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MONTANA Centennial 1889·1989™

MONTANA CENTENNIAL WAGON TRAIN ITINERARY

Campsite	Date	Time	Scheduled Activities
Bannack	June 11	4:00 p.m.	Church Service at historic Methodist Church.
		5:00 p.m.	Centennial potluck provided by Dillon area church groups - free of charge.
	June 12	8:00 a.m.	Official departure. Wagons Ho!
Harrington's	June 12	5-6:00 p.m.	Arrival Sing-along
	June 13	8:00 a.m.	Departure
Dillon	June 13	Noon	Arrival and parade through Dillon.
		5:00 p.m.	BBQ provided by Dillon Centennial Committee and town of Dillon. Music by Junior Fiddlers.
		8:00 p.m.	Square dance at Beaverhead High School.
	June 14	7:00 a.m.	Chuckwagon pancake breakfast prepared by Dillon Boy Scouts - $2.00.
		9:30 a.m.	Departure
Christensen's	June 14	2:00 p.m.	Arrival
		5:00 p.m.	Lamb BBQ by Montana Sheep Producers, $2-$3 (wagon train only).
		6:00 p.m.	Square dance and sing-along provided by First Baptist Church youth group and Monte Massar.
	June 15	8:00 a.m.	Departure
Anderson's	June 15	5-6:00 p.m.	Arrival
	June 16	8:00 a.m.	Departure

Ruby Reservoir	June 16	5-6:00 p.m.	Arrival
		6:00 p.m.	Box social. Town of Sheridan -- discount for wagon train.
		7:00 p.m.	Sheridan's mountain man black powder survival demonstration.
	June 17	8:00 a.m.	Departure
Virginia City	June 17	5-6:00 p.m.	Arrival and parade through town.
		6:30 p.m.	"The Vigilante", a play about the hanging of Sheriff Henry Plummer. Performed by Dillon Masonic Lodge. Tickets $3.00 at Elks Lodge.
		7:00 p.m.	Elks Rocky Mountain oyster feed & dance.
	June 18	11:45 a.m.	Church service available at St. Paul's Episcopal Church in Virginia City.
		5:00 p.m.	BBQ at Virginia City Centennial Center. BBQ cost is $1.50 (burgers, salad, hot dogs.
		7:00 p.m.	"The Vigilante", $3.00 at Elks Lodge.
	June 19	8:00 a.m.	Departure
Ennis	June 19	5-6:00 p.m.	Arrival and parade through town.
		7:30 p.m.	Square dance at campsite
	June 20	7:00 a.m.	Pancake breakfast prepared by Ennis Chamber of Commerce and Boy Scouts.
		9:30 a.m.	Departure
Earl Knighten's	June 20	3:00 p.m.	Arrival
		6:00 p.m.	BBQ for wagon train provided by Knightens and Ennis Chamber of Commerce
	June 21	8:00 a.m.	Departure
Pete Jackson's Sterling	June 21	5-6:00 p.m.	Arrival
	June 22	8:00 a.m.	Departure
Pony	June 22	5-6:00 p.m.	Arrival and parade through town.
		6:30 p.m.	BBQ provided by Pony Homecoming Assn. Music following.
	June 23	8:00 a.m.	Departure.
Harrison Lake	June 23	5-6:00 p.m.	Arrival
		7:00 p.m.	Music by The Parlour Pickers.
	June 24		
	June 25	9:00 a.m.	Departure

Willow Creek	June 25	5:00 p.m.	Arrival and parade through town. Hamburgers and hot dogs available for public, prepared by Three Forks Volunteer Fire Dept.
		6:30 p.m.	Roast beef dinner for wagon train only at Willow Creek Fire Hall.
		7:30 p.m.	Entertainment for wagon train by Bob Ross, author of "Muddled Meanderings in an Outhouse".
	June 26	6:30 a.m.	Pancake breakfast for wagon train at Sarah Faith Ranch - $3.00. Money to help fund Willow Creek School playground.
		8:00 a.m.	Departure
Tribble's	June 26	5:00 p.m.	Arrival
		6:00 p.m.	BBQ and accordian music provided by Town of Whitehall. (Wagon train only.)
	June 27	8:00 a.m.	Departure
Fox's	June 27	5-6:00 p.m.	Arrival. Music by Milo Fadness Country-Western Band.
	June 28	8:00 a.m.	Departure
Wickum Springs	June 28	1:00 p.m.	Arrival
	June 29	9:00 a.m.	Departure
Boulder	June 29	5:00 p.m.	Arrival
	June 30	Noon	Lunch prepared by Madison-Jefferson 4-H Junior Leaders.
		5:30 p.m.	BBQ prepared by local townspeople - free to wagon train and public. Public requested to bring casserole, salad, or dessert.
		8:00 p.m.	Dance and centennial costure contest ($1 cover charge). Music by Finley Creek.
	July 1	8:00 a.m.	Departure and parade through Boulder. Escorted by VFW Honor Guard.
Jefferson City	July 1	5-6:00 p.m.	Arrival
		6:30 p.m.	Pioneer BBQ prepared by Jefferson City Volunteer Fire Department
	July 2	8:00 a.m.	Departure

Montana City	July 2	2-9:00 p.m.	Buffet for public.
		4-8:00 p.m.	Parlour pickers will play.
		5:00 p.m.	Arrival
		6:00 p.m.	Buffet for wagon train $4.95.
		8:00 p.m.	Boy Scout Troop 229 - Indian dancing and contests.
		8:00 p.m.	Dancing under the stars! - Fool's Gold
	July 3	7-9:00 a.m.	Breakfast prepared by Boy Scounts - $3 to wagon train and public.
		10:00 a.m.	Departure
Helena	July 3	1:00 p.m.	Ceremony at Capitol
		4:00 p.m.	Arrive at camp
		6:15 p.m.	Sweet Adelines
		6:30-8:30	Open house for public. BBQ prepared by Helena Trailriders.
		7:00 p.m.	Last Chance Square Dancers
		9-Midnight	Band - California Country Comfort
	July 4	6:30-8:30	Breakfast by 4-H at $3. For wagon train only.
		9:00 a.m.	Departure
		11:00 a.m.	Parade in Helena
Fort Harrison	July 4	4:00 p.m.	Arrival
		6:00 p.m.	Wagon train potluck - bring your leftovers!
		7:00 p.m.	Music by Jake and Theresa Thomas
		7:45 p.m.	Music by Energetic Seniors

GOLD WEST COUNTRY
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1155 MAIN STREET, DEER LODGE, MONTANA 59722
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Montana Centennial Wagon Train

Bannack to Helena
June 11 to July 4, 1989

Montana Draft Horse and Mule Association

Rainier. The Only Beer.™

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Montana Centennial Wagon Train

Bannack to Helena
June 11 to July 4, 1989

Montana Draft Horse and Mule Association

Acknowledgments

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1989 Centennial Wagon Train

A very special thanks to the below-named Wagon Train committee members who contributed thousands of volunteer hours and disrupted their already-too-busy lives for two years to organize this wagon train.

These individuals represent the determination and backbone of Montanans today who wish to preserve our heritage and celebrate our Centennial.

Wagon Train Committee
Robert Clark - Wagon Boss
Wayne Tichenor - Trail Boss
Leslie Clark - Secretary
Marlene Teague - Finance
Keith Horne
Leroy Fadness
Jim Lotan

Souvenir Book Committee
Ellen Dodds
Pat Kelley
Barbara Lien
Bonnie Morgan
Vicki Rieffenberger

Thanks to the following people for their contributions:
Steve Russell for information on historical trails;
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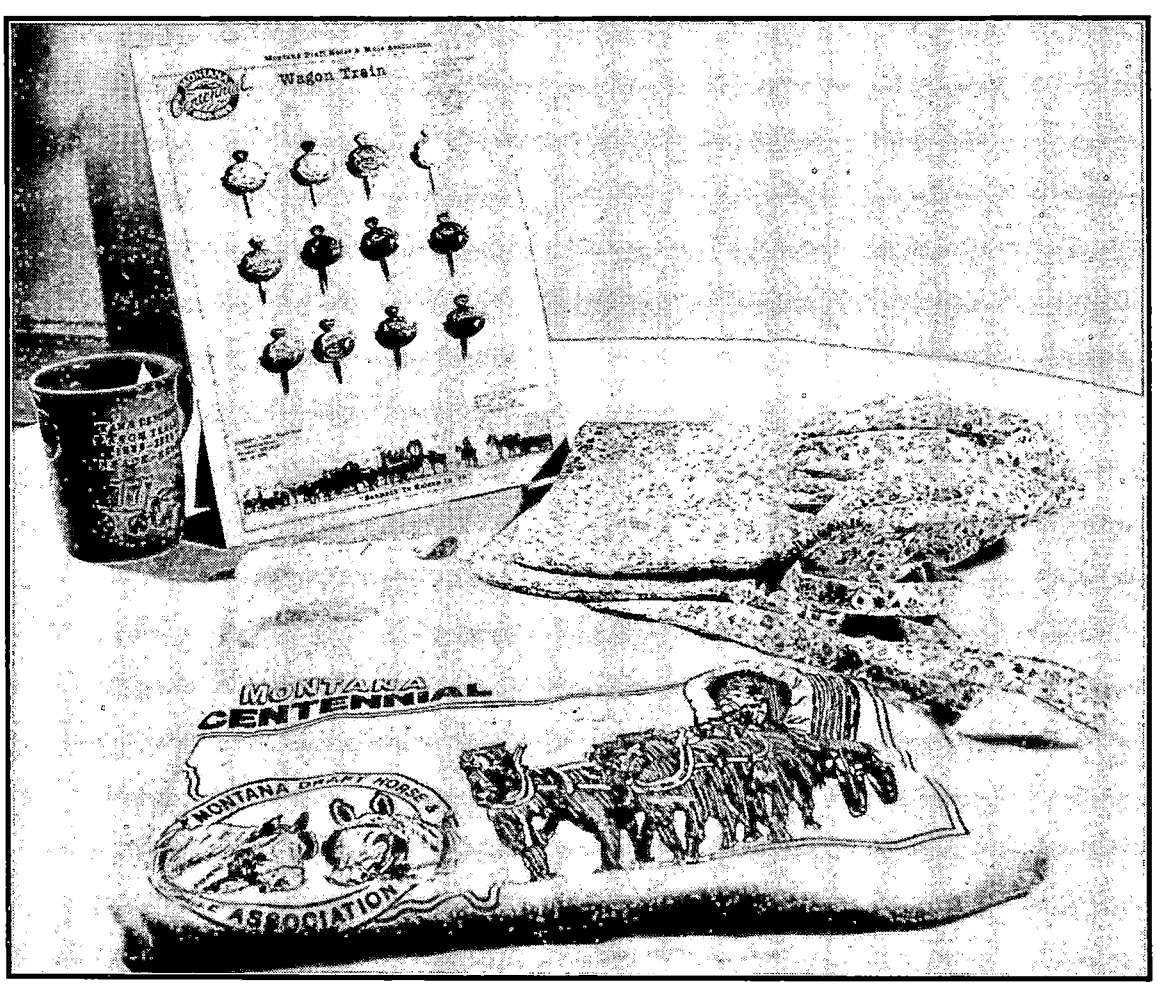

The wagon train was financed in part through the sale of our five products which were sold at meetings, through retailers, and to those who simply wanted to support the project. These items will be for sale in the Official Peddler's Wagon, Entry No. 1.

Sanctioned Pin
$5.00

Sanctioned
Souvenir Booklet
$5.00

Sun Bonnet
$10.00

Coffee Mug
$7.00

T-Shirt
$7.00

The Centennial Wagon Train wishes to thank each of the following for their assistance with this project:

Joe Calnan
Montana City Store
Montana City, MT

Col. Jack Walsh
Col. Terry Wood
Adj. Gen. James Duffy
Ron Oesterle
Montana National Guard
Helena, MT

Dale Reagor
Luxan and Murfitt Law Firm
Helena, MT

Montana Historical Society
Helena, MT

Paul Blades and Rob Dunn
Fort Harrison VA Center
Helena, MT

Dick and Korrene Livesay
Helena, MT

Brian Patrick
Executive Director
Centennial Statehood Office
Helena, MT

Bernard Menard
Townsend, MT

Ike Lanning
Wally Trerise
Montana City, MT

Tom Mazanec and
Troop 229 Boy Scouts
Clancy-Montana City, MT

Helena Energetic Seniors
Helena, MT

Lewis and Clark County
Sheriff's Reserve

Helena 4-H Clubs

Thanks to all the generous landowners whose ground the Montana Centennial Wagon Train crosses on its way from Bannack to Helena:

Cal Creek Ranch, Sheridan
Dan Leadbetter, Ennis
Earl Knighten, Ennis
Larry Hughes, McAllister
Sitz Ranch, Harrison
Carey Bros. Ranches, Boulder
Steve Marks, Clancy

John Heide, Boulder
Hamilton Ranch, Boulder
Dave Rieder, Boulder
Harold Shervin, Boulder
Boulder Valley Cattle Co., Boulder
Mick McCauley, Boulder
Bovey Restoration, Virginia City

To any we may have had the oversight to omit, our apologies, and to all, our most sincere thanks.

Excerpts from Names on the Face of Montana, by Roberta Carkeek, permission granted by publisher.

Thank you to the following people and entities for assistance with the photographs included in this publication:

Dan Vichorek
Montana Magazine

Montana Travel Promotion
Montana Historical Society

State of Montana
Office of The Lieutenant Governor
Helena 59620
(406)444·3111

ALLEN C. KOLSTAD
LIEUTENANT GOVERNOR

It is an honor for me to commend the Centennial Wagon Train, its organizers, sponsors and supporters on their outstanding effort to bring a part of Montana's history to life.

The success of this outstanding project, undertaken against considerable odds, is a tribute to the energy and tenacity of those who believe in the "Can Do" attitude that makes Montana the special place it is. Only those most intimately concerned with the entire operation can know what it takes to arrange an event like this, and to those hardy souls must go a special salute.

Our entire statewide Centennial effort is living proof that the true creative spirit is alive and well out here in Big Sky country. Whether it's Circle or Joliet, Billings or Browning, wherever one goes in Montana this summer, Centennial events are sure to be nearby — entertaining, enlightening, delighting spectators and participants alike.

As Chairman of the Montana Statehood Centennial Commission, it has been exciting (and eye-opening) to know that thousands of Montanans in communities and organizations statewide are willing to sacrifice so many hours and so much energy, often at considerable personal expense, to celebrate Montana's birthday.

The Centennial Wagon Train, and all Montanans, can be truly proud of their fine Centennial accomplishments.

On behalf of Governor Stephens and myself, I commend this outstanding work. A job well done!

Sincerely yours,

Allen C. Kolstad

Allen C. Kolstad
Lieutenant Governor, Chairman
Montana Statehood Committee

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NO:1
Don and Beverly Huffman with Byron, Shaun, Chris, Danial
Billings, MT

Every wagon train needs a peddler's wagon to supply parts for inevitable breakdowns along the way. The official Centennial Wagon Train peddler's wagon is driven by Don and Beverly Huffman, owners of Big Sky Leatherworks, a harness shop in Billings. The wagon has a farm wagon running gear underneath it. The new peddler's box on top contains wagon train products for sale. When asked why they wanted to come on the wagon train, Don and Shirley said, "After participating in many horse activities, we have found the people who work draft horses to be the friendliest and most helpful."

NO: 2
Dr. John and Karen Harlan
Clancy, MT

John and Karen have Tennessee Walking horses and mules which they ride, pack, and drive. They are driving a spring wagon, built about 1890, that was used as the Helena-to-Marysville stage. It is now used for pleasure driving and parades.

John & Karen Harlan
P.O. Box 348
Clancy, Montana 59634

406/933-8583

John, a surgeon in Helena, and Karen, a teacher in Clancy, have two sons: Jason and Jabez. When asked to contribute a tall tale, John said, "I am tall enough for a tail but none has sprouted yet." They are on the wagon train "to be a part of the historic celebration of our great state's birthday."

The draft horse and mule breeds hitched to the wagons in the Montana Centennial Wagon Train exhibit a variety of colors, sizes, and shapes. Other distinguishing characterisitcs are their temperament, ability, and use.

Mules

Technically, a mule is a sterile hybrid born to a horse mare and sired by a long-eared donkey stallion known as a jack. Several breeds of donkeys produce jacks including the Sicilian, Catalonian, and Andalusian breeds. In the first part of this century American jack breeders developed the Mammoth Jack from several of these breeds. The best Mammoth Jacks stand up to 16 hands and weigh 1200 pounds.

Jacks are bred to mares of either saddle or draft horse breeds to produce riding mules or work mules. Draft mules stand from 15 to 16 hands high while lighter saddle mules weigh from 900 to 1200 pounds and are 14 to 16 hands high. Mules come in every color that horses do. Mules are legendary for their smooth ride, toughness, and surefootedness in mountainous terrain.

NO: 3
Cotton Riley
Richfield, ID

Cotton Riley brought three mules, Kate, Ribbon, and Mickie, to pull his wagon. The wagon is between 50 and 60 years old, originally from the Richfield, Idaho area.

Cotton and his wife Nina, grew up in the Richfield area and farmed and raised livestock until their only son was out of high school. Then they rented the farm, and Cotton took a job with a cattle association and Nina taught school. While riding for the cattle association, Cotton began packing mules to haul salt for the cows and even rode some of the long-ears. During his 22 years with the cattle association Cotton says he had some hair raising experiences, including finding mutilated cattle and seeing UFOs.

The Riley's are both retired. Cotton fixes up old wagons for parades, using them sometimes spectacularly: he had a nice run-away with his team of mules in the wagon days parade at Ketchum, Idaho, on Labor Day 1988. He didn't run into or over anyone or anything, but he did generate a lot of speed and excitement. Cotton says he's going on the Montana wagon train because he's always been interested in pioneers, wagon trains, and freight lines. Now he's going to live it.

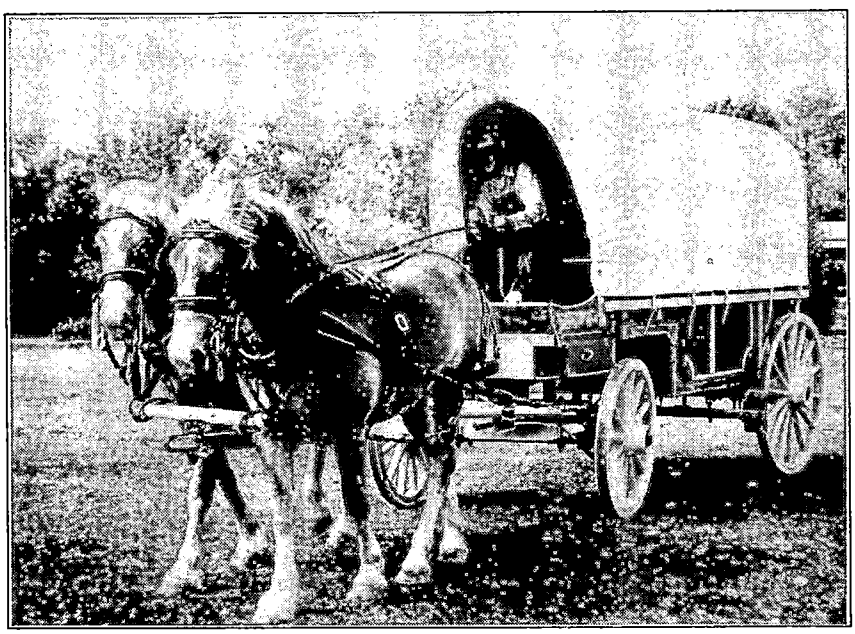
Cotton is sponsored by Shoshone Sale Yard, Inc. Shoshone, Idaho 83352, phone 208-886-2281 which is owned by Pete Peterson. Pete says he sells all kinds of livestock every Monday and honesty is their motto.

