School of Veterinary Medicine

# *Racing Against Time*

securing the safety, integrity and advancement
of horse racing in California

UC DAVIS
School of Veterinary Medicine

***Center for Equine Health***

*Director: Dr. Gregory L. Ferraro*

*e-mail: glferraro@ucdavis.edu*

*phone: (530)752-6433*

*Web site: www.vetmed.ucdavis.edu/ceh*

***California Animal Health and Food Safety Laboratory***

*Director: Dr. Alex Ardans*

*phone: (530)752-8700*

*Web site: http://cahfs.ucdavis.edu*

***School of Veterinary Medicine***

*Dean: Dr. Bennie I. Osburn*

*University of California*

*One Shields Avenue*

*Davis, California 95616*

*Published by: Center for Equine Health, School of Veterinary Medicine, University of California, Davis*

*Writing/Editing/Creative Design: Barbara Meierhenry, Center for Equine Health; and Marianne Post, UC Davis Design Services, Repro Graphics*

*Photography by Katey Barrett Photography; Jane Morgan, Southern California Equine Foundation; and Benoit and Associates*

*The Center for Equine Health is supported with funds provided by the Oak Tree Racing Association, the State of California Pari-Mutuel Fund, and contributions by private donors.*

# *Racing Against Time*

## Securing the Safety, Integrity and Advancement of Horse Racing in California

*Reflections on three decades of collaboration between the University of California–Davis and the horse-racing industry, with a look toward the future*

*March 2005*

**The UC Davis School of Veterinary Medicine has a long and prominent history of commitment to equine health, dating back to the School of Veterinary Medicine's beginnings in the late 1940s. Many accomplishments have been seen in the diagnosis and treatment of problems in the areas of orthopedics, reproduction, and infectious disease.**

**At the request of the California Horse Racing Board (CHRB), a program was established at the California Animal Health and Food Safety Laboratory at UC Davis to address catastrophic racetrack injuries. The Postmortem Program, guided by the Equine Welfare and Racing Injury Prevention Committee and prominent trainer Richard Mandella, has generated considerable new information about racing injuries. Of equal importance to the welfare of racehorses, researchers through the J. D. Wheat Orthopedic Research Laboratory, headed by Dr. Susan Stover, have advanced knowledge of equine orthopedics far beyond anyone's expectations. These programs are a splendid example of California's ingenuity and resources being pooled to address racehorse health and injury issues.**

**The late Senator Kenneth L. Maddy was largely responsible for establishing ongoing equine research support for the School of Veterinary Medicine. He championed the concept of drug testing to prevent abuse of racehorses and other equine athletes. He also believed that for horse racing to remain a viable and healthy industry, the integrity of the sport must be ensured. His vision was implemented in 2000 with the establishment of the Kenneth L. Maddy Equine Analytical Chemistry Laboratory, a research and forensic testing laboratory specifically dedicated to meeting the needs of the racing industry.**

**Beyond California, few states have developed the breadth of resources or the dedication at all industry levels for improving the safety and welfare of racing horses and for preserving the integrity of the sport. We look forward to building on the past successes of this academic/industry partnership and are committed to contributing to the advancement of California's racing legacy.**

**Alex Ardans, Director**
**California Animal Health and Food Safety Laboratory**
**University of California, Davis**

As a practicing equine veterinarian for 27 years and more recently as Director of the Center for Equine Health, I am aware of the enormous positive impact created by the partnership between the UC Davis School of Veterinary Medicine and the California horse-racing industry. This long-standing relationship has done more to advance the welfare of the equine athlete and ensure the integrity of horse racing than any other single factor. Over the past three decades, this working partnership has become internationally recognized as the "gold standard" within horse racing. No other state or national entity has surpassed California in foresight or leadership in the advancement of equine medical knowledge or in the proper conduct of racing as a humane sport.

California's legislative leaders, horse racing industry executives, university faculty, and citizen horse lovers can take pride in what they have created. Our state's system of regulatory funding and industry support to ensure the safety and integrity of horse racing through research is unsurpassed. It demonstrates that for innovation in pursuit of the public good, California is once again ahead at the wire.

