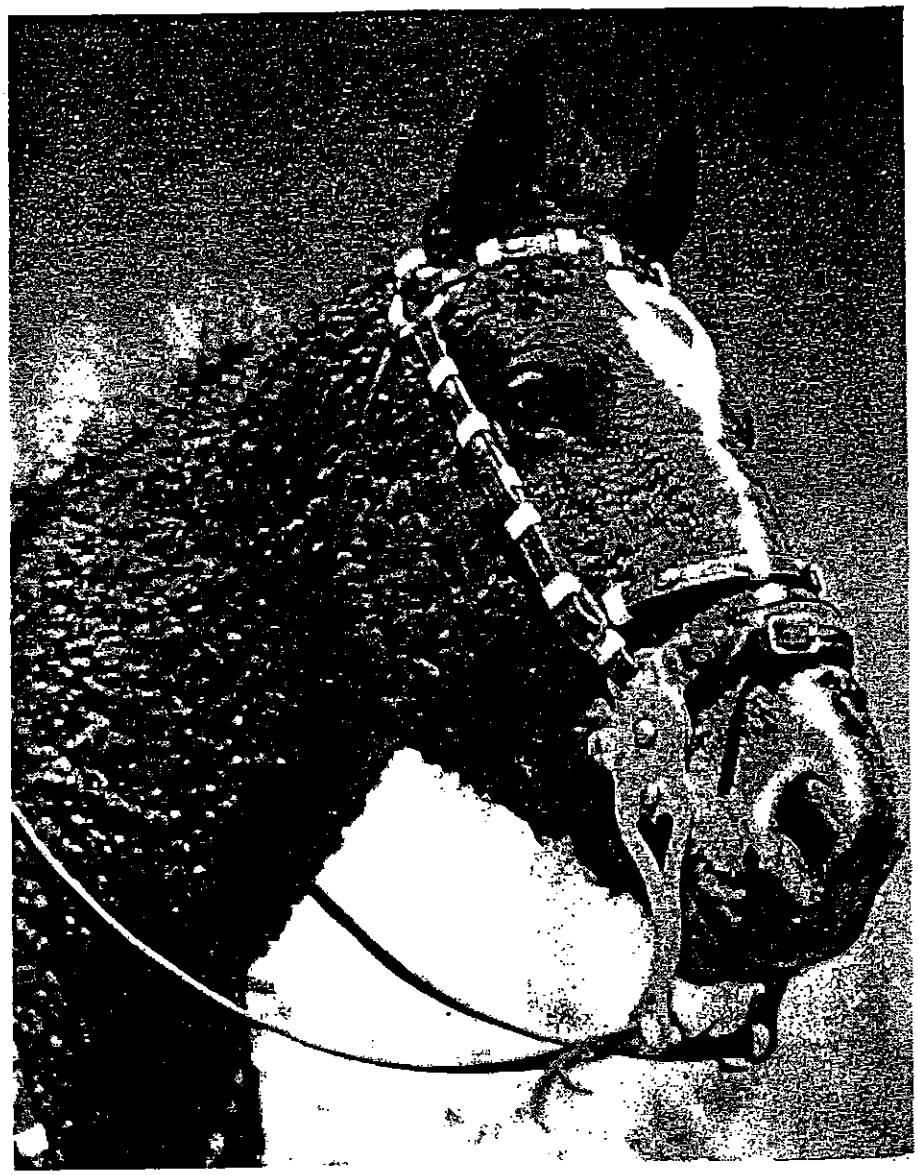

The Curly Horse in America

Myth and Mystery

Myth and Mystery:

The Curly Horse in America

by Shan Thomas

with special assistance from

David Gaier

Dr. Ann Bowling

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DEDICATION

In barns and pastures all over the country there are animals who are the last remaining members of their breed. These animals are the remnants of livestock that once served human needs before factory farming and mechanical transportation took over. Some of these animals are beyond hope - there are too few of them to make a comeback - they are on the road to extinction. Some are in a slightly better situation and are living in a time when there is a new awakening to the value of these "rare breeds." The future of these animals – and our own – may be brighter. It is to this future that this study is dedicated.

FOREWORD

During 1988 the C.S. Fund Conservancy conducted a research project to examine the historical origin and genetics of North American horses with curly hair. The C.S. Fund Conservancy has owned and bred curly haired horses for the last three years as part of its program to save endangered breeds of livestock.

Currently these horses are being tracked by an organization called the American Bashkir Curly (ABC) Registry located in eastern Nevada. After the annual meeting of the ABC Registry in June of 1987 a number of breeders came to the C.S. Fund Conservancy and asked what the Conservancy might be able to do to help save the horses. We agreed with these breeders that the first step was to accurately document the horses' characteristics. After this first step, it was hoped, the conservation efforts of various breeders would be easier to define.

As we began the search for the documentation on the horses' history and characteristics we found that too many people had lost their objectivity about the origins of the horses. This is true on both sides of the curly horse issue. There are those who believed theories about the horse's origin without any evidence and there are others who disclaimed any possibility of the curly horse being anything but a fluke or a sick animal. The one thing both sides had in common was very little data on which to base their opinions. We agreed to look at the horses without these prejudices. This report is an effort to separate what has been documented from what cannot be substantiated, at least not at this time.

This summary of the Final Report is organized around the major theories of the curly horse's origin. To this we have added all that we could find in the scientific literature along with the results of a blood typing study conducted on 200 horses. For those who are interested in continuing the research, the leads we followed are fully described in the full Final Report. We have also included in the full report the leads we weren't able to complete within the year of the project. The full report is available to anyone interested in continuing the research necessary to determine the future of the curly horse.

This summary is being released prior to the full final report to keep the flow of information moving as decisions on the horse's future are being made. Your questions or comments are welcomed and encouraged. Please feel free

to contact the senior author at the C.S. Fund Conservancy, 469 Bohemian Highway, Freestone, CA 95472.

WITH APPRECIATION. . .

The final report is a combined effort of a great many people who assisted us in providing information ideas and support throughout the study. Without all of this help the study would not have been nearly as complete. Although this summary is a condensation of the full report we did not feel we could condense the special contributions that lead to the success of the study.

A special note of appreciation goes to David Gaier who performed remarkable feats of detective work during the year he spent as the C. S. Fund's intern ferreting out the historical leads. We were also very fortunate in having the enthusiastic assistance of Dr. Ann Bowling, Director of the Serology Laboratory of the University of California at Davis and Dr. Philip Sponenberg, Professor of Genetics and Pathology at Virginia Polytechnic's College of Veterinary Medicine. Their input and patience in working with a non-scientific audience was extremely valuable.

We are also grateful to the following contributors (in alphabetical order):

- Alter Vida's staff of Ascuncion, Paraguay for researching the South American occurrence of curly horses.
- The American Minor Breeds Conservancy's staff and Board for their many timely and useful leads.
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- Cathy Bauer, curly horse owner in Montague, California for her contribution to the Russian section.
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- Melissa Bucher, curly horse breeder of Sterling, Kansas for her contribution to the North American section.

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- Pat and David Cook, curly horse breeders in Oroville, Washington for their computer assistance in developing a mailing list and a list of horses for the blood typing sample as well as input into the Pre-historic section.

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- Bill and Ron Groves, curly horse breeders of Bragg Creek, Alberta, Canada for their contribution to the North American section.

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- John Kappes, former curly horse breeder from Rock Springs, Wyoming for his assistance in the North American section.

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- Joe and Corine Mead, curly horse breeder and his veterinarian Dr. Brien Marts of Sequim, Washington for their support throughout the research project and their extensive contribution to the blood typing sample.

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- Dick Miller, Park Ranger at San Diego Old Town State Park for his thorough investigation of our San Diego clues.

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- Herman and Marie Louise Ostrom, curly horse breeders from Calistoga, California for their support throughout the research project and their contribution to the mailing list.

- Dr. Arthur Saxon, P.T. Barnum scholar for his interest in our obscure question which enabled us to find the 1864 text.

- Bill and Linda Strickland, curly horse breeders from Sunman, Indiana for their support throughout the research project, their ideas and suggestions and their computer assistance in the compilation of a mailing list and a list horses for the blood typing sample.

- Bill Walton, Head Ranger at Ft. Ross State Park, California for access to private records and archives.

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- Ellen Wells, Head of Special collections and Rare Documents at the Smithsonian Institution, Washington, D.C. for her continuing interest in the research project and for providing us with some rare and valuable documents.

- Dale Woolley, curly horse breeder from Hastings, Michigan for his unpublished biography of the Damele family.

- Don Wybert, curly horse breeder from Sun City California for his support throughout the research project and his references describing Russian horse breeds.

As grateful as we are for the support and information provided by all of these people, we would like to point out that the C.S. Fund is solely responsible for any inaccuracies which might have slipped by the author and editors.

This project would not have been possible without the expert assistance from all the translators. The number of letters and documents in languages other than English was remarkable. We would like to thank first Javier Toruno who provided the first large Spanish translation free of charge. The first Russian translation and the task of converting our letter and project description into Russian was done by the husband and wife team of Fred and Yelana Van Doren. An obscure Italian text was translated as a favor to us by Edward Roveglia. As the foreign language communications kept pouring in, we finished the project with the capable string of translators from the Wordmill Translation Service here in Sebastopol, California. German and Spanish was done by Steve Fuller-Rowell, French by Lee Curtis, additional Spanish by Laura Goldman, Russian by Albert Duncan and Alex Shkolnick, and Portuguese by Zilda Santos McCausland.

A number of people currently raising curly horses or other breeds of endangered livestock gave an equally significant contribution to this study — they let us know the project was necessary and useful to their efforts. We would like to thank all of those people who indicated an interest in the study throughout the last year. There were many days when your words of encouragement made a great deal of difference. We hope the report lives up to your expectations and is helpful in conserving the curly horse in North America.

Last but by no means least, the C.S. Fund Conservancy would like to thank its Board of Directors whose farsightedness and generosity allowed us to venture into these uncharted waters.

Shan Thomas
Freestone, California
25th of May, 1989

THE WHY AND HOW OF SAVING RARE BREEDS

A certain amount of extinction is an inevitable part of evolution. But today we see extinction happening at a rate never before known. Between 1600 and 1900, as some human beings attempted to conquer the natural world, it is estimated that one plant or animal became extinct every four years. Now, in the late 1980's, we are losing one plant or animal every hour.

The survival of the planet is threatened by this rapid loss of genetic material. No single species can provide adequate resistance to severe weather, pests or disease. The world of plants and animals becomes more vulnerable to catastrophe as we lose genetic variety. All the "information" contained in the genes of all the different species hold the answers to the challenges that we can not foresee. The wide variety of genes and types of animals is referred to as "diversity."

Stories about species extinction or the loss of diversity are making it onto the evening news and into newspapers. The stories are usually about the loss of exotic and wild species of plants and animals. What is not so well known is that this terribly rapid extinction is happening among domestic seeds and livestock.

This is happening in two ways: first, just like wild animals, domestic environments are being destroyed - in this case the family farm or the owner occupied ranch. Secondly, domestic genes are lost when humans are not careful about keeping track of their plants or animals and dilute the original genes by excessive crossbreeding.

A curly horse breeder in Indiana, Bill Strickland, put it like this:

"Say you're driving along the highway on a dark and stormy night. Suddenly the trouble lights go on across the dash board and your car dies miles from home. You see a street light through the rainy windshield. It is an emergency phone booth.

Bundling up, you lean into the wind and make a run for the phone booth. There, hanging from the phone, is the old familiar 'Yellow Pages.' This is full of information. It has almost everything you could ever imagine needing.

Bad as it is, you know that help is close at hand as you look first under auto towing. What? Someone has torn out the page! It's gone! Sigh, no

help there.

Think again, you say to yourself. Because there's nobody at your house at that moment, you try taxi service. This time the page is there, all right, but it has been left open and the ink has run so that you can't read any of the writing.

There you are — in need of information and it isn't available — gone or diluted beyond recognition."

This is a very good way to think about the loss of diversity in domestic plants and animals. It shows us what we can expect from the extinction that is happening all around us. When the animals — and their genetic information — become extinct they are gone — forever. And, when the once pure breeds are consistently crossbred, the dilution wipes away what was once a distinctive and unique genetic stock.

There are many tools used to conserve endangered gene pools of rare livestock. Some are technical ones such as artificial insemination and embryo transplants. Others are educational and organizational such as raising public awareness of a rare population or creating a breed registry.

One thing all these tools have in common is the need to clearly identify the animals being conserved. To design a useful breeding program or write meaningful rules for a breed registry, the job of identifying the animals (the gene pool) has to be done. **Put very simply, you can't save an animal until you know what it is you're saving.**

This is the central issue of this report: how does one save a curly horse population from extinction if one is not sure what makes up a curly horse? Curly horses are proving to be a perfect example of how genetic erosion can arise through information erosion.

But knowing what an animal should look like or where it came from is not always easy. Where to find the information about the group of animals one is trying to save is often as difficult as finding the remaining animals.

For this project we started with a variety of experts in the field of rare breed conservation as well as current curly horse breeders. We also found references in our local university library and from meetings, telephone calls and correspondence. The following is a summary of what we found. . .

THE HISTORICAL SECTION

Historical research concentrated on the verbal and written descriptions and locations of the horses. We started with what was already available in letters, magazine articles, diaries, textbooks, and other sources. We corresponded with current curly horse owners and rare livestock conservationists as well as international contacts. Advertisements and articles were run in horse magazines and rare breed newsletters. Any information concerning curly horses in the Americas or elsewhere was gratefully accepted.

We regret that we did not start the work years ago because some people with important information are no longer alive. This loss was magnified by the fact that the current American Bashkir Curly Registry wrote us to say that there were no archives and that the Secretary of the Registry did not wish to participate in the research. It convinced us that the project was more necessary than we originally thought.

We shifted through the preliminary information and saw the four major theories about the curly horse origin which we felt should be documented:

- The horses came from Russia
- The horses came from South America
- The horses are native born mutations
- The horses are the remnants of pre-Spanish horses

FIRST, THE RUSSIAN THEORY

The question we posed was: Has there ever been a horse in Russia with curly hair and could such a horse (or horses) be the common ancestor of the North American curly horse?

The connection between a Russian breed called Bashkir and the present day American Curly horse is a basic presumption of many people. It has been readily accepted in the past twenty years. We felt that this would be an important place to start by taking a fresh look at this possibility.

In addition to the investigation into the presence of a curly haired horse

in Russia, we also looked at how such a horse could get over here. This is currently a large gap in the theory. Most of the current writing simply issues a disclaimer that nobody knows how the Russian horses arrived in North America, but here they are. We think this is a great leap of faith that doesn't necessarily help to understand where the horses came from or what they should be today.

Let's begin by looking at how Russian curly horses might have been able to get to North America. There are currently three suggestions. Were the horses. . .

. . . imported and left behind by the Russians who settled the fur-hunting colonies along the Pacific northwest?

. . . imported into central Nevada by a rancher named Tom Dixon in the late 1800's?

. . . of ancient origin having come across the Bering Straits land bridge thousands of years before the Spanish introduction of horses?

The ancient origin theory will be discussed later in the section we've called "Prehistoric Origins." So we'll take on the other two theories beginning with the importation by Russians during their occupation of the northwest coast of North America.

THE RUSSIAN COLONIES ALONG THE NORTHWEST

Suzanne Swanson was one of the founders of the current curly horse breed registry and a breeder of Arabians (including the Damele stallion Nevada Red). Mrs. Swanson began the search for curly horse origins in the 1960's after she bought her first curly horses from the Damele family of Nevada.

When you look at the location of the Russian settlements along the western coast of the United States and Canada, Mrs. Swanson certainly had a sensible idea regarding the Russian fur-trading connection. Tom and Sandy Hendrickson, curly horse breeders from Indiana also encouraged us to look more closely at the Russian fur trading activity in the early 1800's. Here is what we found.

The Russian's interest in the sea otters pelts of Alaska and North America began as early as 1742. A number of independent settlements were set up from the Aleutians down the Alaska coast to Puget Sound. These camps were supplied with grain, munitions, and other necessities via supply ships from Russia. A great deal of the time, the settlements were dependent upon their own hunting, farming or trading for their survival. These settlements were organized exclusively for fur hunting.

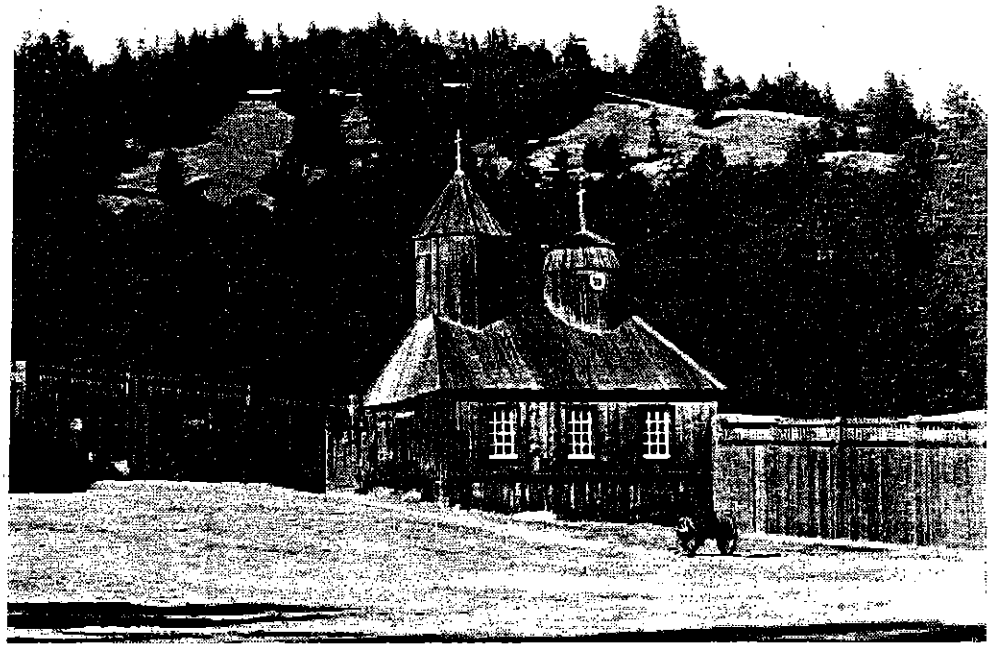
On July 8, 1799 the Russian American Company was formed with an eye toward greater efficiency, organization and protection for the fur traders. After discovering the Spanish had no claims north of San Francisco, the Russian American Company decided to establish a settlement about eighty miles north of what is now San Francisco. Called Ross (an archaic form of Russia), it is became known as Fort Ross.

Ross was established in the hope that it would supply food for the Russian fur-trappers and the fort become the center of Russian expansion in this area of Northern California. As with the rest of the Russian settlements, Ross was to be a disappointment as an agricultural settlement. The long supply routes from Russia were never totally replaced.

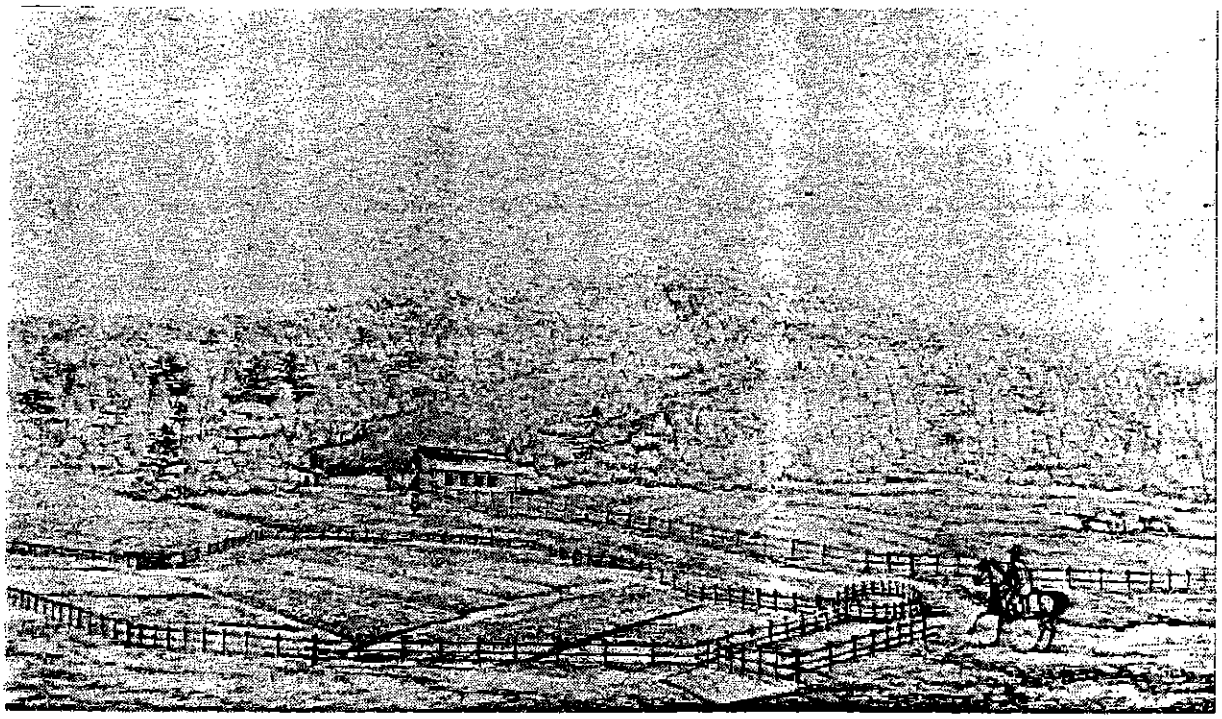
The Russians began to trade with the Spanish in San Francisco as early as 1805 and continued to depend on them for their supply of livestock. Due to political changes, open and legal trade with the Spanish did not last for long but the Russians often continued to trade on the black market with Native Americans and some of the Spanish ranchers.