M.J. McDonald driving wagon

Montana Magazine

BIG HORNE REGISTERED BELGIAN DRAFT HORSES

"Striving to raise good, quality
horses since 1977. Registered
Belgian colts for sale every year."



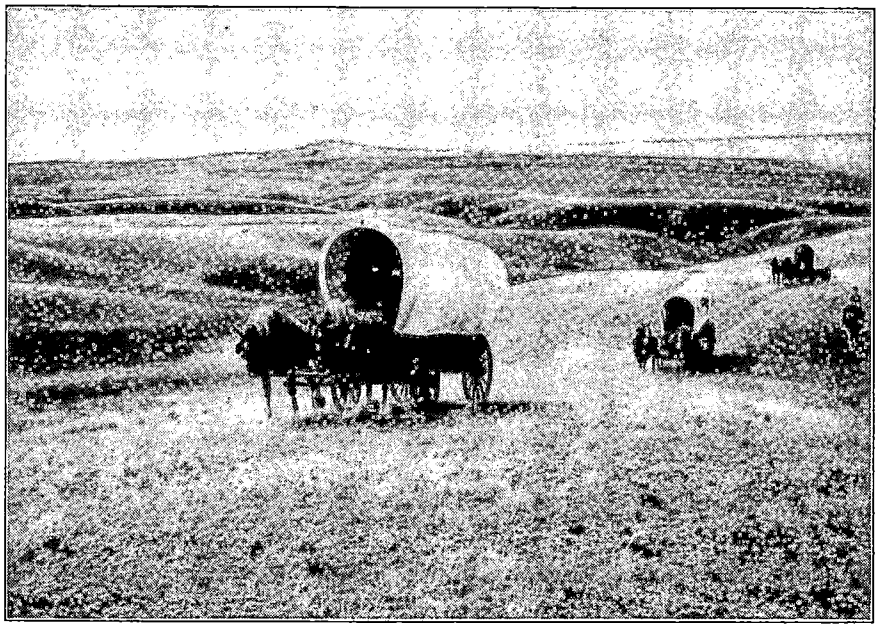
Senior herd sire - Mosquito Creek Archie (Canadian & American Registry)
Junior herd sire - Schaefer's Kyle
Registered mares by - Constable, Conqueror, Jerrett du Marais and Continue

NO: 4
Keith Horne and Marlene Teague
Helena, MT

Keith and Marlene raise registered Belgians and have about 20 around their place. Bonnie and Dacia, a team of full sisters out of their mare and stallion, will be pulling their wagon. The wagon was Marlene's uncle's. Keith modified it to a 5th wheel for showing and breaking colts. Wheels were rebuilt by Dave at Old West Coach in Joliet, Montana. The cover was loaned to them by their good friend Rollie Hebel of Ennis.

Marlene, a banker, has been secretary-treasurer of MDHMA for the past seven years. She crafted the old fashioned bonnets whose sale is helping fund the wagon train. Keith, a fireman, says he is a jack of all trades and a master of none. He builds different types of horse-drawn equipment, out of both metal and wood, always looking for a better way to make them. Keith and Marlene are dedicated to raising quality Registered Blonde Belgians. For fun they go to the Sandpoint, Idaho, draft horse show every fall. They were scheduled to be married on this trip but spent the wedding dress money on a new tent for the wagon train trip.

Jeannie, Marlene's mother from Oregon, will be joining them for the trip.



NO: 5
James Syme
Plentywood, MT

James Syme's Belgians are pulling his mountain wagon, which originated in Plentywood. Participation in previous wagon trains and trail riding make him an experienced hand around horses. When he's not wagon training, he's working on his farm or dancing. He figures that at his age the Centennial Wagon Train will be the highlight of his wagon train days.

NO: 6
Robert H. Walker
Richey, MT

Originally from Fort Keogh near Miles City, the 80-year-old wagon of Robert Walker served as a campsteader wagon for many years for McClain's Sheep Company of Paxton, Montana. Robert's dad bought and used it on his ranch for another 10 years. Johnny and Irene, Robert's Quarter horses, are pulling the rebuilt wagon.

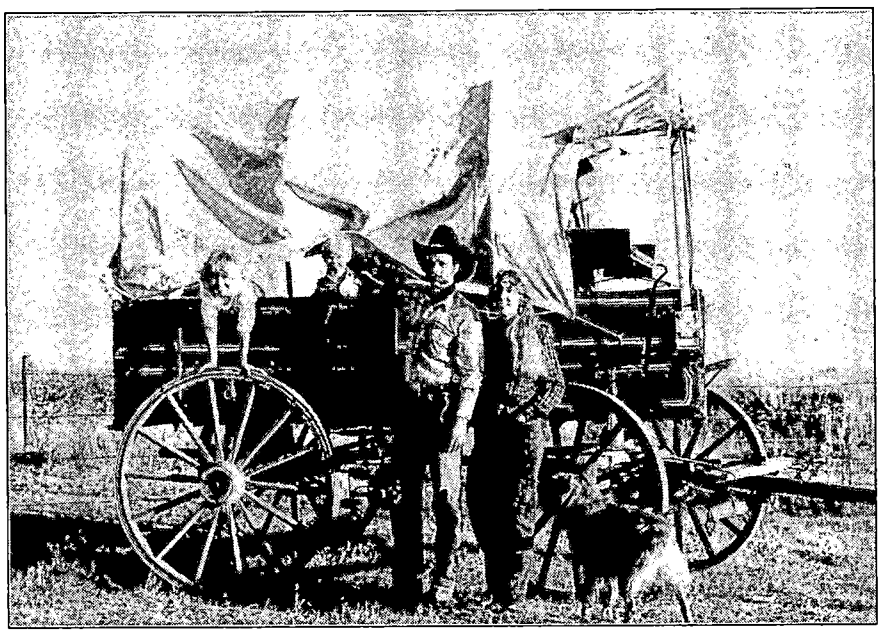
Robert is a retired construction worker, sheepherder, and bartender who raises hogs in his spare time and likes to tease his seven grandkids. Traveling from the rolling hill country near Richey, where wheat farming and livestock predominate, Robert is on the wagon train to meet new people and see new country.

NO: 7
Gerald L. Gabel
Huntley, MT

Gerald Gabel's Belgian-cross sorrel mules are in the harness of his covered Studebaker wagon. The wagon had been made into a grain wagon so he had to convert it back to a covered wagon. The team has been used for pulling just about all kinds of farm equipment as well as Santa's sleigh at Christmastime. Gerald runs an excavation and construction business and relaxes by rebuilding old horse drawn farm equipment and working with his horses and mules.

He says he didn't know there was such a smooth ride until a friend, Bill Greene, interested him in mules. Now he won't ride anything else.

NO: 8
Will and Jan Donahue
Belgrade, MT



Jan and Will's team of Belgians, Dick and Dolly, were broke by the fine old teamster Edgar Loomis, of Brusett, Montana. They were Edgar's wheel team for a fourteen horse freight hitch in the Miles City Centennial Parade in which he won first place. All parts except the wagon bows and sheets are original on the old John Deere wagon, whose original owner brought it to Nebraska around 1902. Its wide wheels suited the travel conditions on the sandy soil of the country below the Platte.

Jan and Will have lived in Belgrade for six years. Jan, a certified nurse-midwife, delivers babies in normal, uncomplicated childbirth situations in her birthing room, Bridger Birth Center. Over the past six years she says she has helped add about 300 new Montanans to the census. Will, also a registered nurse, worked the night shift in the emergency department of Bozeman Deaconess Hospital for five years. He is now directing the nursing services at Bozeman Care Center, a long-term care facility.

It was Jan's idea to do this wagon train. The Donahues said "We've always had horses and wanted a team but never could figure out a way to fast talk each other into buying a team. This was the opportunity we'd been waiting for." Their two children, Jesse, 7, and Kelly,3, will be with them on the wagon train.

NO: 9
Norman Frankland and Bonnie Evans
Victor, MT

The Frankland-Evans entry is a 75-year-old International Harvester/Weber grain wagon pulled by their team Nellie and Fred. The wagon came from Wolf Point and was part of the Racetrack wagon train that traveled from Wisdom to Hamilton in 1976. Norman was born in England and emigrated to the U.S. in 1957. Bonnie is originally from Maine and arrived in Montana by way of New Mexico. She is an endurance rider, artist and horse breeder. They call their farm Flying Heart Farm. Joining them is Charlie Yearian, draft horse trainer extraordinaire, Teddy Bryan, a cowboy and captain of industry, his wife, Laura Yelloweyes, a beadworker, Chip Jasmin, a folksinger, and Chadeynne Roush, a drummaker.

NO: 10
Ken and Pearl Roy
Darby, MT

Ken doesn't need any instruction on driving a team and wagon. After 13 years of rolling along with a variety of wagon trains, Ken organized the Bitterroot Valley wagon train in 1976 and has ramrodded it since except for one year. But his experience before that started at an early age. Ken came to the Bitterroot Valley in 1935 from Fort Peck, Montana, with his Dad and three brothers bringing two wagons, two teams, and one saddle horse. Ken said it took 23 days to cover 740 miles. The horses wore out one and a half sets of shoes. After World War II and a stint in the air force Ken and his wife, Pearl, settled down to raise grade and purebred Hereford cows til semi-retiring in 1976. They still break, train and trade horses and put up hay. Their two sons, Ben and Tom, daughters-in-law, and four grandchildren love horses and ranch life. The grandchildren learned to ride almost before they shucked their diapers. Ken and Pearl's mixed breed-pintos are pulling their "Western" wagon. The wagon was built around 1900 and rebuilt in 1965 by Ken and Ben. Everett and Ruth Brown will begin driving Roy's team and wagon. Ken and Pearl will take over after Ken ends his duties as trail boss on the Stevensville to Bannack wagon train. Ken and Pearl said this Centennial Wagon Train looked like their kind of fun.

Shires

The Shire horse was developed in the 1700s in the eastern and central counties, or shires, of England for use as dray horses in London and Liverpool. The breed was developed primarily from Dutch and Belgian stock. The early breeders concentrated on producing a massive, muscular horse with heavy bone and heavily feathered legs. Shires first came to the U.S. about 1830, and a number of Shire stallions were standing in Montana in the 1880s and 1890s. J.H. Truman, the biggest Shire importer, had a branch in Billings, and the Yellowstone Park Company owned several of the breed. They were used to pull supply wagons in the Yellowstone Park.

Shires are rare in the U.S., with the greatest concentration in the Northwest. Shire numbers fell to a few hundred in the 1950s and 1960s; few of the horses bred in this period were registered. Imports from England have helped the recovery of Shire numbers in recent years. Postwar American Shire breeders have concentrated on maintaining the draftiness of the breed, but have bred for smaller size and less feather. The horses imported from England in recent years have generally been leggier and less drafty.

The Shire comes in all colors, with bay, brown, black, and grey being the most common. White markings on the face and legs are almost universal.

NO: 11
Kathleen Meyer
Patrick McCarron
Stevensville, MT

Between us we're farrier, author, actor, editor, sailor, storyteller, packer, philosopher, commercial fisherman, drywall contractor, whitewater rafting guide, teamster, cowboy, teacher, canoeist, seakayaker, gourmet camp cook, wrangler, rambler, roughneck, and entrepreneur. We're survivors, both. We're English, Irish, Scottish, German, French and Dutch, but one of us is a purebred. We're 12'10" with one atop the other's shoulders (ok, ok, maybe that's stretching it an inch). We have 86 years experience. At what? Well—that's advertising for you! Look us up on the Wagon Train and find out who's who. Come get your horses shod or look over a copy of the newest wilderness handbook: *How to S#*! in the Woods – an environmentally sound approach to a lost art.* It's humorous, informative reading—a must for the city-slicker, new to squatting under the Big Sky, or other friends and relatives still fumbling with their drawers. (Copies for sale will be available in local bookstores.)

On July 5th, trail's end for the Centennial Wagon Train, we plan to keep rolling down the dusty road by team and wagon until the snows. We'll be searching for a somewhat circular, 6-week route linking ranches needing a shoer. And should you be looking for ranch sitters for the winter, talk to us.

The old Clydes are too gimpy to make this trip. By the time we circle-up in Stevensville, we'll have a younger team. So gather up your hello's, tall tales, old-timer wisdom, and bales of unwanted advice and stop by for a cup or bottle of something. Meet us, meet the horses, and see if our newly acquired Missoula freight wagon (above) looks any different after a long winter's work. Wagons ho! Yessiree!!!

*** Many thanks to the ***Bitterroot Carriage Company*** and ***Frank Ringel*** for all their help ***

Harvest in Liberty County, circa 1912

Montana Historical Society / Montana Magazine

NO: 12
Marlen Halverson
Glasgow, MT

Back in 1972, Marlen Halverson gave a Canadian farmer five silver dollars for the running gear of a Massey-Harris wagon from Saskatchewan, Canada. He rebuilt the running gear and a friend helped him rebuild the box. From these beginnings he began driving teams and wagons in conjunction with a youth camp. He drove hundreds of miles each summer and hauled from 10 to 60 people each outing. Marlen considers himself a cowboy, farmer, and merchant who also raises and trains horses. Born in Scobey, Montana, in 1940, Marlen says he's still very young and enjoys work so much that he can't tell whether he's working or playing. He especially likes long, hard horse treks, like this one - no trailers or campers just real people.

Marlen brought Clydesdales and mules to pull his wagon. His first team of mules in 1976 taught him plenty. His helpers hitched the team up to the wagon and Marlen said gitty-up. Off he went - down the road, over the road bank, around a building. He braked the wagon but no brakes, so he headed to a tree, one mule on each side. He said it was a sudden stop. Bouncing over the road bank he had broken the reach and lost the back wheels.

Marlen came on the wagon train because he won't be here for the 200 year celebration.

NO: 13
Wayne and Lola Eby
Victor, MT

From their herd of 12 Belgians, Wayne and Lola Eby chose Pride and Chubb, to pull their 100-year-old Studebaker wagon. Originally from North Dakota, the wagon has been rebuilt twice and used around their farm to haul anything that needs hauled. They ranch in Victor, raising cattle. They "fool with horses" in their spare time taking part in horse shows and parades. The Ebys joined the wagon train because it is a once in a lifetime trip.

NO: 14
Bill Brand
Ketchum, ID

Bill Brand and his two mounts, a Tennessee Walker, Prince, and a Missouri Foxtrotter called Blue, are riding along with the wagon train. Bill says he spends half the year in Arizona and half in Idaho riding around the back country of these states. He is on the wagon train because it sounded like a fun trip and offered new country to travel.

NO: 15
Homer and Helene Malaby
Freestone, CA

Starting in the horse business with saddle horses, Homer and Helene Malaby have now acquired draft horses. Their half-Percherons, Sunday and MaeLynn, are pulling their wagon which they guess to be between 80 and 100 years old. Their neighbor, who is in his 80s has been their guiding light. Homer says "Mr. P. still has his draft horses as well as every tool, piece of hardware, and wagons from days gone by." For fun, Homer and Helene take their team to Mr. P's, hitch to one of his original vehicles and cruise the streets of Petaluma, listening to some of Mr. P.'s experiences.

Homer is a Veterinary Medical Officer with USDA in animal care, presently working in the southern California area. One son, Dan, lives in the Bay area working in the electronics field. Helene works hard keeping house, garden, and animals running smoothly. They have 37 acres in pasture, apple orchard, and woods. The horses are earning some of their keep by pulling out downed logs for firewood and slash.

NO: 16
Russell Starlin
Ronan, MT

Russell Starlin works on rebuilding wagons when he's not ranching or selling. Belgians are in the harness as they have been on many past wagon trains. His wagon is one from the 27 wagons and 7 buggies around his place.

Russell maintains he must be the only box car cowboy left. "We rode box cars all over the state taking only our saddles. I broke horses for $5 a head. I worked only on big ranches and made $15 month."

NO: 17
Don Coutts
Red Lodge, MT

Rough and Ready and Rock and Rye, the four good Belgians owned by Don Coutts are pulling his wagon. One team is hitched to a Studebaker, the other to a freight wagon. Don is an old hand at driving. His wagons see a lot of use in his wagon train business: Beartooth Wagon and Sleigh Rides. His "outside" income to support his horse activities comes from his work in the construction business. He enjoys all horse activities and is looking forward to a good time on the wagon train.

NO: 18
Larry Vance and Isabelle Carlhain
Livingston, MT

Larry and Isabelle's team are pulling a wagon with a 1909 original undercarriage. Isabelle, who studied architecture in school, designed the box. Larry built it and put it to use. Isabelle came from the Tetons to Red Lodge where she wintered as a sheepherder. She had packed one horse all the way and alternated between riding him and walking. A serious accident while logging halted her travels for two years. But it was by no accident that she decided to stay.

Larry and Isabelle met in hunting camp where they worked as guide and cook respectively. Two months later they rode out as a team. After 16 years as a deputy sheriff for Park County, and a lifetime working with stock, Larry left the force to work his horses full time. Larry and Isabelle raise draft horses, mules, and crossbred riding stock. All are broke to ride, pack, and drive because, Larry says, one day they may be pulling a wagon or manure spreader and the next day skidding an elk from the high country. They use the animals to "commute" for supplies from their ranch nine miles from Livingston. Larry's teams have been used in parades, on wagon trains, in front of farm equipment and for pulling sleighs at Bridger Bowl ski area. He logs with them in the fall and winter, and packs them in the summer to build and maintain wilderness trails. At last count they had 16 head.

They want everyone to feel free to visit with them. They break stock to ride and drive and have good, well broke young teams, single horses, and mules for sale.

Fjord Horses

The versatile Norwegian Fjord horse is used, both English and Western, for riding, jumping, hunting, trail and in driving all types of hitches. The Fjord stands 13 to 15 hands high, weighs 1000 to 1400 lbs, and can pull up to three times its own weight. They have a gentle disposition, and like people. Their color is usually brown dun with a stripe of black in the center of their back and a light mane.