Gregory L. Ferraro, Director
Center for Equine Health
University of California, Davis

# Historical Perspective

For over three decades, a unique partnership existing between California's horse-racing industry and the UC Davis School of Veterinary Medicine has fostered the safety of racehorses in our state, sought to ensure the integrity of the sport, and promoted the continuous advancement of equine athletic medicine. This relationship has been recognized worldwide as a model for public and private sector cooperation in the conduct of horseracing and has demonstrated California's capacity for visionary leadership.

Since the mid-1950s, the UC Davis School of Veterinary Medicine has been an international leader in the field of equine medicine. This fact was well known to the Oak Tree Racing Association, and it was their recognition of the need for research and development within the racing industry that initiated what is now a long-standing program. Because of their confidence in the UC Davis Equine Research Laboratory (now called the Center for Equine Health) and its director Dr. John Hughes, in 1973 Oak Tree made a substantial financial contribution to the UC Davis program with the caveat that they become partners in solving the industry's equine medical problems. At the same time, Oak Tree invested in an on-track equine medical organization, the Southern California Equine Foundation, to facilitate active cooperation between the private conduct of equine racetrack medicine and university research.

This newly formed working group began a pioneering on-track research project to determine the cause of exercise-induced pulmonary bleeding in horses. Thus began what is now the longest and most successful program for continuous equine athletic medical research in the world. The concept of on-track clinical research supported by in-depth university laboratory analysis has been established as a "gold standard" approach for improving the medical care, safety, and welfare of racehorses.

In the late 1970s, an equine orthopedic research group was formed at the UC Davis School of Veterinary Medicine to work with racetrack veterinarians to identify injuries specific to racehorses. Projects were designed to determine the cause and prevention of specific injuries, and those projects over the years have led to a steady decrease in the numbers of horses injured per racing day. This study group was eventually endowed as the internationally recognized J. D. Wheat Orthopedic Research Laboratory. Among the breakthrough discoveries made possible by this research laboratory was that small stress fractures are the precursors to eventual breakdowns. This knowledge led to the on-track use of nuclear scintigraphy (bone scanning) to identify horses with stress fractures who were at high risk for injury.

In 1990, the racing industry and the UC Davis School of Veterinary Medicine instituted a Postmortem Examination Program to further enhance the ability to analyze and prevent racing injures. Under this new program, all horses that die on California racetracks are thoroughly examined at one of the California Animal Health and Food Safety Laboratories. The information acquired under this program over the last decade has dramatically influenced both our understanding of and ability to control racing injuries. Samples taken from horses examined under this program are studied in depth at the J. D. Wheat Orthopedic Research Laboratory, and the resulting knowledge regarding risk factors for injury has profoundly influenced the management of racing. An example of this type of change was the discovery that horses wearing certain types of horseshoes were more often found to be severely injured than others. This has led to specific recommendations and guidelines for horseshoe design.

The most recent addition to this system of racing medical research and development is the Kenneth L. Maddy Equine Analytical Chemistry Laboratory. Created through legislative mandate in 2000, this laboratory provides routine drug testing and quality control analysis to ensure the integrity of racing in California. Additionally, the laboratory's scientists conduct research into the effect of drugs on racing performance and on the long-term health of horses. The Maddy Laboratory is one of the few such laboratories in the United States accredited by the International Standards Organization and has rapidly established itself as a leader in its field.

We believe these programs have, in their total effect, significantly improved the health and welfare of the racehorse, advanced the science of equine athletic medicine, and helped to ensure the integrity of racing.

# Partnership between the UC Davis School of Veterinary Medicine and the Horse-Racing Industry 1973 – 2005

**1973**

The Beginning. Oak Tree Racing Association makes initial contribution to establish the Center for Equine Health. Pictured in photo are, from left to right: Joe Harper, Clement Hirsch, Dean Rhode, John Hughes, Jack Robbins, and Rich Matheny

In 1973, the Oak Tree Racing Association made a substantial contribution to the UC Davis School of Veterinary Medicine for equine medical research with the caveat that they become intimately involved in solving the industry's equine medical problems. Thus began a unique partnership that has brought safety and integrity to the sport of horse racing in California, improved the lives of countless numbers of horses through veterinary medical research, and endured the test of time. As the longest and most successful program for continual equine athletic medical research in the world, this partnership is recognized worldwide as a model for public and private sector cooperation in the conduct of horse racing and has demonstrated California's capacity for visionary leadership.

