**



**White hats  
cause no  
reaction**

**Animal  
fears are very  
specific**

22

## Calm Animals Easier to Handle 20 to 30 Minutes to Calm Down



Photo by Sherry Taylor

23

- 
- ✓ The importance of reducing fear is now being recognized
  - ✓ Fear free methods are being used at veterinary clinics
  - ✓ Fear of the Veterinarian is a common problem
- 

24

## Fear Free Nail Trim With a Lion



25

## Fear is a Strong Stressor Young Dogs Fearful of Loud Noise and Unfamiliar People or Animals Turn Gray at an Early Age



Camille King et al., 2016

26

**Fear is the Main  
Emotion in Autism**

**My Amygdala (Fear  
Center) is Three  
Times Larger**

University of Utah, 2010

27

**Low Fear Dogs  
Lower Stress**

---

- ✓ Bold personality makes domestic dogs entering a shelter less vulnerable to disease
- ✓ Shy dogs (high fear) poorer immune parameters

---

Corsetti et al., 2018

28

## Animals Have Emotions



- Prozac works on dogs. Increases serotonin at nerve endings
- Brain systems where emotions originate are located in subcortical brain areas that are similar in all mammals
- Neurotransmitters same

29

## Genetics of Horse Domestication

- ❑ Two small genetic changes associated with greater use of horse
- ❑ Increase in serotonin neurons
- ❑ Decrease in back pain
- ❑ Chariot invented



Librado et al., 2021

30

## Core Emotions

- ❑ **FEAR** – Most primitive emotion for survival (Amygdala) (Shy or bold personality)
- ❑ **RAGE** – Anger (Hypothalamus)
- ❑ **PANIC** – Separation anxiety (Periaqueductal area brain stem) (Isolation stress)
- ❑ **SEEKING** – Approach novelty (Nucleus Acumbens) (High or low exploration personality)
- ❑ **ADDITIONAL EMOTIONS** – Lust, caring, play

Jaak Panksepp, Affective Neuroscience, 1998 and Panksepp, 2011

31

## Music Mixing – Board of Emotion

- ✓ High or low FEAR (Shy or bold) cows, separate trait from aggression
- ✓ High or low SEEK (Exploration) Go getter, Laid back cows

Perez-Torres et al., 2014;  
Goodman et al., 2016

32



## A Non-Slip Floor is Essential as Slipping Causes Fear

Reward puppies with treats to tolerate having their paws held



Credit: Brandon's Life Blog

33

## Research by Dr. Gregory Berns, Emory University

Reward circuits in dog's brain are activated similar to humans when they smell familiar people or see hand signals associated with food



Credit: Wired Magazine, wired.com

34

## Chickens and Rats Self Medicate with Pain Killers

- Artificially create an arthritic joint
- Provide two feeders or water bowls
  - One contains a bitter tasting pain killer and the other contains plain feed or water
- Animals choose the pain killer when the joint is inflamed and switch away from it as the joint heals

Colpaert et al., 2001

35

## A 45-minute daily play and training period reduces cortisol levels in shelter dogs housed individually in a noisy kennel




---

**Contact      26 mg/ml**  
**No Contact 41 mg/ml**

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Coppola et al., 2006

36

## Dog Park That Works



- Attentive staff
- No outside food or toys to prevent resource guarding
- Really aggressive dogs not allowed