NO: 19
Edwin Clementino
Petaluma, CA

When Ed Clementino was tipped off to the Centennial Wagon Train by the Huffmans of Big Sky Leatherworks in Billings, Montana, he knew it was a once in a lifetime experience that he just couldn't miss. Born in Gustine in Merced County, California, Ed never left the Golden state. From Merced County he moved to Sonoma County where he and his wife Bena owned a dairy and raised three children. Ed's son now owns and manages the milking herd which has since moved to Glenn County, California. Ed manages the replacement stock in Sonoma County. Ed purchased six mules, Tom and Jerry, Doll and Babe, Lillian and Bell, when they were just green broke. Ed set to work, making them what they are today. Ed has shown his hitch at the Bishop Mule Days in Inyo County, California, taking first in the six-up classes and in the parade. Local parades and Draft Horse and Mule shows keep Ed busy winning many awards and ribbons. He is a member of the Sonoma County Trail Blazers and drives the six-up in their annual ride. When not taking part in parades or organized drives, Ed's favorite activity is to "just hook'em up and go fer a drive" in the Petaluma Hills.

Ed's Baines Freight wagon has a canvas cover and is around 75 years old. He purchased it about six years ago and aside from changing the seat, has done nothing major to it.

Christine Kaplan hails from the Wiedemann Ranch in Contra Costa, California. When not helping Ed as an outrider or swamper, she team ropes, rides, and drives her own horses, and works with her father in the family's commercial real estate business. Al Kaplan, her father is a native of Oilmont, Montana.

NO: 20
Lyle E. and Wilma Jane Wanderlich
Twin Falls, ID

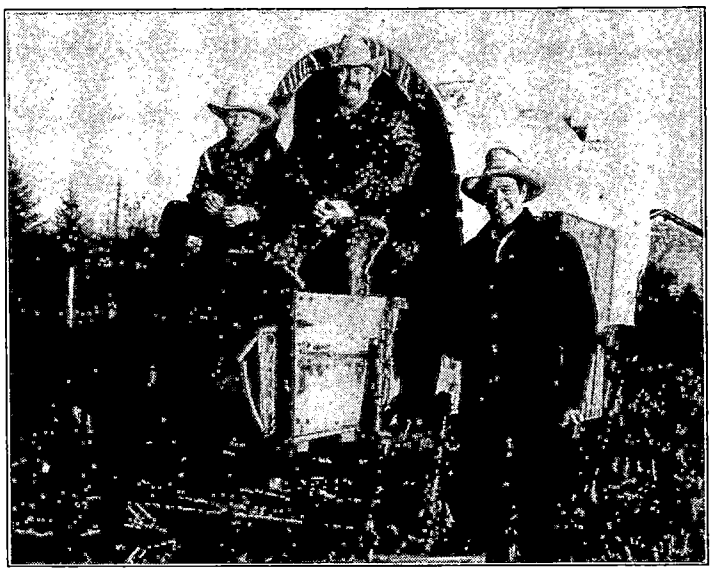
Lyle and Wilma own Roseacre Farms in Twin Falls, Idaho, where they raise several breeds of horses including paints, Quarter horses, Thoroughbreds, Belgians and mules. He and Larry Aslett are traveling on a farm wagon, originally from Washington, that was rebuilt by Lyle. Lyle is a semi-retired anesthesiologist, and chariot races in his spare time. As a young boy, Lyle worked the fields with teams of draft horses. Since that early age it has been his dream to drive the big animals in a wagon train.

NO: 21
Les Broadie
Arco, ID

Wanderlust seems to have captured Les Broadie who drives his teams and Weber wagon in parades and wagon trains throughout Idaho, Oregon, Nevada, California, and now Montana. Some of Les' 30 mules are pulling his rebuilt wagon in the wagon train. Les, who claims to be retired, spends his time on wagon trains, packing, showing horses, selling wagons and buggies, and taking some time to smell the roses as he passes by. He lives near Arco back home at Idaho, a little town south of Idaho's rugged central mountain area at about 6000 feet in livestock country.

Oxen breaking ground near Coalridge, Montana

Montana Historical Society / Montana Magazine



NO: 22
Kevin Irish and Glenn Bailey
Helena, MT

Well-broke horses are a joy to handle says Kevin Irish. That's why he brought his team of sorrels, Packett, an ex-race horse, and Boomer, a registered Quarter horse. He says his dark brown team is coming around nicely and are real powerful. This team includes Dan, Kevin's lead pack horse, and Pete, a new arrival.

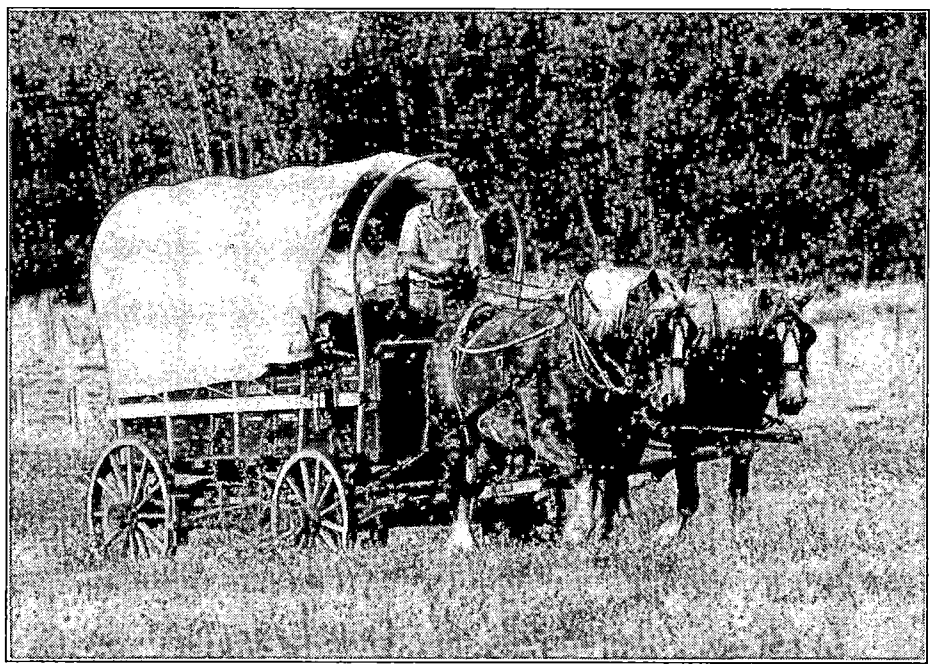
Kevin shares ownership of the wagon with Glenn Bailey of Helena, Montana. In Helena's early days, the wagon was used around town delivering goods. Around 1974 or 1975, Bud Pierson of Race Track, Montana, purchased the wagon and rebuilt most of it. He used it for six years, particularly during his start as wagon master of the Race Track Wagon Train. Kevin and Glenn purchased the wagon in August, 1988. The wagon has yellow running gear and natural box finish.

Kevin's son, Clint Irish, is the brakeman. The outriders are John LaRocke who will be trading between his two big mares, Glenn and Shadow, a gray Quarter horse, and Kevin who will be on his saddle horse, Drifter.

Ned and Shorty with Grandpa Nash

Conrad Public Library / Montana Magazine

NO: 23
Jim and Ruth Lotan
Stevensville, MT



One of the Belgians in harness on Jim and Ruth Lotan's team is a barrel racer, too. Marshall, the big red gelding, ridden by son, Erik, won the draft horse barrel race at Ravalli County Fair in 20.4 seconds. The Belgians are pulling their 80-year-old Birdsell farm wagon that originated in St.Maries, Idaho. It was used on the 1988 Scout Train.

Versatility does not belong solely to their horses. In addition to raising Belgians, Jim and Ruth are busy with photography, writing forestry handbooks, hunting, fishing, and partaking in mountain man rendezvous. They also take part in parades and wagon trains, and drive for a commercial wagon train near Glacier Park. Jim says that Ruth tolerates his horses. Their grandchildren, Eric and Ellen, will be joining them on the wagon train.

NO: 24
Chuck and Mary Jensen
St. Regis, MT

Dreaming for many years of a wagon train experience, Chuck and Mary Jensen feel the Centennial Wagon Train is the chance they've been waiting for. They brought their two Belgians, "Pesky Prince" and "Dancing Dan", and Quarter horse, Tucker, to help them down the trail. Behind the Belgians comes their Bain Company wagon which they purchased at the Sandpoint sale in northern Idaho. Originally from Deer Lodge, the Jensens now farm and ranch in St. Regis, Montana. When the works all done in the fall, they like to travel a little. Their friends, Dick and Shirley, are joining them on the wagon train.

NO: 25
Leon and Gertrude Reynaud
Santa Rosa, CA

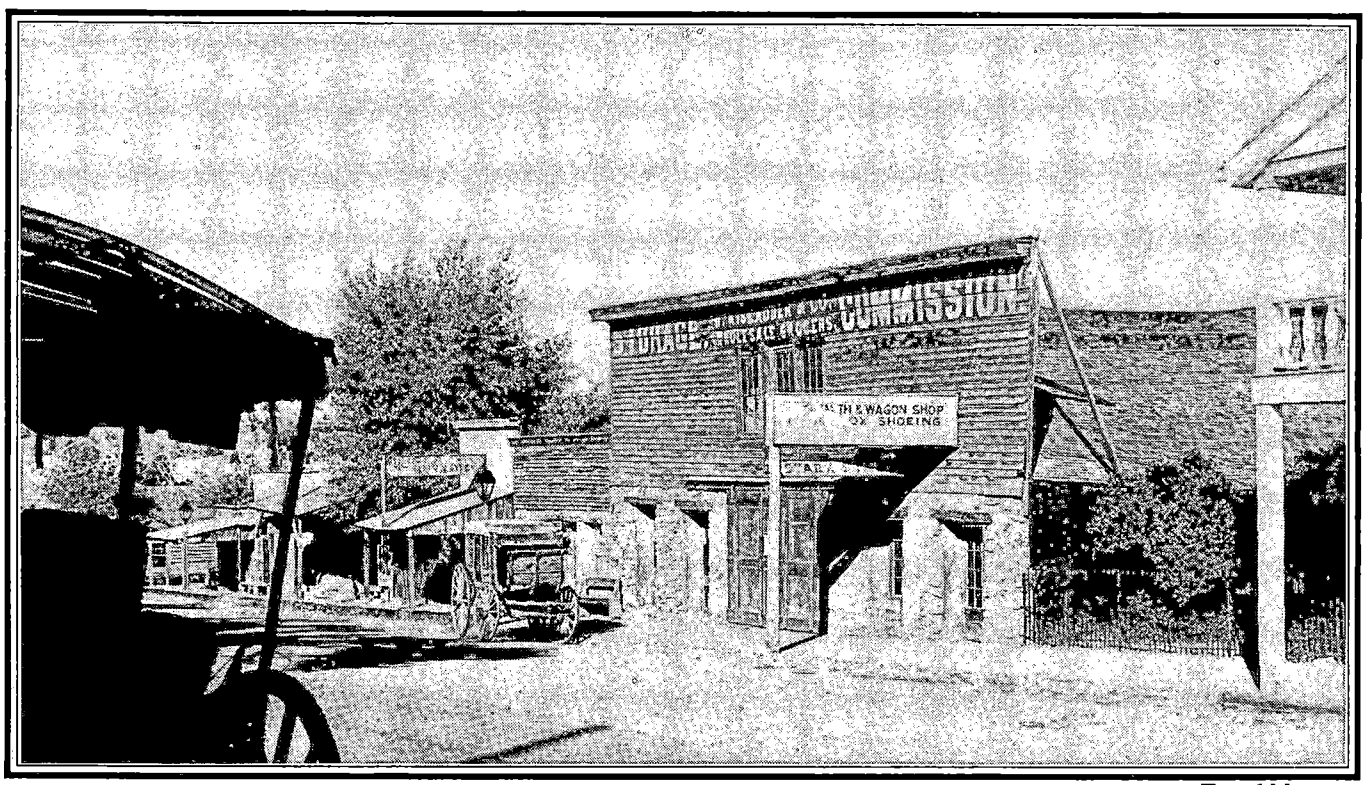
A fun time and a challenge is what Leon and Gertrude Reynaud were looking for when they heard about the Centennial Wagon Train. Leon, a realtor and native Californian, and Gertrude live on the edge of Santa Rosa, California. In their spare time, they fish, boat and ride with the Sonoma County Trail Blazers. Their two Quarter horses are pulling the new, amish-built wagon from Pennsylvania. They have pulled the wagon on rides in the hills and on Sonoma County Trail Blazer's trips.

NO: 26
Robert and Leslie Clark
Whitehall, MT

Colorful teams of Pinto Belgians pulling Robert and Leslie Clark's two wagons: an 80-year-old Mitchell and a 1901 Studebaker. The Mitchell came from Ovando and the Studebaker from Bozeman. The Clarks rebuilt both wagons. The Clarks have driven the teams and wagons in parades and in the Virginia City wagon train. In fact, Robert and Leslie have taken part in all of the scout trains for the previous three years in preparation for the Centennial Wagon Train. Robert, a building contractor, calls himself a used hippie and claims to be the only fool in the valley who farms with horses. Leslie is a potter. Robert and Leslie also enjoy other horse activities such as poker runs, field days, and shows. In honor of the Centennial, Robert is growing his hair to look as authentic as possible because he feels beard-growing contests discriminate against women. Leslie is gritting her teeth as usual. They think their gelding "Buck" is the biggest Pinto west of the Mississippi.

Centennial Wagon Train Itinerary: First Week, from Bannack to Virginia City

Sunday, June 11, 1989 The Centennial Wagon Train meets in Bannack



Main Street of Bannack Travel Montana

Monday, June 12, Evening camp at Harrington's Rattlesnake Ranch

Helen Larson, a participant in the wagon train, once owned the Rattlesnake Ranch. She says that Henry Plummer and his gang spent a lot of time at the ranch when it was the home of Red Jaeger, a buddy of Plummer's. One of the ranch's attractions for the gang may have been the bootleg whiskey flowing from a still there. Plummer, notorious in this area as a criminal who also was elected sheriff, inspired the formation of the vigilantes, who took the law in hand and hanged Plummer and many of his gang. Near the creek on the ranch, as the story goes, workers found two chests of loot, including watches and gold, buried there from stagecoach hold-ups. Don and Shirley Harrington, who now own the ranch, raise commercial Black Angus cattle and registered Quarter horses. Their son Mark manages the ranch and does some rodeoing. Don is a distributor for Pepsi and announces rodeo.

Tuesday, June 13, Evening camp at Dillon Rodeo Grounds

The Chamber of Commerce anticipates an entire week of events to celebrate the Centennial Wagon Train. A warm welcome from the people of Dillon is certain.

Historical Notes Along the Wagon Train Route: Bannack to Virginia City

The Centennial Wagon Train heads up at Bannack on the west leg of the original Corinne Wagon Road.

The Corinne Wagon Road, sometimes known as the Corinne-Virginia City road, headed north from Corinne, Utah, to the southern border of Montana and branched. The east branch passed near present day Monida and divided again into two roads. The west road went to Bannack through Red Rock Creek and Horse Prairie and continued to the Deer Lodge valley. The east road went through the head of Blacktail Deer Creek, past present day Dillon and on to Virginia City. From there it continued to Helena.

A $40 toll was required to travel the Corinne Wagon Road.This angered some people since the route was supposedly one of the most "remarkable natural highways" and little labor had been expended to make it usable.

The founding of Bannack had its roots in the discovery of gold on July 28, 1862, where Grasshopper Creek enters the Beaverhead River. After panning for a short time, the prospectors knew they had discovered a significant gold deposit. They followed the placer gold upstream, and soon 300 people had settled on the site of Bannack, 12 miles above the first discovery. Named after a local Indian tribe, the Bannocks, the settlement was initially called East Bannack, later Bannack City, and finally Bannack. By the summer of 1863, the population had grown to 1000 people, expanding later to around 5000.

Bannack's status as Montana's first capital makes it a fitting jumping-off point for the Centennial Wagon Train.

From Bannack, the wagons will follow the old stage road to Dillon. It was along this road that the notorious Plummer gang of road agents performed many of their stage holdups. The wagon train route passes "Road Agent Rock", which the holdup men used as a lookout point to spot the gold stage leaving Bannack.

A woman's diary from 1881 notes "Of all the dreary looking places I ever saw, Dillon is about the worst." Perhaps the treeless landscape caused the woman's melancholy. Grasslands near Dillon are famous for producing quality cattle.

Dillon was named for Sidney Dillon, president of the Union Pacific Railroad, who supervised the completion of the line from Utah to Butte. The town was once called Terminus because the construction of the railroad was halted there - a rancher refused to give his ranch up for a right-of-way. The rancher was finally bought out. The town of Terminus, established in 1880, became Dillon in 1881. At one time Dillon was also known as Blacktail, a name taken from the creek that runs through the town.

Wednesday, June 14, Evening camp at Christensen's ranch

Art Christensen was born on this ranch near Dillon. Since he took over the operation in 1945, he has increased his sheep flock from 14 to over 450 ewes. According to an article in SHEEP! magazine, this ranch covers elevations from 5000 to over 8400 feet and is well-known for its prolific Finn-cross ewes with a lambing of over 200 percent. The Christensens also do some farming. Sheep are usually herded to the high mountain pastures in late June. To protect the lambs from coyotes and other predators, Art has tried bells on the collars, tape players, pneumatic cannons and guard dogs; the latest experiment is a guard donkey.

Thursday, June 15, Evening camp at Anderson's Ruby Dell Ranch corrals

Part of the old horse and ox pasture on the Anderson's ranch was used by freighters on their trek from Corinne, Utah, to Virginia City over the old Virginia Trail on the Sweetwater. The ranch was purchased by the Anderson family from J.E. Morse in 1919 who had earlier sold it to the Beaverhead Ranch Co, then bought it back. Deer, antelope, sage chicken, and grouse roam the area and there are trout in Sweetwater Creek. The host says the ranch has a prehistoric buffalo jump and medicine wheel. Other areas of interest include deposits of garnets and Indian teepee rings.

Friday, June 16, Evening camp on BLM ground near Ruby Reservoir

The nearby town of Sheridan is planning some special activities including a black powder shooting demonstration.

Saturday, June 17, Evening camp at Virginia City

The people of Virginia City are planning a big welcome with a parade, barbeque, and dance on Saturday.

Robber's Roost near Virginia City Travel Montana

From Dillon, the wagon train will cross the Ruby range of mountains then travel along the Ruby River to Alder Gulch. The name "Ruby" was given by prospectors who thought the garnets they found were rubies.

The wagons will arrive in Alder Gulch near Nevada City. Nevada City was the second largest city in Montana Territory in 1865.

Alder Gulch entered Montana History the spring following the gold discovery at Bannack, when a group of miners left Bannack in search of more gold. They made camp on a creek near the Tobacco Root mountains and did a little panning, hoping to get enough gold to buy tobacco. Instead, they stumbled upon one of the biggest placer gold deposits in Montana.

Miners rushed to this Alder Gulch site and in June 1863, a claim was filed for a townsite. Confederate sympathizers had chosen the name of Jefferson Davis' wife, Varina. The newly elected judge, however, had strong sympathies for the north and refused that name. He substituted Virginia City. By the end of the summer 10,000 miners crowded the gulch.