**1976**

Creation of Southern California Equine Foundation and on-track veterinary units to facilitate care of racehorses and collaborate with UC Davis veterinary research.

**1978**

First UC Davis on-track research project to study pulmonary bleeding in horses.

**1983**

First long-term orthopedic research project conducted on site to determine the cause of specific racing injury.

**1987**

Satellite Wagering Act (Senate Bill 14) passed. State-mandated research funding designated for the UC Davis School of Veterinary Medicine from Simulcast wagering.

**1988**

Veterinary orthopedic research laboratory created at UC Davis. Endowed as the J. D. Wheat Orthopedic Research Laboratory in 1998.

**1989**

Blue Ribbon Committee to address drug testing concerns of the California racing industry.

**1990**

Postmortem Examination Program established at UC Davis and two strategic locations throughout state to determine cause of injury and death for all horses that die on California racetracks.

**1993**

Installation of nuclear scintigraphy at Santa Anita Race Track to diagnose stress fractures in horses in active training. Stress fractures were found to be precursors to breakdowns from racing.

**1994**

Redistribution of Simulcast racing percentage (Senate Bill 518) directing two thirds of earnings to development of an Equine Analytical Chemistry Program and Laboratory.

**1996**

Identification of horseshoe toe grabs as a risk factor for injury.

**2000**

Kenneth L. Maddy Equine Analytical Chemistry Laboratory opens.

**2001**

Account Wagering Bill (AB 471) directed to UC Davis equine research and drug testing program.

*Mankind's true moral test, its fundamental test (which lies deeply buried from view), consists of its attitude toward those who are at its mercy, animals.*

*— Milan Kundera, 1929*

# J. D. Wheat Orthopedic Research Laboratory

Performance horses suffer from a wide variety of injuries that are unique to their particular athletic pursuit. The mission of the J. D. Wheat Orthopedic Research Laboratory is to discover risk factors, preventive measures and effective treatments for these injuries.

In the late 1970s, the UC Davis School of Veterinary Medicine was fortunate to have a group of faculty with a mutual interest in equine orthopedics and racing injuries. Led by the school's senior equine clinician, Dr. J. D. Wheat, combined with the talent of Dr. Roy Pool, a pre-eminent bone pathologist, and Dr. Timothy O'Brien, an equine radiologist, this group laid the groundwork for what is now one of the most respected laboratories in the field of equine orthopedic research. These individuals had the foresight to realize that the solution to many equine orthopedic injuries and unsoundness lay in basic cellular research. If the microscopic and cellular changes that occurred prior to clinical evidence of disease could be studied and understood, many injuries could possibly be avoided. With this vision, the group formed the initial collaborative laboratory structure now known as the J. D. Wheat Veterinary Orthopedic Research Laboratory.

While Drs. Wheat, Pool, and O'Brien provided the foresight and necessary academic support to create the laboratory, their vision was actually brought to fruition under the careful guidance of Dr. Susan Stover, current laboratory director. With the support of her predecessors and the contributing abilities of many new and emerging scientific talents, Dr. Stover has carefully guided the laboratory forward during the last 20 years, constantly expanding its capabilities and strengthening its scientific base. Under her guidance academicians and practicing veterinarians alike have developed a better understanding of how fractures and other orthopedic injuries occur in horses.

Through the laboratory's cooperative work with the Postmortem Examination Program, Wheat Laboratory scientists have described and delineated many of the risk factors for equine racing injuries. The racehorse is now managed much differently because the specific patterns of microscopic bone response that occur under the stress of race training are now known.

Some of the major benefits to the racehorse that have resulted from research at the J. D. Wheat Orthopedic Research Laboratory include:

- Catastrophic fractures in racehorses are usually preceded by microscopic bone changes called stress fractures.