Ross continued to operate but at a loss. The sea otter population rapidly declined under massive hunting and the foggy coastal weather was not conducive to good grain crops. By the late 1830's the settlement was costing far more than it was worth. In 1841 Ross was purchased by the American John A. Sutter. The livestock listed on the bill of sale were descendents of the cattle, sheep and horses acquired through trading and the black market.

The evidence from Fort Ross' archives and other sources indicates that it was unlikely the Russians brought horses with them for their settlements on the west coast of America. Very detailed ship's logs are available, and when this information is combined with the known history of the Russian colonies the research suggests that horses were not imported from Russia to the coast of California.

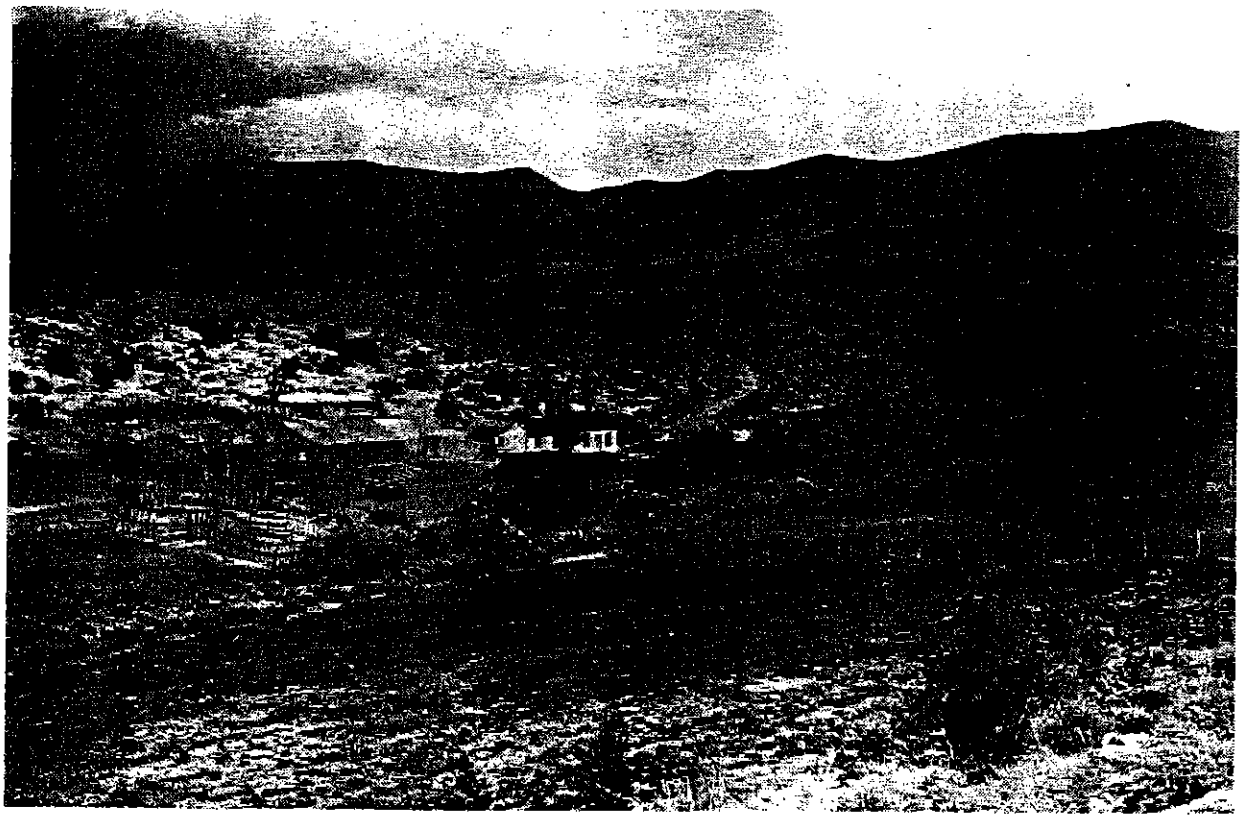


Fort Ross, California
photograph from the Ft.Ross State Park Collection



Russian Farm, Freestone Valley about 1839
photograph from the Oregon Historical Society

Mustang Drive Through Eureka, Nevada around 1900
photograph from the Nevada Historical Society



Ranch Land surrounding Eureka, Nevada around 1900
photograph from the Nevada Historical Society

THE TOM DIXON IMPORTATION

The second theory of how Russian horses got to this continent, is that a Nevada rancher named Tom Dixon imported some curly haired horses in the late 1800's. This interesting lead was given to us by Dr. Ann Bowling. She sent us a few pages photocopied from a book entitled Mustang by Anthony Amaral.

None of the men involved in the story are still alive but we made contact with some relatives of Anthony Amaral and Albert Laird, the man who provided Mr. Amaral with the story. We also found the personal papers from which the book was written housed in the archives at the University of Nevada at Reno. Finally, we visited the Eureka County Museum and were treated to the uncataloged archives of Tom Dixon's estate with the help of Susan Gallagher, the museum director.

The man who reported the story to Anthony Amaral was Albert Laird. In a nutshell, Mr. Laird said Mr. Dixon imported three curly haired horses, a stallion and two mares, from northern India into Nevada. The horses, Mr. Dixon was told, came across the Kyber Pass. Mr. Laird reported that the story was told to him by his parents who were friends of Mr. Dixon's. There is no doubt that such an importation could explain the curly horses in the feral herds around Eureka. Therefore, it seemed very necessary to check it out. Here's what we found.

It was rather easy to establish that Tom Dixon did have a large horse breeding operation in Nevada and that he used the feral horse population for breeding stock. According to records at the Eureka Museum, Mr. Dixon arrived to Eureka in either 1869 or 1872 and bought his first piece of property in February of 1877. He proceeded to buy a number of mines and tracts of land, as well as springs and water holes in the area. He shared the Irish love of good horses and spent a great deal of time breeding horses on the open range around his properties. He died without heirs in 1927.

The only shred of evidence were two property tax receipts that appraised Dixon's property including his livestock. On the 1918 receipt and then in 1926 the livestock was listed as "cattle", "saddle horses" and "fuzztails" (on the 1918 receipt) and "fuzzies" (on the 1926 receipt). We thought we had found something but have been cautioned by many people knowledgeable about horses in this area that the difference was probably due to the distinction made between purebred saddle horses and grade horses off the

range from Mustang stock.

Other than these two tax receipts, we could not find any conclusive proof of the actual importation of curly horses — no bill of lading, no ship manifest, no ranch records, no newspaper articles.

The stallion and two mares were said to have been allowed to run with the rancher's stock. The first two stud colts produced by the three original horses were released in areas close by Eureka. If the horses were related to a breed of horse with a dominant gene for curly coat, these five — three of whom were stallions — would have been more than enough to influence the feral population that we see today in east central Nevada.

In addition, if these horses were imported and related to the Russian breed of horse that lives across the Kyber Pass, it may mean that there are two separate strains of curly horse living in America. According to the records relating to Tom Dixon the horses could not have been imported before 1880. As you will see in the section that follows there are sightings of curly horses in North America long before that time.

NOW THE SEARCH FOR A RUSSIAN CURLY HORSE

In the event new evidence came forth about a Russian importation, we began trying to verify that there was a breed of horse in Russia known for its curly coat. Again Suzanne Swanson's name came up as the place to start. Mrs. Swanson did do a lot of research in the 1960's but unfortunately her archives could not be located and she passed away last year. The only remaining clue to the work done by Mrs. Swanson was the October, 1960 article published in Western Horseman magazine.

We had to start from scratch, but managed to find a total of thirteen contacts in Russia. To do this we spoke to the Smithsonian Institute (Dr. Deb Bennett, Dr. Robert Hoffman, Dr. G. Terry Sherrer and Ellen Wells), numerous universities, the National Geographic Society, the National Agricultural Library (Jesse Ostroff), the United States Embassy in Moscow (William Huth), the American Minor Breeds Conservancy (Libby Henson and Laurie Heise) and current owners of curly horses (the Hendrickson's, Don Wybert, Cathy Bauer and Bill McCurdy).

We composed a letter and one page description of the research project which we had translated into Russian. The letter was carefully worded to give the Russian contacts something to go on, without presuming we were only interested in information about Bashkir horses. We basically asked, "Is there a horse in the USSR that is known for its curly hair and if so what is the breed's name?"

The letters written in Russian really seemed to do the trick. (We tried to send the letters in English at first and got no response). We received responses from nine of the eleven Russian contacts to which we added the two letters from Cathy Bauer and Bill McCurdy.

LETTERS FROM RUSSIAN SCIENTISTS AND ORGANIZATIONS

The All-Union Society of Geneticists and Breeders which we found through a directory in the library did not respond. The All-Union Research Institute of Animal Husbandry suggested by the United States Embassy in Moscow also did not respond.

The letter to the Moscow Zoo went via Saul Kitchener, former Director of the San Francisco Zoo. The reply was in English and stated that the horses we were looking for are known as the Lokai and that they are found in the region of Russia known as Tajikistan. The Moscow Zoo Director went on to say that attempts by Soviet scientists to stabilize the gene for curliness had not been successful. One theory in his country is that the gene mutates according to climactic conditions.

He said that the genetic problem was being studied by a professor at the Zoo-veterinarian Institute in Dushnabe, Tajikistan and that he was forwarding our letter. As we go to press we have not heard anything further.

Enclosed with the Zoo's letter was a photocopy of a chapter from volume I of a book titled, Book of Horses, published in the USSR in 1952. This reference came up on a number of occasions and we will say more about it later.

Thanks to our translator (Wordmill Translation Service of Sebastopol, California,) we discovered that the USSR State Agroindustrial Committee or Gosagroprom is an agency much like the United State's Department of Agriculture. Under Gosagroprom there is a department called the All-Union

Horsebreeding Production and Scientific Association (AUHPSA). And under this is the All-Union Research Institute of Horsebreeding (AURIH). We contacted all three of these.

When we wrote to Gosagroprom our letter was forwarded. We heard from the General Director of the All-Union Horsebreeding Production and Scientific Association. His letter was short and to the point:

"In response to your inquiry we would like to inform you that horses of the Lokai breed are bred in the Tadjik, SSR and that some of them have distinctly curly hair."

Without knowing that we were writing to the same agency, we wrote a second letter to the State Agroindustrial Committee (Gosagroprom). Once again our letter seems to have been referred on to someone else. In this case the Director of the All-Union Research Institute of Horsebreeding. The Director wrote in Russian and referred us to a book entitled, Horse Breeding in the USSR. This book is available in an English version and we found it at our local university library.

The letter noted that, "Horses with curly hair are occasionally found among some of the breeds raised in the USSR, most often among the horses indigenous to Tajikistan" (these are the Lokai). His letter was most interesting because it raised the issue of the possible distribution of curly coats among horses through recessive genes as well as a breed known for what we may assume is the dominant gene type. This is identical to the way the genes seem to be functioning among the American horses with curly hair.

Before we received these replies we had already written directly to the All-Union Research Institute of Horsebreeding, an office under Gosagroprom. The first reply, in English, promised a more detailed letter in the future. We were told that our contact there would consult with his colleagues in Middle Asia and write again in two or three months. He did add, "I know that they have some quantity of curly horses among the Lokai breed at the Koklash Stud in Lenisski Region of Tadjik, SSR."

We wrote to other experts of Russian agriculture and livestock including John Hodges at the United Nations' Food and Agriculture Organization (FAO) in Italy. FAO has been conducting a major effort to catalog all breeds of domestic livestock in the world. Mr. Hodges was able to give us information about the recently completed survey of the horses of the USSR.

The response from Mr. Hodges included the address of Dr. Ian L. Mason in Scotland and a FAO Bulletin from which we took the address of the Research Institute for Farm Animal Breeding and Genetics. A professor on the staff of this agency was responsible for the most modern survey of breeds of horses in the USSR which was outlined in the FAO Bulletin.

The response from the Research Institute for Farm Animal Breeding and Genetics told us, in English, that we were looking for Lokai and sent us a page and a half of typed Russian text on the Lokai breed.

We also pursued Dr. Mason in Scotland whom Mr. Hodges described as the scientist who had just completed editing the survey of Russian horse breeds for FAO. Dr. Mason gave us some bibliographical references. He then commented upon what he knew about the Bashkir and Lokai breeds. He did not feel that he could add much to what had already been sent to us from Russian sources. He agreed that the Lokai would be the breed known for its curly hair.

We also wrote to Skotoimport which is the official Russian agency dealing with importation and exportation of agricultural products. They sent a letter written in English and a photocopy of the photograph of a Lokai horse. The opening paragraph said, "We wish to inform you that the horses with karakurl curl are bred in USSR and they belong to the Lokai breed." The last paragraph issued us an invitation to visit the area to "...view the horses and make a selection."

Another contact we received was the Bashkir Research Institute of Technological Studies in Livestock Production and Feed Manufacturing. We thought if anyone would know about Bashkir horses, it would be these folks.

The six page reply, in Russian, came from a Senior Researcher and the Deputy Director. The letter begins, "Based on our study . . . we may assume that the object of your research most likely is the Lokai breed."

The letter goes on to quote a description of the Lokai and its curliness in the following Russian texts: The Horse Breeding Handbook published in Moscow, 1983; The Horse Book, Vol 1, published by the State Agricultural Literature Publishing House in Moscow, 1952; and Central Asian Horse Breeds, published by the Academy of Agricultural Sciences Publishing House in Moscow, 1937.

The Bashkir Livestock Institute contacts also said, ". . .so only the Lokai

horses are known to have a curly coat as a characteristic feature of the breed. We have not found any reports of other breeds of horses in the USSR with this characteristic in the literature available."

Some months later we heard again from the Senior Researcher at the Bashkir Livestock Institute who had kept our project in mind when she attended the All-Union Coordinating Conference on Scientific and Technical Work in Horse Breeding. At this meeting, attended by scientists from all parts of the USSR, she asked about curliness in horses and how frequently others had encountered it in various breeds.

She learned that most Russian scientists share the same opinion held by most American geneticists — that the coat is the result of a recessive gene and occurs very rarely — a view that has since been questioned by an American scientist, Dr. Philip Sponenberg.

The Senior Researcher said that among of the people that did know about horses with curly hair, the Lokai was the only breed identified as having curly haired horses in any significant numbers. In fact, the farm in the Tadjik region raising curly Lokai has a brood mare herd of about fifty head.

In addition to these Russian responses, two current curly horse owners gave us very interesting letters. One is from Cathy Bauer of California and another is from Bill McCurdy of Pennsylvania.

Cathy received a letter from a friend who works in a Russian Institute for the Study of American and Canadian culture. Cathy's friend pointed out that there was no mention of curliness in any literature she could find on Bashkir horses. The letter confirms what we received from other Russian contacts.

The second letter is to a friend of Bill McCurdy's from a horse breeder in Germany. The letter describes some Russian breeds with which the author of the letter is familiar and then draws the same conclusion that we do from the Russian responses.

It was unanimous that the Russian horse known for having curly hair is not the Bashkir but the Lokai. This would not be a concern if it weren't for one thing — Bashkir horses descended mainly from prototype "steppe" horse and have been retained in their original "coldblood" type. Lokai on the other hand are descended from horses related more closely to Arabians, Barbs

and Turks and have been bred to retain their "hotblood" type — primarily speed and agility over rugged terrain.

If there is evidence that the Russian Lokai are the ancestors of modern day American curly horses, then this original type should receive attention in any conservation program seeking to restore and save the horses.

It should be noted that the Lokai's native land is in the mountains separating Russia from Afghanistan. This region is connected to Pakistan and northern India by the famous ancient road known as the Kyber Pass which is part of the story told about Tom Dixon's importation.

LOOKING FOR THE LOKAI IN THE LIBRARY

While we waited for the Russians to reply we began following up some library references about Bashkir and Lokai horses. Here's a brief summary of our findings:

"Animal Genetic Resources of the USSR", published by the United Nations Food and Agricultural Organization, Animal Production and Health Paper no.65 (1988) is the latest census of Soviet horse breeds. In the description of the Lokai breed it states, "The hair is characteristically S-shaped." Dr. Ian Mason of Scotland who edited this publication agreed that it was an error in the translation and that we would be accurate in considering "S-shaped" to mean "curly". In this same document the Bashkir breed is also discussed, but there is no mention of curliness.

The National Agriculture Library (NAL) holds two and a half million volumes of books and papers relating to agriculture, farm technology, plants and livestock including the stud books of any purebred livestock imported since the 1880's.

The benefit of this library of stud books is obvious. Most foreign herd books are quite detailed and would have been an excellent source of information about either Bashkir or Lokai. But neither breed is represented in the collection.

There are many other texts at the NAL. Included in the collection are one-of-a-kind volumes on all aspects of agriculture and animal husbandry. The Lokai is discussed in a document by the All-Union Research Institute of

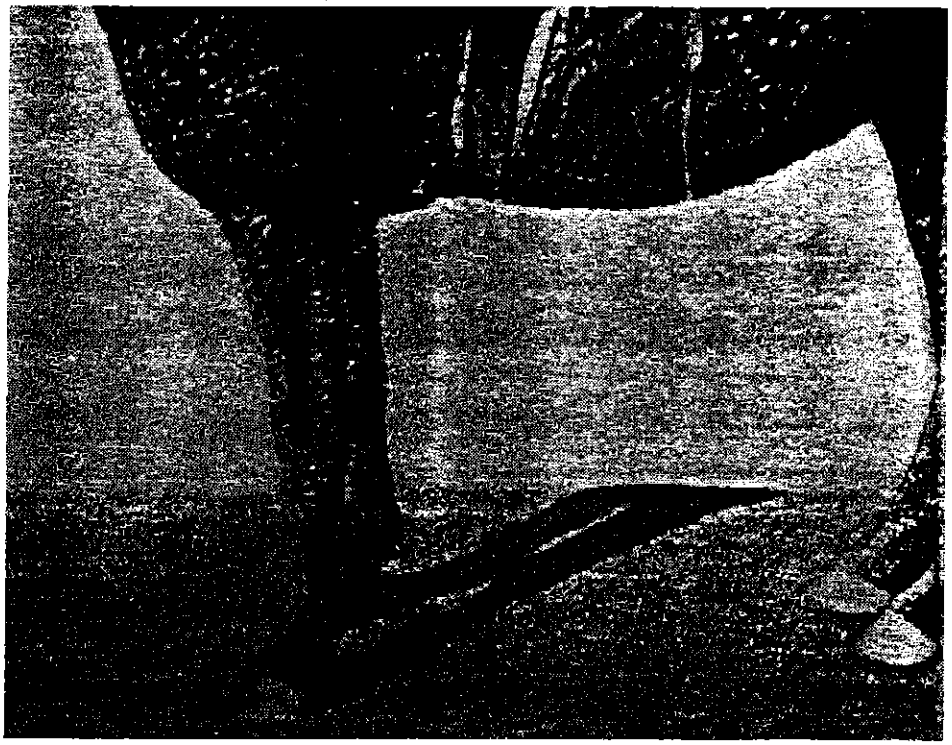


Рис. 12. Курчавость у локайской лошади

Curly Horse Photograph in Russian Study of Lokai
Reproduction provided by The National Agricultural Library

Curly Horse in Saudi Arabia
photograph from Sail, September 1986

Horse-Breeding called Breeds of Horses in Middle Asia, published by the Lenin Academy of Agricultural Sciences in Moscow, 1937. It was one of the works recommended to us by the Bashkir Research Institute, the Moscow Zoo and Gosagroprom. Jesse Ostroff, of NAL, sent this chapter to us in the original Russian. It contains a picture on p.216 of the lower half of a Lokai horse with very tight curly hair. We later received an updated version of the 1932 study from the Bashkir Livestock Institute and have included the translated version in the full report.

HOW DID THE BASHKIR CONNECTION GET STARTED?

We became curious about how the name "Bashkir" ever became associated with the American curly horses because the Russian replies were so unanimous in telling us that the horses in Russia was called the Lokai. In addition, the library research confirmed all the information on the Lokai as the curly breed not the Bashkir. With all the evidence pointing to the Lokai how did the name Bashkir ever take hold?

Because we had been told there were no archives to look into at the current American Bashkir horse registry's office, we started asking current owners who had a long history with the curly horses. We heard from Benny Damele, one of the original curly horse breeders in Nevada, and a Michigan curly horse breeder, Dale Woolley, that there was a very simple answer.

In the 1930's or 40's the Damele family came into possession of a Sunday cartoon much like "Ripley's Believe It or Not." The small drawing and its caption had been kept in a family photo album since that time. It was this cartoon that Benny Damele remembered as a source of the idea that the horses came from Russia.

The cartoon had been cut out of its original newspaper page without any identifying information. Mr. Damele could not remember the exact date or name of the newspaper in which it ran because he was quite young when it came into his family's possession. We went to the University of Nevada at Reno library for some assistance from Linda Robards, who searched all the newspapers in Nevada from 1930 to 1950. We came up empty handed.

But Linda was able to trace the history of these types of cartoon features. She said, judging from the square shape, it might be from a cartoon called "Strange As It Seems" by John Hix. Because this was a syndicated feature it

could have appeared in any one of hundreds of newspapers across the country.

We thought that if we could verify the cartoon's author we might be able to find his archives. We asked a group of journalists in San Francisco for some assistance in trying to verify this and to find any archives that might exist for Mr. Hix. This dedicated group of journalists, the Center for Investigative Reporting, usually takes on the heavy stuff in life. But they thought our request to track down an obscure cartoon of a curly haired horse was just the thing to take their minds off the world's troubles.