The territorial capital moved from Bannack to Virginia City and remained there from 1865 to 1876. Virginia City was the first incorporated city in Montana. Many of Virginia City's original buildings stand. Above the town white wooden markers identify the graves of several of Henry Plummer's road agents who had their necks stretched by the Vigilantes.

The first leg of the Centennial Wagon Train will end with a layover at Virginia City.

NO: 27
Roger Reinhardt
Hinsdale, MT

Roger Reinhardt brought along two of his eight head of Percherons to take part in the wagon train. Duchess and Holly are pulling a wide-bolstered freight wagon that Roger acquired from Lewistown and rebuilt. Roger's son, daughter, and grandchildren are hitching a ride. Back on his ranch, the horses earn their keep helping in haying, seeding and feeding. Roger takes time from ranching to do leatherwork and wagon repair. He also enjoys draft horse events - both competition and parades. Roger said he had to go on this wagon train because he won't be around for the next one in a hundred years.

NO: 28
Robert and Claudine Eby
Laurin, MT

A historic freight wagon once owned by Mr. Simeon Buford who started a freighting and grocery business in Virginia City in 1878, is pulled by Robert and Claudine Eby's two Belgians, Captain and Molly. Although dimmed by age, lettering on one side of the original box on the wagon reads "Buford Mercantile, Alder Gulch, Montana Territory". The Ebys removed this box and replaced it with a sheep wagon box and new wheels; the rest of the running gear is original. Bob and Claudine originate from Madison County and have four children; their youngest daughter, Mykie, is an outrider on the wagon train. It is rumored that Claudine has bred her two half-Shetland pintos to a burro and hopes to have a team of her own that won't run her over. The Ebys enjoy anything that involves teams or driving and the highlight of every year is attending the Sandpoint Show in the fall.

Percherons

The Percheron horse originated in the northwestern region of France known as Perche. The breed probably was developed for use as war horses by knights, but around the time of Louis XIV of France, the breed was being used for heavy draft work. It is believed that original breeding stock included Arabian horses left from the rout of Saracen in 700 AD, as well as heavier native horses that may have been in existence since the ice age.

Percheron horses were introduced into the United States around 1840, but the greatest numbers arrived between the 1850s and 1880s. In 1876, the Percheron-Norman Horse Association was formed in the U.S.; after several name changes, it is now called the Percheron Horse Association of America. The famous Bar U Ranch brought Percherons to prominence in Canada in the early 1900s. Much of the Bar U's foundation stock were the 35 registered Percherons and 1200 grade Percheron mares they purchased from a ranch in Dillon, MT.

Percherons rank second in popularity to the Belgian as a draft horse breed in the U.S. The average Percheron stands 16.1 to 16.3 hands high and weighs 1900 to 2100 pounds. The Percheron's ruggedness, power, and heavy muscling in the lower thighs combines with good conformation of the feet and legs, and a clean way of going. Percherons are usually black or gray (90 percent), although the breed has bays, browns, chestnuts and roans.

NO: 29
Roy E. and Pat Nonella
Sebastapol, CA

Roy and Pat Nonella's 1890 California Mountain Wagon, from Chico, California, was built by E.E. Canefield. Roy rebuilt it and has used it on the Sonoma County Trail Blazer's week-long cross country ride. He has brought with him his mules, Margaret and Mildred, and Quarter horses, Thunder and Duke. Roy is a general contractor who enjoys any horse activity and hunting. Sandra Meyer is joining them.

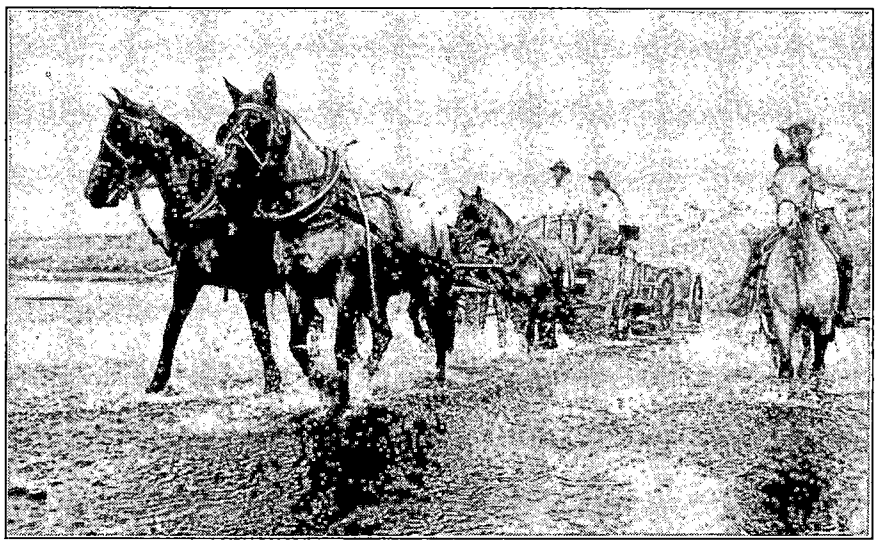
NO: 30
Barbara Williams
Fort Harrison, MT

NO: 31
Bob and Sandy Green
Clancy, MT

Long before wagons came to Montana, there were pack strings. To commemorate this contribution to Montana's past, Bob Green and his brother Floyd will be riding the entire route pulling their pack string of equine helpers. Bob Green resides in Helena and is retired from the Navy. Floyd resides in Puyallup, Washington, and is employed as a heavy equipment mechanic. Bob will be mounted on his Quarter horse and Floyd will be riding a USDA-captured mustang. When these two first read about the wagon train, Bob says "There was no doubt in our minds that we wanted to be a part of it!"

John and Sandy Doster from Helena will be joining the Greens for portions of the trip. John is retired from the Air Force and is a photography buff. Sandy works at Capital Ford Sales and Service in Helena. Sandy Green, Kathy Moots, and Dean Carter will also be joining the string. Calling themselves the Thursday Afternoon Saddle and Bottle Club, this group frequently gathers for short rides in the Helena area. Extended pack trips take them into the Absarokee and Scapegoat Wilderness Areas.

NO: 32
Dr. Jim Curtis
Malta, MT



Jim Curtis is driving a North Montana Prairie Wagon, which Jim says is like most of us: of unknown vintage and heritage. Purchased about 15 years ago, the wagon has rolled on several Milk River Wagon Trains in the Malta area and has made runs into the Missouri Breaks and on other expeditions. It has been turned over, beat up, bashed around and rebuilt one board at a time as needed. The pup was originally owned by Wesley Orahood of Malta, built by Dale Freitag, and stolen by Doc Curtis. It has been on wagon trains and excursions across Northern Montana and Southern Saskatchewan for the past twenty years. The hitch is lashed together with authentic gear including crotch chains, finger links, and fiddle links.

Jim Curtis has been the local Veterinarian in Phillips County (Malta) since 1970 and is president of the Montana Veterinary Association. Doc Curtis's 13 year old daughter, Katie, and her horse, Cal, are veterans of several wagon trains in the Malta and Moosejaw, Saskatchewan areas and will be riding along. Chief outrider and all-around hand for the hitch for the past 10 or 12 years, Jim Jr. helped prevent, helped cause, or watched wrecks on wagon trains from the Missouri Breaks to Moosejaw. Rusty Pray was about three years old when the first Milk River Wagon Train pulled out and he has been on just about every one since.

The wide open prairie and rough "Breaks" country of Montana north of the Missouri gives the crew lots of room to ramble through desolate, uninhabited land. Doc says the Montana Centennial Wagon Train is a natural for this crew to participate in and do their part to recognize Montana's Centennial Celebration and remember with pride our heritage.

Suffolks

The most ancient draft horse developed for agricultural purposes is no doubt the all chestnut-colored breed from Suffolk County, England: the Suffolk Punch. In 1768 Crisp's Horse of Ufford was foaled, the stallion to which almost every Suffolk horse today traces in the direct male line. The Suffolk Horse Society was founded in 1877; the first stud book was published in 1880.

The importations of Suffolks began in the late 19th century; one stallion, Gold Dust 1824, won the sweepstakes prize at the Oregon Spring Show in 1899 for any age or breed. In 1938, there was an importation of 14 stallions and 64 mares to the U.S. Then there was a lull until the 1980s when a flurry of activity occurred and several stallions were again imported. *(continued on following page)*

NO: 33
George C. Woolsey
Victor, MT

Before Montana achieved statehood, George Woolsey's wagon was rambling around the territory. The Peter Shetter covered wagon from Judith Gap is over 120 years old, and is pulled by his team of Percherons, Nip and Tuck. George rebuilt the wagon and has used it extensively. He is a retired rancher living in a log cabin he built himself in the Sapphire Mountains. Horse activities have been and still are a big part of his life. He has broken and trained all types of horses and mules and now travels around the Bitterroot valley giving wagon and sleigh rides. He drives his team in parades and in wagon trains. Joining him are Ginger, who works for Montana Department of Fish, Wildlife, and Parks, Patrick, a school teacher, Cliff, a retired farmer, and Marylyn, a horse trader.

NO: 34
Leslie M. and Ruth McGetrick
Butte, MT

Who takes care of the animals back on the farm when everyone else wants to join the Montana Centennial Wagon Train? Leslie and Ruth McGetrick solved the problem by having enough children that at least one would agree to stay home and take care of the animals and house. Their son, Tom, agreed to do just that. Leslie just finished restoring their 1915 International Harvester wagon which is pulled by their Percheron team. Leslie has also restored many old buggies and horse-drawn equipment. Retired Montana natives with 7 children and 13 grandchildren, some of whom will be joining them on the wagon train, the McGetricks keep busy. Ruth's needlecraft, canning, remodeling, and other such home projects keep her busy. They live on the continental divide near Butte. One of Ruth's neighbors has loaned her an old-fashioned dress and bonnet to wear on the Fourth of July for the Helena parade and celebration.

(Suffolks, continued)

The basic conformation of the Suffolk has not changed since the beginning of the breed.

The Suffolk, bred for general use on the farm, exhibits greater uniformity than any other breed: for conformation, quality,and disposition, as well as color. Characteristically, the appearance of the Suffolk is a pleasant, roundly modeled whole without flatness or grossness. It is famous for its strength, stamina, docility, longevity, and soundness. No other breed has the Suffolk's singleness of color. The Stud Book mentions 7 shades of chestnut, ranging from dark liver or burnt chestnut to light golden sorrel. White marks are admissible-a star in the forehead, patch, snip, strip, or even blaze, and white ankles mostly on the hind feet. Out of more than 12,000 matings of Suffolks that were tracked, all foals were chestnut. Those who work the Suffolk horse claim they have "heart, a ready willingness to work and great endurance". They also note the qualities of a fast walker, docile, and an easy keeper. They are about 16 hands high and weigh 1500 to 1600 pounds.

NO: 35
Dempsey and Jenny Swan
Butte, MT

Dempsey and Jenny Swan are outriders with Entry No. 34, the McGetricks.

NO: 36
Charles Kendall
Big Sky, MT

Charles Kendall is an outrider with the wagon train.

NO: 37
Jeff Hughes, Kirby Johnson, and Kevin Rocek
Westbrook, MN

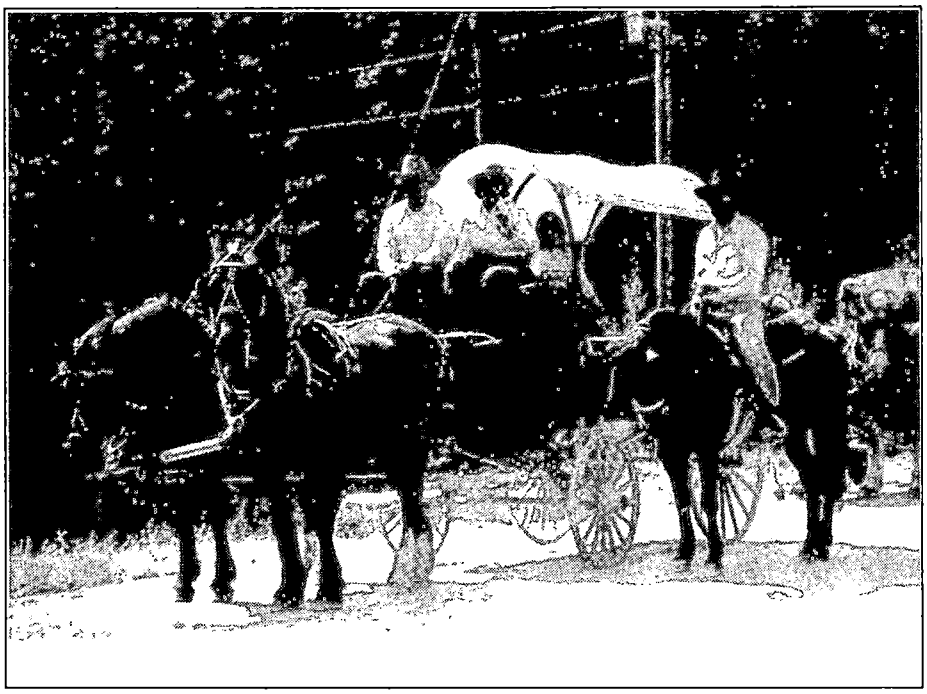
Strong ties to early Montana and an intimate knowledge of wagon train sport lured Jeff Hughes from the land of 10,000 lakes. Jeff's grandfather homesteaded at Poplar, Montana; his sister Geraldine Johnson Hughes lived and raised four children at Helena and is buried there. Jeff's wagon train experience stems from the Camp Courage wagon train, a group of volunteers from Iowa, Minnesota, South Dakota, and Wisconsin, that travel about 200 miles in 11 days taking pledges along the way. The money raised enables handicapped children and adults to enjoy a camping experience where they obtain special aid with their disability. In its 11-year history hundreds of children and adults have attended these three week sessions. Jeff also uses his team to farm his seven acres on which he raises hogs, farrow to finish.

Jeff's Belgian team, Dan and Foxy, is pulling his George A. Clark and Sons wagon which has been restored but retains the original finish and decals. It is from Minneapolis, Minnesota.
Traveling with Jeff are Kevin Rocek and Kirby Johnson, also from Minnesota.

NO: 38
Bill, Alice, Ryan, and Mindy Taylor
Escalon, CA

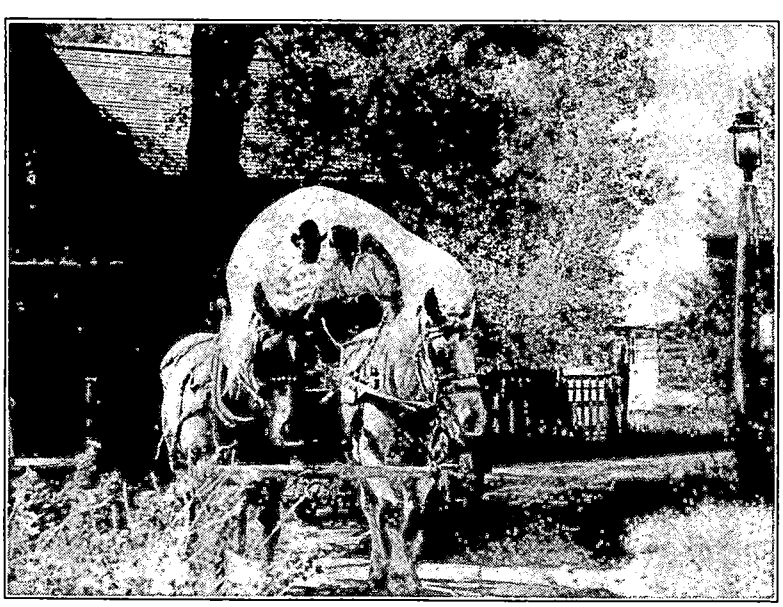
Blue and Gold Macaws and Amazon Parrots seem unlikely companions for Belgian horses. But at Bill and Alice Taylor's farm they coexist peacefully. Near Escalon, a small town of 3500, the Taylors live on a secluded five acre farm where they stay busy with their garden, orchard and animals. However, the Taylors and their son and daughter, Ryan and Mindy, left the exotic birds at home and headed north seeking adventure. They brought their Belgians, a strong team which garnered a couple of first places in pulls in California. Their wagon was carefully handcrafted by the Taylors.

NO: 39
Carl and Dianna May
Sagle, ID



The Sandpoint, Idaho, Draft Horse International show has been the catalyst that converts many people to the gentle giants - the draft horse breeds. Carl and Dianna May also fell under their spell at this fall show. But a team without a wagon doesn't carry much. So back to the show went the Mays to buy an 80-year-old Massey-Harris grain wagon. To outfit the wagon for use, they installed brakes, benches, steps and a spring seat, and added a metal tongue and canvas cover. It is pulled by their team of half-Percherons. They use the wagon for commercial wagon rides, parades and training colts. They also travel from their 300-acre ranch to construct hiking trails for the Forest Service in the northwest and California. Horse-drawn vehicles are a second and related hobby. Making history as well as repeating it was the Mays impetus to join the Centennial Wagon Train. They say,"It will be like a dream come true."

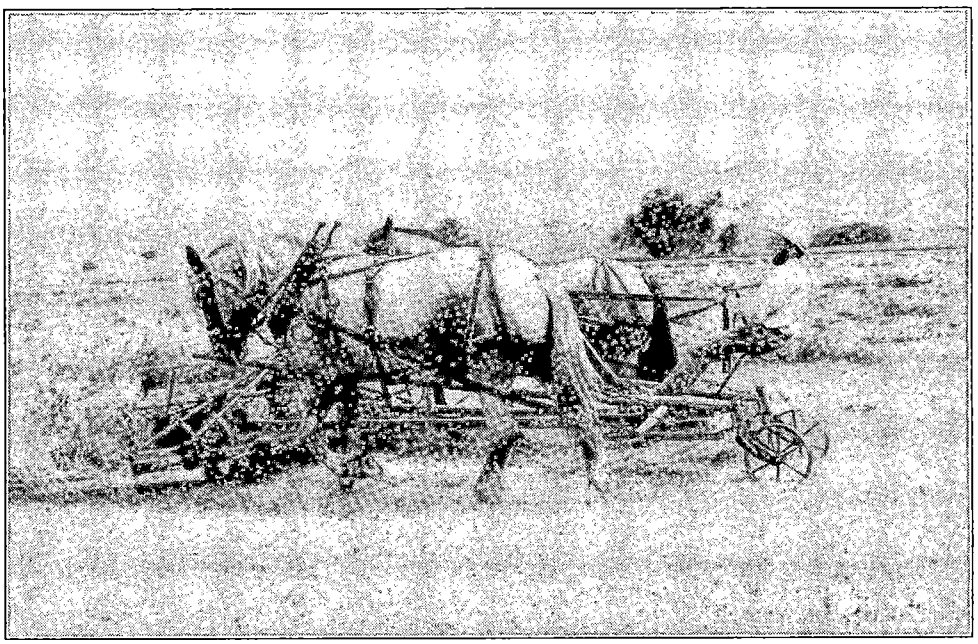
Larry Herst, a shirt tail relative, who says he loves anything horsey is joining the Mays as are Ruth and Jeff Eick, the May's daughter and son-in-law.