- The occurrence of stress fractures and their locations are predictable.

- Nuclear scintigraphy (bone scanning), combined with other diagnostic techniques, can be routinely used to diagnose stress fractures.

- Delineated the association between high-density exercise and increased risk for injury.

- Determined an increased risk for catastrophic humeral fracture in the 60-day period immediately following periods of extensive lay-off from training.

- Established the relationship between horseshoe toe-grab height and risk for injury.

- Demonstrated that 25% of racehorses suffer from undiagnosed pelvic and back injuries.

- Improved understanding of joint and cartilage function and factors that lead to damage.

- Assisted in the development and testing of new devices for fracture repair in horses.

Notwithstanding these major accomplishments, the challenge remains to continue advancing the safety of horseracing in California.

*A racehorse is an animal that can take several thousand people for a ride at the same time.*

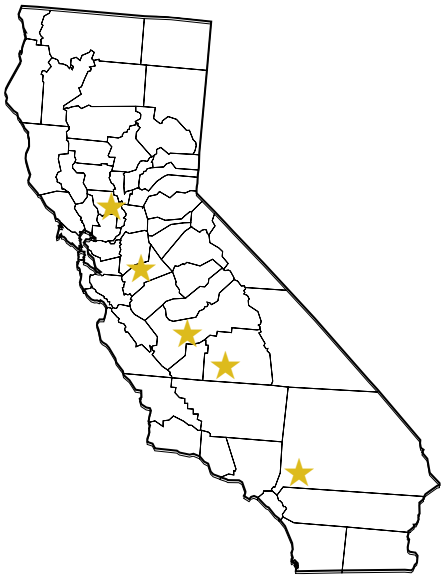
# Postmortem Examination Program

The Postmortem Examination Program established within the California Animal Health and Food Safety Laboratory has had a greater impact internationally regarding the health and welfare of the racehorse than any other single entity. It has not only stimulated innovation within California but has served as a model for a multitude of similar programs within horse racing worldwide. These programs have resulted in a dramatic improvement in the understanding of the causal factors for racing injuries and their rate of occurrence. Thus, California's reputation for scientific innovation and leadership has once again been showcased to the world.

Investigators from UC Davis recognized early on that there were very subtle changes to the bone structure preceding the more devastating injuries seen in the breakdown of racehorses. When this preliminary information was presented to the leaders within the California racing industry in 1990, they directed the California Animal Health and Food Safety Laboratory to establish a program for the systematic postmortem examination of every horse that died within a racing enclosure. It was readily understood that this combination between the private racing industry and a State of California service organization would also need in-depth research support in unraveling the complicated cause-and-effect nature of racehorse injuries. The J. D. Wheat Orthopedic Research Laboratory was the logical third partner in this pursuit.

Since that time, the discovery of new knowledge in the field of equine orthopedics has been staggering. Through careful examination of breakdown injuries, microscopic analysis of the bones and ligaments involved, and statistical analysis of the information garnered from large numbers of these examinations, the patterns for cause and effect have begun to be elucidated. We now know that bone responds to the stress of training and racing in predictable manner, and that the manner in which horses are trained, the surfaces over which they run, and the racing equipment they wear can all affect their risk for injury.

Statistical and clinical information regarding the incidence and severity of exercise-induced pulmonary hemorrhage has been accumulated through the Postmortem Program, as well as new information regarding cardiac anomalies associated with athletic training. The program has also allowed for the continual monitoring of infectious disease among California's racehorse population, thus providing valuable information for use in disease control strategies. Additionally, many new and previously unknown maladies have been discovered through this program, which have in turn stimulated targeted research designed to alleviate the identified conditions.