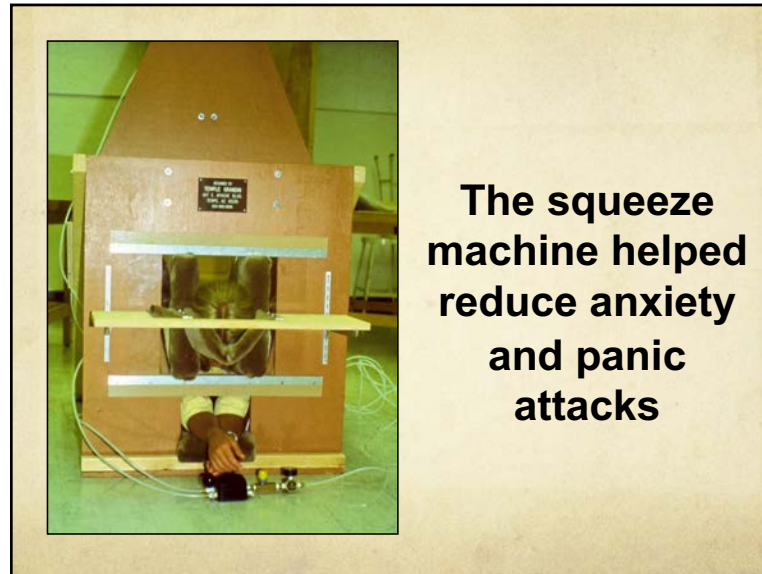
37

## Pressure Wrap Effects Reduces Separation Distress

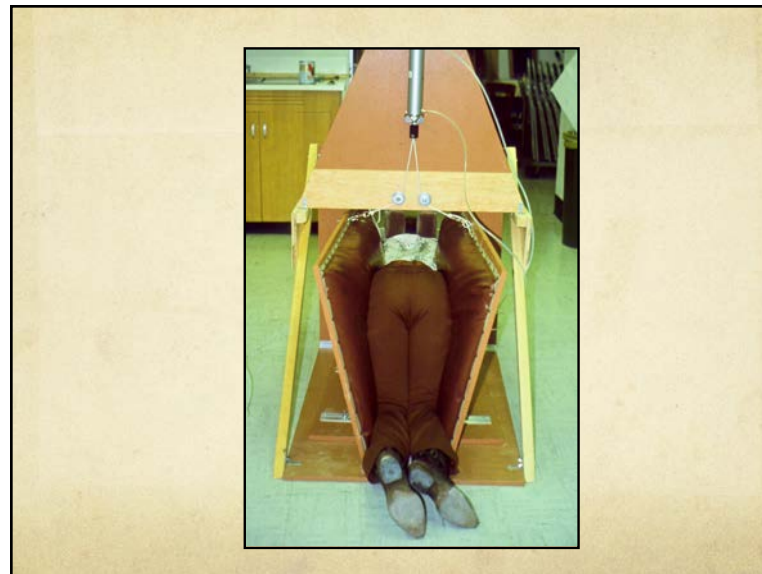
- Reduced heart rate
- More effective on dogs not on medication
- Dogs spent less time orienting towards the door of the kennel

King et al., 2014

38



39



40

## Brain Can Be Either More Cognitive Thinking or More Social Emotional

- Solitary mammals provide an animal model for autism
- Dog sociability and friendliness genetically related to Williams Syndrome

Reser et al., 2014;  
Von Holdt et al., 2017

41

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Compared to wolves, dogs will look to people to help them solve a difficult problem. This behavior is heritable (Persson, et al., 2015)

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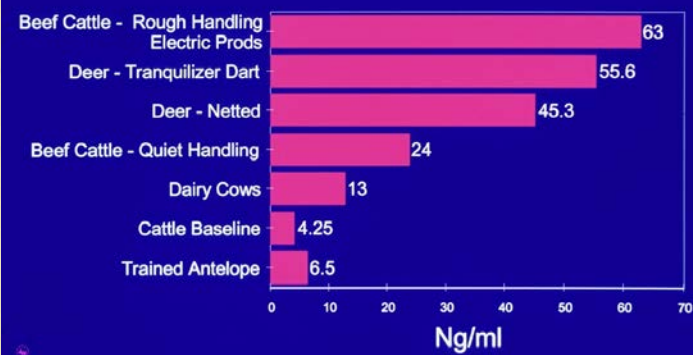
42

**The Same Gene  
Sequences That Give  
Humans a Large Brain,  
May Also Cause Autism,  
Schizophrenia, and  
Epilepsy**

Sikela and Searles, 2018

43

**Cortisol Levels During Restraint**

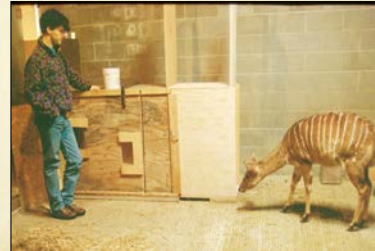


44

## Voluntary Cooperation Greatly Lowers or Eliminates Fear Stress



Grandin et al., 1998



45

## Good Stockmanship is Important

---

- Pigs easier to move and lower heart rate when acclimated to walking in alleys (Lewis et al., 2008; Geverink et al., 1998)
  - Acclimating heifers to moving through chutes lowered cortisol and improved reproductive performance (Cook et al., 2012)
- 

46

An animal's first experience with a new person, place, or vehicle should be good to prevent the formation of fear memories



Credit: Miss Behavior's Blog

47

Horses will show less fearful behavior when confronted with a novel object when they were with a familiar person. Heart rate stays the same

(Marshall and Christensen, 2015)

Owner present during veterinary exam lowers heart rate and less fear behaviors

(Stellato et al., 2020)

48

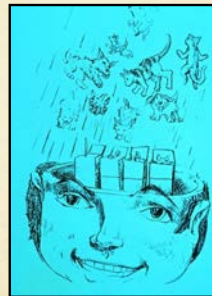


## On the leash and off the leash – two different categories



49

## Sensory thinkers sort specific pictures, sounds, touches, and smells into categories



*Little Rainman* by Karen Simmons

50

- All my thinking uses specific examples to create concepts
- It is **bottom up thinking** and not **top down thinking**
- I learned ALL concepts using specific examples put into categories