NO: 40
Bert and Betty Howey
Boulder, MT

Bert and Betty Howey's Belgians, Robin and Ribbon, are pulling a 1907 Webster farm wagon in the wagon train. Parts of it have been rebuilt and they have used it many times for wagon trains and hay rides. Bert and Betty are retired but keep busy with odd jobs and horse activities, which include going to races and rodeos, and the scout train and Virginia City wagon trains. Their daughters and grandchildren are traveling with them on the trip.

NO: 41
Vicki and Jim Rieffenberger
Elliston, MT

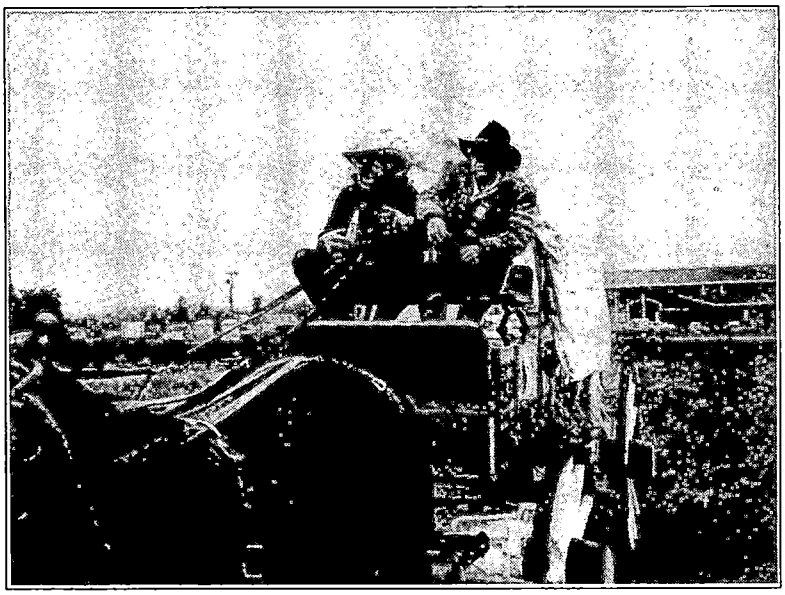


Using horsepower to feed cattle in minus 35-degree weather and hay in 90-plus degree weather keeps Jim Rieffenberger and his Percheron gelding, Cody, in working condition. Jim is also a blacksmith and farrier. Vicki, an engineer with the Department of Natural Resources, says she sometimes prefers her garden and fiber arts to her job. Jim and Vicki live on five acres on the Little Blackfoot River in Elliston, a small town west of Helena. Tana, Vicki's Quarter horse mare stays in shape helping Jim calve in the spring and hitting the mountain trails with Vicki in the summer. Jim and Vicki are along to spell Bob and Bonnie Morgan on the Morgan's wagon and to serve as outriders and helpers. They are looking forward to seeing the old trails from the back of a horse or top of a wagon seat.

Where the buffalo roam

Travel Montana

NO: 42
Helen Larson and Joan Mohr
Dillon, MT



A wagon train without sourdough is like a song without a tune. The Centennial Wagon Train won't meet that sorry fate for the smell of sourdough hot cakes will be wafting from Helen Larson and Joan Mohr's wagon in the mornings. And it's guaranteed the cakes will be good. The two of them have had a world of experience cooking for hungry hay hands in the Big Hole area. Naturally, Helen and Joan are driving a rebuilt chuckwagon. Friends since the 1950s, Helen and Joan met when the Larsons hired Joan and her husband to build fences on their ranch in the Big Hole. The two plan to drive their chuckwagon on the Centennial Cattle Drive from Roundup to Billings in September.

NO: 43
Bob Stone
Santa Rosa, CA

NO: 44
Leroy and Sandy Fadness
Boulder, MT

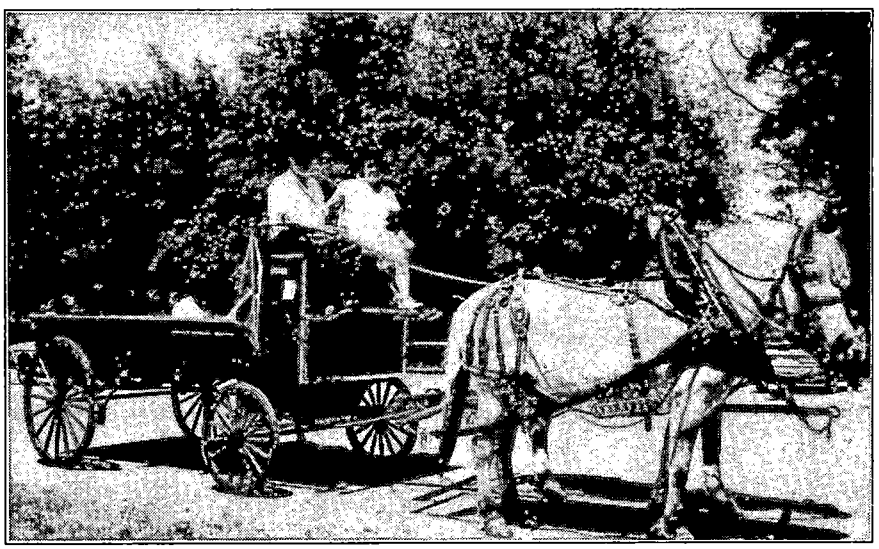
The last dray wagon used in Butte adds its historic bulk to the Centennial Wagon Train. Leroy Fadness rebuilt it and has used it in parades and 10 other wagon trains. Leroy and Sandy promise a story around the campfire as to why their team can't pull this wagon when they are upside down. Leroy's wagon roots go back a long way. When Leroy's father was an infant, his family emigrated from Canada to Montana in a wagon. Horse events occupy the Fadness family year around: racing horses, 4-H activities, packing, parades and other draft horses activities. Logging and ranching keep them solvent. Joining Leroy and Sandy on the wagon train are daughters Roy Ann and Tonna, foster daughter Carmella Romero, and sister-in-law Angie Fassett. Leroy claims that the reason he came on this wagon train is because Robert Clark made him. Considering that Leroy has been on 10 other wagon trains, that might be classed as a tall tale.

NO: 45
Ken and Pat Torgerson
Lambert, MT

Love draws Ken and Pat Torgerson off their three-generation farm northwest of Lambert. They are riding along with the wagon train because, in their words, "Pat loves to ride and Ken loves Pat". Ken farms, Pat teaches school, and they use their horses, Kotaz and Govenor, to work their cattle.

NO: 46
Bob and Claire Casey
Chouteau, MT

NO: 47
Harold, Dorothy, Bob, and Jim Sherette
Spokane, WA



A breed not often seen in the West is pulling the Sherette's wagon. Norwegian Fjords, although smaller than other draft horse breeds, can pull three times their own weight. The Sherettes use their Fjords extensively in fairs and parades in the Spokane area. In 1987, they traveled to Minnesota with five Fjords to join a centennial parade. For variety in their hitches the Sherettes keep numerous horse-drawn vehicles on hand including an early 1900s original milk wagon, sleighs, a doctor's buggy and fifth wheel wagon. Two grandsons, two granddaughters, and two of their friends are traveling along on the wagon train.

NO: 48
Char and Theresa Christoph
Greenacres, WA

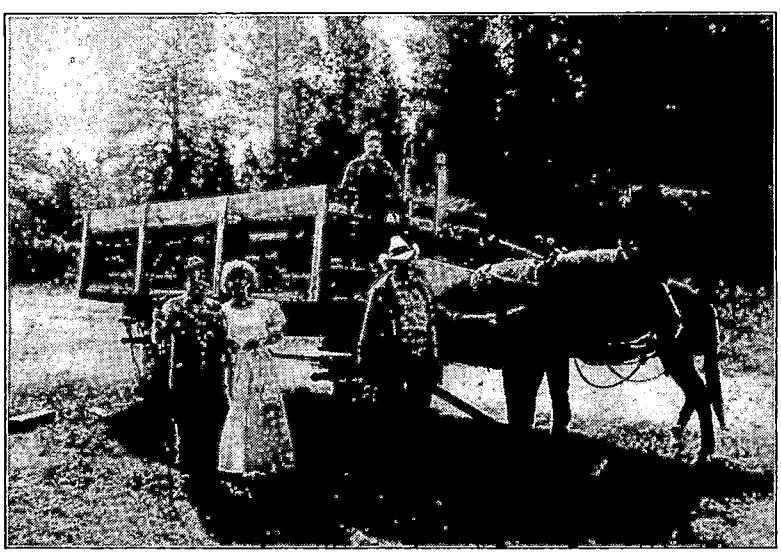
Outriders with Sherettes are Char Christoph and her daughter, Theresa. Char says their whole life revolves around horses. She and her daughter enjoy trail rides, cow penning, cutting, roping, parades, showing and training - anything as long as it uses horses. They live near Spokane and are counting on the wagon train to meet other horse enthusiasts and see new country.

NO: 49
Steve Hamper and Julie Turnbull
Plains, MT

Thinking the wagon train would be just the thing for bored horses, Julie and Steve signed on. Their team is pulling a steel-wheeled buckboard style wagon that came from Plains, Montana. They have rebuilt it and use it for wagon rides. They both work in a group home for handicapped adults in Plains and spend their spare time in horse-related activities such as draft horse shows and O-Mok-See events. A diversified small farm raising chickens, hogs, rabbits, and a garden keep them busy.

NO: 50
William W.(Bill) Wall
Clancy, MT

The Bill Wall crew are riding since, as can be seen from the picture, their wagon didn't meet wagon train specifications. Bill claims to be 80 and an expert cattleman, horseman and bullshipper. Riding with Bill are his daughter, Donna Wiseman, grandson, Trevor, and two dudes, Dave and Scott Carlson. When he is not fixing fences or chasing cows, Bill trains horses and takes part in O-Mok-See events. He says he has to go on the wagon train this time because he doesn't think he'll be around in 100 years for the next one.



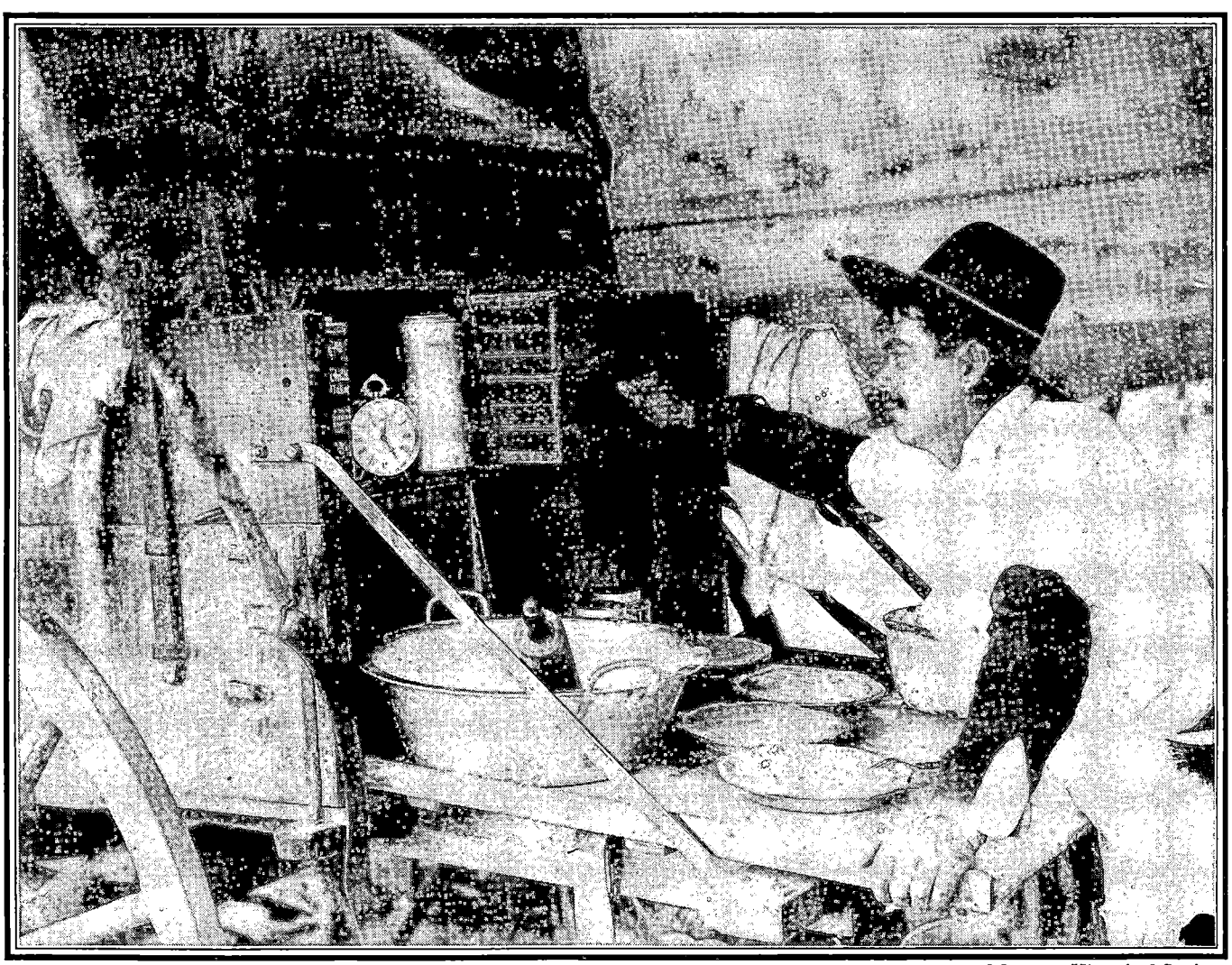
NO: 51
Dennis Lietzow

NO: 52
Jay Dean
Helena, MT

Jay Dean is riding Nizhoni, his paint Quarter horse; Nizhoni means "the pretty one". Jay who labels himself an outlaw incognito, has lived all over the western states and enjoys playing music, cross country and trail riding, making crafts, herding cows, canoeing, and fishing. He is on the wagon train for the experience for his horse and himself, and to hide from the rat race for awhile.

NO: 53
Gwen and Mildred McKittrick
Red Lodge, MT

It didn't take much arm twisting for Rollie Hebel to convince Gwen and Mildred McKittrick to drive Rollie's wagon and team from Virginia City to Helena. Both have a lifelong interest in horses, and Gwen frequently competes with Rollie's roan Belgians at parades and shows. Gwen was born in Hardin, Montana, in 1919, to a ranching family who left Illinois in 1908 to settle in Montana. As a young boy, Gwen followed the roundup wagons on the Crow Reservation. In the 1950s Gwen began raising Absarokee Appaloosas. His favorite was Absarokee Sunset, a stallion which has been honored in national breed magazines and shows. Gwen still trains saddle horses as he has for 68 years. He is currently a director for Latigo Corporation planning the Great Centennial Cattle Drive leaving Roundup on Labor Day weekend, 1989. Mildred's hobbies include collecting antiques, painting, ceramics, and sewing. She cooks in hunting camps and has raised three boys. The McKittrick's have helped organize the Chief Joseph ride for six years.