Their search took them to the newspaper archives at the University of California at Berkeley. Nothing was found here except the lead that the style of the drawing looked like that of John Hix.

Then they went to the Museum of Cartoon Art in New York City for further verification. The cartoon we were looking for was verified as a Sunday cartoon-page feature called "Strange As It Seems" drawn by John Hix. Next we looked for the Hix archives or the syndication company.

Two companies sold "Strange As It Seems." These are large firms that do have archives. The bad news is that the archives are not cataloged. As we went to press, the Center had requested the syndication companies to search their archives. We were told this could take months.

Now, as if this wasn't frustrating enough, we came across what we believe to be a very old magazine article that may the basis of the "Strange As It Seems" cartoon. While gathering together articles published about curly horses in North America, we came across a 1947 letter to the editor in the Western Horseman magazine which states that Nature magazine ran an article in 1939 that located curly horses in eastern Russia.

We found the back issues of this magazine in our local university library — the magazine is no longer in print. It is not the same magazine as the current British publication by the same name. The article is about the evolution of the horse and much of what is put forth in the article is no longer considered to be an accurate description of horse evolution. There was, however, an illustration of a man in British country attire holding a noticeably curly horse in halter. The caption next to the photograph was identical to the one in the Hix cartoon.

So there we have it, right? Why go any further? Because we had in the meantime begun to receive letters back from Russia from very knowledgeable

sources that refuted the idea that curly horses are from the Bashkir region and which unanimously identified the Russian curly horse as a Lokai. When there is that sort of contradiction a researcher is under an obligation to go on and not conveniently stop where one feels most comfortable.

We felt if we could find the archives of the author or the photographer of the Nature article, we might be able to shed some light on where they got the information that the horses from Bashkir were curly coated.

The American Nature Association, the original publisher of the old Nature magazine, is no longer in existence. This Association gave its mailing and publication list to the American Museum of Natural History in 1960. But the Museum told us that it did not receive any old records.

The American Nature Association was also a founding member of the International Union for Conservation of Nature and Natural Resources currently headquartered in Switzerland. Our correspondence with this group was not helpful but gave us another clue that the archives may be housed at a private foundation in Cambridge, Massachusetts. Following up this lead turned out to be another dead end.

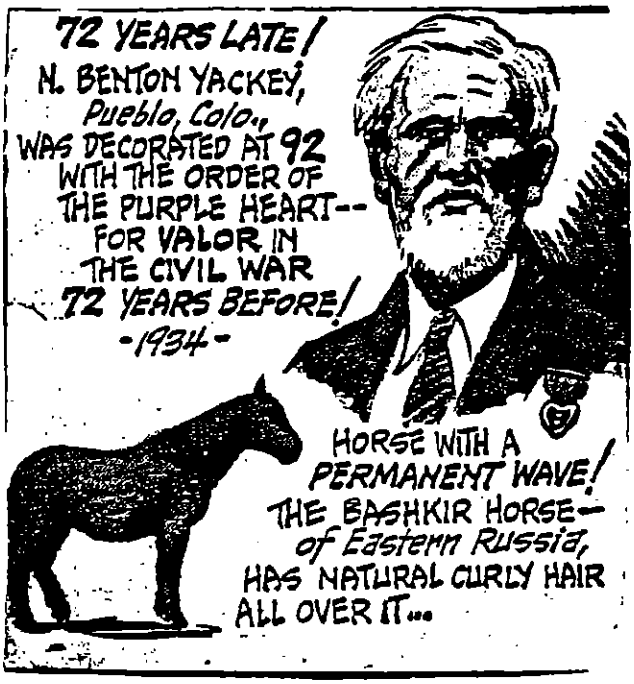
Therefore, this cartoon/photograph is the only reference which calls a curly coated horse in Russia a Bashkir. There is no further information about the source of the information used to write the caption in either the story or the cartoon. Given the significant differences in the Bashkir horse and the Lokai horse we consider it unwise to base the North American curly horse's breed characteristics on this reference.

But for now we are left with two conclusions. The Russian horse with curls is the Lokai not the Bashkir. The American horse with curls may have received some of these genes in the late 1800's in central Nevada.

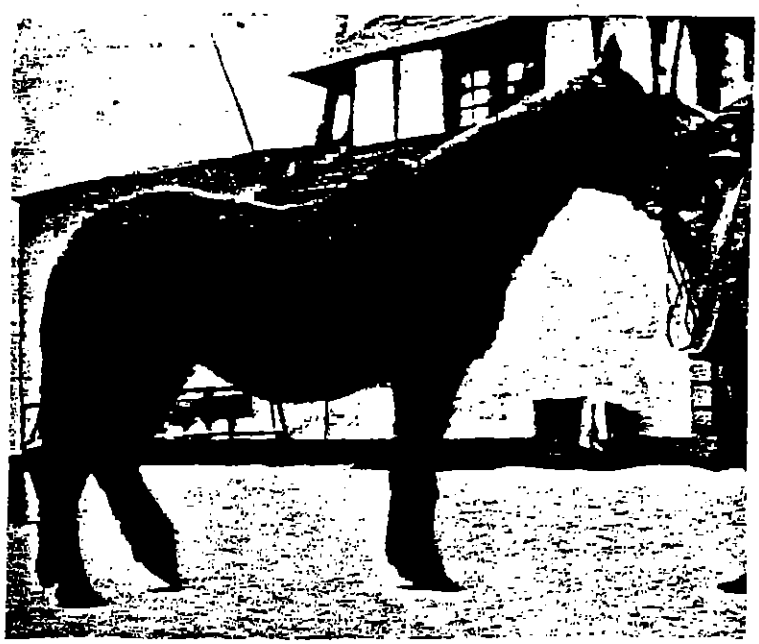
But what about the sightings showing that curly horses have been in North and South America long before this?

THE SOUTH AMERICAN CONNECTION

The South American search started with a book called Pelajes Criollos, by Emilio Solanet, published in Buenos Aires in 1955. This book was sent to



Sunday Funny Feature Cartoon "Strange As It Seems"
by John Hix
from the family scrapbook of the Damele family



A HORSE WITH A PERMANENT WAVE
This exceptional horse belongs to the curly-haired breed of the Bashkirs, and comes from the plains of eastern Russia

Illustration from "The Evolution of the Horses"
Published in Nature magazine, March, 1938

us in the Spanish version by Dr. Ann Bowling. Emilio Solanet was an expert on horses in South America and a professor at the school of veterinary medicine at the University of Buenos Aires. He is also known as the founder of the Argentinian breed known as Criollos.

Pelajes Criollos describes the coats of Criollos horses – "Pelajes" means "coat". The book talks about coat colors except in one chapter which is devoted to horses that are "crespo." "Crespo" is a Spanish word for curly. The chapter contains several quotes that led us to other sources confirming the existence of Curly horses in South America from the late 1700's until the 1940's.

What was particularly fascinating was to see the similarities between the South American description of the curly horses and the North American descriptions. There are a number of references to breed characteristics like a sparse mane and tail, small but strong bodies, fleet and sure footed, small hard feet, narrow faces or heads, and unusual body odor.

The most important quote in Solanet's chapter came from Felix Azara's book The Natural History of Quadrupeds of Paraguay. The importance of Azara's work became even more obvious when we discovered that Charles Darwin had also used him as a reference in The Variation of Animals and Plants Under Domestication.

In Azara's text there is a section discussing the effects of climate on different species. Please remember that Azara is writing before Darwin's work on evolution. The Azara text, published in 1802, states:

> I have seen many curly haired horses, ones which are called "Pichai" in Paraguay. Their hair is kinky, like that of the Negroes in Guinea . . .

The translation goes on to note differences in body type, including a narrow face, and comments that the mane and tail are short. He also states:

> These horses reproduce themselves; mixing with others, they beget half-breeds, . . . Since those half-breeds are ugly, there is an attempt to exterminate them through castration, and even by killing off the curly haired mares.But this is to no avail, because there are always those that are born to parents of the common stock.

This last paragraph is interesting for a couple reasons. First he seems to be referring to a genetic transmission of curly hair by a dominant gene ("they beget half-breeds"). There is a possibility that this is the same mutation that now exists among the modern curly horse in North America. While we can't be certain, his last sentence may refer to the existence of the recessive genetic trait and he has misinterpreted them to be one and the same. This confusion exists even today. We'll talk more about this difference in the Biological Section.

Also, the practice of exterminating curly horses echos the experience of many people currently keeping the horses in North America. As we saw from the interviews provided to us from modern South American horse breeders, the extermination Azara talks about may have proven more effective than Azara believed it would be.

Another of Solanet's quotes led us to Wilfrid Latham's book The States of The River Plate, published in 1868. In his discussion of the horses in this part of South America he states:

> It is not uncommon to see horses with crisp curled hair all over, something like the 'wool' of a negro's head: occasionally whole manadas (herds) are filled with such horses. I should suppose that it was one of this singular race that Barnum exhibited in the 'States.' These horses have scarcely any mane,and little or no hair on the tail. I have not been able to ascertain the origin of this peculiarity in horseflesh.

This quote indicates that the South American curly horses were still alive and well in the mid-1800's. It also lends support to the horses being of the "dominant gene type" because there are so many of them in existence.

We were also surprised to see the reference to P.T. Barnum and you will find the results of our investigation into this sidelight in the North American section.

We were given one more source that confirms the presence of curly horses in South America in the late 19th century. We received a book from Jim Rohl who is a member of the American Minor Breeds Conservancy and a historian of cattle breeds. Somewhat later in our research we were sent a copy of the pertinent page by Roland Newman, a curly horse owner from New Jersey.

The book is Points of the Horse, by Captain M. Horace Hayes, published in 1893, and in it Captain Hayes quotes from Mr. Cecil Gosling's notes. Mr. Cecil Gosling was His British Majesty's Consul for Paraguay at this time. Hayes quotes from Gosling's notes:

> The curly-coated Pony is a very old breed which is now nearly extinct. Its Indian name is "Pyshai", which is pronounced Pee-shy-ee . . . like a retriever, (it) has curly hair over the body and legs. Their origin appears to be unknown.

Taken together the quotes from Azara, Latham, and Hayes seem to indicate that curly horses were relatively plentiful in the La Plata region between Paraguay and Argentina in the early 19th century, but they have been systematically eliminated from the feral horse herds until they were nearly extinct by the late 19th or early 20th century.

There were other references made by Solanet that we were not able to confirm. While Solanet mentions Dechambre, he does not specify which text of Dechambre's was cited. We examined a work by Dechambre called Le Grandi Razze Dell' Allevamento Francese—Cacalli, Bovini, Ovini (The Great Races of French Breeding - Horses, Cattle and Sheep) which we were able to find with the able assistance of Jesse Ostroff at the National Agricultural Library. The translation did not reveal a reference to curly horses. Professor Dechambre may have done a study on curly horses in Europe in the early 1900's but we were unable to find this.

When we translated the work by Azara, he refers to Goubaux et Barrier (we can not tell if this is one name or two) and M. Blanc finding the curly trait in coach horses of Paris in 1850. We were unable to find these author's works.

As we mentioned, curly horses are discussed as part of Charles Darwin's book, The Variation of Animals and Plants Under Domestication which was published in 1896. A careful reading reveals that Darwin had not personally seen any curly horses but he wrote:

> A Russian breed of horses is said to have curled hair, and Azara relates that in Paraguay horses are occasionally born, but are generally destroyed, with hair like that on the head of a negro; and this peculiarity is transmitted even to half breeds: it is a curious case of correlation that such horses

> have short manes and tails, and their hoofs are of a peculiar shape like those of a mule.

In a very tantalizing footnote, Darwin claims someone named Dr. Canfield, apparently an associate, informed him that a breed with curly hair was formed by selection in Los Angeles in North America. This lead has proven elusive.

Both Darwin and Latham make a point of indicating that they do not know where the trait comes from or where the horses originate. Darwin's reference to the possibility of a curly horse in Russia is interesting because our Russian research showed the Lokai to have been traced back over 500 years.

There was evidence that the authors were describing a horse with the dominant type curly hair, not just an occasional recessive occurrence. That being the case, the presence of horses with the curly trait in South America at this time makes a stronger case for curly horses showing up in the herds of North America without the need for importation.

Could curly horses in South America have come from imported Russian stock? Were there curly horses in Spain that had bred with the horses brought by the conquistadors? We needed to know more about the Spanish stock that was imported as the Spanish colonized South America.

In an attempt to track down more details on the type of horses brought to the New World by the Spanish, we looked through a number of references including The Horse of the Americas, by Robert Denhardt. Mr. Denhardt's book is a keystone to understanding the spread of the horse in the Americas. We wrote to Mr. Denhardt who responded with a number of suggested references and his personal recollections:

> I saw several "caballos rizos" (curly horses) in Argentina in the early 1940's (when he was researching his book). However, I assumed they were just unusual, like a man with curly hair. Never saw the horses' dams or sires.

We began to discover that the texts that Mr. Denhardt had suggested we consult were not easily obtained, even from our local university library. We did manage to obtain Ensayo de Clasificion de los Pelajes del Caballo, by Robert Dowdall, which Mr. Denhardt had strongly recommended. This text

concentrated on the coloring of the horse; there was no mention of curliness. Our investigation of the presence of Curly horses in the La Plata region seemed to be at a standstill.

The opportunity to get first hand reports out of South America was almost too good to be true. But in October of 1988, some C.S. Fund staff traveled to South America and one of them (our Executive Director, Martin Teitel) went to Paraguay. After several meetings with Paraguaian horse breeders around the capital city of Ascuncion, Marty was introduced to a hardworking group of scientists and environmentalists from the group ALTER VIDA, the Center for Studies and Training for Ecodevelopment. They were willing to conduct a search in Paraguay's libraries and among all the knowledgeable people they could contact.

ALTER VIDA searched eight public libraries and two private ones. In all there were thirty different books consulted, but only two of these volumes contained anything concerning curly horses. First was Horses of America by Angel Cabrera and the other was Breeding Criollo Horses by Roberto Dowdall.

In Horses of America, by Cabrera, there is a chapter called "The Wild Horses." Cabrera mentions the curly trait in relation to theories concerning the origins of horses in South America. Cabrera quotes Azara as discovering curly horses in Paraguay. He also cites several European sources that confirm curly horses existed in Europe. Among these sources there are references to the Mexican pony called the Galiceno which is a descendent of the Spanish/Portuguese ponies the Garrano and the Sorraria as well as the curly ponies on the island of Rodo off Norway.

Cabrera uses the European citations to develop the argument that the European curly horse may well share a close kinship with the Crespo/Pichai in South America. He also feels that while there are many who look to the link between curly horses and prehistoric horse, he can find no support in the archaeological record to support this theory. We were fascinated to see how wide spread this Prehistoric theory seemed to be, given its popularity among some North American curly horses owners.

Cabrera goes on to describe the old Argentinian wild horse as sturdy, resistant to hardship, strong despite their small size, quick and agile, intelligent, calm and docile. The horses were normally very tranquil but, if pushed would bring forth extra reserves of energy. While the Argentinian cavalry began to favor larger horses, in the mid 1800's the horses were so well respected that the English Army exported 2000 into India to quell the "Indian

Mutiny."

What if some of those hardy animals were Pishai/Crespos and ended up in the hands of a horse dealer in Delhi who sold them to a Nevada rancher named Tom Dixon claiming they had come across the Kyber Pass?

Mr. Cabrera goes on to specifically discuss the curly horses called "Pichai." He reiterates the work of Azara and Captain Hayes and H.M.C. Gosling who we have mentioned before. Cabrera offers an opinion that the feature of curliness is more prevalent among horses which have not undergone some sort of artificial selection that mandates straight hair as the only acceptable hair type. He also describes the curly hair as a mutation. As you will see when we get to the biological summary, this opinion will be shared by Dr. Ann Bowling after seeing the results of the blood typing study.

In Breeding Creole Horses, by Dowdall, we found a chart of various characteristics of horses, including curly hair, and their probable genetic form of transmission. The reference to curly hair on Dowdall's chart is drawn from the work of John Lasley who published the study in Buenos Aries in 1974. Mr. Lasley supports the other scientific literature at the time which thought that curliness was always recessive. As we said earlier, this is no longer seen as the case.

ALTER VIDA also contacted thirty different people in agencies and colleges throughout Paraguay in an attempt to locate someone who might shed some light on the origins and history of the South American curly horses. We were also eager to discover if anyone knew of any living curly horses. All of these contacts but six had never heard of a curly horse. The six who had heard of them were able to give varying reports of the horse's existence but none knew of any curly horse still alive in Paraguay or Northern Argentina.

We feel that this evidence supports a conclusion that curly horses similar to one of the North American types existed in South America. Clearly there was an old type curly horse that resembled the "cayuse" of North America and which received the same treatment as our early Indian ponies and mustangs — killed off or "improved" beyond recognition.

There is absolutely no evidence — at this time — of an 17th or 18th century importation of curly horses from South America into North America or the other way around. But the feral herds of both North and South America are made up of common stock and the evidence is too strong to ignore the relationship between the animals. At this time the most important point is

the verification of curly horses in the western hemisphere over a long period of time.

To the stories of Russian horses brought in by Tom Dixon and the sightings of curly horses in parts of South America, we can add a number of recorded sightings of curly haired horses in the United States back to the beginning of the last century. We turned the study to these sightings.

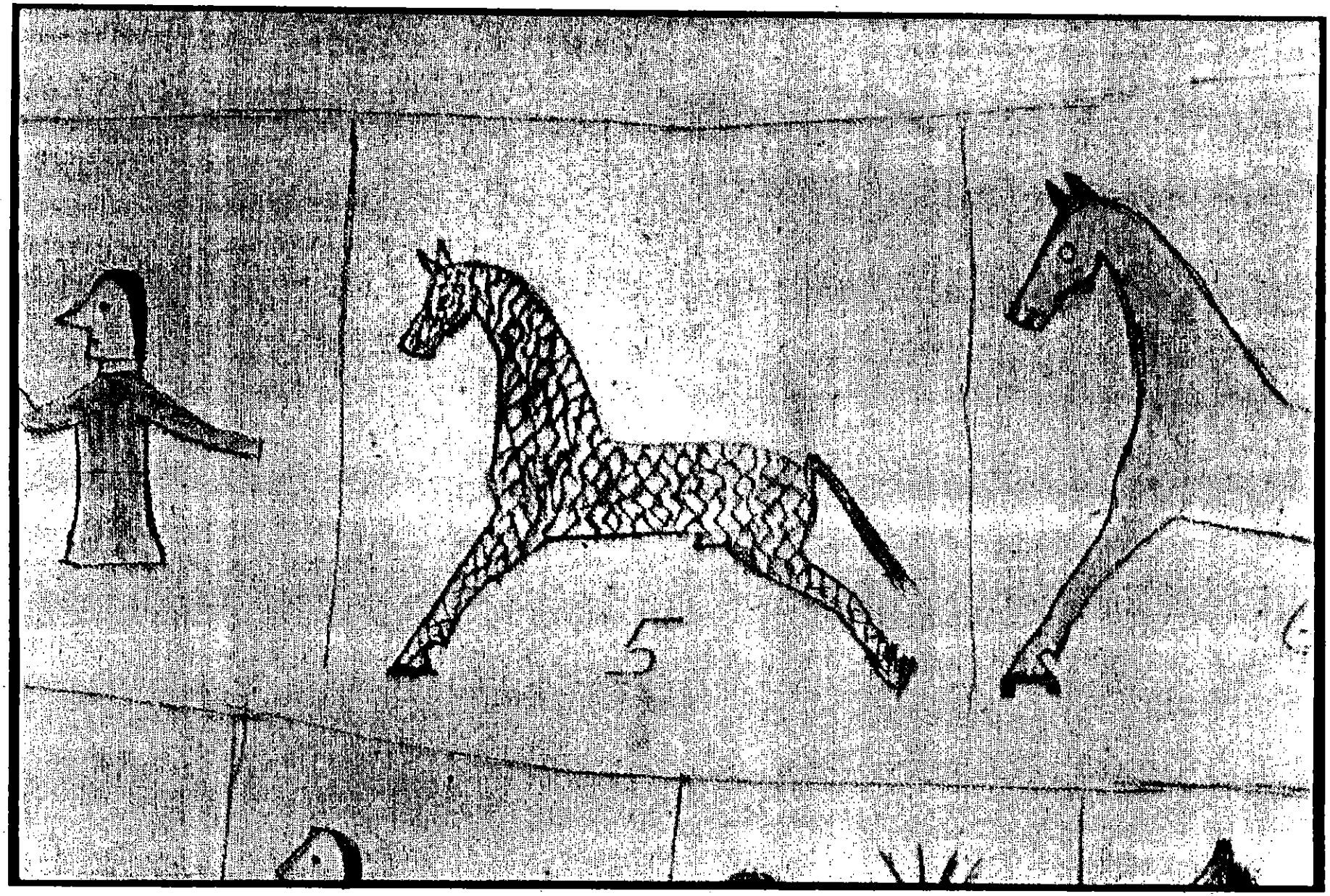
THE NORTH AMERICAN CONNECTION

The obvious place to start was with the literature on the history of horses in the Americas. We read all the major works about the history of horses in America and in some cases we managed to communicate with the authors of those works.

As is to be expected with most research, we came up better educated but empty handed time and time again. People who had spent years, if not their whole lives, researching horses in America could make suggestions but had no data of their own. Hope Ryden, author of the book, America's Last Wild Horses, had never heard of Curly horses. Librarians with special collections loved the challenge but couldn't put their hands on anything that answered the question of origin. One of the most knowledgeable authors still living, Robert Denhardt, who wrote, among other things, The Horse of the Americas and the major histories of the American Quarter horse, had heard of the curly horse — both here and in South America — but he could not shed any further light on the subject. But all was not in vain and we weren't in it alone. Perseverance and cooperation paid off once again.