51

## Bottom Up Thinking

---

- Animals
  - People with Autism
  - Computer Artificial Intelligence
- 

52

## The Flight Zone is the Animal's Safety Zone

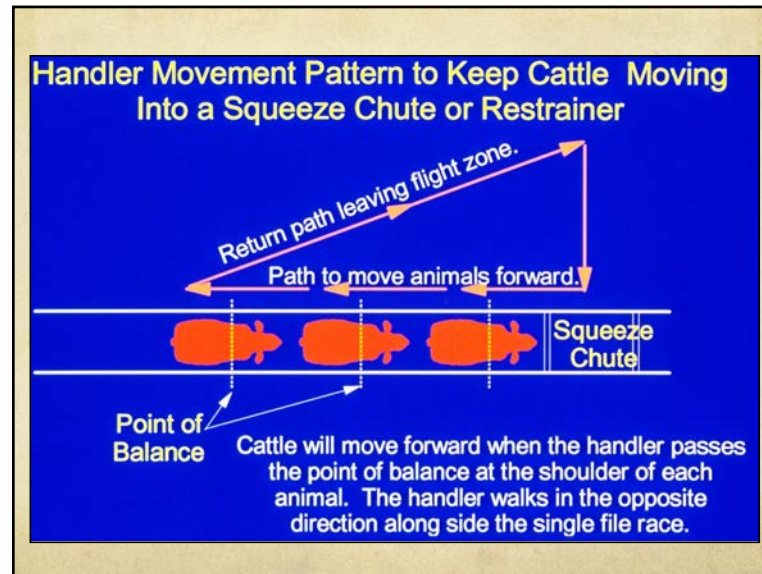


53



**Animals turn away when the handler enters the flight zone**

54



55

## Sell Yourself with a Portfolio

- ✓ Put it on your phone
- ✓ 30 second WOW

**LIVESTOCK HANDLING SYSTEMS**  
 A Well Designed Facility will help make your Livestock Operation More Profitable.

**CUSTOM DESIGNED To Fit Your Operation**

Working, sorting, loading and hauling facilities for all types of livestock are custom designed and built to meet your specific needs. Our facilities are designed to handle all types of livestock and are built to last. We have the experience and resources to design and build the most efficient and profitable livestock handling systems for your operation. Contact us today for a free consultation. We will help you design the most efficient and profitable livestock handling system for your operation.

**CURVED WORKING CHUTES For Greater Efficiency**

A curved chute is the most efficient and profitable design for handling livestock. It allows the handler to work the animals from the side of the chute, rather than the end. This design allows the handler to work the animals from the side of the chute, rather than the end. This design allows the handler to work the animals from the side of the chute, rather than the end. This design allows the handler to work the animals from the side of the chute, rather than the end.

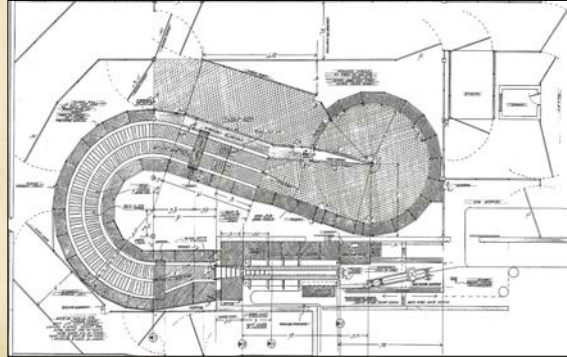
Consultants & Designers of livestock handling facilities for feed lots, ranches, packing plants & auctions.

**GRANDIN LIVESTOCK HANDLING SYSTEMS, INC.**

July 2, 1982 Release No. 2009-0001, Revised 01-11-13  
 Phone: 800-833-7263  
 2009 - Grandin Livestock Handling Systems, Inc. P.O. Box 5070  
 Fort Collins, CO 80520

56

## People Were Impressed With My Drawings



57

## Cattle move easily through the wide curved lane to the crowd pen



58

## Non-Slip Flooring is Essential

- Animals get agitated when they slip
- Squeeze chutes, stocks, scales, unloading ramps



Steer coming out of squeeze chute

59

- 
- Measuring Livestock Handling Prevents Bad From Becoming Normal
  - People Want the Thing More than the Management
- 