Mexican John baking pies

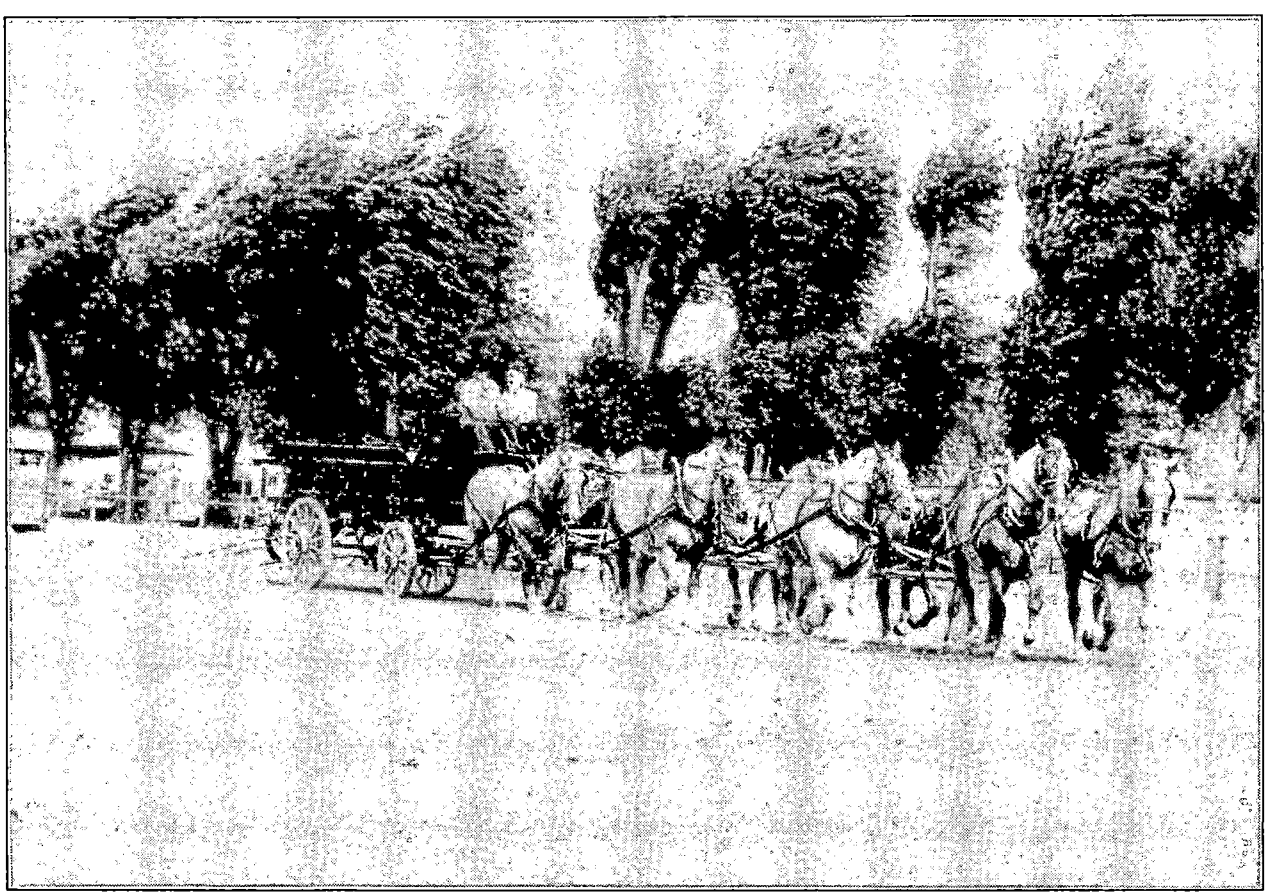
Montana Historical Society

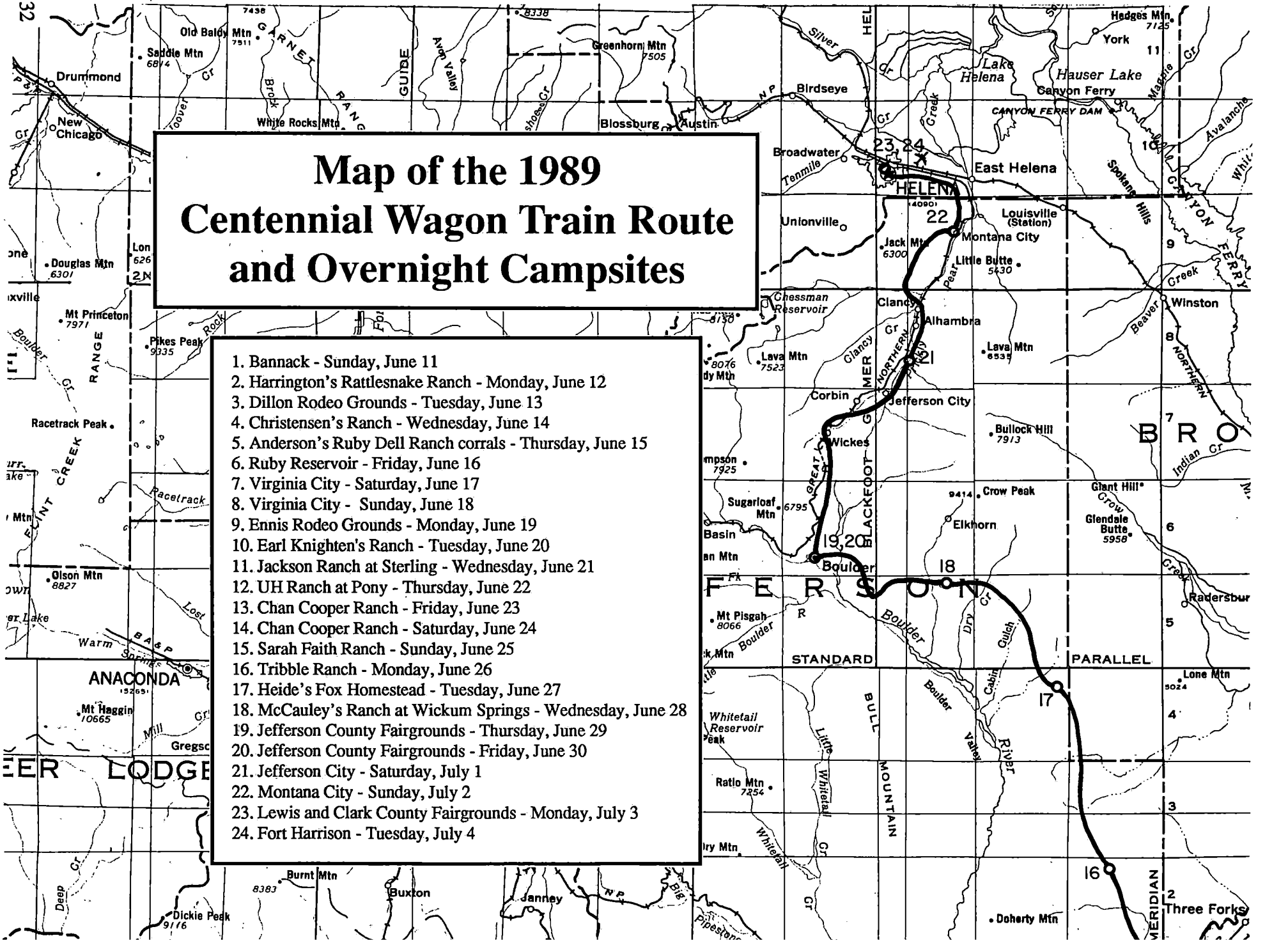
NO: 54
Rollie Hebel and Erma Evans
McAllister, MT

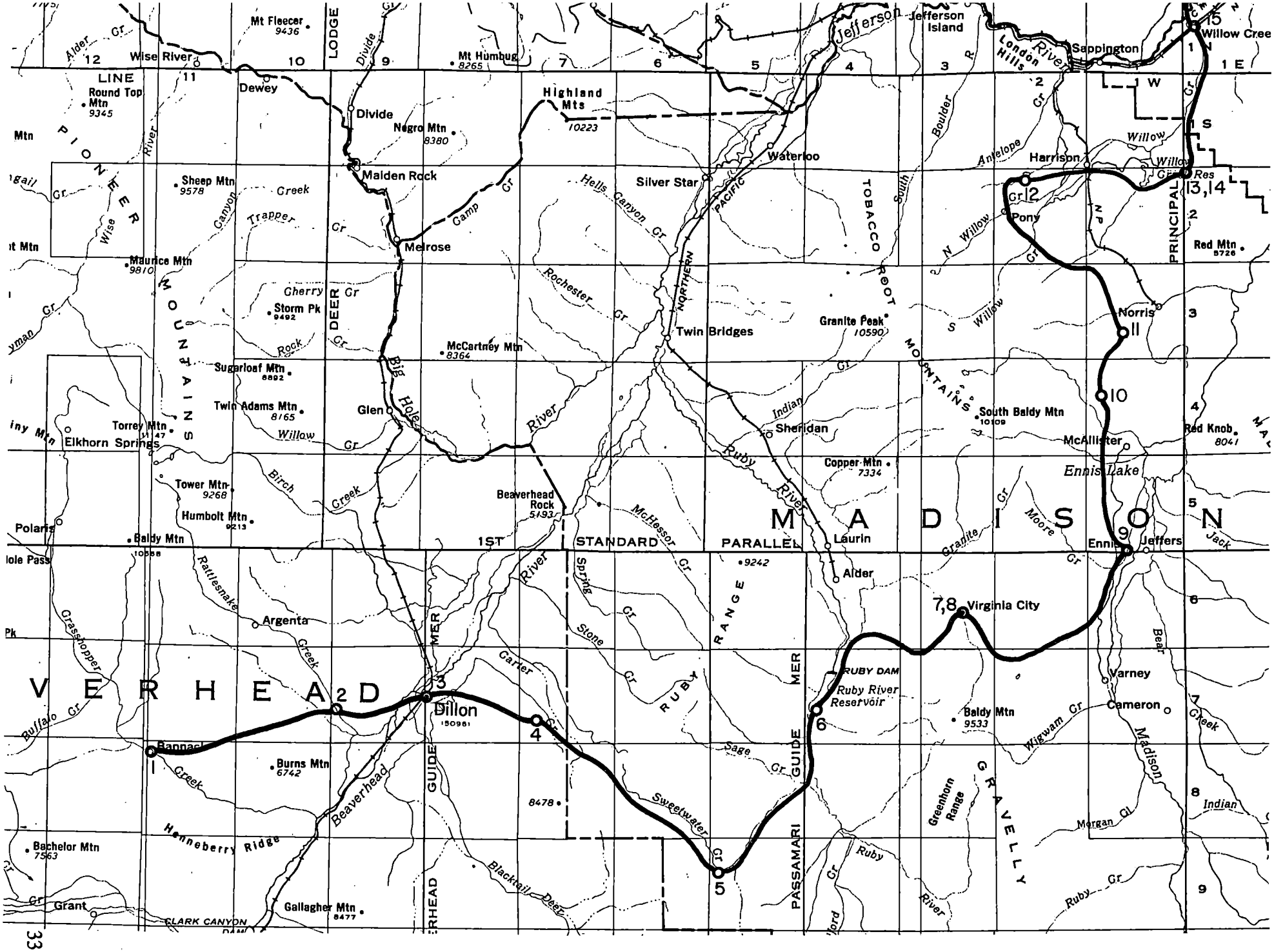
The Centennial Wagon Train is a piece of cake for Rollie Hebel who took the Montana Bicentennial Wagon from Bozeman to Valley Forge, Pennsylvania, in 1976, a 2800 mile trip. Rollie and Erma raise and show registered roan Belgians and commercial Angus cattle in the Madison valley. Rollie's interest in the roan Belgians was sparked by Zavan Green of Firth, Idaho, who had been raising them since the early 1940s. Rollie and Erma show their Belgians at The Billings Metra Fair, Eastern Idaho State Fair in Blackfoot, and at parades and other events throughout Montana. Rollie is operation foreman for Cypress Minerals at Cameron and occasionally auctioneers at local sales.

Erma's father homesteaded in the Gallatin Valley in 1888 upon arriving from the state of Kansas. Erma, a Townsend native, ranched in the Boulder Valley and McAllister areas most of her life. Her horse activities span several decades. She was an RCA rodeo queen in 1947, and won the amateur 4-up driving competition in 1988 in Blackfoot. She also placed 3rd in a class of 17 for team competition.

Joining the Hebel-Evans entry will be: Robin Daumiller of Kalispell who trains and shows saddle horses, Tracy Poole, former NILE queen from Billings and student at EMC, Margaret Erickson, a schoolteacher from Ennis who was raised on a ranch in the Cameron area. She belongs to the Madison Valley Sidesaddle Club.




Map of the 1989
Centennial Wagon Train Route
and Overnight Campsites
1. Bannack - Sunday, June 11
2. Harrington's Rattlesnake Ranch - Monday, June 12
3. Dillon Rodeo Grounds - Tuesday, June 13
4. Christensen's Ranch - Wednesday, June 14
5. Anderson's Ruby Dell Ranch corrals - Thursday, June 15
6. Ruby Reservoir - Friday, June 16
7. Virginia City - Saturday, June 17
8. Virginia City - Sunday, June 18
9. Ennis Rodeo Grounds - Monday, June 19
10. Earl Knighten's Ranch - Tuesday, June 20
11. Jackson Ranch at Sterling - Wednesday, June 21
12. UH Ranch at Pony - Thursday, June 22
13. Chan Cooper Ranch - Friday, June 23
14. Chan Cooper Ranch - Saturday, June 24
15. Sarah Faith Ranch - Sunday, June 25
16. Tribble Ranch - Monday, June 26
17. Heide's Fox Homestead - Tuesday, June 27
18. McCauley's Ranch at Wickum Springs - Wednesday, June 28
19. Jefferson County Fairgrounds - Thursday, June 29
20. Jefferson County Fairgrounds - Friday, June 30
21. Jefferson City - Saturday, July 1
22. Montana City - Sunday, July 2
23. Lewis and Clark County Fairgrounds - Monday, July 3
24. Fort Harrison - Tuesday, July 4
Drummond
New Chicago
Saddle Mtn
Old Baldy Mtn
White Rocks Mtn
Greenhorn Mtn
Blossburg
Austin
Birdseye
Broadwater
Tenmile
HELENA
East Helena
Lake Helena
Hauser Lake
Canyon Ferry
CANYON FERRY DAM
Hedges Mtn
York
Unionville
Jack Mtn
Montana City
Louisville (Station)
Little Butte
Douglas Mtn
Mt Princeton
Pikes Peak
Chessman Reservoir
Clancy
Alhambra
Winston
Lava Mtn
Corbin
Jefferson City
Wickes
Bullock Hill
Racetrack Peak
Racetrack
Sugarloaf Mtn
Basin
Crow Peak
Elkhorn
Giant Hill
Glendale Butte
Olson Mtn
Boulder
Mt Pisgah
STANDARD
PARALLEL
Radersburg
Lone Mtn
ANACONDA
Mt Haggin
Gregson
Whitetail Reservoir
Ratio Mtn
Doherty Mtn
Three Forks
Burnt Mtn
Buxton
Janney
Dickie Peak
Deep Cr
Warm Springs
Lost
Mill
Dry Gulch
Cabin
Indian Cr
Beaver Creek
Spokane Hills
Avalanche
Silver
Tenmile
Pipestone
Big
Boulder
Jefferson
Missouri
Gallatin
Madison
Flint Creek
Rock
Garnet
Guide
Avon Valley
Pioneer
Bull Mountain
Whitetail
Little Whitetail
Dry Cr


Mt Fleecer 9436
Wise River
Mt Humbug 8265
Jefferson Island
Sappington
Willow Cree
LINE
Round Top Mtn 9345
Dewey
Divide
Highland Mts 10223
Negro Mtn 8380
Waterloo
Harrison
Sheep Mtn 9578
Malden Rock
Silver Star
Pony
Red Mtn 8726
Maurice Mtn 9810
Melrose
Norris
Storm Pk 9492
McCartney Mtn 8364
Granite Peak 10590
Twin Bridges
Sugarloaf Mtn 8892
Twin Adams Mtn 8165
Glen
Sheridan
South Baldy Mtn 10109
McAllister
Red Knob 8041
Torrey Mtn 11147
Elkhorn Springs
Tower Mtn 9268
Humbolt Mtn 9213
Copper Mtn 7334
Ennis Lake
Beaverhead Rock 5193
Polaris
Baldy Mtn 10568
Laurin
Alder
Ennis
Jeffers
9242
Argenta
Virginia City
Varney
Cameron
Ruby Dam
Ruby River Reservoir
Baldy Mtn 9533
Dillon 15098
Burns Mtn 6742
8478
Bachelor Mtn 7563
Grant
Gallagher Mtn 8477
Clark Canyon Dam
Pioneer Mountains
Tobacco Root Mountains
Ruby Range
Gravelly Range
Greenhorn Range
Beaverhead
Madison
Jefferson
Ruby
Big Hole River
Wise River
Trapper Creek
Camp Gr
Rochester Gr
Indian Creek
Willow Gr
Rattlesnake Creek
Grasshopper Creek
Stone Gr
Carter Gr
Sage Gr
Sweetwater Gr
Blacktail Deer Creek
Hennebery Ridge
Buffalo Gr
Birch Creek
Moore Gr
Granite Gr
Wigwam Gr
Morgan Gl
Spring Gr
McHesser Gr
Hells Canyon Gr
Boulder R
London Hills
Antelope Gr
Willow Res
Divide Gr
Alder Gr
Cherry Gr
Rock Gr
Lyman Gr
Jack Creek
Bear Creek
Indian Creek
Ruby Gr
Ruby River
1ST STANDARD PARALLEL
BEAVERHEAD
MADISON
PRINCIPAL MERIDIAN
BEAVERHEAD GUIDE MERIDIAN
PASSAMARI GUIDE MERIDIAN
NORTHERN PACIFIC
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Centennial Wagon Train Itinerary: Second Week, from Virginia City to Willow Creek

Sunday, June 18, Layover, Virginia City Days

Sunday is set aside for a day of games and entertainment. These will include children's games, the Bozeman Barbershop Quartet, and the Red Lodge Grizzly Peek-A-Boo can-can dancers at Vigilante Hall. The flavor of the old days is recaptured in Virginia City's wooden boardwalks, historic buildings,and the mining and outlaw legends that go with them.

Monday, June 19, Evening camp at the Ennis Rodeo Grounds

Tuesday, June 20, Evening camp at Earl Knighten's Ranch

Earl Knighten leases the ranch and runs 300 cow-calf pairs. The ranch is owned by James Robertson who bought it from the original homesteaders. The ranch once was a horse ranch that shipped horses all over the U.S.

Wednesday, June 21, Evening camp on the Jackson Ranch at Sterling

J. Peter and Helen Jackson cite several places of historic interest in the area of their ranch, including the Sterling townsite and Stone Quartz Mills. During the peak of mining activity here, from 1865-67, the town of Sterling rivaled any in the region, according to Jeff Safford, of the Montana State University History Department. He says that surface mining in this region, known as the Hot Springs Mining District, produced rich gold ore. However, for various reasons, the ore could not be economically processed. Many investors who anticipated long term mining were disappointed, and money invested in quartz mills was lost. The town of Sterling is now extinct, although the mines are still worked.

Historical Notes Along the Wagon Train Route: Virginia City to Willow Creek

The wagon train follows an old freight road between Virginia City and Ennis. Also in the area was a toll road operated by Slade, a member of Plummer's gang.

Ennis was named for William Ennis, who was born in County Down, Ireland, and arrived in Montana in 1863. He lived in Bannack for a time, then relocated to the Madison River, where he built a store, and eventually ran the post office. He was shot while standing in front of the Madison House in Virginia City, by a neighbor who was angry because of a rumor that Mr. Ennis had maligned his character. He died of his wounds on July 4th, 1898.

McAllister, located seven miles north of Ennis, was established in 1896. A Methodist church built in 1887 is still used occasionally.

More than 500 people lived in the thriving mining town of Sterling during the 1860s. Four quartz mills made of stones cemented with a mixture of lime and horsehair dominated the town; the remains of one are still standing.

Cecil M. Reel in Trails and Trials, tells of the Sterling gold strike. "Someone had grubstaked two miners to drive a tunnel and they had worked all winter unknowingly along the side of this rich vein. Then one day while they were outside in the sunshine eating their lunch, a cave-in occurred, exposing the vein...It was four feet in width with six inches of gold in the center. The ore assayed at $6000 a ton after all specimens were picked out and at the old price of $19 an ounce. A sample of the ore sent to the World's Fair in San Francisco in 1895 received first prize. It took four years to mine this body of ore."

Norris, an old mining town established on Hot Spring Creek and at the end of a railroad line, has been an important cattle shipping point. Norris Hot Springs was popular as a bathing spot for miners, cowhands, and weary travelers.

Thursday, June 22, Evening camp at the UH Ranch at Pony

George Reich uses the UH Ranch for summer cattle pasture. The wagon train camp is near a lake created with horse-drawn scrapers by the Watt family in 1907.

Friday, June 23, Evening camp at Chan Cooper Ranch near Harrison Lake

The big red barn, house, granary, and other buildings were built by Chan's grandfather, William Buttelman. The lumber was hauled by horse and wagon from Willow Creek. When Harrison Lake was formed the buildings were moved to the valley at the mouth of the Willow Creek Canyon. The Coopers say the cabin, barn, and buildings located in a draw south of Harrison Lake were on land homesteaded by a Mr. and Mrs. Rose. They made moonshine during prohibition and spent time in jail once or twice. Part of the road over the hill to Willow Creek was used by stagecoaches moving between Fort Benton and Virginia City. Deer, antelope, coyotes, rattlesnakes, and lots of birds at the south end of the lake are at home here.

Saturday, June 24, Layover, Harrison Lake

Pony has been described in several books as a ghost town but it has a thriving population of about 100 people. Pony was named after a character from mining's heyday, a fellow under five feet tall who was crowded out of Virginia City mines. He continued to work from creek to creek, panning enough to keep himself in groceries, until he found a substantial claim near present day Pony. Although he paused to celebrate, he soon moved on, leaving his claim to others who honored him by choosing his nickname as the town's name. George Moreland worked the claim and discovered the lode which was the source of the placer supply. He dug down about 14 feet at the site of an outcrop in the middle of a patch of wild strawberries, and discovered ore so thick with gold that the gold could be mashed out with mortar and pestle. It wasn't long before a mill was moved from Sterling to stamp out the gold from the ore in Pony. Investors from Butte, Helena, and even Boston speculated on the mines at Pony. Through the 1890s mines around Pony turned out hundreds of thousands of dollars in gold ore.