At the very beginning of the project we started soliciting letters or phone calls from people with personal recollections of the horses. To this data we added letters-to-the-editor or first hand stories that we found or which were sent to us. We then analyzed these stories for what they said about curly horses, entered them into a database and then sorted the references by time and place.

Among the most exciting references were the descriptions of the very early sightings of curly horses among Sioux and Crow Indians.



Curly Horse on a Sioux Winter Count - High Dog

THE WINTER COUNTS

There are precious few references to curly horses in North America before Tom Dixon's alleged importations of the horses. But what references there are clearly indicate that horses with curly coats were known to exist in North America before 1880. The most significant lead we had was the "Cranbrook Winter Count" sent to us by Ken Budney, a curly breeder in Michigan. Looking further we found that there are more "Winter Counts" which substantiated the Cranbrook sighting.

We would like to take a moment to explain the Winter Counts. The Plains Indians of North America did not originally have a written language. The history and knowledge of a tribe was passed down generation to generation by the oral traditions of story telling and songs.

There was often a large amount of data being kept by the tribesmen and women responsible for keeping the group history. This led to the first step in the development of writing known a "pictographs." These sketches and designs represented important events or times in the life of the tribe.

In the case of the Winter Counts a pictograph was used to illustrate each year and arranged in sequential order usually on an animal hide. (In later years the Winter Counts were often transferred onto cloth). The Winter Counts were a mnemonic device — that is, a way to trigger one's memory. These were calendars and history books rolled into one.

The name "Winter Count" is actually a white man's term. This way of describing the "calendars" comes from the method used by the Plains Indians for counting their years. For a Sioux the year ended when winter ended. The beginning of spring was considered the rebirth of the next year.

The contents of the Winter Count preserved at the Cranbrook Institute in Bloomfield Hills, Michigan has been translated. The winter of 1801-02 was remembered as the year the Sioux stole some curly horses from the Crow.

The history of this Count was explained by Alexis Praus in a paper written for the Cranbrook Institute of Science in 1962. This Winter Count is mentioned again in The Indian and the Horse by Frank Gilbert Roe.

The Sioux artist/historian who maintained the Cranbrook Count was Swift Dog. The information that accompanied the Count when Cranbrook

Institute acquired it in 1922, placed the tribe at that time on the Standing Rock/Cheyenne River Reservation at the mouth of the Grand River. No small coincidence that this is one of the significant locations of curly horses today.

In his article, Mr. Praus provides a few more details:

> . . . At this time, most of the Tetons (Sioux) did not have horses but began to acquire them rapidly by trading and stealing. When the group who kept this count first obtained horses is not indicated. Curly haired horses can still be seen on the Plains. This variety of horse is mentioned in other counts and is probably not a freak or a sport.

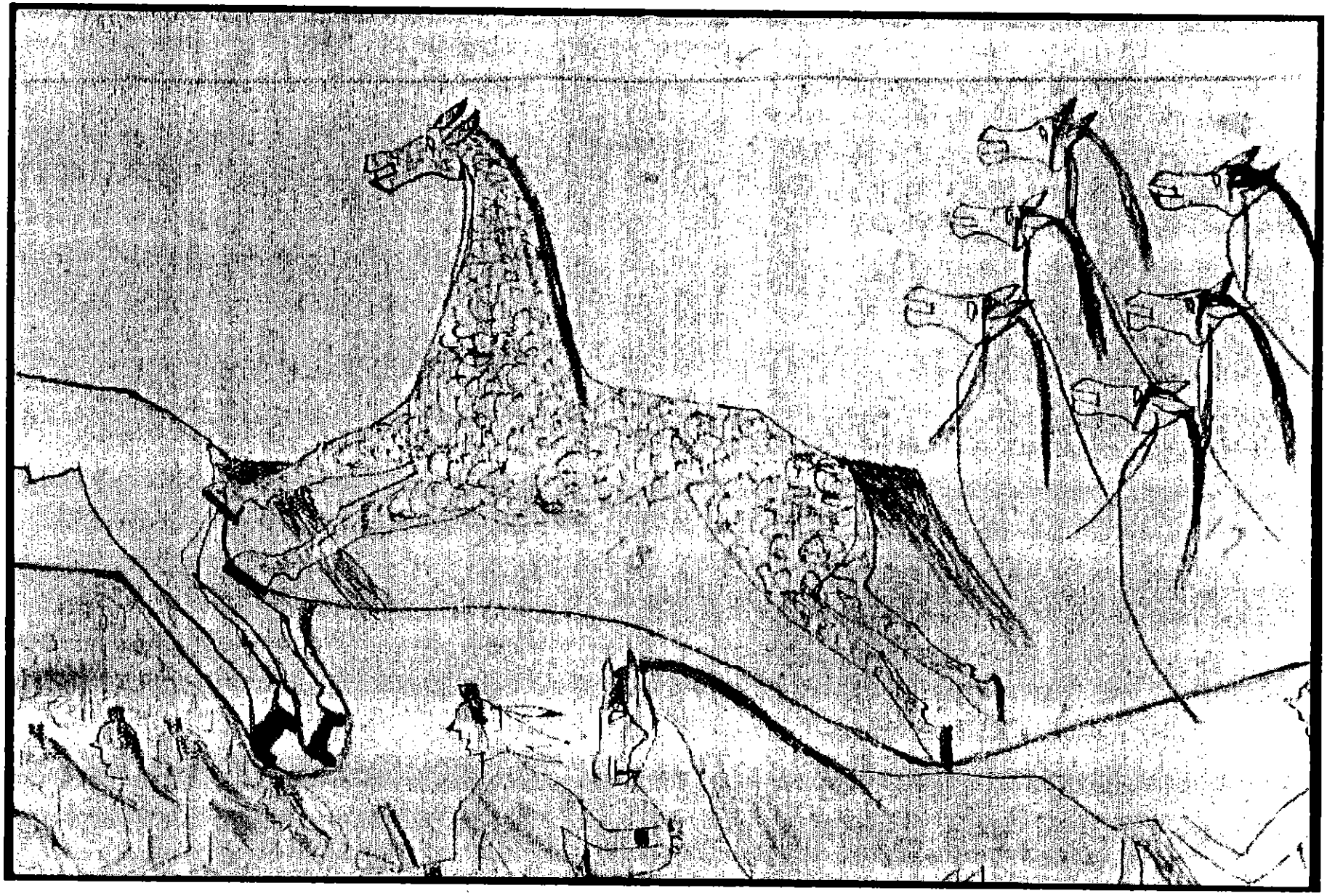
While we were in North and South Dakota last November, we found a historical researcher living in Bismark, Anne Hefermehl, who we hired to do some further archival work using sources that seem to exist only in North or South Dakota. Anne provided us with five other Winter Counts that talk about this same event during the same year.

The fact that the event on the different Winter Counts remains the same and occur on the same year can be explained. Winter Counts were first kept by only a few people, all of whom were related to the same tribe. When the Counts were seen by other Sioux family groups the Winter Counts began to spread. The counts were copied from one of the originals up to a certain point in time and then were maintained by the new historian.

The Winter Counts are usually named after the Amerindian historian responsible for the drawings. Anne Hafermehl provided us with photographs of the 1801-02 curly horse capture from the Winter Counts of Blue Thunder Variant III drawn by No Two Horns; a Blue Thunder Variant translated by Dr. Beede of Fort Yeats in 1925; High Dog; Swift Dog; and another Blue Thunder Variant.

The Winter Counts aren't the only recording of curly horses used by Plains Indians. Glen Conley and Sharon Williams, curly horse breeders from Indiana sent us an account by Chief Red Cloud describing the Battle of the Little Bighorn which took place in 1876 in eastern Montana, the tribal lands of the Crow.

This account included some drawings that Red Cloud was persuaded to make in 1881. Some of these drawings are reproduced in TIME-LIFE BOOKS' Old West Series in the volume titled The Indians with the text by Benjamin



Curly Horse on a Sioux Winter Count - Blue Thunder

Capps. In one of the drawings you can see that the horse one of the Indians is riding has hair drawn differently from the other horses in the picture and has a very short mane. We agree with Glen and Sharon that this is a depiction of a curly-haired horse.

There is another intriguing reference to curly horses that predates this reference. We discovered it when reading Wilfrid Latham's The States of the River Plate (discussed previously in the South American section.) Latham mentioned that he ". . . should suppose that it was one of this singular race that Barnum exhibited in the 'States'."

It was this kind of surprise that made this project so much fun. We were assuming from the date of Latham's writing that he was talking about P.T. Barnum but we were at a loss to find Barnum's curly horse in any of the library sources describing the great showman.

Then we found Dr. A. H. Saxon who is the foremost American authority on P.T. Barnum. Dr. Saxon had never heard of the horse but as a good researcher he was immediately intrigued by the possibility. After some research into his archive, Dr. Saxon told us that the horse is mentioned in Barnum's autobiography. Back to the library we went — still no luck.

Back to Dr. Saxon we went. Rather than thinking us to be pests he promptly sent us information on the specific edition we should find. Later editions of P.T.'s autobiography were heavily edited and many things removed that P.T. had included in his original version.

The book is titled The Life of P. T. Barnum (Written By Himself), originally published in 1855 by Redfield. Sure enough, there was the "woolly horse" story. Barnum tells the story of acquiring a curly coated horse in Cincinnati in 1848, forty-six years after the Sioux stole curly horses from the Crow. On page 349 Barnum describes the horse:

> It was a well formed horse of rather small size, without any mane or the slightest portion of hair upon his tail. The entire body and limbs were covered with a thick fine hair or wool curling tight to his skin. He was foaled in Indiana, was a mere freak of nature, and withal a very curious looking animal.

Many people reading this summary would not agree with P.T. about the horse being a "freak of nature" but Barnum wasn't the first to not know that

Curly Horse Ridden by Sioux in Lower Left of Drawing
Red Cloud Drawing of the Battle of Little Big Horn
From TIME-LIFE BOOKS

other curly horses exist.

Barnum goes on to tell the tale of what he did with the horse. It is yet another testament to his outrageous character. P.T. had not seen of a suitable event in which to use his new horse until the papers became filled with the latest exploits of the intrepid explorer Colonel Fremont.

This time Fremont had been lost in the Rockies for some months. When word finally started appearing in the press that the Colonel was still alive, Barnum saw his opening. He bundled the horse from nose to tail and smuggled him by train from Connecticut to New York. Safely hidden from view, Barnum leaked a fake message from Fremont telling about the capture of a marvellous animal that looked like a horse but couldn't possibly be a horse. In fact it seemed to be a combination of an elephant (the hairless tail), a deer (its light hindquarters), a horse (its overall size), a camel (its curly coat) and a sheep (he claimed it could leap twelve to fifteen feet). After the news hit the papers, all P.T. had to do was sit back and collect twenty five cents a head for a look at Colonel Fremont's discovery.

We uncovered other tantalizing clues throughout the investigation for this chapter. We have already mentioned Darwin's footnote in his book The Variation of Animals and Plants Under Domestication about Dr. Canfield and Los Angeles. We also learned of a more modern Hollywood connection.

As we experienced throughout the year we conducted this research project, telling anybody about the research can turn up to some amazing leads. For instance, as we started receiving a number of letters from Russia, our mail carrier made a comment on the stamps. We told her about the project. "Oh yes," she responded, "I saw a curly horse when I was growing up near Los Angeles." It seems that the actor Leo Carillo who played the Cisco Kid in movies and on television had a curly horse and often exhibited it in local fairs and horse shows. Mr. Carillo has since died and nothing could be found from the attempt we made to contact his former agent.

Therefore . . . based on these sightings it is clear that curly horses did exist in North America in the 1800's, but there is still no indication of where or how they might have originated. Furthermore, there is good circumstantial evidence but no clear connection between the curly horses of the nineteenth century and curly horses of the present.

So, on we went. In an attempt to fill in the gap between the late

nineteenth century and modern times we initiated an oral history project to collect recollections from people who have seen or owned curly horses. The following is based on what we found.

We received over 40 phone calls and letters in response to display ads in Equus and Western Horseman magazines. We also received an additional 30 inquiries and stories when an article about the project appeared in the March issue Equus magazine.

When David Gaier and Shan Thomas traveled to Nevada to collect information, we made a list of all the articles displayed in the scrapbooks of the American Bashkir Curly Registry. These scrapbooks are displayed every year during the Registry's annual meeting in Ely, Nevada. We then wrote to the magazines in which these articles appeared and received duplicate copies of any that were still available.

Last, but not least, we contacted as many people as we could who currently own curly horses and asked for their stories. From this request, we received an additional 47 responses.

All of these stories were then studied for five items: the name of the person reporting the sighting, the name of the person associated with the horse, the date of the sighting, the place of the sighting and any details describing the horse. As we mentioned earlier, this data was entered into a computer database for further analysis. The list generated from the database is included here.

We know that this represents just a small number of the sightings that exist. We don't mean to present this as though it were the last word in curly horse sightings. If someone could get access to the letters that have been written to the American Bashkir Curly Registry over the past eighteen years and note the five items we tracked, we could readily expand this analysis. As we mentioned we were not allowed to see the registry archives but we know these letters exist and they may contain useful information.

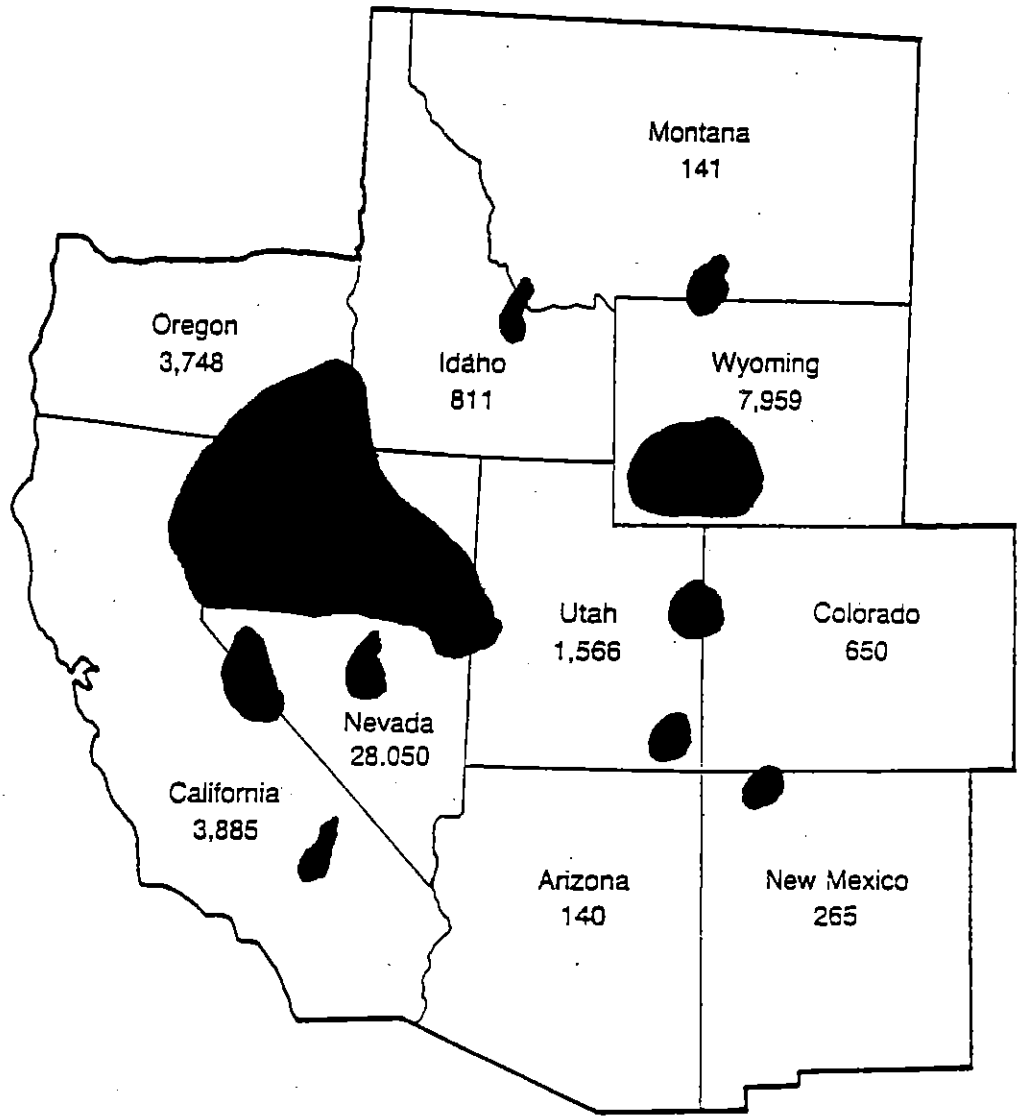
As you can see there are consistent reports of curly horses in every decade of this century. What we also found interesting was the clustering of sightings into certain geographic regions. While the details describing the horses are sparse, they most often confirm the characteristics noted in the South American texts, the P.T. Barnum story and the Red Cloud drawing. What follows is a summary of the details we pulled together about the Great Plains of North and South Dakota and Nebraska, Colorado, the Rock Springs Area

Curly Horse Sightings

DATE	STATE	LOCALE	COMMENTS
			Bought curly horse from horse dealer in ___
1882 (c.)	WY	Lander	Dad had a matched pair - called them buffalo ponies
1890 (c.)	MO	St. Louis	Came across them frequently in this vicinity
	WA	Walla Walla	Had a curly horse as a boy
1900	SD	Sisseton	Skjonsberg's parents move to Bentley, Alberta & take curly mare with them
1900 (c.)	SD	?	Ole Skjonsberg's uncle brought a curly stallion to Alberta
1900 (early)	CO	Denver	Brought curly palomino with him to Lancombe, Alberta
	ND	?	Brought curly mare "Wild Lizzie" to Calgary, Alberta
1912	NV	East of Tonopah	100 miles east caught curlies - Western Horseman & Amaral's Mustang
1917	NB	?	Kroeger living in Cody, NB - furnished photo of curly for Clint Anderson article.
1920 (c.)	NV	?	Her curly horses' ancestors shipped to Manitoba by rustlers from Montana & Nevada
	OR	"Eastern"	Kirchoff's father owned a curly draft-type
1930	WY	"Central"	Glen's father had curlies
1932	NV	Austin	Damele family begins breeding curlies after hard winter kills their stock
1937	SK	Cymric	Bill & Ron Groves' father owned one from 2 straight-haired parents
1942 (c.)	CO	Englewood	Owned one - sent photo to Ripley's Believe It or Not
1948	CA	Hollydale	Owned one - bought elsewhere - dam was curly Indian pony
1954 (c.)	OR	Umatilla Nat'l Forest	Lived in Pendleton, OR - caught first curly in U.N.F.
1957 (c.)	Midwest	?	Bought her curly mare who was born in unknown area of midwest
1959	NV	Fernley	A horse dealer sold Suzanne Swanson her 1st curly with 3D brand on shoulder
1960 (pre)	OR	Blue Mountains	Lived in Pendleton, OR - saw curlies in these mountains
1969	MO	"Southern"	Knew of a curly x foxtrotter
1969 (c.)	CA	Bear Valley	Acquired a curly
1970	NC	?	Letter to editor of Western Horseman
1970 (pre)	NB	Cody	Sold at auction to Clint Anderson

Curly Horse Sightings

DATE	STATE	LOCALE	COMMENTS
1970 (pre)	SD	"The Reservation" Buzzard Basin Ft. Pierre	Owned curlies - wrote to Western Horseman Sold curly to Clint Anderson Diamond A Ranch told Clint Anderson he "had a bunch."



Estimated population sizes and major areas (darkened) of wild horses in the western United States as of late 1983. Estimates for Nevada and Colorado are from 1982. Data courtesy of Bureau of Land Management. U. S. Department of Interior.

of southwest Wyoming, the East-Central area of Nevada, the Blue Mountains of Eastern Oregon, and Central-Southern Canada.

NORTH AND SOUTH DAKOTA AND NEBRASKA

The existence of curly horses among the original occupants of this area of the United States has been discussed in the previous part of this chapter. We wondered, along with others who are researching Curly horses, what present day sightings/stories one could find in this area.

The best source of leads in the beginning was, again, Glen Conley and Sharon Williams. They had been searching for the last year for the Amerindian connection. They very generously shared all their research with us.

They had success in both the Standing Rock Reservation area and the Pine Ridge Reservation areas of South Dakota. We followed up Glen and Sharon's leads by telephone and with an on-site visit last fall.

Our first contact was Max Blacksmith of Pine Ridge who spoke to us through his daughter Philamine Blacksmith of Loneman, South Dakota. We had been given Mr. Blacksmith's name as a possible source of information by Ted Hamilton, an archaeologist at Oglala Lakota College who had been helpful to Glen and Sharon.

Mr. Blacksmith is an Oglala Sioux and is in his 80's. When we first spoke to Philamine we explained what we were looking for and asked her to arrange a telephone interview with her father. She explained that because her father was from another generation, he was uncomfortable with telephones but that she would see what she could do. She told us not to anticipate too much because she had never heard of such a horse and did not believe her father would be able to tell us anything.

A few days later we called Philamine again. Much to her surprise, her father had vivid memories of the horses. He was pleased that someone had asked about the curly horses although Philamine had no memory of her father ever talking about them before. Mr. Blacksmith remembered that the horses were "hard to come by" and that they were "smelly," like a horse that was sweating all the time.

Mr. Blacksmith's memory of their smell was a delightful piece of information because it was the first North American report that included this particular detail. Up to this point this had only been discovered in the South American writings of Felix Azara.