*Stars show locations of the University's California Animal Health and Food Safety Laboratories. Postmortem examinations of racehorses are performed at three of these sites (Davis, Tulare, and San Bernardino).*

# California State Senate

STATE CAPITOL
SACRAMENTO, CALIFORNIA 95814
(916) 445-9600

2503 WEST SHAW AVENUE, #101
FRESNO, CALIFORNIA 93711
(209) 445-5587

POST OFFICE BOX 249
1980 W. FIRST STREET, #2
HILMAR, CALIFORNIA 95324
(209) 667-3309

895 NAPA AVENUE, #4-6
MORRO BAY, CALIFORNIA 93442
(805) 772-0287

KENNETH L. MADDY
SENATOR, FOURTEENTH DISTRICT
REPUBLICAN FLOOR LEADER

COMMITTEES:
CONSTITUTIONAL AMENDM
ELECTIONS AND REAPPOR
GOVERNMENTAL ORGANIZ
(VICE CHAIRMAN)
HEALTH AND HUMAN SERV
(VICE CHAIRMAN)

JOINT COMMITTEES:
ARTS
LEGISLATIVE AUDIT
(VICE CHAIRMAN)

SELECT COMMITTEES:
BUSINESS DEVELOPMENT
CALIFORNIA'S BUSINESS C
CALIFORNIA'S WINE INDUS
FAIRS AND RURAL ISSUES
INFANT AND CHILD CARE
AND DEVELOPMENT
PACIFIC RIM

September 23, 1992

The state of California has one of the largest horse industries in the nation which contributes to the overall economy and lifestyle of our citizens. California's horse industry encompasses racing fans, horse owners, breeders, trainers, agricultural producers, and the providers of equine goods and services.

Despite our state's ongoing budget difficulties, it is imperative that equine health and performance related research is able to continue. Horse enthusiasts depend on the Equine Research Laboratory at the University of California at Davis for information and research activities designed to improve the veterinary care, treatment and performance of their horses. No other facility in California is better prepared with faculty and technological resources to deliver this information.

I am pleased to see that the Satellite Wagering Act (Senate Bill 14), which I drafted in 1987, has become a significant source of economic support for ERL. Increasing simulcast revenues have helped establish a broad base of research at the ERL which directly benefits, not only the state's racing industry, but also the interests of all breeds and types of horses.

The people of California are fortunate to have a world class equine research program addressing horse health concerns. Our state's horses and their supporting industries are well served by this facility.

Sincerely,

KENNETH L. MADDY

Kenneth L. Maddy
1934–2000
Champion of Equine Welfare

*Note: In 1995 the Equine Research Laboratory changed its name to the Center for Equine Health.*

# Kenneth L. Maddy Equine Analytical Chemistry Laboratory

The late Senator Kenneth L. Maddy was a meteoric force on the state of equine athletics in California. He was largely responsible not only for establishing equine research support for the UC Davis School of Veterinary Medicine but for ensuring its continued progression over the years. He championed the concept of drug testing to prevent abuse of equine athletes and believed that for horse racing to remain a viable and healthy industry, the integrity of the sport must be guaranteed. His vision was implemented in 2000 with the establishment of the Kenneth L. Maddy Equine Analytical Chemistry Laboratory, a research and forensic testing laboratory specifically dedicated to resolving equine industry concerns.

The Maddy Laboratory, nationally and internationally renown, is accredited by the International Standards Organization (ISO), and it has the distinct advantage of proximity and access to the UC Davis School of Veterinary Medicine. The primary functions of this lab are to:

- Provide routine drug testing for racehorses to ensure the integrity of racing events.

- Conduct research to develop testing protocols for new drugs and investigate new classes of drugs susceptible to abuse.

- Develop new technologies to study the pharmacology of therapeutic medications.

- Provide information, continuing education, and recommendations on pharmacology-related issues.

- Work with the analytical instrumentation industry to test sophisticated new equipment.

- Work with the veterinary pharmaceutical industry to investigate new animal drugs.

California has seven major racetracks and a greater number of fair tracks. For every horse race, a minimum of two to three horses are randomly selected for drug testing. The Maddy Laboratory performs approximately 20,000 of these tests annually, screening for the presence of more than 700 different drugs, including narcotics, analgesics, stimulants, tranquilizers, opiates, and local anesthetics. Medications that are used for therapeutic purposes have varying degrees of clearance (time needed for withdrawal of treatment before racing), but by law therapeutics cannot be administered within 48 hours of a race. Gas chromatography-mass spectrometry or liquid chromatography-mass spectrometry using validated methods, confirmation analyses, and strict quality control ensure the accuracy of each test.