Harrison took its name from the Harrison family which had a ranch in the area, noted for Morgan horses, shorthorn cattle, and a dairy. The post office opened around 1870.

NO: 55
George and Dorothy Miller
Absarokee, MT

George and Dorothy Miller's team, Duke and Prince, is pulling their Conestoga, also known as a Prairie Schooner. George bought the running gear and then built the box. George, a retired electric line contractor, spends his spare time driving his horses, hauling kids, attending parades, and joining wagon trains. George is on the wagon train to be part of the Centennial celebration and meet all the people who are on the train. Russ Atkins may join George with another wagon.

NO: 56
William Abney and Karnes Sundby
Helena, MT

NO: 57
Terry Embody and Fred Kohlmeier
Napa, CA

From one of the largest wine producing areas of our country comes an outfit with an international flavor. The 1906 Studebaker Freight wagon in its original condition is from Napa, California, and is owned by Terry Embody, a Missoula, Montana, native. It is hitched to a team of Percherons owned by Fred Kohlmeier, a native of Achim, Germany.

Terry, raised in Conrad and Helena, has been a fireman in Napa, California, for 20 years and hopes to move back to Montana upon retirement. He has kept the family brand (Bar Over 17) registered in Montana. Terry's wife, Evelyn is a Napa, California, native and works in the shipping department of a local winery. She enjoys horses and the Montana outdoors. Fred emigrated from Germany to California as a young boy. He worked in San Francisco as a mechanic and then opened a tow service in Napa; he is also a reserve policeman. Fred uses his team in parades, plow days, and pulling the local fire department's 1904 Nott Steam Engine. Jeannette Kohlmeier, born in Glasford, Illinois, moved to San Francisco, met and married Fred and settled in Napa. She works for the telephone company. Her hobbies are riding horseback and raising her grandchildren.

Haflingers

Haflingers resemble small chunky Belgians. They originated in the Austrian Alps near the village of Hafling, hence the name. During World War II, they were used as pack animals in the Alps and later were eaten when food became scarce. The breed survived in spite of these difficulties and were first imported to the U.S. in 1958.

NO: 58
Forrest M. Davis
Ronan, MT

Another wagon train participant with loads of experience is Forrest Davis, president of the Montana Draft Horse and Mule Association and member of the Western Montana Draft Horse and Mule Association. He can be found on the Western Association's annual wagon train in the Flathead area on Memorial Day weekend, come rain or shine. Forrest's team of Belgian full brothers is pulling his 1929 Studebaker wagon acquired in Washington and rebuilt by Forrest. He also farms with his horses, breaks and trains draft horses, teaches others how to drive, and is active in draft horse shows in the area. He is on the wagon train because he says, "It is my lifestyle". Joining Forrest are his daughter and son-in-law, Candy and Pete Weimer, and their children, and Jim and Jean Nemeth from Plains, Montana.

The Nemeths compare their riding horses to hummingbirds because they eat their weight in food every two days. Jim has just completed his MBA at the University of Montana and Jean teaches school. They enjoy trail rides, pack trips, wagon trips and hunting, although one fall Jim says he spent more time hunting lost horses in the Scapegoat Wilderness than he did hunting elk.

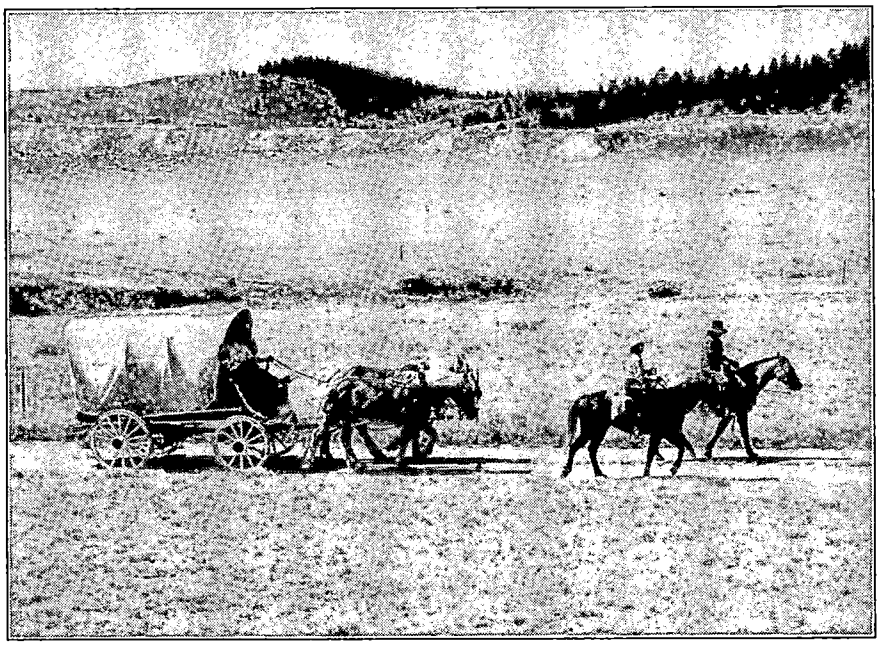
NO: 59
Sonja Berg
Belgrade, MT

Sonja Berg, with her two horses Telisha and Rusty, is an outrider on the train. Rusty is a "Montana Traveler", a "new" breed becoming established in Montana. Sonja's pack saddle is an old U.S. Cavalry style pack saddle that was used in the 1920s in Jackson Hole Wyoming. Her riding saddle is also cavalry style with a 1913 date stamped on it. She says she has ridden nearly 5000 miles on this saddle. Sonja raises a few colts, breaks and trains them, and packs and trail rides. The Centennial Wagon Train fulfills her dream of riding with a wagon train.

Joining Sonja is Nick Shrauger from Bozeman, a recently retired professor from Montana State University. He has a small ranch and enjoys many horse activities. His great grandfather, George Staudaher, arrived in Bannack on June 1, 1863, and continued to Alder Gulch. He later established the Pearl Spring ranch north of Dillon. Nick's grandfather, Nicholas Staudaher, was a stock inspector in Beaverhead County in the early 1900s and was in Bannack in 1901. It is especially meaningful to Nick that this journey begins in Bannack.

NO: 60
Greg Johnson
West Yellowstone, MT

NO: 61
Wayne and Carol Tichenor
Whitehall, MT



Wayne Tichenor is the trail boss for the Centennial Wagon Train. Wayne, Carol, and their three daughters, Carla, Valerie, and Jana, have been working on the planning of the Centennial run since its conception several years ago. They live in Whitehall and have hung their hats there for the past 15 years; all are native Montanans. The Tichenors have been wagon training since 1972 when they joined Jim Dennis on the Malta wagon train. After gaining two years of experience there, they started a small run out of Big Timber; then Wayne and Jim started a run in Virginia City with the help of Daryl Tichenor and Jim Edwards. That first train was a big success and became an annual event. On the third year of the Virginia City wagon train, plans were put into motion for the Centennial run.

The Tichenor wagon came from the Clifford Jensen ranch near Ronan. The wagon, a 1910 International grain wagon, was restored by the Tichenor family; the metal bed when removed weighed 300 pounds. The Tichenor team is a big set of Belgians with a back up set of young Belgians.

A special guest is their granddaughter, three-year-old Sherri Gillespie. Wayne says Sherri was impatient to begin, continually asking if it was time to go on the wagon train yet.

Clydesdales

The Clydesdale horse is a heavy draft breed which originated in Scotland. About 1750, the farmers of Lanarkshire began using Flemish stallions upon their native mares. One of these stallions, Blaze is generally credited with being the foundation sire. He passed on to his sons and daughters his size, conformation, and temperament. Their progeny inherited these same characteristics, still evident in the breed today.

By 1830, the farmers of Lanarkshire and adjacent counties had developed the system of hiring stallions to stand for mares in the district. In Lanarkshire, only Clydes were used. A breeders society was organized in 1877, followed by the stud book in 1878. These horses were imported to the U.S. in the early 1870s. The U.S. Clydesdale Breeders Association was organized in 1879.

The Clydesdale is lighter than the Belgian, Percheron, or Shire and lacks the width and compactness of the other draft breeds. No other breed of draft horse equals the Clydesdale in style and action. The breed is noted for a brisk walk, with a good snappy stride and a short trot, and well flexed hocks carried close together. A moderate amount of fine feather or long hair at the rear of the legs below the knees and hocks is characteristic. Bay and brown with white marking are the most common colors, but black, grays, chestnuts, and roans are occasionally seen.

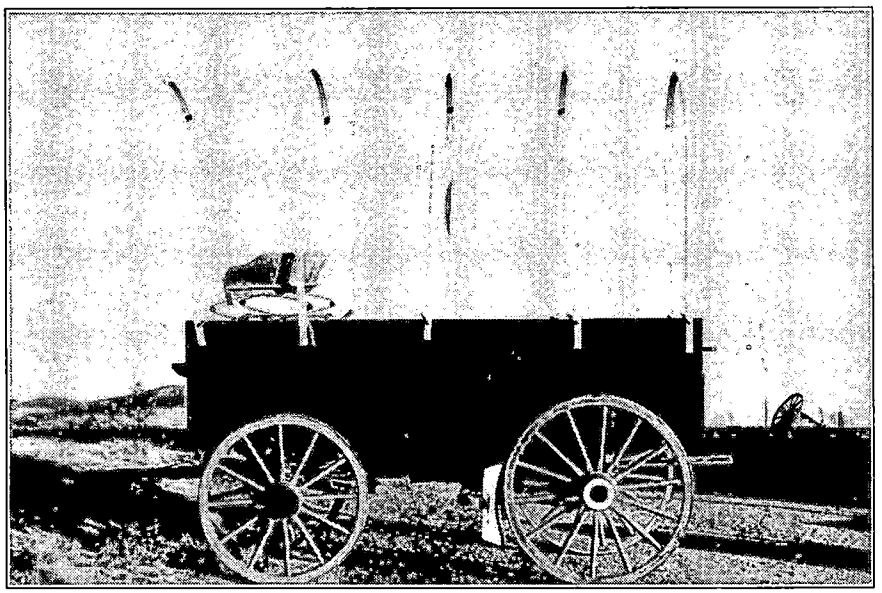
NO: 62
Mike and Dixie Myhre
Dillon, MT

Mike and Dixie Myhre's Belgian team is pulling their turn-of-the-century John Deere wagon. They acquired it from an old rancher in Harrison and only had to paint it, and add a new tongue and canvas top. They use the wagon in parades and sometimes to haul grain. Mike and Dixie use their horses on the ranch mostly for feeding, drilling grain, and hauling manure. Their eight-year-old grandson is traveling with them on the wagon train. They joined the wagon train to get away from the ranch for a few days, enjoy their horses, and spend time with their horsey friends.

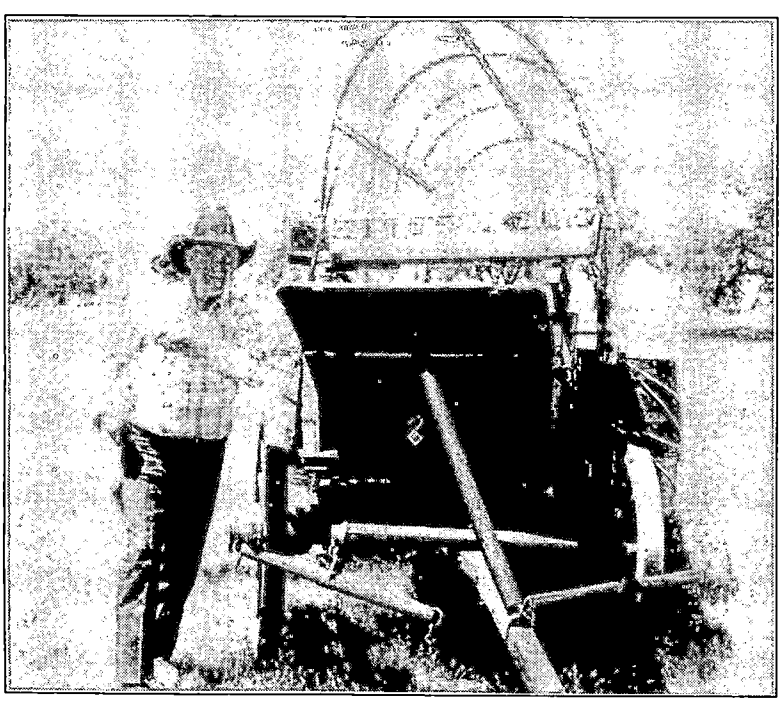
NO: 63
Ray Neely and Art Magnusson
Huson, MT

It seems many horsemen aren't content with just one equine activity and the Neely-Magnuson duo fits that category. As members of Back Country Horsemen, Many Valley Saddle Club, and Montana Longears Association, they trail ride, O-Mok-See, rope, show mules, and take part in rodeos. Their mules have won ribbons from first to grand champion. Ray is a rancher from the Frenchtown area and Art is a retired veterinarian from Frenchtown. Their mules and Mammoth mollies are pulling their John Deere Farm Wagon on the Centennial wagon train. Last year in May they used it on the Flathead wagon train.

NO: 64
Bob and Bonnie Morgan
East Helena, MT



A flatland wagon without brakes in mountainous Montana could cause its occupants trouble in a hurry. So when Bonnie and Bob Morgan moved to Montana from Indiana in 1985, they added brakes to their wagon. The McCormick-Deering farm wagon, pulled by Morgan's Belgians, Jack and Jiggs, was bought used by Bob's dad in 1920 for farming in Indiana and Illinois. He used it extensively to shuck corn, sow oats and grass seed, and for miscellaneous hauling until after World War II when he modernized his operation with tractors and rubber tires. The wagon then sat in the barn for the next 30 years, serving as a grain bin for seed wheat and oats. Bob's dad died in 1981, and Bob got the wagon. Other than the brakes, bows, and a new paint job, the wagon is in its original condition. Bob and Bonnie enjoy just about any horse activity from draft horse shows to trail riding. They also like a variety of breeds. Their team is part of a herd of eight consisting of two Clydesdales, three Quarter horses, a Morgan, and the two Belgians. Bonnie says Jack and Jiggs' most notable accomplishment to date has been consuming an entire bale of hay without stopping.



NO: 65
Jim West and William Ritchey
Rough And Ready, CA

A Belgian team is pulling Jim West's and Bill Ritchey's century-old Baker wagon acquired from Colorado. Jim spends his time driving teams and wagons, giving rides, and making movies. Bill Ritchey is an old wagon master and a lifetime member of the Kit Carson Mountain Men. Micheal Stires, a self-proclaimed mountain man, is hitching a ride as is Toby Jackson of Reno, Nevada. They are on the wagon train because they think it'll be the last big one.

NO: 66
James Deck and Debra Doris
Whitehall, MT

NO: 67
John and Linda Best
Deer Lodge, MT

John and Linda Best's Belgians are pulling their farm wagon which was resurrected from an old wagon on their farm and bits and pieces of another one. The team and wagon has been used on the Racetrack wagon train for several years. John was born on the family farm in Deer Lodge and is still there. In addition to farming the 80 acres, John is a millwright in a local sawmill, and Linda has a knitting and yarn business. John and Linda call their ranch Rock-a-Plenty because, they say, they have more than the community's share of rocks. They enjoy draft horse shows and 4-H horse activities. Traveling with the Bests are their twins Lisa and Erica, and their friends Mary and Larry Persons and daughter Jessi.

NO: 68
Harold Smith
Whitehall, MT

NO: 69
Tommy F. and Beatrice Martin
Parma, ID

Coming from the Boise valley, a fairly flat valley of irrigated row crops, Tommy and Beatrice are looking forward to the hills and dales of the Bannack-to-Helena trail. Tommy says he is 75 years young and has worked horses all of his life, which today include sleigh rides, hay rides, horse pulling and play days. The Martin's Appaloosas will be pulling their wagon. They learned of the wagon train at the Sandpoint Draft Horse Show and decided they couldn't miss this opportunity.

NO: 70
Pete and Candy Weimer
Polson, MT

This team is big! Pete and Candy Weimer's Belgian team of half brother and sister weigh over a ton apiece. As might be expected, the team is used in heavy weight pulls, as well as in shows and parades. The Weber wagon belongs to Forrest Davis, another participant in the wagon train, who says that his dad bought it new when Forrest was about 10 years old, making the wagon about 50 years old. Because the wagon is always kept in a shed, it is in mint condition. They use the wagon every year on the annual Flathead wagon train. Pete and Candy, their daughter Callie Jo, and son Chad live on a small farm. They use their horses in field day activities, parades, and shows and for all their farming. They joined the Montana Centennial Wagon Train because they wanted to take part in a once-in-a-lifetime event.

NO: 71
Ira A. and Wanda M. Zuroff
Richey, MT

The Zuroff's acquired a wagon from Roger Reinhart for their Percheron-Thoroughbred cross team to pull. They rebuilt the wagon and designed the box and cover. This is their first wagon train. The Zuroffs farm and ranch — when it rains. On their mostly dryland farm, they raise wheat, barley, and red Angus cattle. They wanted to be part of the wagon train because their parents came to Montana in the early 1900s. After 80 years in Montana, they felt their family name should be a part of the Centennial Celebration. Their children may join them on the wagon train.

NO: 72
Boone and Jerrian Jones
Butte, MT

Mules and horses teamed up to pull Boone and Jerrian Jones's wagon. Sissy and Sam are the leaders, Shorty and Suzzie are wheelers. Boone said this winter Suzzie worked on attitude adjustments necessary to pull the wagon. The wagon is a team effort also. To construct their wagon, Boone and Jerri gathered parts from various places and talked Jerrian's parents into doing the major reconstruction. This is a maiden voyage for both wagon and drivers. They acquired the canvas as the result of winning 2nd place at the World Championship Pack Horse Race in Big Timber in 1988. The prize was a gift certificate donated by the Reliable Tent and Awning Co. in Billings. Jerrian is a Medical Technologist at the Butte hospital and Boone is a state livestock inspector. Their children are with them and they anticipate parents will join them at various places along the trail.

NO: 73
Donald and Charlotte Jones
Belgrade, MT

An historic and colorful participant is the Montana State Bicentennial Wagon. As Montana's entry in the 1975-76 Bicentennial Wagon Train River Route, the wagon was driven from Bozeman, Montana, to Valley Forge, Pennsylvania, by Rollie Hebel. The wagon, owned by the Montana State Historical Society, is steel blue with '76 in forged steel lettering on the tool box. The Bicentennial wagon is a prairie schooner made in 1974 by Carriages By Arkansas in Jonesboro, Arkansas. A team of Shires owned by Don and Charlotte Jones is pulling the wagon from Bannack to Virginia City. They will join the wagon train again at Boulder and continue to Helena. Don and Charlotte raise Charolais cattle and small grains on their farm located on the west slope of the Bridger mountains with a commanding view of the Gallatin valley and surrounding mountains. Charlotte also spins and weaves, and Don raises German Angora rabbits.