Glen and Sharon also told us about a curly horse breeder by the name of Ernest Hammrick. At this point we decided that one of us should go to North and South Dakota to conduct interviews first hand. Shan spent three days last November doing the following interviews. Here is her report.

When I arrived in a South Dakota cafe to spend the day with Ernie, I found him having coffee with Bill Mulligan, another horsetrader who was recommended to me as a person to talk to by Jack Chase, the Dakota State Brand Inspector.

Bill, modestly begged off knowing anything much about the horses and said if I was going to talk to Ernie I was going to find out all there was to know. Not long after Ernie and I started talking we were joined by a friend of Ernie's, Maurice Williams. Mr. Williams is a breeder of registered Quarter horses and part Sioux. He stayed with us throughout the interview and contributed to the information that follows.

In the early 1930's — '32 or '33 —Slim Burndt bought some curly horses from a Cheyenne Indian named Eli Bad Warrior. At that time Eli lived on his family grounds along Bear Creek on the Cheyenne River Reservation. Eli Bad Warrior died only a few years ago.Slim bought all of his stock from Eli and Ernie bought all of his stock from Slim.

Ernie has been around this area for some time. He currently leases pasture on the Standing Rock Reservation from the Bureau of Indian Affairs. This has given some people the mistaken impression they are buying horses from an Indian resident of the reservation. While Ernie's horses are only a few generations removed from Indian bred stock, they are his own mix and he is not an Amerindian.

We visited five of his herds on this land later in the day. He is justifiably proud of the horses he is producing according to his formula. He has never tried to breed a "pure" curly and all of his horses are of mixed blood. He likes the curly coat but is basically looking for a good sturdy "usin'" horse — mainly for working cattle. He has long admired old style stock horses from which the modern, highly refined Quarter horse is descended. He likes the old stock horse's disposition, cow sense and stamina.

A primary goal of Ernie's is to produce a horse with "good bone under him." He'll go as far as Oklahoma or Texas to get his horses if they have what he likes. From what I saw that afternoon, Ernie's eye has not failed him in attaining his goals. While his horses are considerably different from the horses seen in Nevada, they are certainly good looking animals in their own right.

The horses he breeds are solid in the body, short and stocky weighing between 1000 and 1200 pounds. They have good legs without being too drafty. Their legs are of medium proportion without the exaggerated long forearm of modern quarter horses. They have short backs and a round croup. Ernie dislikes the rafter hips so common among horses with Barb blood. Most of his horses have round hindquarters — some with a crease down the midline. The tail set is about medium. There is not much evidence of Arabian blood in the hindquarters. For the most part the herd has nice heads, on the small side, much like Quarter horses with a round cheek and small muzzle. This was especially noticeable in his stud, Bad Warrior.

The colors range among sorrels, chestnuts, browns and bays. He is not breeding for color. His horses' curliness was slight when I saw them, with it concentrated along the neck and back. Some of the horses showed the scrub mane and tail while others had manes and tails similar to straight haired horses. Ernie agrees with Maurice Williams when Maurice mentioned that he thought the reason the horses had fallen out of fashion is that they "stink like hell."

Ernie breeds for a sensible, trustworthy horse. He doesn't know why anybody would want anything else. He doesn't think his curly horses are that much nicer in temperament than many of his other stock. But he doesn't think they are wild tempered by nature, either. However, one of Eli Bad Warrior's horses, Curly Wolf, made quite a name for itself as an unridable bronc in the Dakota rodeo circuit.

Slim and Ernie have provided most of the start up stock in North and South Dakota. Dorothy Hedges, a long time breeder of curly x Appaloosas got her start with a Burndt horse. Bill Valentine, a breeder crossing curly horses with Spanish Mustangs in Wales, North Dakota got his stock from Mrs. Hedges. New curly horse breeders in Hebron, North Dakota, Merlin and Maureen Neidhard, bought their stock from Ernie just a few months prior to my visit.

Ernie feels that the horses have been in the area for a long time but couldn't shed any light on their origin.

The next day I spoke to Mr. Pat McLaughlin who is a member of an old family well known on the Standing Rock Reservation. His grandfather is Major McLaughlin who served as a now famous Indian Agent on the Standing Rock Reservation in the late 1800's. Pat McLaughlin has served many years as head of the Reservation's Tribal Council. Through both of these connections, Pat is a person with bountiful contacts.

Both he and his wife had recollections of curly horses. Mrs. McLaughlin grew up on Oak Creek near Mahto (just west of Mobridge). She remembers that her family had a mare and it had a colt and both were curly. The horses were in her family in the early 1920's. She couldn't think of any curly horses in the area today.

Pat also knew what I was talking about. He recalled that 50 or 60 years ago there was "quite a herd" in their area. He was aware that Ernie Hammrick was breeding them over in Mobridge, and as far as he knew Ernie was the only one. He has spent time on some of the other reservations and does not remember seeing curly horses on any of them in recent years.

He remembered two curly horses in particular that he knew as a child. One was a gentle saddle horse belonging to his mother's uncle, Robert Mad Bear. When he went over the list of traits, he only recalled that it had a straight mane and tail and that these were fairly long for horses around there. It seems that most of the horses in his part of the country commonly had short manes and tails.

The other curly horse belonged to a friend of the family, Deafy Tiger. Again, he didn't remember many details about the horse except that Deafy would hunt with this horse and shoot right off its back. Without my prompting, Pat offered his opinion that it sure must have been a calm horse to allow someone to do that.

I also interviewed Maureen and Merlin Neidhard who had just bought curly horses from Ernie. As well as breeding horses and cattle, the Neidhards publish a magazine aimed at exotic and rare breed fanciers.

Maureen and Merlin have been raising and trading horses for 30 years. They heard about curly horses through a variety of sources including the American Minor Breeds Conservancy. As they asked around looking for some to buy they dug up a little more history of the horses in that part of the world.

The most important piece of the puzzle they felt they had ever been given

was that the horses might have achieved a sacred status to the local Sioux. A personal friend of their's, who is a Sioux, surprised them one day by asking why they had curly horses. The friend seemed offended that the Neidhards, who are white, had curly horses which their friend said were sacred to the Sioux and therefore non-Indians shouldn't have them.

The Neidhards felt that this and other information had been given to them in confidence and that they did not want to give out their friend's name. Their friend went on to tell them other stories.

He said there were references to curly horses in religious ceremonies in the book Black Elk Speaks. We reread the book but could not find this reference.

Their friend was also aware of the Winter Counts and confirmed that curly horses are depicted with corkscrew manes.

Their informant said the curly horses were owned and used only by ruling class Sioux. Lower classes were not allowed to touch them or care for them. The curly horses were known as "Buffalo Horses" because of the tradition of a medicine man mounted on a curly horse killing the first buffalo of the year.

There are a number of references to a class of Indian pony called "Buffalo Ponies" but there is no mention in the literature of their curliness. The Buffalo Ponies were kept in special favor by their owners and never loaned out. (It was a mark of wealth among many Sioux tribes to loan horse to less fortunate tribesmen.) The literature states the horses were called Buffalo Ponies because they were the fastest and the bravest horses kept specifically for hunting buffalo.

The Neidhards had also heard that the curly horses were kept for religious ceremonies and were not used for hunting or war. We haven't been able to shed any light on this. The currently available archives at the North Dakota Heritage Center had nothing on the use of curly haired horses in special religious ceremonies. We were very interested in the story because it had never come up in the other research.

They couldn't remember where they had heard it, but they remember being told that there was a display in a museum in San Francisco with a photo of the army killing the curly horses after the massacre at Wounded Knee. They may have heard this from Ernie Hammrick who told us about this but said it was a museum in San Diego. To follow this lead we contacted the park ranger

at Old Town State Park in San Diego, Dick Miller, and asked him to try to find the museum and then find the display. Following Ernie's description that it was a museum near the zoo, Dick looked at all five museums that would fit this description but such a display is not currently in any of them. Dick also interviewed the five museum directors and none of them had any recollection of the display.

A final story that puts Curly horses in the Great Plains area is one that was submitted to Western Horseman magazine in January of 1970. Mr. Clint Anderson's article is a first hand story of a couple of curly haired horses but is not completely clear in its details.

He describes the horse as, " . . . no different from other stock horses except that their hair was curly, and the mane and tail kinky, as were their fetlocks."

Of the four that he owned, one was a big sorrel horse with white stockings and a blaze face bought in the Buzzard Basin country in South Dakota. Mr. Anderson mentions a horse breeder in Ft. Pierre, South Dakota who seemed to have a significant number of the horses, but basically the horses seemed to be rare.

Mr. Anderson bought three curly horses from an unidentified reservation — a mare and colt and her yearling. Again we find a reference to the dominant type genetics for curliness because Mr. Anderson notes, ". . .this yearling got one of my best Thoroughbred race mares in foal and the colt was curly."

The curly horses that are discussed in the article are all held in high esteem. Mr. Anderson talks of their cow sense and dependability.

Clearly we can say that the curly horse has been and continues to be a resident of the Great Plains. Changed by generations of crossbreeding, the horses that exist today are significantly changed from their Indian bred or feral ancestors. Some of the horses which might be most nearly like the old ones are those out of Bill Valentine's crossbreeding program with Spanish Mustangs. Future interviews might turn up more details on old type breed characteristics but it appears that the Indian Pony/Spanish Barb Mustang was the ancestor.

COLORADO

Many present day curly horse owners at least know their horses are not a freak of nature, but there are still people who have owned curly horses, even in recent times, who have no idea that any other curly horses exist. Two of the three stories from Colorado fit this description.

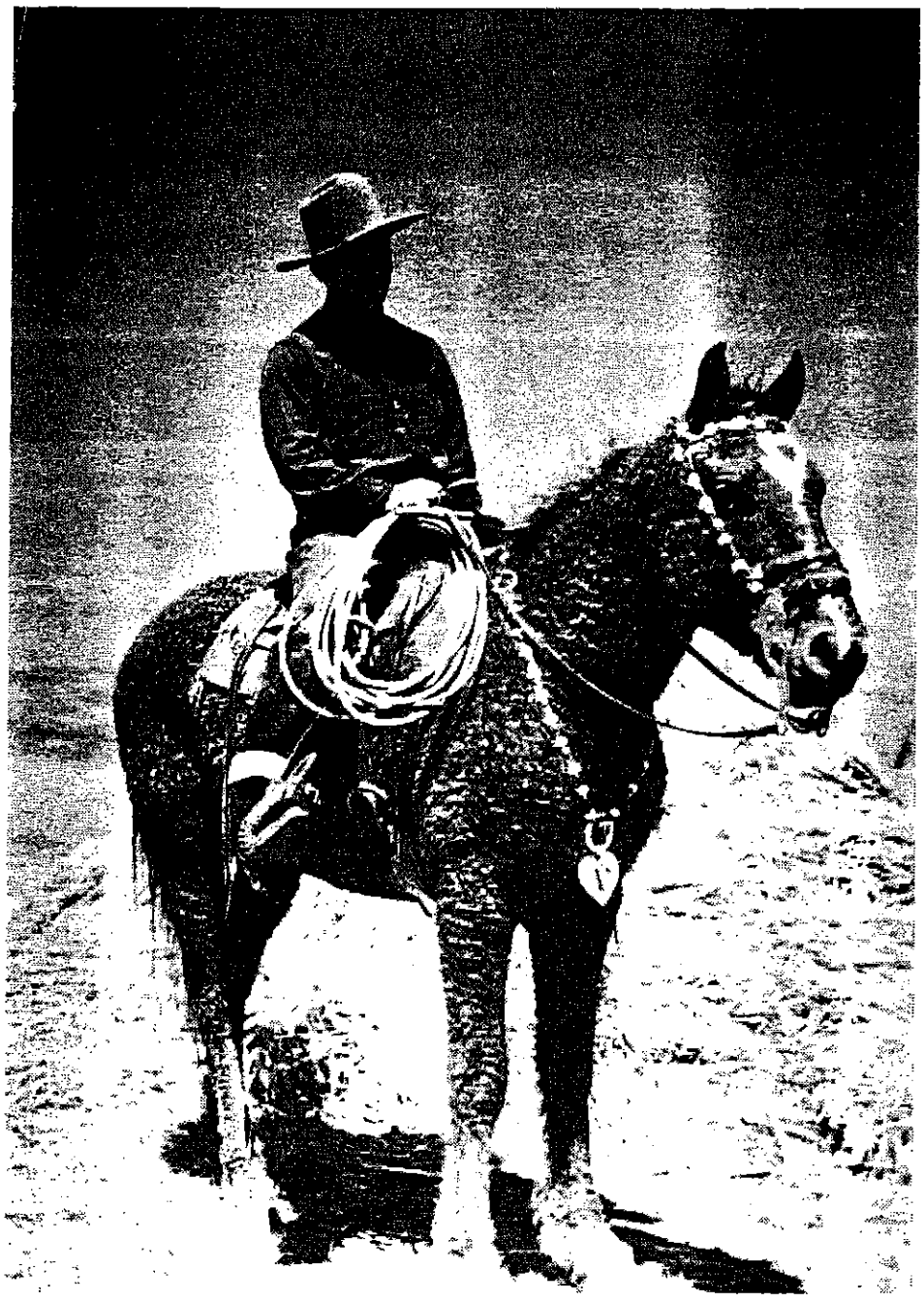
One such man was George A. Dollison. Mr. Dollison was mentioned in a letter printed in the June, 1960 Western Horseman article called "Fur Covered Horses."

On July 12, 1946, Mr. Dollison wrote the following letter to Ripley's Believe It Or Not:

Dear Sir:

> I am enclosing some snapshots of my horse "Curley" that I think may be of interest to you for publication in your strip. As the pictures illustrate, Curley is a very unusual horse; in fact I believe that he is probably the only one of his kind.
>
> His hair is not like horse hair but is more the texture of fur and is extremely curley. He has no forelock and his mane never attains a length of more than about three inches. Hair in his mane takes the shape of spike curls and when he has not rubbed his mane out on corral poles it looks like a row of corkscrews. His fetlocks are also a mass of cork-screw shaped curls. Even his tail is curley. Curley's color is almost as unusual as his coat, being an individual shade of red that cannot be classed either as bay or sorrel.
>
> I have shown Curley to dozens of horsemen but have never yet found a man who has seen another horse like him.
>
> Sincerely,
>
> George Dollison

In the photographs is a horse that is not unknown to many present day curly horse owners. The small horse with a short back and a straight neck is common among today's curly horses. The size and shape of his legs is also common. Of particular note is the triangular head shape that became familiar



George Dollison and Curly of Englewood, Colorado
photograph from Ripley's Believe It or Not

George Dollison and Curley
"Ripley's Believe It Or Not" August 19, 1946
Reproduced with permission from Ripley's Believe It Or No

to another Colorado breeder and is seen today in some of the Dakota horses.

Among the letters we received was one from Steve Baer who lives in Monte Vista, Colorado. Steve saw our ad in the Western Horseman and called our office. He was puzzled about what we were doing because he, like Mr. Dollison, thought that his horse just might be a one of a kind.

When we realized he had not read or heard anything about current day curly horses, we asked him to do us a favor. Before we sent him any information that would "taint" his perceptions, would he sit down and write us a description of his horse.

Steve was quite willing to do this and sent us a wonderful letter on April 25, 1988. In his letter, Mr. Baer told us that he came by his horse through a friend trying to get rid of the ugly fence jumper. Mr. Baer said that he liked nice looking horses, but that he was more interested in their disposition and whether he could use them. He went to his friend's house

> . . . the next evening after work, and being dark, we took flashlights and walked out into their paddock to look at him. I was able to walk right up to him (in the dark), and checked him over by feel to see if he was sound. I picked up his feet and felt for conformity. He felt and, as near as we could see, looked sound. Already I liked his disposition. The next day I took my trailer and picked him up. He loaded like he had done it all his life. My friends still insisted that he was the ugliest horse they had ever seen. (You know how registered horse breeders are!) But I saw their point in the daylight, because he had a huge mule head and a stocky draft horse body. But I really liked his disposition and took him home.

Steve found that the horse was gentle but tough. The horse could go all day without shoes over rocky ground and carry a full pack or a large man. His wife and kids loved the horse who in turn seemed content to stay with them. Steve pointed out that no fence had ever kept the horse in so they figured he stayed with Steve's family because he liked them.

Steve provided us with the following description. Please keep in mind that this person claims to know nothing about what a curly horse should be like.

> He stands 13 1/2 hands, has a small draft horse body, a mule head and curly coat from poll to tail. He has a 2" mane that is like a cork screw wire bristle that never grows, and no forelock. He is red in color and has a star. He also has black hooves and I have never shod him. He has a disposition similar to a draft horse, but better, because he isn't as lethargic and he genuinely likes people. He will come up to anybody and loves to be petted.

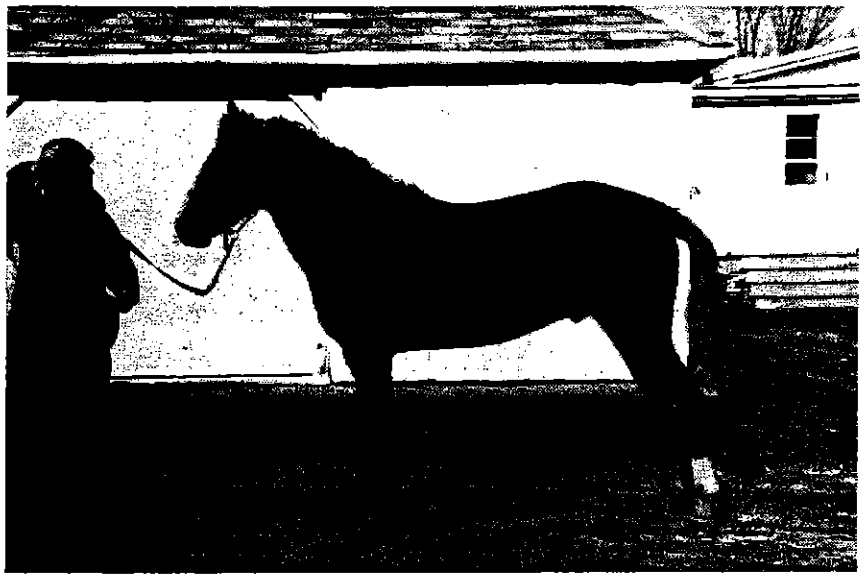
Steve's description was remarkable in a number of ways. The size of the horse is like the descriptions from South America and some places in the U.S., for instance Oregon and Nevada. The shape of the head was also like the South American horses. The sparse mane is found in other areas and among all the reports from Colorado. The tough constitution and extremely hard feet are consistent with many other descriptions. And of course there is the special temperament that so many curly horse owners have reported.

A husband and wife team breeding curly horses in Colorado differ from Mr. Dollison and Mr. Baer by knowing of the existence of other curly horses. Many of their horses are still alive among the curly horses known today. Their names are Francis and Dora Fredell of Boulder, Colorado.

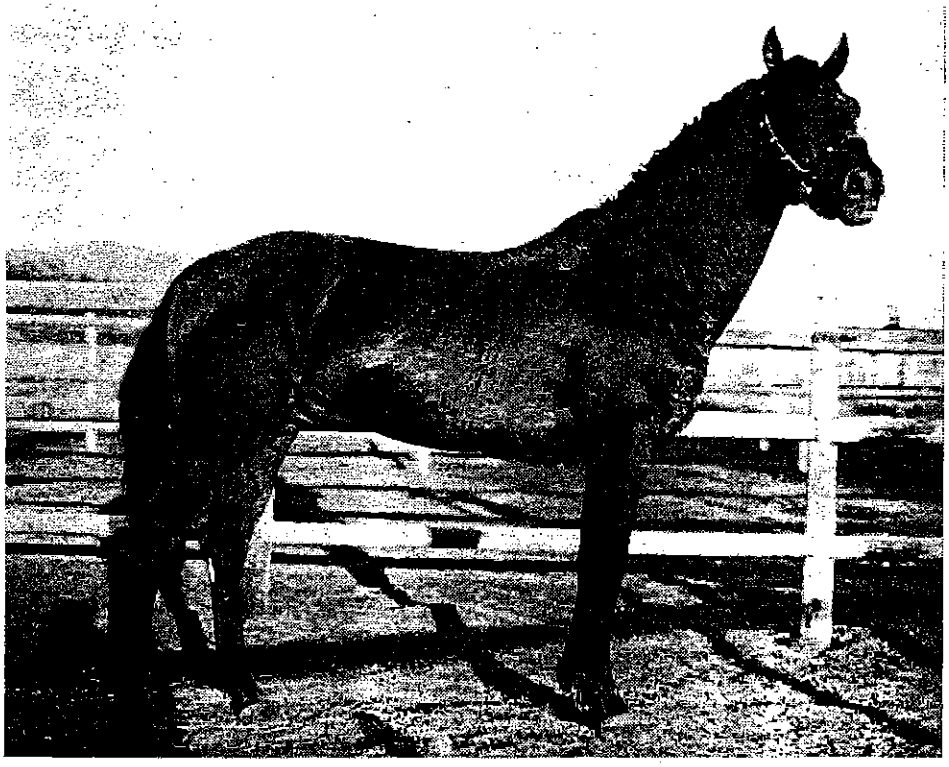
The Fredells were active horse breeders until ill health forced them to stop and they sold the last eight curly horses to Gloria and Russ Bratcher in Oregon around 1983. Mr. Fredell's history with curly horses goes back to his first curly black mare presented to him as a gift from his father. At the time Mr. Fredell's father bred horses with curly hair and kept up the line until Mr. Fredell was old enough to start his own operation.

When Mrs. Fredell joined the partnership, Mr. Fredell was already producing a number of curly horses from his stock horses each year. The curly horses were not his only goal so there were straight haired horses on his place as well. The curly horses at the time were typical stock horses from the old Spanish feral stock — small, quick, rugged and straight faced and often rafter hipped.