With the support of the Center for Equine Health, which maintains a herd of horses used in various studies, researchers in the Maddy Laboratory study the pharmacology of new medications to develop elimination profiles. Factors such as drug clearance, elimination, and therapeutic value are determined in order to recommend appropriate thresholds for therapeutic drugs without affecting performance. In addition, new classes of drugs including peptides, growth hormones, and synthetic hemoglobin are investigated for their potential abuse.

The laboratory currently has ten different mass spectrometers available for drug testing. Increasingly sophisticated and sensitive instrumentation has allowed researchers to detect very small quantities of substances in blood long after cessation of drug intake. In the past, most medications were detectable only in close proximity to administration. Today's technology makes possible the detection of these same drugs for days or weeks following their administration. These advancements in forensic chemical analysis ensure a greater level of integrity in horse racing and demonstrate the value of continuous pharmacological research.

# Challenge for the Future

The science of equine medicine is on the verge of making the breakthrough from one of injury treatment to that of injury prevention. The medical resources and research capabilities of the UC Davis School of Veterinary Medicine must continue to be employed to the fullest extent if the California horse industry is to remain a viable and substantial contributor to the state's economy. The future growth of the racing industry can be ensured only by preventing the excessive economic losses resulting from the continued injury of its athletes.

Inappropriate use of pharmacologic agents in athletics continues to be a problem for all regulating agencies. In the years ahead, the expertise and research of the Kenneth L. Maddy Equine Analytical Chemistry Laboratory will become increasingly important to maintain the integrity of equine sports competition. The effects of newly developed drugs on performance will need to be determined and new procedures

***Ultimately, the science of equine medicine cannot move forward without the continued public/ private partnership that the State of California has championed for the past 30 years.***

and methods for their detection developed. Constant surveillance and monitoring are required to avoid abuse of both the horse and the betting public.

Horses have been an integral part of California's history and society since the founding of our state. Californians have long demonstrated their love and devotion to these animals and, as such, expect their public and private institutions to continue to protect and care for them. Ultimately, the science of equine medicine cannot move forward without the continued public/ private partnership that the State of California has championed for the past 30 years. We are optimistic that our system of industry-derived financial support for equine research and regulatory service can be maintained in the decades ahead.

DEL MAR
THOROUGHBRED CLUB

Office of the President

I speak from experience when I say that in racing, the health of our horses reflects the health of our industry. Consequently, the California horse industry is deeply indebted to the University of California--Davis School of Veterinary Medicine. For over 30 years, they have provided the research and development programs necessary for the effective management of an industry that provides goods and services to the State of California valued at over $3 billion.

According to a 1996 American Horse Council survey, Californians own roughly 642,000 horses, of which 70% are actively engaged in racing or other equine athletic events. As a result, the horse industry directly provides 36,000 full-time jobs and revenue for an additional 700,000 Californians as horse owners, service providers and volunteer organizations. Additionally, the national equine industry makes a $11.4 billion positive annual impact on California's economy. Clearly, what is good for the horse is good for California.