60

### Survey of Cattle Handling in Squeeze Chute in 28 Nebraska, Kansas, and Colorado Feedlots

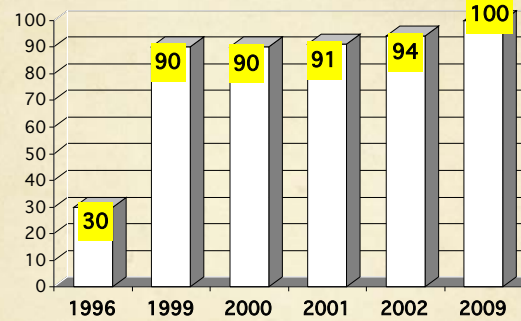
	Average	Range
Electric Prod %	5.5	0 to 45
Vocalization % *	1.3	0 to 6
Exit Falling %	0.8	0 to 2
Exit Stumble %	6.7	0 to 28
Miscaught %	2.2	0 to 16
Exit Run %	30.7	2 to 75

\* No branding, castration, or dehorning

R. Woiwode, 2014

61

### Percentage of Beef Plants That Stunned 95% or More Cattle with the First Shot



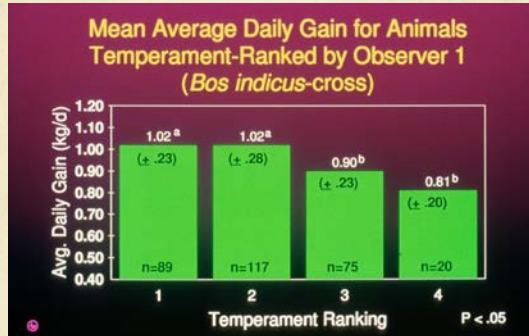
USDA survey prior to industry wide auditing

McDonald's Audits started

Continued auditing by major customers  
Continuous auditing maintains good performance

62

### Cattle that become agitated in the squeeze chute have lower weight gains



Cattle that run fast out of the squeeze chute may perform poorly

Voisinet et al., 1997, Fell et al., 1999

63

- Do not over select for temperament
- Genetic differences in maternal behavior
- Difference in vigilance
- Some mothers call their calf
- A few poor mothers walk away

Florecke et al., 2012

64



## Purebred Brahman Approach People for Stroking



65

## Critical Control Points for Cattle Welfare

- ✓ Handling scoring
- ✓ Sores, lesions, damaged knee joints, swollen leg joints
- ✓ Lameness and mobility
- ✓ Dirty animals
- ✓ Body condition
- ✓ Ammonia levels – Indoor animals
- ✓ Heat stress – Open mouth breathing in cattle
- ✓ Coat condition

66

## Example: Lameness is an Outcome of Many Bad Conditions

- ❖ Agitated Cattle Scuff Hooves (toe abscesses)
- ❖ Rapid Growth
- ❖ Poor Leg Conformation
- ❖ Poor Foot Care
- ❖ Foot Disease
- ❖ Injuries
- ❖ Beta-Agonists – Hot Weather

67

## Poor Leg Conformation Causes Lameness and Difficulty Walking



Correct

Collapsed Poor  
Poor

Straight Post

68

**Post Legged Cattle  
Leg is Too Straight**



69

**The pig has bad leg conformation**



**Beef should not repeat this mistake**

70

## **Corkscrew foot – A genetic defect in cattle**



**Photo by L.A. Horstman, DVM,  
Purdue University, 2010**

71

**A wild fox  
is fine  
boned  
slender  
and  
nervous**



72

**The Russian scientist, Belyaev, selected foxes for a calm temperament and found that other traits, such as coat color also changed**



73

**Domestication of deer started thirty years ago. They would not have tolerated a person in the small pen.**



74

## Older Type Bull Dog



75

## Modern Bulldog



76



Photo Credit: *New York Times*, 1938

77

## A Good Pug That Can Breath



78

## Extreme Arab Horse



Has selective breeding of horses gone too far?

Horsesmacl.com, Andrea Marques

79

## Need to Look at Quality of Life When Assessing Welfare

- 
- Preventing suffering is not sufficient
  - Does the animal have positive emotions
- 

80



## Does an Animal Have a Life Worth Living?

- ✓ Heavy broiler will ride swinging platform
- ✓ Requires really good management

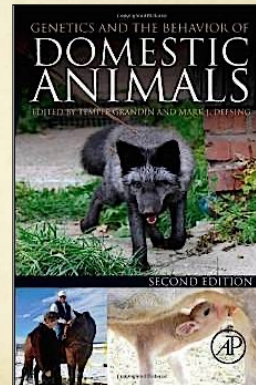
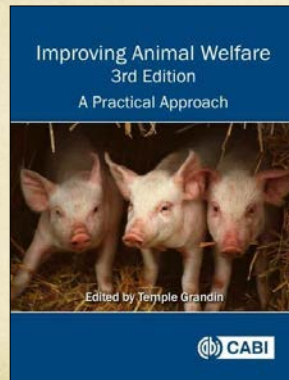


81



82

[www.grandin.com](http://www.grandin.com)



83