Mrs. Fredell's influence turned the breeding program more specifically toward American Quarter Horses. By the time the Fredells sold their last stock their curly horses were 75 to 90% Quarter Horse according to Mrs. Fredell's calculations. The horses were most often sold at the Fort Collins Auction and always with the pedigrees intact so the new owner could register the horse in the American Quarter Horse Association. Mr. and Mrs. always



Missouri Foxtrotter Stallion - Velvet's Red Riches
photograph from Jay Hensley collection
Stallion owned by Jay Hensley



Fredell bred Stallion - Warlord's Thunder
formerly called Star Buck
Stallion owned by Ralph and Cindy Cervin when photo was taken

liked the curly hair on their horses and thought the prohibition against such a characteristic for Quarter Horses was foolish. They did not, however, believe the curly horses were ever anything but descendents of the Spanish horses left to run wild over the last 400 years so they chose not to register them with the American Bashkir Curly Registry.

Mrs. Fredell described their breeding goal as producing horses with good deep chests and long pasterns to improve the horses stamina and action. The round rump and Quarter Horse head was the other typical features although they occasionally got one with rafter hips or a slightly dished face. They never bred for size, sticking to the original Quarter standards of 14 to 15 hands. They did breed for speed both on dam and sire sides. The very fast little mare of barrel racing fame also introduced the chestnut pinto coloring among their horses. Their other horses were of all colors with reds, sorrels, black and palomino being common.

A big issue in their breeding program was the horse's attitude toward humans. Mrs. Fredell was most fond of the calm and intelligence of horses from the Quarter Horse lines of McQue and Oklahoma Star. Many of the Fredell horses carry this lineage. She didn't feel that the curly horses were any better in their temperament than the straight haired horses but then the Fredells were aiming for all of their horses to have good dispositions. Some of the curly colts, she remembers, were difficult to handle because they became a one person horse too soon.

The original black mare showed a thick double mane and this showed up often among their horses. Mrs. Fredell said the sparse mane and tail often cited by other curly horse owners did show up but not more than a half a dozen times.

Both Mr. and Mrs. Fredell have fond memories of their horses, curly and straight and were pleased to hear that there were still so many curly haired horses in existence.

THE ROCK SPRINGS AREA OF WYOMING

This is the area where feral horses are found today. It is a large area just north of the Colorado and Wyoming border. The history of curly horses in this area seems to start on a private ranch southeast of the town of Rock Springs.

This section is indebted to more outstanding research done by Glen Conley and Sharon Williams, who you heard about earlier in this chapter. Glen and Sharon, like many curly breeders in the Midwest and East have been able to buy curly feral horses through the Bureau of Land Management (BLM) Adopt-A-Horse program. Because many of these BLM curly horses are coming out of the Rock Springs station, Glen and Sharon wanted to know more about the horses. The culmination of their research is a long and detailed letter from the man credited with the infusion of curly horses into the feral stock, John Kappes.

John Kappes was identified time and again by folks around Rock Springs as the man who would know the story of the curly horse in that area. After reading his letter, we also visited John who is now living in Northern California.

John owned curly horses while living on the family ranch in Rock Springs, Wyoming where he grew up. He said he considered them fine mounts. Of the nine horses he broke and rode, only two were not up to his standards. The rest had the ability to "put a cow up a tree."

Somewhere between 1942-1945 John's foster uncle Isaac (Ike) Newton Brooks, bought a black curly stud colt from a horse trader around Laramie, Wyoming which is just north of Fort Collins, Colorado. This black curly horse is called The Laramie Stud for the sake of this research. The horse was non-fading black with a white snip on his nose and two front stockings.

The person who would know all the details about this purchase is Ike's foreman Dean Smith. Unfortunately, John said, Mr. Smith has become quite a hermit, and further efforts by Glen and Sharon to reach him have been fruitless.

The Laramie Stud lived only 18 years, due mostly to a condition called "parrot mouth" which makes nipping short grasses nearly impossible. The Stud had a dished face, with a rather round almost bulging forehead, short ears and a very fine muzzle. Mr. Kappes felt that the Stud's legs were too long for his short back and that he was "rafter" hipped. Mr.Kappes also remembers that the Stud had long fore arms with short flat cannon bones as well as a good, deep chest.

The Laramie Stud was a small horse, weighing only 950 pounds. Mr. Kappes was able to provide weights of all the curly horses he discussed in his letter because it was the practice on his families ranch to weigh the horses

on a stock scale.

Despite some drawbacks, John fell in love with this horse. While the Laramie Stud did throw some very fine colts he did sometimes pass on the "parrot mouth" condition.

The Laramie Stud was not broken and turned out to range breed with John's uncle's stock and that of their neighbor, the Sweeny family. Sweeny had about 1400 head at one time and John's uncle Ike had more than that.

John broke two seven year old colts out of the Laramie Stud: one frosty grey, rafter hipped; one black with a snip on his nose, not rafter hipped. John said he couldn't remember any details about the dams of these horses. The grey looked a dead ringer for the Laramie Stud except his legs were not so long, and his back was longer. The black horse's head didn't look at all like the Laramie stud, in fact no part of him did except the long forearms and powerful muscles. Both horses weighed about 1200 pounds. Frosty, the grey, was very gentle. Snip, the black, was never gentle but worth the effort it took to ride him because of his strength.

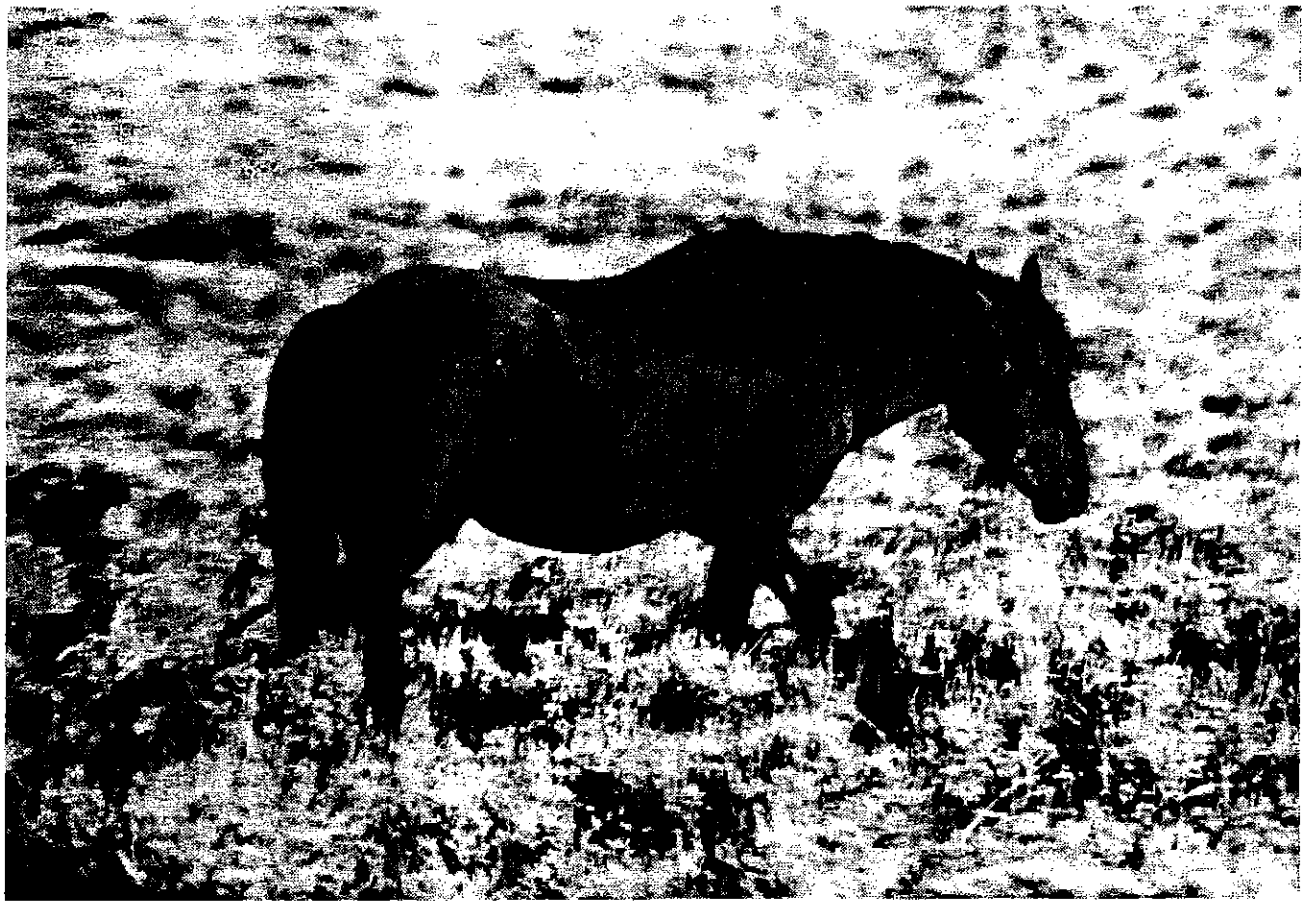
John remembers that both horses had an exceptional walk and trot. No horse in the "wild bunch" including the Morgan x Standardbreds, Army Remount Thoroughbreds or Tennessee Walkers, which had been purchased and turned in with the mares to improve blood lines, could come close to outrunning Snip.

John knows that exceptional horses come along only every so often and he was felt fortunate to have two more curly horses that matched Snip and Frosty in every way. These two were out of the Laramie Stud's son, Rocket, and both were iron grey.

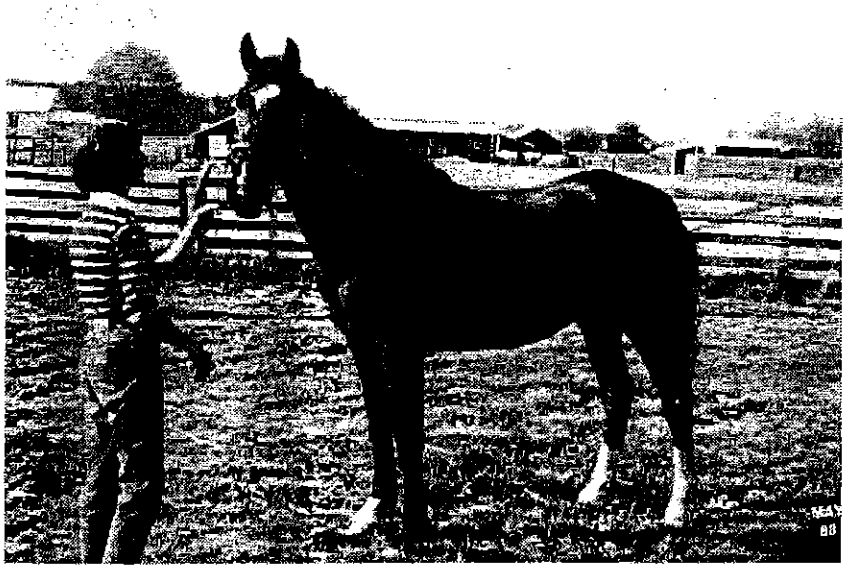
Both attained a mature weight of 1150 pounds. Both were excellent cow horses able to put a cow "down a gopher hole".

And just like the first two one of these iron greys, Peewee, was very gentle and the other, Knots, never really liked humans.

John provided us with photographs of his horse and an excellent chart giving conformation details. He noted that the horses stayed curly their whole life though as they grew older, some lost the summer waviness and became straight haired except in winter. The horses tended to have very sparse manes and tails with very little fetlock feathering. But there were others who had



Rock Springs Stallion - Rocket
photograph from John Kappes collection
Stallion owned by John Kappes



Rock Springs BLM Mare - Boo
photograph by Bill Strickland
Mare owned by Bill and Linda Strickland

full tails and manes and fetlock feathering. John attributes this to the influence of the variety in the range's brood mare band.

John gave us details on other curly horses he owned and compared them to photographs provided to him by Glen and Sharon of current day curly horses. He saw many resemblances between his horses and some of the horses being bred by Ernest Hammrick in South Dakota. He also saw similarities with a few horses that are descendants of Damele stock. John described most of his horses as smart, extremely agile, and very fast.

John's later stock and probably many other curly horses coming out of this part of the country were sired by the Laramie Stud's son, Rocket. John was very fond of this horse and described him as a joy to ride. John said even judges in pleasure and reining classes admired Rocket's free and easy gait. John used Rocket regularly as a stock horse and found him fast and strong with remarkable endurance.

Most of his colts were good ones, John said but Rocket's greatest potential was not realized until he was retired to the open range in 1974. John's knowledge of the ranches surrounding his uncle's place leads him to believe that Rocket and the Laramie Stud fathered all the present day curly horses around Rock Springs.

Today's Rock Springs horses are what you would expect from John's description of the crossbreeding program. They are considerably larger than the original Laramie Stud with a number of horses showing the Belgian draft horse blood that Ike Brooks introduced to the range in that area. The horses are more "modern" in their appearance but still curly and hardy with pleasant dispositions.

EAST - CENTRAL NEVADA

Nearly all that is known about curly horses today stems from the work of one family in Nevada, the Damele's. While the discussion in the Russian chapter already introduced you to this family, there are a few more details we would like to add as well as some clarifications. The member of the family most people are familiar with today is Bernard "Benny" Damele. Benny has lived most of his life on the Dry Creek Ranch east of Austin, Nevada. We are very grateful for the time and patience he has shown us and others in helping put together these pieces.

The following Damele family biography is drawn from details provided by Benny Damele, Carrie Eddy and Betsy Williams. We are also very grateful for access to an unpublished book authored by Dale Woolley, a curly breeder in Michigan. Mr. Woolley has done extensive research into the Damele family with the assistance of Benny Damele, Pietrina Etchegaray, a daughter of Steven Damele, and Gladys Goicoechae, another Damele descendent.

In August of 1879 Giovanni Damele arrived in New York from Genoa, Italy. He had a growing family to support and like so many before and after he looked at America. Giovanni traveled to Eureka, Nevada, where he stayed earning the money necessary to send for his family back in Italy. Finally, eleven years later in December of 1890, his wife Pietrina and their three sons were able to join him.

After reuniting the family in America, Giovanni (who was now became known as John) started to look for ranch land. In addition, the family continued to grow. In October of 1891, Peter Luke (Benny and Peter J's father) was born. This son was followed by three girls.

On May 28, 1898 John Damele signed the papers to purchase the Three Bars Ranch, northwest of Eureka. Court house records show the family took possession of the ranch in the spring of 1899. It was soon after this purchase that family tradition notes John, Peter Luke and Bernard saw curly horses running among a band of feral horses near the ranch. Benny Damele told us that his family probably saw the curly horses around that time but it wasn't until the winter of 1932 that they had any in their possession.

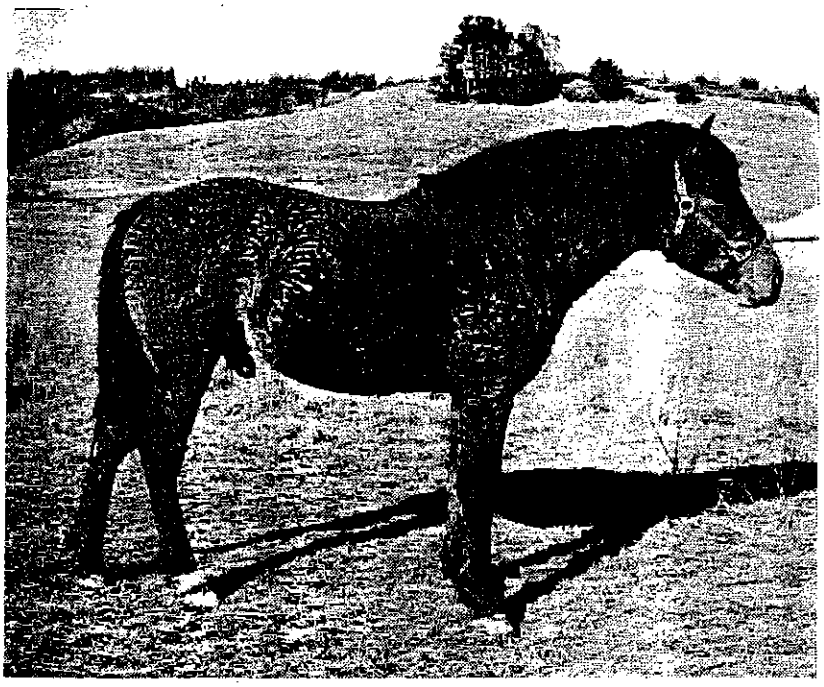
John (Giovanni) Damele died on August 9, 1909. After his father's death Bernard took over the Three Bars with his wife, school-age children and his younger brother Peter Luke. Not long after, the family was joined by an accredited teacher, LaRaine Glen, who came to tutor Bernard's children. Miss Glen and Peter Luke were married on July 24, 1926.

Now there were two families living on the Three Bars as Peter and LaRaine soon had two sons, Peter Jason born in July of 1927 and Bernard Glen (Benny) born in April of 1930.

The curly horses began coming into the Damele's lives not long after Benny was born. In 1931, two of Stephen Damele's sons caught a sorrel curly in the Roberts mountain range. They broke him to ride and sold him. Stephen's sons John and Leo remember seeing other curly horses throughout the Hanson and Roberts mountains and in Red Hill Canyon.

Benny Damele and Shoshone D on the Dry Creek Ranch
photograph from Jay Hensley's collection

Damele bred Stallion - Dixie D
Photograph from Dr. Wayne Oler's Collection



Damele bred Stallion - Grant's Dusty D
Photograph from the C.S. Fund Conservancy Collection

In 1932 the real turning point occurred. A winter of fearsome proportion hit the Great Basin. Domestic and wild stock froze or starved to death. When the horses were rounded up in the Spring almost all of the straight haired stock horses used on the Three Bars had perished. In among the remaining few were some curly horses — worn but definitely alive.

Neither Peter L or his brother Bernard had to be told twice. If these horses could be broken and turned into cow ponies, they certainly could be relied upon to stay alive when other horses died. As it turned out, the horses could work cattle and the Damele curly horses were crossed with other stock horses to produce what the Three Bars needed.

In the fall of 1942, Peter L and LaRaine fulfilled a dream and bought their own place. The Dry Creek Ranch is 25 miles southwest of Three Bars. Peter L and Bernard split their holdings and Peter L got the curly horses. With his two sons, Peter J and Benny, Peter L formed the Three D brand. Many curly horses in North America carry this brand today.

Like many other breeders, Benny and his family have not tried to breed a "pure" curly. They had specific needs for their horses and they had specific tastes about how they want them to look. Both of these breeding goals have guided the range breeding that has happened on the Dry Creek ranch. The horses today show an Arabian influence due mainly to the long and productive life of the Dry Creek's stallion, Nevada Red. The horses have retained a relatively small size with good legs and a short back — all traits of older lines of Arabians. The horses have also been crossed recently with purebred Morgans which has had a profound influence on the body type and shape of the head. Betsy Williams noted that the head was much different in the old days on the ranch and she described a narrow face not unlike the South American descriptions. There were times when the curly mares (crossbred though they were) were bred to one or more curly stallions but few records were kept to verify parentage of current stock.

THE BLUE MOUNTAINS OF EASTERN OREGON

The movement of feral horses has long amazed researchers and observers of these herds. While the following is only a small detail there is significant evidence that the small, wiry type curly reached beyond the eastern edge of the Great Basin into the Blue Mountains of Oregon. Two more sightings place curly horses in Walla Walla, Washington in the 1880's and in "Eastern"

Oregon in the 1920's.

The sighting for which we have the most information is the 1960 capture of curly horses by C.A. "Buz" Wolf of Pendleton, Oregon. His story is from another Western Horseman article written by Dorys Grover. Mr. Wolf captured the horses on government land in the Umatilla National Forest. He first saw them running wild around Pendleton in the Blue Mountains.

Mr. Wolf started to breed the horses and found that the curliness was inheritable. He became involved enough in his breeding program to consider starting a registry and proposed that the horses be called the Pendleton Horse. His observations of the rate of curly hair in crossbreeding is consistent with the latest theory on a dominant gene. His suggestions that he always got curly coats when crossing curly with curly is not impossible but may have been an observation based on too few samples.

He also noted breed characteristics that are familiar to everyone by now — in particular small size, straight faces and little mane and tail hair. He credits the sparse mane and tail of the horses to the fact that they have Appaloosa blood in them. From the photographs that accompany the article it is hard to see how he drew the conclusion that his horses had Thoroughbred blood in them. Actually the little horses in his band look very similar to the Argentinian Criollos from thirty or forty years ago that we saw as we investigated the South American connection.

Theses horses resemble some of the early descriptions of the feral horses in North America. The current Nevada horses have already been heavily influenced by outside breeds of Quarter Horse, Arabian and Morgans. Colorado and the Dakota curly horses have been equally influenced by grade stock and Quarter Horse lines. The little horses on the Wolf ranch may have been the last survivors of the original type.

SOUTH - CENTRAL CANADA

Finally, we would like to elaborate on what appears to be a fairly long history of curly horses in Canada. From what anyone can tell all the original Canadian stock was imported from the United States.

Two current day curly horse breeders contacted us after reading the article and ads in Equus and Western Horseman magazines. They are Marilyn

Atkey of Manitoba and two brothers, Bill and Ron Groves of Alberta.

Marilyn was unaware of other curly horses and was very pleased to hear about the number of other curly horses in existence. We put her in touch with other owners and the American Bashkir Curly Registry so she could to talk to other interested curly horse owners.