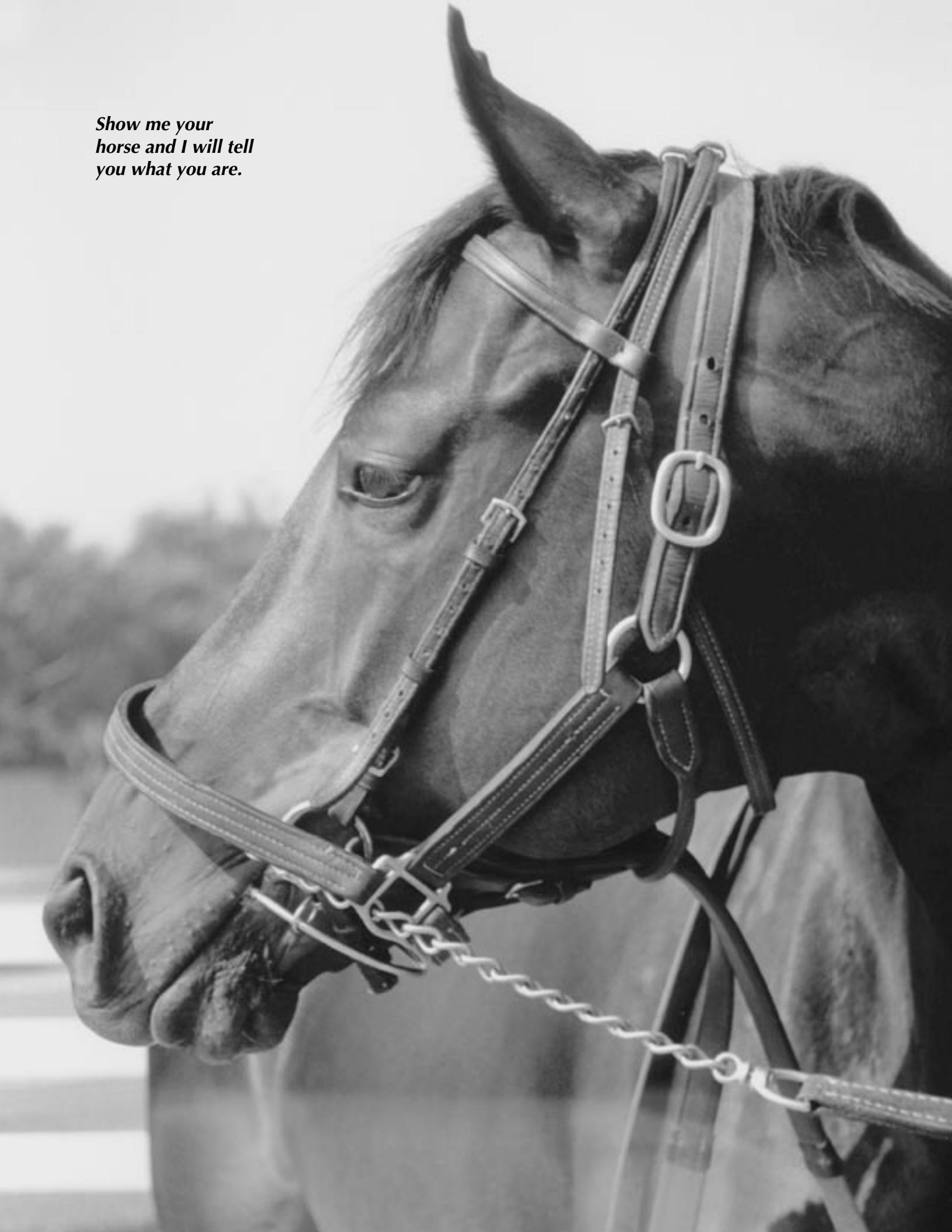
The UC Davis School of Veterinary Medicine has the best equine research and testing laboratories in the country. Their breakthroughs in the cause and control of equine orthopedic injury, healthcare management and reproductive efficiency have profoundly affected the economic soundness of the industry. Their innovative research, guidance and service in the area of drug testing has added tremendously to the integrity of racing in California and the nation.

Taken as a whole, the contributions made by the UC Davis School of Veterinary Medicine to the horse industry over the last three decades have been nothing less than incredible. It is vitally important that their ability to continue to work on our behalf be sustained. Private funding, together with the support of the legislative and executive branches of government, has been the backbone of California's horse industry achievements and will undoubtedly determine our future. We must stay the course and continue to build upon this model of success.

Sincerely,

Joe Harper, Chairman
Center for Equine Health Advisory Board

*Joe Harper and the Del Mar Thoroughbred Club have long been enthusiastic supporters of the UC Davis Center for Equine Health and School of Veterinary Medicine. Along with his fellow executives and directors, he has made significant financial contributions in support of equine research and was instrumental in the implementation of the equine Postmortem Examination Program for California. His reputation for innovative leadership is well recognized within horseracing, and the success of the Del Mar Thoroughbred Club serves as a model that many in the industry have chosen to follow.*


*Show me your horse and I will tell you what you are.*