At first Marilyn thought her horses might have come from the Dakotas. This made sense given how close Manitoba is to North Dakota. Later, however, she said that the most reliable information she could find was from a former owner of some of her horses. This person was quite sure that Marilyn's horses were descended from the stock from Nevada or Montana. Furthermore, she was told that the horses were possibly rustled (stolen) around the 1920's.

Marilyn's story is hard to verify but it isn't out of the range of possibility. We were hoping for something with more documentation when we heard from Bill and Ron Groves.

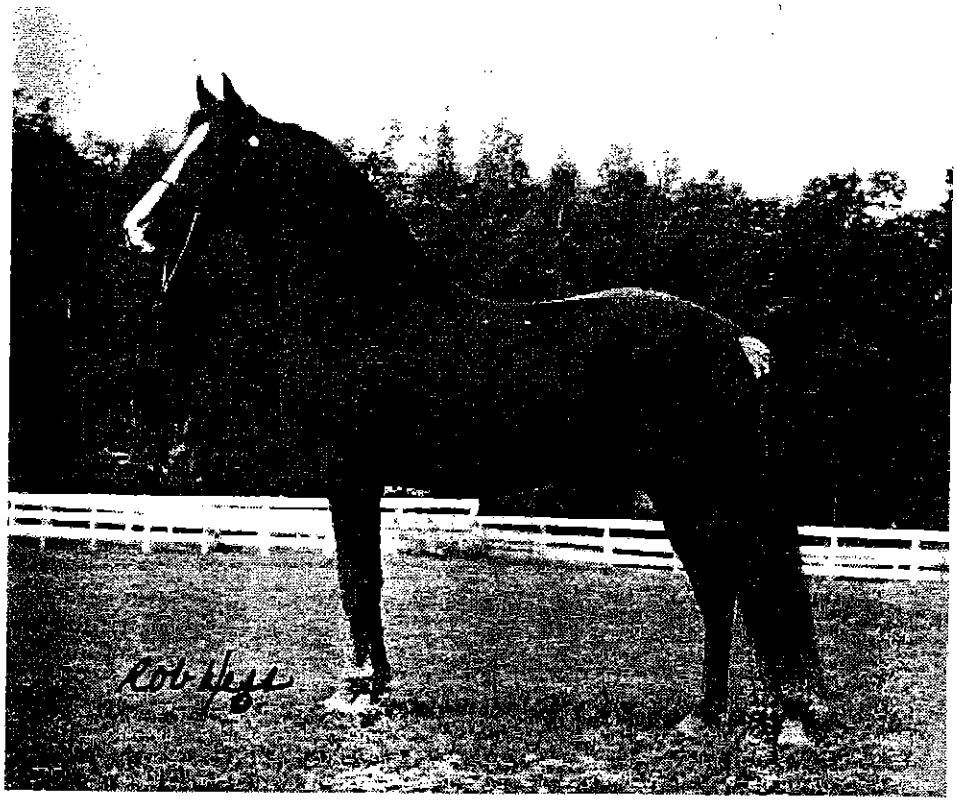
Bill and Ron are well on their way to being the historians of Canadian curly horses. As they described their efforts to us, we were very impressed with their thoroughness. This search has taken them all over including a bush plane search of the pastures within a 500 mile radius of their home. The following is what they have discovered so far about the curly horses in their area of Alberta.

Bill and Ron got their start much like others before them. Their Dad had owned a curly coated mare named Bunny. The brothers remembered her fondly and when Ron saw a curly coated horse for sale at an auction in 1987, he jumped at the chance to own it.

The owner of the horse Ron bought at auction is Ole Skjonsberg. Mr. Skjonsberg has been raising curly horses for many years having inherited his stock from his parents. His parents came to Alberta at the turn of the century along with many other Norwegians from North and South Dakota. Mr. Skjonsberg's parents brought with them a curly palomino mare. Mr. Skjonsberg's uncle also brought a curly pinto stud.

According to the information Mr. Skjonsberg gave Bill, these two horses were the basis for all the stock now owned by Mr. Skjonsberg, his son Roger and his daughter Bev Scott. Some of the stock may also carry the blood of a palomino stud brought to Alberta by Sam Henderson from Denver, Colorado.

"Old Type" Stallion - Roy Olepeter
photograph from Bill Groves collection
stallion owned by Ron and Bill Groves of Canada



"New Type" Stallion - Dan J
photograph by Rob Hess
Stallion owned by Marcia Boyd of Alaska

Mr. Skjonsberg, his son and daughter own a total of about thirty curly horses.

In addition to the Skjonsberg line, Bill and Ron traced the origin of horses currently owned by Mrs. Mary Simpson also of Alberta. These horse are descended from a curly mare brought to Calgary from North Dakota by Andrew Young. The mare's name was "Wild Lizzie". Mrs. Simpson owns a great great grand-daughter of this mare which has been cross bred a number of times, mainly to Arab stallions.

A number of offspring from all these horses are now scattered around Alberta, Saskatchewan and British Columbia. Bill and Ron continue to track many of these horses and are dismayed at the number of times curly horses end up at auctions headed for "the can" (meaning the horse is to be butchered for pet food.)

The horses that they see most often resemble the Dakota horses and the older Damele horses. They are small, stout, short necked, straight faced and short backed. They usually have short, sparse manes and tails and some hair on their fetlocks. Mr. Skjonsberg is of the opinion, the purer the lines, the less hair there will be on the mane and tail. The horses, for the most part, display a pleasant disposition and manage well in the severe winters of this part of Canada.

That sums up our findings to date about curly horses in Russia, South America and North America. Let's finish with the Prehistoric Search and the Biological findings before we say any more.

THE PREHISTORIC THEORIES

There is an idea that the curly horse is descended from non-Spanish horses. This theory actually has two versions which we will try to put into perspective in this section.

One version of the theory agrees with current scientific evidence that prehistoric horses came across the Bering land bridge with the woolly mammoth, the giant sloth and other Ice Age mammals. But these proponents say that contrary to current opinion, horses did not become extinct when so many of these other animals disappeared.

The second version is less prehistoric and more pre-Spanish in its notion

of the origin of curly horses. This version is based on the idea that there were purposeful and significant attempts by other cultures to colonize North and South America long before the Spanish, French, Russians and English started to arrive in the 1500 and 1600's.

As you can see these are not light weight ideas. Neither one of these theories can or should be dismissed out of hand. Historical studies and archaeological finds are constantly overturning long held views. There are two problems, however. The most obvious one is the extent to which one would have to go to turn up any hard evidence. As we said in our first quarterly summary, archaeological excavations was beyond the scope of our study.

The second problem with spending a great deal of time on these theories is based in the realities of how genes work. Over a number of generations, genes are said to "drift", that is move away from what the genes originally represented. This drift happens over a significant period of time and both of the pre-European theories would fit that definition. This is further complicated by a great deal of crossbreeding in the horses that are alive today. The biological reality is that the drift which has occurred between the prehistoric horse and the current backyard curly horse would be immense.

The drift is large enough that looking into the possible connections between current day curly horses and ones of ancient origin is little more than an academic exercise. But in the spirit of completeness we are going to try to add whatever we can to the body of information being gathered about these two versions of ancient origins.

PREHISTORIC ORIGINS

If you could read all the books that have been written and talk to all the people who have studied Ice Age mammals and their extinction patterns, you could start a library of your own. First we should begin by defining some terms that are commonly used and then we will move into the theory itself.

The Ice Age is actually not one but many periods of time during which the earth's temperatures dropped and glaciers extended toward the equator from both poles. The last big movement of ice is the one we are concerned about. It is called the "quaternary" period of our current geological age.

These geological ages are nothing more than marks along the calendar of earth's existence. Over the years scientists have observed special events that make it sensible to say where one period ended and another began. It's just the way we segment our lives into childhood, young adulthood, middle age and old age. The latest of these geological periods is the "Pleistocene."

Toward the end of the tertiary period of the Pleistocene hundreds of species all over the planet became extinct. The fossil record becomes more accurate all the time. Part of the reason is that scientists are finding more fossils and therefore have more information. Another important factor is that the methods for dating these discoveries are always being refined.

Even with this new evidence it appears to be the case that prehistoric horses died out on the North and South American continents between 12,000 and 8,000 years ago. The way this has been determined is quite simple. The fossil record of horse bones stops around 8,000 years ago and doesn't start again until around the early 1500's with the reintroduction of horses by the Europeans. Just like the woolly mammoth, the saber-toothed cats, dire wolves and giant sloths, there are no more horse fossils after this period of time.

The reason for this extinction has been studied for generations. It is now seen as the result of a complex set of events. Drastic changes in the environment and the negative influences of humans effected animal populations 10,000 years ago in much the same way as these events do now.

Over a very long period of time the earth's climate began to change, culminating 10,000 years ago in a warmer climate with shrinking ice caps and higher sea levels. While it seems to us that the warmth would have been for the better, the climate change actually had many negative effects. A major problem was the loss of open grassland across North America which reduced the suitable environment for many grazing animals.

Two other pressures were at work during this phase as well. The first is the effect of human beings' "overkill." This means that due to the hunting techniques common among ancient humans, huge numbers of grazing animals were killed during mass attacks. These kills were actually so large as to push some of the species like mammoths to the brink of extinction.

Because the overkill technique was most often used on large vegetation eaters, a second pressure came into effect. This effect has been noted among modern ecological studies in Africa. Through these studies it has been seen

that the loss of one or more of the large vegetation eaters may be enough to destroy the grazing opportunities of the smaller animals. This is due to the fact that the grasslands are kept from being consumed by the surrounding forests by the large animals eating the trees. The modern example is the loss of a herd of elephants from a given location which was rapidly followed by an expansion of the forest over the surrounding grassland and the further loss of gazelles and zebras. The large vegetation eaters are called "mega herbivores", in case you ever run across that phrase.

Now scientists see that this situation could very well explain why the smaller grazing species like camels and horses became extinct when the mammoths died out 10,000 years ago.

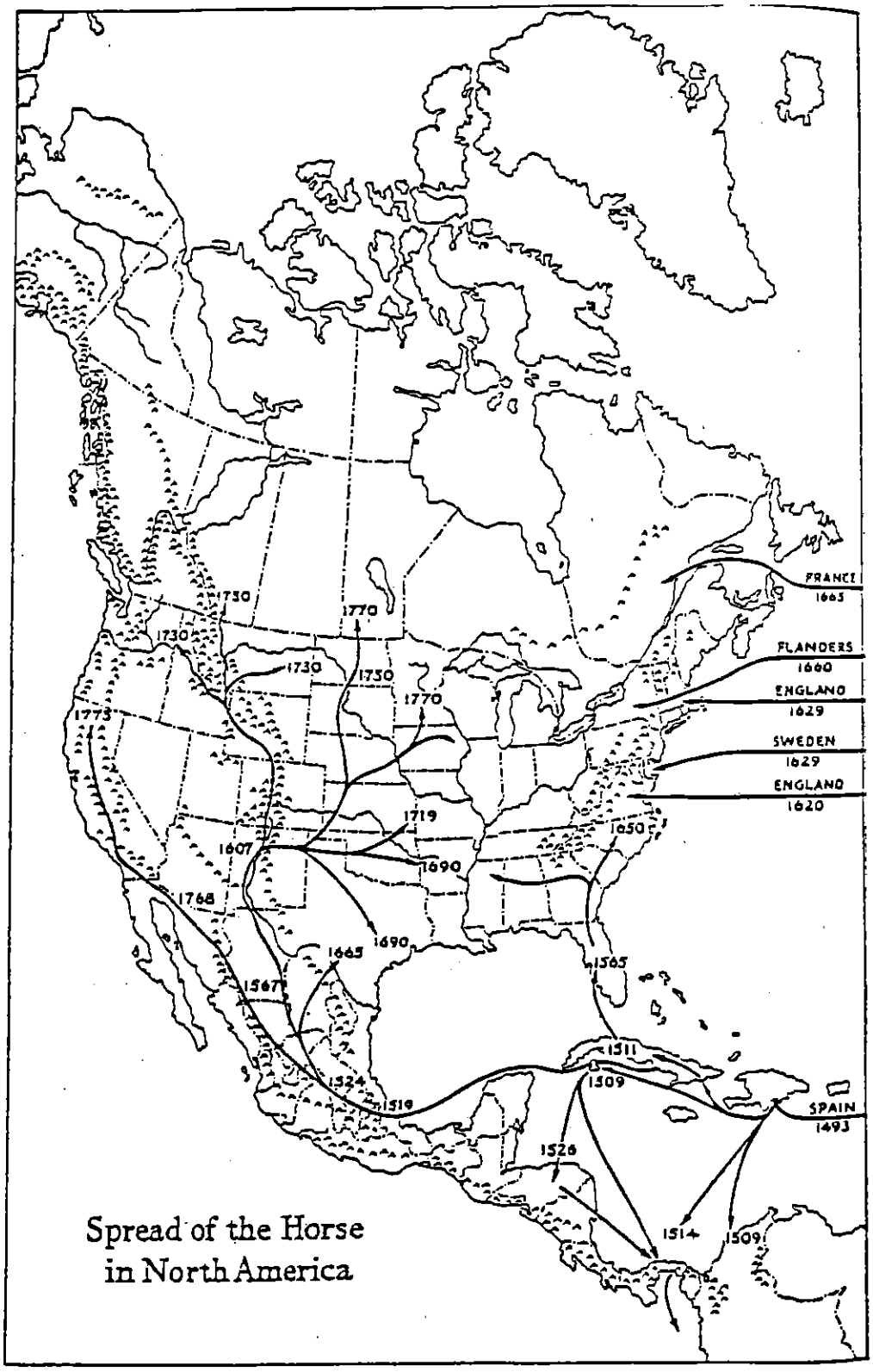
So taken together, the climate change, the human overkill and the loss of the "mega herbivores" all lend credence to the fact that horse bones have not been found in layers of the earth that date back 10,000 to 8,000 years ago. That's the way it stands now but we must remember that a great many new discoveries happen all the time.

COLONIALISTS BEFORE 1500

This idea is really fascinating and introduced us to some very interesting sources of information. Unlike some people who feel very strongly that this origin of curly horses has been proven, we feel that a great deal is left to the imagination and can not be documented in an acceptable manner at this time. That is not to say that it is not worth the effort of looking further. It is to say that here, as in all the investigations, some reasonable level of authenticity should be sought.

The source most often quoted to prove that curly horses came either with early Norse invaders or even earlier Chinese sailors, is a book entitled 8,000 Years of Seafaring by an amateur historian, Orville Hope. We were loaned Mr. Hope's book two years ago by a curly horse breeder in Half Moon Bay, California, Dr. Wayne Oler. Frankly at that time we couldn't believe that anyone was taking the book seriously.

We have not changed our minds about the quality of the text. The sources are poorly documented, the conclusions are often unwarranted by the facts and the overall organization of the book is very poor. The book does, however, draw upon some professional sources that are well worth taking a



Spread of the Horse
in North America

close look at.

Foremost among these is the body of work begun by Dr. Barry Fell, formerly of Harvard University. Professor Fell has retired to San Diego and favored us with a lengthy interview toward the end of our study. Dr. Fell's contributions to the field of pre-Columbian archaeology are amazing. He has made institutions of American history and archaeology sit up and take notice. Much of his work is still hotly disputed among academic circles. He demands high quality research and open minds.

One of Dr. Fell's and his associate's most important contributions is the annual journal published by his Epigraphic Society. Dr. Fell's theories are based as you might guess, not solely on finding bones and artifacts but on translating writings preserved on the artifacts.

Dr. Fell thought that a thorough examination of the past fifteen years worth of ESOP (The Epigraphic Society Occasional Papers) would produce some interesting leads about the introduction of horses. The most likely importation, if there was one, would be during one of the Norse or Celtic Iberian visits. These are fairly well documented and have the interesting coincidence of having taken place both in North America and in Paraguay, South America.

The Epigraphic Societies Occasional Papers can be found in all major university libraries. There is a full set in the University of California at Berkeley. Reading the full set would be necessary to say one had sufficient information regarding this theory of curly horse origins but it could take the better part of two years to do so.

This is not to say it should be ignored. Quite the contrary, the geographic associations alone make it worth while. As you saw earlier there was a reference to curly hair among ponies on an island off the coast of Norway as well as in northern Spain and Portugal. One risk of carrying this research further is that people may not like what they find if they are looking for breed characteristics to use in conserving curly horses. We can only say now that insufficient work has been done on the resources that are available to shed light on this other side of the idea about Prehistoric origins.

THE BIOLOGICAL SECTION

We hope you'll forgive us for making you wait so long for this part. It really was important to go over all we could find out about the horses using conventional methods. The Biological Section is meant to augment that work and could not been viewed without the historical background.

We're pleased that in the Biological Section an equal amount of activity transpired. Under a contract with the Serology Laboratory at the University of California at Davis, we blood typed 200 curly haired horses. This work was done under the direct supervision of the Serology Lab's director, Dr. Ann Bowling. Dr. Bowling was very helpful throughout the study and enthusiastically explored the curly coat phenomena as far as she could with the data provided. She is wonderful to work with and spent many extra hours helping us choose the sample of horses and then decipher the results.

In addition to Dr. Bowling's work we are pleased to publish the results of an analysis done by Dr. Philip Sponenberg of Virginia Polytechnic Institute. Dr. Sponenberg's paper is the first to show that the genetic trait for curly hair, in the majority of the horses being called American Bashkir Curlies, is a dominant trait. This will be explained in more detail in just a moment. Dr. Sponenberg was also helpful throughout our study in interpreting scientific findings especially as an expert in Spanish horses and minor livestock breeds.

We managed to find four other pieces of scientific writings about curly hair in horses, one from the U.S.S.R., one from South America and two from the United States. It is not only useful to have these all together for the first time but also they may serve as encouragement to other researchers considering further research into curly horse genetics.

EXAMINATION OF GROSS AND STRUCTURAL CHARACTERISTICS OF MANE AND BODY HAIR OF THE BASHKIR CURLY HORSE

In 1975, Dr. Keith Farrell of Washington State University assigned one of his graduate students to examine the body and mane hair of four curly horses. We read about the study in a old issue of the American Bashkir Curly registry newsletter but could not get any further information from the Registry. So we called the University hoping to find someone who might be able to tell us where to get a copy of the results.

Dr. Farrell is no longer alive but his wife, Pat Farrell, carries on some of his work. Mrs. Farrell kindly provided us with a copy of the results of the hair study. As it turns out, Dr. Farrell was the inventor of freeze branding. In the course of that invention, he became very knowledgeable about the structure and properties of horse and cattle hair. The report is not something a lay person can understand so we have "translated" it for this summary. A total of eight hair samples were sent to Farrell's lab from Pats Ghengis Khan, Dixie D, Grulla D and an unnamed grey gelding from the Damele ranch. The eight samples represented one body hair sample and one mane hair sample from each horse.

Dr. Farrell's student was looking for two things: first the structure of the hair shaft to see if it was altered genetically or physically. That is to say was the horse born with its curly coat or had it been curled by some means like saddle blankets or stress.

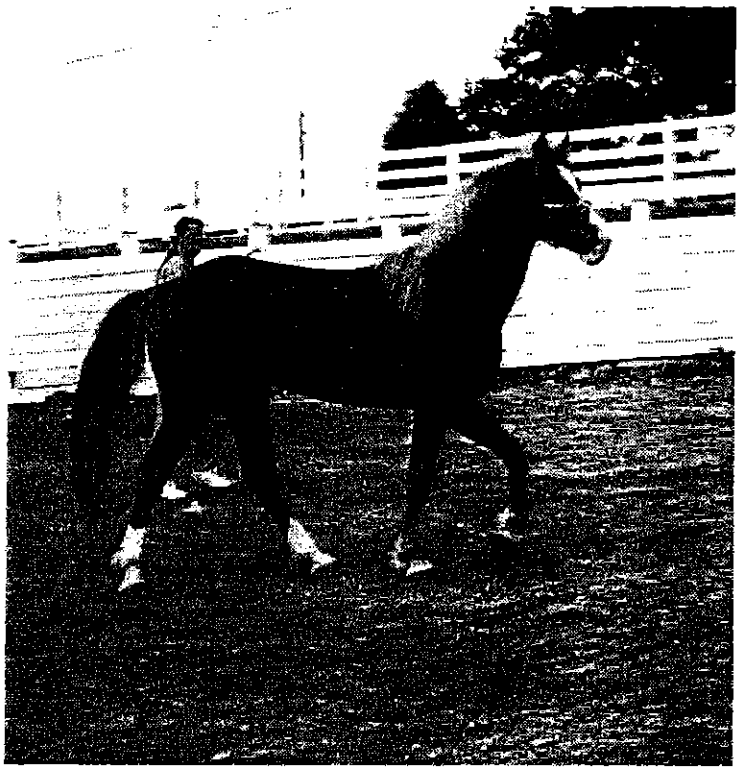
Secondly he looked for the basic shape of the hair shaft as well as measuring the fineness of the hair. This was done by looking at cross sections of the hair in microscopes as well as measuring the hair in microns as is done with sheep fleeces.

The curly hair tested with the "Polarization Stress Analysis" showed that indeed the horses had inherited their curls and had not been curled after birth. Now this may sound silly to many people who currently keep curly horses but it is exactly this sort of documentation that is necessary to build the body of scientific information we are all interested in having.

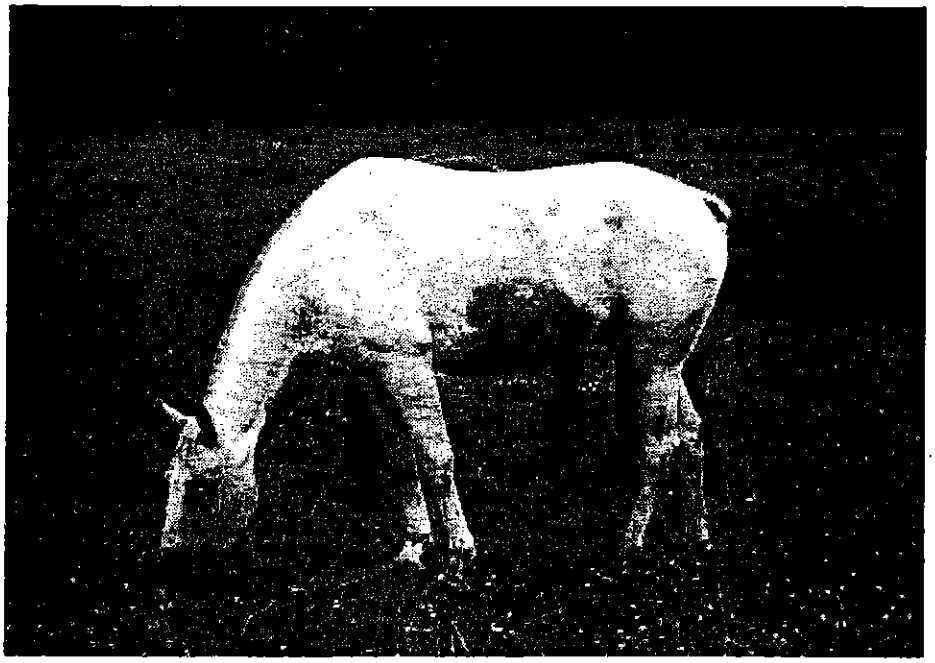
What was also seen in the "PSA" test was that the proteins in the hair cells were arranged in ways very similar to other breeds of horses. This would be interesting to pursue in light of the disease that can produce curly hair in horses. It does support the later findings that the horses are not a distinctive subspecies like a zebra but rather are normal horses with different hair type.

The micron testing did not show the fineness of any of the hair to be out of the ordinary. Body hair from other breeds ranged from a very fine of 24 microns to a coarseness of 100 microns. Body hair from the grey gelding averaged 67 microns, Grulla D averaged 44 microns, Dixie D averaged 86 microns and Pats Ghengis Khan averaged 62 microns.

The examination of the shape showed mostly oval hair in cross section. This was the most interesting find because it had been thought that hair had to be flat to be curly. Straight hair is round. Because this study was done



Full Mane and Tail on a Curly Foxtrotter Stallion
photograph from Jay Hensley's collection
stallion owned by Janis Parks of North Carolina



Bare Mane and Tail on Curly Mare
photograph from Jay Hensley's collection
mare owned by Janis Parks of North Carolina

before the release of results showing there are both dominant and recessive genes for curliness, it might be interesting to examine some of the horses thought to have the recessive type curly coats and compare them to these findings. (All of the Damele horses have dominant type curliness.)

THREE STUDIES ON RECESSIVE TYPE CURLINESS

We can lump all three of these together because they do basically the same thing. By looking at individual horses that have curly coats and then examining the horse's pedigrees, the authors of these studies came to the conclusion that curly hair in horses is rare and recessive.

Because these studies are well done and helpful we will leave it to the very interested people to read them in their original form in a copy of the full final report. We will describe them here just so everyone gets a chance to know about them.

One of the three studies is a Russian report done on Lokai horses. Dr. Sponenberg says a translation of the raw data does not support the report's conclusion that the Lokai are curly by a recessive mechanism. The proportions come out much more like the statistics that Dr. Sponenberg found among the American curly horses and therefore look as though the Lokai's curly hair is also transmitted by a dominant gene.

This leaves the other two studies. One is entitled "Curly Coat of Horses" by Leonard Blakeslee, R.S. Hudson and H.R. Hunt all of Michigan State University. The study was published in 1943 in Volume 34, of the Journal of Heredity. The second is from South America and is called "Genetica Equina" by John Lasley published in 1974 by Editorial Hemisfero Sur, Buenos Aries, Argentina.

Both of these studies looked at horses with curly coats who usually have straight haired parents. Because of the way recessive and dominant genes work together, when an animal has two recessive genes — one from each parent — the offspring will take on whatever trait the recessive gene controls. If one looks at many, many crossings one can see a pattern in the number of times these recessive type offspring turn up. Based on these proportions, both Blakeslee and Lasley came to the conclusion the horses they were looking at transmitted curly hair via recessive genes. And they were right. The important thing to remember is that not all curly horses are of the recessive type.

The last two pieces to discuss are Dr. Sponenberg's work and the results of the blood typing study. It makes sense to talk about Dr. Sponenberg's work next because it sheds new light on the scientific literature to date.

Dr. Sponenberg was kind enough to allow us to include his unpublished manuscript on the genetics of curly hair in the full final report. Because it is all about the statistics of dominant and recessive genes we can't talk about it without a quick review of some very basic concepts. This will be very basic and hopefully painless. For those of you who have a scientific background, please bear with us for a few paragraphs.

A QUICK INTRODUCTION TO GENETICS

1. All traits that can be inherited are passed on by genes. There are millions of genes controlling everything a horse can be. These traits are present in the animal whether or not you can see them.

2. Every offspring receives one half of all his genes from his male parent and the other half from his female parent. There are no other proportions possible - that is to say a foal can't get 80% of his genes from his sire and 20% from his dam. Nor can he get only 25% from each parent and make the rest up himself.

3. Genes are combined in random order when a sperm (with the half from the sire) fertilizes an egg (with the half from the dam). It must be remembered that each mating is another chance for a random combination and this makes for a great deal of diversity. This is why full siblings don't always resemble their parents and why it is so hard to predict the outcome of a particular mating.

4. Genes function in paired sets (one gene from the sire and one gene from the dam). They are arranged like a ladder along the DNA substance that makes up a chromosome. Chromosomes are a collection of genes. Horses have 64 chromosomes.

5. Often, gene pairs contain two different forms of the gene. Some genes are said to be "dominant" over the other gene in the pair. If the other gene is being dominated it is called "recessive."

a. When the animal carries two dominant genes for the trait in question, it is said to be "homozygous dominant."

b. When an animal carries two recessive genes for the trait, it is said to be "homozygous recessive."

c. When the animal carries one dominant gene paired with one recessive gene, it's said to be "heterozygous."

When you see the results of the genes at work (like the color of the horse or its size, etc), the gene is said to be "expressing" the trait. Both the dominant and recessive forms can be expressed under certain circumstances. The important thing to remember is that a dominant gene will be expressed (that is, you'll see the color or size) even if the other gene in that particular pair is recessive.

7. A finally, genes are given letters of the alphabet when people are talking about them. A capital letter represents a dominant gene. A lower case letter is for the recessive form of that gene. For our purposes, let's call dominant curly hair "CH." Therefore, we will call the recessive state "ch."

This all leads us to the new information that Dr. Sponenberg was able to show when he examined that first two stud books of the American Bashkir Curly Registry. First he confirmed that there were horses that fit the patterns formerly seen as homozygous recessive — that is a curly haired foal from two straight haired parents. But he also saw evidence that there were many more horses with curly hair than could be accounted for by this theory.

Dr. Sponenberg was able to show that a horse can become curly coated by having a dominant gene. This was most evident if one assumed that there was a dominant gene and that some of the curly coated horses are heterozygous (that is, one dominant gene and one recessive). Because of the random way in which genes combine it would be possible to get a straight haired foal out of a mating of two curly haired horses if the foal got a recessive curly gene from each parent. With the other theory (the homozygous recessive offspring of two straight haired horses) this would be impossible. If a horse is curly because it has two recessive genes for curliness it can only give its offspring a recessive curly gene. Therefore if two curly horses who are homozygous recessive types are bred together the only genes they can pass on are recessive curly ones. This means that all their offspring must be recessive curly — no straight haired foals would result. But it is evident in the Registry's stud books that curly to curly matings have produced straight haired foals. Therefore Dr. Sponenberg saw that there was something else going on among curly horse genetics.

Because this has some pretty serious ramifications lets take a look at some sample matings.

Stallion "A" has two dominant genes for curly hair. The curly hair is "expressed" which means he appears curly. He is mated with a curly coated mare "A" who is also homozygous dominant — she too has both dominant curly genes. Let's say this was done four times and that the foals did exactly what the statistics said they should do (foals never cooperate like this but let's pretend):

Stallion "A" CH/CH	X	Mare "A" CH/CH	
Can produce these possible offspring:			
CH/CH Foal 1A	CH/CH Foal 2A	CH/CH Foal 3A	CH/CH Foal 4A

As you can see the only results possible are that all the foals are curly coated and all are homozygous dominant.

Now let's say we have a straight haired stallion "B" who had two curly haired parents. Under Dr. Sponenberg's theory this fellow would be homozygous recessive — he has two recessive genes which in this case give us the opposite of curly hair which is straight hair. If we breed him with a mare who is also homozygous recessive with straight hair we would get something like this:

Stallion "B" ch/ch	X	Mare "B" ch/ch	
Can produce these possible offspring:			
ch/ch Foal 1B	ch/ ch Foal 2B	ch/ch Foal 3B	ch/ch Foal 4B

Just like the first couple, these horses have nothing to give their offspring but a recessive gene which means all straight haired foals.

Of course the interesting problem comes when you cross two horses that look curly because they have a dominant gene for curliness but who also carry a recessive gene which is hidden by the dominant gene. This is called

heterozygous.

If we cross the heterozygous Stallion "C" who has one dominant gene and one recessive gene with a mare who also has one dominant and one recessive gene we will get the following (remember we are working with perfect situations here. It takes thousands of crossings to make the numbers come out right):

Stallion "C" CH/ch	X	Mare "C" CH/ch

Can produce these possible offspring:

CH/CH	CH/ch	ch/CH	ch/ch
Foal 1C	Foal 2C	Foal 3C	Foal 4C

Among these foals you see that foals #1C, 2C and 3C all look curly because they have at least one dominant gene. But looking at foal #4C you see a homozygous recessive which we know to be a straight haired foal. This is because the two curly haired parents who produced foal #4C both have a recessive gene and in this case those two recessives got together producing straight hair.

This 75:25 ratio held up under Dr. Sponenberg's anaylsis of the stud books and it explains what Dr. Sponenberg found in his study. When he tracked the number of horses that were coming out of the different crosses in the stud book he could see definite patterns. The bottom line is that the current stud book is tracking both types of horses — those that have the dominant gene for curly hair and those who are really of another breed but have a recessive gene for curly hair.

Genetically these two types of curliness are not the same. The statement we have heard from the American Bashkir Curly Registry is that it doesn't matter which sort of curliness the horse has genetically. This statement has no basis in fact — it has never been studied. It is very likely that crossbreeding to recessive curly horses dilutes the dominant style breed just as much as crossbreeding to straight haired horses of other breeds. The recessive horses are first and foremost members of their parent's breed. If it looks like a duck and quacks like a duck it is a duck — even if it has recessive curly feathers.

THE BLOOD TYPE STUDY

When we began this study we were encouraged by the American Minor Breeds Conservancy to look into the possibility of blood typing some of the horses. This technique had been used very successfully with rare breeds of cattle. The Serology Lab at the University of California at Davis is considered the best in the nation and, as luck would have it, it is only a two hour drive from our office.

We met with Dr. Ann Bowling early on in the study to gain a better understanding of the process of blood typing and what we could expect from persuing this work. While we are not geneticists, we have been able to grasp the basics with Dr. Bowling's help and hope we can do the same for you.

Blood typing is not all that different from what we have all had done in a doctor's office — it is a reading of the different aspects of blood and serum done by some very sophisticated machinery in the Davis lab. The big difference between human blood typing and horse blood typing is the wide array of specific types that can be read in a horse's blood. Far different from humans "A", "O" and "B", horse blood can be typed for 135 variants. That is not to say that each horse will read out all 135. It is in fact the differences in the individual horse's readings that is the basis for the analysis.

Blood typing has been perfected over the years to a high degree of accuracy. It is primarily used for individual identification of an animal or to verify the parentage of a foal. This latter works by process of elimination. Once the sire, dam and foal have been blood typed, the process looks at the foal and the dam to see what is left for the foal to inherit from the sire. If the sire does not possess the other half of the foal's blood type, that sire is eliminated as a possibility and another sire is tested. This is critical to keeping accurate stud book records as well as keeping track of new technologies like artificial insemination.

Dr. Bowling's lab has blood typed over 200,000 horses when we began this study. Not only does she have all the data on all of the major horse breeds but she has done special studies like the Przewalski's horses and five Nevada based herds of feral horses for the Bureau of Land Management. In addition to these North American horses she has data on a number of European and South American breeds as well.

The process we were looking for was over and above the basic identifica-

tion. We joined Dr. Bowling in hoping her technology would be able to see some genetic information that would help answer questions about how a horse became curly, are the curly horses different from other breeds of horses and is there any difference between recessive and dominant types of curly coat genetics.

The current blood typing technology does not allow you to draw blood from a horse and tell you to which breed the horse belongs. It comes darn close in the best circumstances though because it works by comparison. This means that if you look at a large enough group that has been properly selected and the horses are related to each other in some way — for instance, they are all of the same breed — then the tests will show that the horses do closely resemble each other and are fairly distinct from other known breeds.

This can work even with horses from confused backgrounds or who are being tracked in an open stud book. Granted this makes things much harder but Dr. Bowling certainly saw distinctions between the five herds of wild horses where there had been only natural selection.

So we hoped for the best and signed a contract to blood type 200 horses, mainly identifying them from the current records of the American Bashkir Curly Registry.

The horses were chosen at random from lists of categories that Dr. Bowling helped to develop. These categories are:

- Pure random number — 50 horses from the stud book with a registration number ending in zero.
- Horses born before 1973 — trying to represent the oldest horses known to be in existence
- Horses of unknown parentage
- Horses from Bureau of Land Management adoptions
- Horses born on the Damele ranch
- Horses demonstrating the foxtrotting gait
- Horses with curly coats with two straight haired parents

- Offspring of certain stallions: Copper D, Nevada Red, Peacock D, Dixie D, Peter J, Walker's Prince T, Prince Charming, Ruby Red King, and PDQ. (this was later changed to all stallions with ten or more foals listed in the stud books as of the end of the second stud book).

- Stallions currently standing at stud

- Horses from the Rock Springs, Wyoming area

- Horses for the Standing Rock Indian Reservation in North Dakota

As you can imagine, there were many horses that fit more than one category. For instance, we could choose a horse with a registration number ending in zero who was born before 1973 and who was born on the Damele ranch.

The selection process was seriously hindered by the fact that there is no readily accessible and up-to-date stud book or membership directory. Two curly horse owners, the Stricklands of Indiana and the Cooks of Washington, had computerized the first two stud books and updated these databases through lists published by the Registry's biannual newsletter. This proved to be invaluable. We used the Cook's printouts to choose the horses, then entered the animals' data in a database of our own, printed out lists periodically and sent them to the Stricklands for cross checking.

The blood typing invitations and general announcements regarding the study were sent out using the American Bashkir Curly Registry records with the assistance of Carrie Eddy and her father Bob. We enclosed a post card with each letter encouraging any interested person to get back in touch with us and give us their address because the Registry's records would only be made available this one time. This worked very well and we put together a mailing list from this and other sources of 400 people.

As horses dropped out of the sample — for instance they died or the owner was unwilling to have the blood drawn — the empty slots were filled by horses on an alternative list. We received a number of requests from owners who wanted to have their non-sampled horses blood typed at their own expense. We held off accepting anyone's check until we knew for sure that these horses were not going to show up as an alternate. Overall the response was good.

The sample was entered into a database we created to keep track of the

animal, its owner's name and address and the characteristics for which it was chosen. The database allowed us to quickly update the changes that were necessary as well as print out a variety of reports.

In the beginning of the study we hired a student intern to help us choose the horses and contact their owners. We were very fortunate in having met Carrie Eddy at a meeting in Ely, Nevada. Carrie brought a unique background with her to this internship both in the form of her major in Range Management but also as an owner and breeder of curly horses.

In addition to slogging through the computer lists and sending out all the invitations, Carrie saw that each owner who agreed to participate got the special blood sample kit used to send the blood back to the lab. We received a daily report on what samples had arrived via a computer hookup to the Davis lab. To keep us on schedule Carrie made some "reminder" phone calls to make sure all the samples were getting in to the lab. Carrie put in over 100 hours doing this part of the biological study and it made a big difference.

We want to say again how much we have appreciated the assistance and encouragement of so many of you. We would like to thank all the owners who have offered to have their horses blood typed. Many people deserve special thanks because without their help we would not have been able to proceed.

There have been some disappointments in finding some of the oldest horses gone. We also had to give up on most of Benny Damele's mares which turned out to be too wild to sample. Actually there were a remarkable number of horses that fell into that category.

Before she completed her internship Carrie had researched well over 200 horses to come up with Dr. Bowling's sample. Much of our sampling effort was wasted time because the stud books were so out of date.

Some other details you might find interesting are:

- The 200 horses that did participate are owned by 74 different people.
- The participating horses are in 27 states in the U.S. and 4 Canadian Provinces.

Of those horses not participating:

- 33 are dead or have disappeared.
- 28 were too wild for the owners to get close enough to draw a blood sample (Some important horses fell into this category).
- 77 were owned by people who did not respond to the invitation.
- 24 horses had owners who said they would take a blood sample but didn't make the deadline.

Joe Mead, as far as we know the largest curly horse breeder in the United States, worked out a deal with his vet, whereby Joe brought a horse to the clinic and Dr. Marts drew the blood sample for free. This effort on Joe's part should not be underestimated because his horses are in four different pastures in a twenty mile radius of his home. Joe provided 13% of the study as he continued to buy horses that had been selected for blood sampling while under their other owner's care. In many cases Joe agreed to take the sample that the other owner had agreed to do. We know how hard we had to work to get 200 horses and can say without a doubt we would not have made it without Joe's assistance.

There were some real disappointments in not getting better representation of the horses from the Rock Springs area of Wyoming as well as very few from the Dakotas because both groups represent what we believe to be distinct family lines.

The best thing about not getting the results of the blood typing study until the very end is that it verified or clarified so much of what had come out in other areas of the research. The following summarizes Dr. Bowling's findings:

1. The horses are very diverse in their genetics. This is to be expected with the open stud book and crossbreeding programs. It is a safe to say that there would be no danger of closing the stud book at any time. In fact, the crossbreeding has done considerable damage to whatever once was considered the original curly horse.

2. The horses demonstrated 110 of the possible 135 blood variants. They did not show any variants that Dr. Bowling had not already seen in other breeds of horses. They did not show any of the unusual variants found among Przewalski's horses.

3. The rare and unusual blood markers that did appear were about 48% of the total variants. This is a typical proportion among modern horses breeds. The rare and unusual markers were concentrated among a very small number of horses, however, giving credence to the idea that distinct populations have arisen.

4. To this subject, Dr. Bowling was less able to say something certain because we received too few samples of some groups like the Rock Springs horses. The two groups which were best represented were the horses from the Damele ranch and the horses with a foxtrotting gait. Damele horse's blood types were similar to each other and different from foxtrotters and vice versa for foxtrotters.

5. When a special measurement was used to produce a graph of the relationship of curly horses to other breeds the curly horses clustered together and near the bottom of the scale with other American breeds, most notably Quarter Horses and Morgans. This would make sense given the active crossbreeding that has gone on for decades. It also shows some evidence that the horses are probably related to other American breeds' common ancestors.

6. The rare and unusual variants that did show up are of particular interest because these were often only found in feral herds or other breeds based on feral stock, like some South American breeds. One horse, the oldest in the study and named for Benny Damele's mother, LaRaine, showed one marker that never showed up in the long standing modern breeds and has so far only been found in two of the feral herds of Nevada and one breed of South American horse. This could be of real significance if Dr. Bowling could get the largest sample possible. It may lead to evidence that there was some sort of influence from a breed outside the normal ones tracked in the United States. It could also mean that the natural selection of many of these horses is an important reason for their curliness and the feral breeding habits should be studied further.

7. But even with all this information there was no single marker that was common to all horses with curly hair. This would have led to further study to see if such a marker was directly related to the gene for curly hair. Basically the horses came up as a very crossed up bunch.

WHERE TO GO FROM HERE

This work should not stop with this report. There are a number of leads left to follow. The description of the horse is becoming more clear all the time but only when it comes into sharp focus will breeders know whether or not they are doing the right thing.

We have consulted with many people throughout this study and would like to pass along a list of suggestions.

1. Continue the biological studies that have begun. The first thing is to finish bloodtyping all the existing curly horses. Next would be some DNA work with the assistance of experts in this new technology.

2. Continue the historical section by following up on the unfinished leads and looking more thoroughly at some of the theories. Of particular interest would be getting access to the archives of the American Bashkir Curly Registry. Many people have deposited their research in the office of this Registry in eastern Nevada. A number of people are finding it difficult to believe that no archives exist and feel that all the records of the Registry are public, do not belong to any one person and should be made available to serious researchers.

3. Stay in touch with each other to share ideas and discoveries. This report was greatly amplified by the willingness of others to add their finds. Good ideas on new tracks to follow as well as new interpretations came more often from discussions with other people not by private contemplations.

4. Look at all ideas and evidence with an open mind but with some critical thinking. Follow common sense guidelines in re-evaluating current theories based on simple rules of evidence. Ask for backup information like name, place, time, title and investigator's credentials. Much more harm than good could be done to the horses that are still alive by well meaning people who are more interested in a good story to tell than real information about the breed characteristics.

The future of the curly horse of the Americas is in your hands. If any of this information has changed your way of thinking about the horses we would like to know. If any of the new thoughts will change your breeding program, we would like to know that too. We welcome your comments and questions. Good luck.

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