NO: 74
Sue Taylor
Plentywood, MT

NO: 75
Dan and Ellen Dodds
Canyon Creek, MT

A pair of Shire foals tagging along behind their dams, Pepper and Rosie, should be attention-getters on Dan and Ellen Dodds' outfit. A third mare, Talullah, might be along as a spare. Dan says their wagon is a Dain grain wagon of unknown age and with unknown history. He and Bob Morgan brought it and a manure spreader back from Mitchell, South Dakota. The spreader has gotten a lot of use, but the wagon train will be the first or second outing for the wagon. Ellen is a Sanitarian with the Montana Department of Livestock, and Dan is an Economist with the Department of Natural Resources and Conservation. Ellen says they have a small flock of sheep they are trying not to lose money on, and in their spare time, about 15 minutes a month, they are remodeling their 100-year-old farm house. Dan says they are on the wagon train because Marlene Teague said they had to go.

NO: 76
Carrielee and Tom Parker
Condon, MT

From the heart of Montana's mule country comes Carrielee and Tom Parker. Tom is an outfitter in the Swan Valley; and Carrielee raises half-assed Arabians (Arabian mules), Arabians (pure and partbred), and Mammoth donkeys. She has won numerous halter and performance championships with her Mammoth Jack and won halter championships with her Jennets. But Carrielee doesn't just show mules, she helps shoulder the work by promoting and running mule shows (Condon Mule Days, Missoula and Kalispell Fairs and the Winter Expo). To keep herself busier she works part time as a teacher's aide and relief cook for the Swan River Forest Camp. She is also head of the Montana Longears Association. The Parker's small covered wagon was a gift from friends in Massachusetts. The wagon was purchased from and rebuilt by Bitterroot Carriage Company of Victor, Montana.

NO: 77
Gene and Shirley Galovic
Billings, MT

The Galovic's Haflingers, Thunder and Prince, are pulling their chuckwagon. The wagon is from Absarokee, Montana, and was rebuilt by Charlie Landried of Hardley-Able Tool Company. Gene and Shirley are both Butte natives and now own a small farm in Billings and a larger one in Twin Bridges, where they hope to live one day. They say that their friends and relatives aren't crazy enough to join them on the wagon train but "what do they know about fun?"

NO: 78
Larry Boe
Creston, B.C.

Norwegian Fjord horses are a versatile breed and Larry Boe takes advantage of their abilities. Four of his herd of 22 are pulling his wagon. Larry uses all of his Fjords in parades, shows, fairs and for hauling hay, skidding firewood, giving sleigh rides, pleasure riding and driving. He and his two sons have also chuckwagon raced at shows throughout western Canada. He has won ribbons with his horses in hitch classes, halter classes and log skids. Larry's wagon was originally a light delivery wagon and has been rebuilt by a retired wheelwright from Cranbrook, BC. Joining Larry are Lynn Sorenson of Creston, Ole Havguard and Arlene MacDonald of Cranbook, and Ken Hansen of Stevensville, Montana. Larry says to let people know they have Fjords for sale at all times.

NO: 79
Bob Miller

NO: 80
Kai and Jackie Christensen
Polson, MT

Kai and Jackie's Belgian team might be known as the pinup celebrities for they were featured on the November 1988 page of the Mischka Draft Horse calendar. The team is pulling an "old" Powder River wagon that Kai and Jackie have used on the Flathead wagon train. The Christensens also farm with their horses. Kai said the wagon train is a family outing as most all camping and pack trips have been since their children were two years old. They feel the wagon train is a once in a lifetime opportunity for all of them.

NO: 81
Dean and Linda Knutson

NO: 82
Diana K. Tibbets
Cody, WY

Kicking back and just enjoying the wagon train to the fullest is the goal of Diana Tibbets and her friends Ed and Joyce Knapp, Speed Spiegelberg, all from Cody, and Shirley and Pete Fornalski from Washington. "We're going to breathe the fresh mountain air, turn our faces to the sun and watch the scenic landscape of Montana pass by while enjoying companionship of fellow wagon trainers," Diana proclaims. Diana hails from Cody where she works for the Bureau of Reclamation as a budget analyst. She also raises mules and has used her mules in parades, fairs, and for riding, driving, and packing. She inherited her muleskinner savvy from her grandfather who drove the critters in Oregon. Diana's team of sorrel mules are pulling her covered wagon.

NO: 83
Gene and Jan Potter and Carly and Jabe
Wisdom, MT

Gene and Jan Potter, ranchers from Wisdom, brought their team of Belgians to pull their fifth wheel wagon. They use the wagon in shows and parades, and also enjoy horse pulling. Bob and Arlene Petersen are driving the second wagon.

NO: 84
Lucky Pierrit
Bellevue, ID

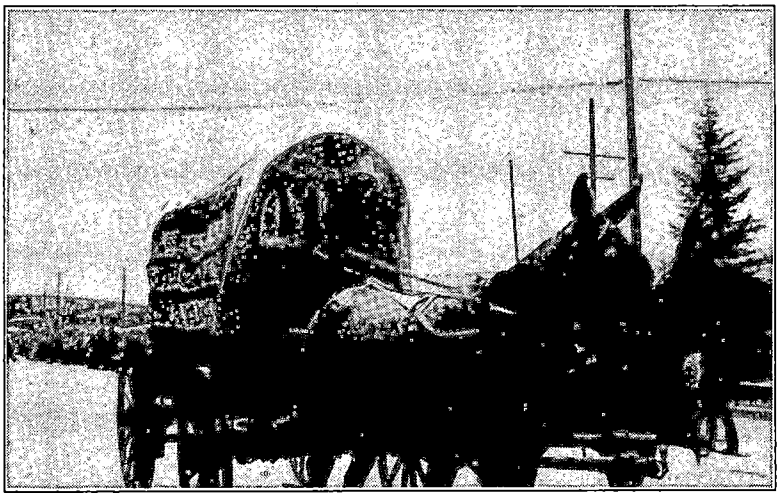
Lucky Pierrit's team is pulling his 60-year-old wooden-wheeled International Harvester wagon. The box was built for him in Meridian, Idaho. Lucky is a frequent participant in parades using this team and wagon as a well as a light driving team which pulls a two-seated buckboard. Lucky ranches in the Wood River Valley, about 40 miles south of Sun Valley, Idaho, which he says has nice summers and cold winters. He and his wife Pat, sponsor a bowling team in Bellevue. He has always wanted to travel with a wagon train but has never had the time until now.

NO: 85
Harry Uffalussy

NO: 86
Paul Burdett
Gold Creek, MT

Paul Burdett's team of Belgians is a mother-daughter team: Surprise and Sis. Paul owns Surprise and Dr. Murphy, a veterinarian from Deer Lodge, owns Sis. Paul's wagon was purchased from Pat Miller of Ronan who had rebuilt it into a covered wagon. Accompanying Paul on the wagon train is Dave Bluford, Paul's tenant, neighbor and friend. According to Paul, Dave is coming along to "take care of the old man". Paul's granddaughters and sons-in-law may join them along the way. Paul has never been on a wagon train and decided that it was now or never.

NO: 87
Paul Greany
Drummond, MT



Centennial wagon train travelers are busy people and Paul Greany is no different. He and Billie Greany own Greany Dry Goods in Drummond and Deer Lodge. Paul also owns a ranch and engages in chariot racing and team roping. Paul's team is pulling his 60-year-old wagon acquired from a local ranch. He said the wagon has been well maintained so didn't need to be rebuilt. He has used it on past wagon trains and for breaking horses. Friends Darrell Bradshaw, Frank Bridgewater, and Buff Hultman are hitching a ride.

NO: 88
Bud Baum
East Helena, MT

Bud Baum's Percheron team, Barney and Charlie, is pulling his covered wagon. Bud purchased the wagon from Pat Miller of Ronan. Bud is a cattle rancher in the foothills of the Winston-Clasoil community and spends his spare time traveling. His granddaughters Kim and Kay, and brother-in-law, Earl, are traveling with him on the wagon train.

Belgians

The Belgian breed originated in Belgium, from which country it derives its name, to meet the farming needs of this low-lying country which required a horse of size and bulk. The Belgian is thought to be directly and exclusively of old Flemish ancestry, indigenous to the country of its origin. Even today, the massiveness of the Belgian breed more nearly resembles the Flemish horse than does any other breed. The Belgian Draft Horse Society was founded in 1886. The Belgium government promoted the breeding of Belgians, and a government commission had to approve all stallions standing for public service.

The first Belgians were imported to the U.S. in 1886. The American Association of Importers and Breeders of Belgian Draft Horses was organized in 1887 which later became the Belgian Draft Horse Corporation of America.

The Belgian is noted for its draftiness: it is the widest, deepest, most compact, most massive, and lowest set of any draft breed. The Belgian is extremely quiet, docile, and patient. Their action is powerful, though less springy and high than that of the Clydesdale and Percheron. Because of their great chest width, many Belgians exhibit a rolling action or paddle with their front feet. Chestnut and roan are the most common colors, but browns, grays, and blacks are occasionally seen. Many Belgians have flaxen manes and tails and white-blazed faces.

NO: 89
Bernal and Jackie Kahrs
Elkhorn Hot Springs, Polaris, MT

A trip "out west" when she was 14 began Jackie Kahr's love affair with the Rocky Mountain country. After finishing school, her first stop was the South Fork Inn in the Big Horn Mountains of Wyoming where she spent several summers. After becoming a professional singer and entertainer, Jackie moved to Tacoma where she met Bernal. Bernal, a transplant from San Francisco to Tacoma at the age of 14, was a scuba diving instructor. The lure of the big sky was still strong so they picked up and moved to Montana. They have owned Elkhorn Hot Springs for nine years. Bernal's enthusiasm for Montana garnered an appointment by the governor to the Tourism Advisory Council on which he serves until 1990. They are on the wagon train because they are proud to be living in Montana and wish to be a part of the state's centennial. Their two black Percheron mares, Polly and Dolly, are pulling their 80-year-old International Harvester grain wagon. The wagon is originally from Ohio. Traveling with them are sons, Jeff, Fred and Chris, daughter, Karen, and granddaughter, Jessica.

Reflections on the Swan — Travel Montana

Centennial Wagon Train Itinerary: Third Week, From Willow Creek to Helena

Sunday, June 25, Evening camp at the Sarah Faith Ranch

This ranch, owned by John Hansen and George Kahrl near Willow Creek, is on the Jefferson River, which Lewis and Clark followed on their way west. Nearby is the confluence of the Missouri headwaters, town of Three Forks, and the Lewis and Clark Caverns. Hansen and Kahrl believe small family-run operations still have a place in American agriculture and are slowly rebuilding the ranch into an organic, self-sustaining farm. They hope that by staying small and organic they can improve the natural environment of their ranch. The draft horse fits into their philosophy. They plan to achieve their goal by mixing horse power and tractor power.

Ducks, geese, herons, sandhill cranes, and other waterfowl should be in evidence along the river.

Monday, June 26, Evening camp at the Tribble Ranch

William Tribble homesteaded the beginning of this ranch and, proving up on the homestead in 1920, he acquired more land during the depression and dry years when many abandoned their homesteads in this area. He was a direct descendent of Granny Yates, an early pioneer, who as a 48-year-old widow, joined a wagon train at St. Louis, Missouri, and journeyed to Virginia City. She is credited as the first person to bring Plymouth Rock chickens to Montana. Granny eventually made six round trips from Missouri to Montana to bring relatives out to Montana to start a new life.

The owners say an occasional elk can be seen on the ranch and coyotes are sure to produce great sound effects in the evening. Watch for teepee rings that mark old Indian camps around the ranch.

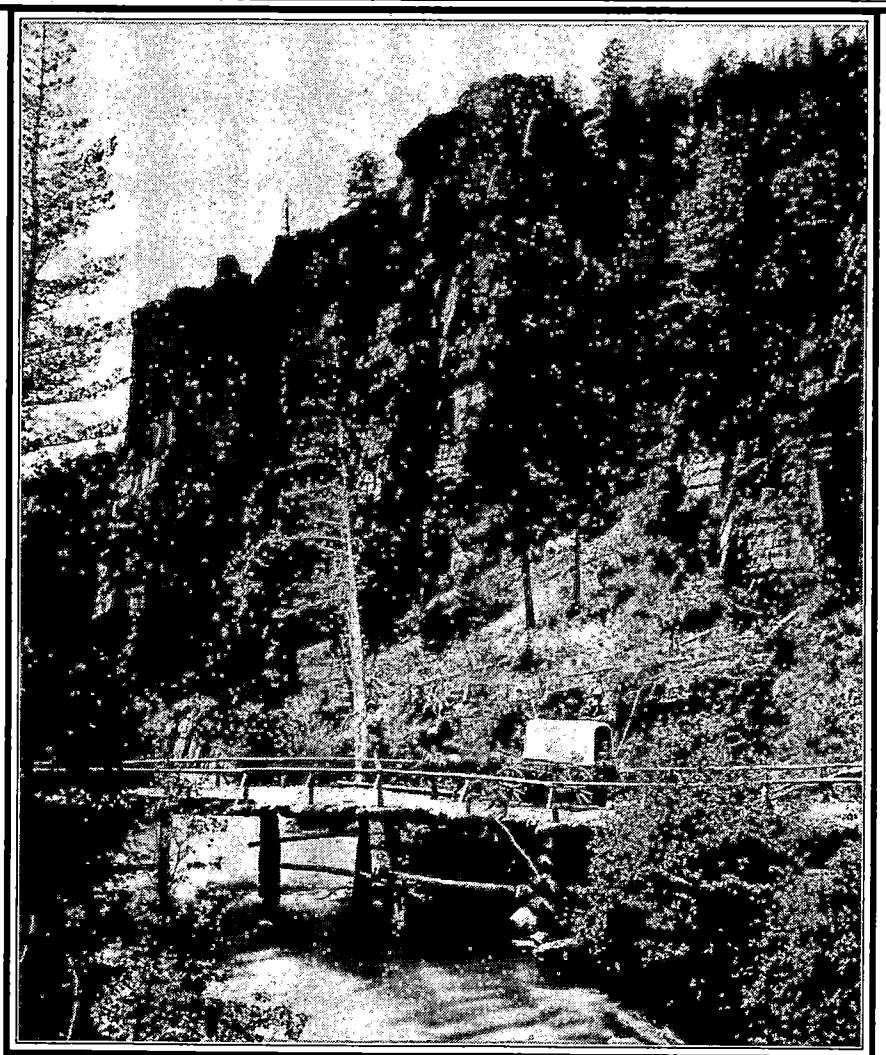
Tuesday, June 27, Evening camp at the Heide's Fox homestead

The Heides have operated their cow-calf ranch for 45 years. Their son and his family are continuing the operation. They calve out the cows in late winter, drive them on foot and by horse to leased ground in the late spring, and bring them back to graze in the fall. Antelope are the most common wildlife in this area.

Historical Notes Along the Wagon Train Route: Willow Creek to Helena

The wagon train follows part of the Yellowstone Trail as it passes through the Willow Creek area on its third leg of the journey to Helena.

Willow Creek's recorded history dates back to 1864 when the first pioneers arrived. The Willow Creek Valley, however, had been a natural thoroughfare for years before. The Yellowstone Trail, a transcontinental route that paralleled the later route of the Northern Pacific Railroad through Montana, was a main east-west road during the early part of the century which served many Montana cities and Yellowstone Park. Parts of the old Yellowstone Trail are now followed by Highway 10. Ruts from the original trail are still in evidence south of town. Northern Pacific Railroad came through the town in 1887, followed by the Milwaukee Road in 1908. Perhaps the earliest historic visitor was Capt. William Clark who rode through the Willow Creek valley on Thursday, July 25, 1805. Willow Creek is home of the Initial Point from which land surveys for Montana are marked. The Point is located on a hill about four miles south and slightly west of Main Street in Willow Creek.



Prickly Pear Canyon, early 1870s — Montana Historical Society

Wednesday, June 28, Evening camp at the Mick and Marge McCauley Ranch at Wickum Springs

Originally known as the Wickum Ranch, this ranch is known for its two-story log house built for Patrick Wickum in 1890 by Frank McGowen. Rock for the house foundation was hauled from "the devil's face," a well-known geographic formation nearby. The Wickums and McCauleys came to the Boulder valley in late 1864, the Wickums on a wagon pulled by oxen.

Thursday, June 29, Evening camp at Jefferson County Fairgrounds in Boulder

Boulder historian Olive Hagadone says that the Boulder fairgrounds were purchased in 1907 by the state to be used as a State School Ranch for the school's students, including the deaf, mute, and developmentally disabled. The dairy barn was built in 1909 by the deaf students. With vegetable gardens and beef cattle, the students were able to supply most of their own food. Use of the ranch as a state facility was discontinued in 1971. The state authorized Jefferson County to use these facilities for recreation, and the Boulder Rodeo Association built the arena. The Boulder valley, settled originally in 1864, is primarily a ranching area. Some of the descendants of the original ranchers still live in the valley.

Friday, June 30, Layover in Boulder

Dinner and a dance are planned by the townspeople for wagon train participants and visitors.

Saturday, July 1, Evening camp at Jefferson City

The Jefferson City Volunteer Fire Department is hosting a barbeque for the wagon train.

At one time Willow Creek was the second largest town in the Gallatin valley, but the population has dwindled to 150 or so. The town has a few businesses, a church, and an elementary and high school. The area surrounding the town is stock and grain farms, some still in the families of the early settlers.

North of Willow Creek the wagon train passes through Milligan Canyon to the Boulder River valley along a former freight route.

The wagon train travels along county roads up the Boulder River valley and crosses the road leading to the mining ghost town, Elkhorn.

The Elkhorn area's first claims were discovered by Peter Wys in the late 1860s. In 1872, Helena merchant Anton Holter formed the Elkhorn Mining Co. and purchased the claims. Holter built a five-stamp wet crushing mill and laid out the town of Elkhorn. For 10 years, Elkhorn miners extracted as much silver ore as the mill could handle. In 1883, after production had increased dramatically, Holter reorganized the company, acquired new capital, and built a 10-stamp mill. In that year, the mines produced almost $200,000 in silver bullion.

Six years later, a group of English capitalists bought the Elkhorn property, and the mine had its best years from then until the collapse of the silver market in 1893. A government official estimated that over $14 million in silver was removed from the mines before the silver bust. Soon after, the English investors sold out, and the mines have never been worked to any degree.

Elkhorn is open for visitors but all the property is still privately owned.

Near the south edge of the town of Boulder, the geothermal waters of Boulder Hot Springs bubble up from fissures in the granite. The old Boulder Hot Springs Hotel is one of the best examples of Spanish Colonial Revival Architecture in Montana.

Boulder, named for the massive stones that lie strewn about the valley, began as a stage station on the Fort Benton-Virginia City route in the early 1860s. It is now the county seat of Jefferson county. The Centennial Wagon Train will once again use the town as a stage wayside, bedding down at the Jefferson County fairgrounds.

As the wagon train heads north out of Boulder, it goes over the Amazon hill and down into Wickes.

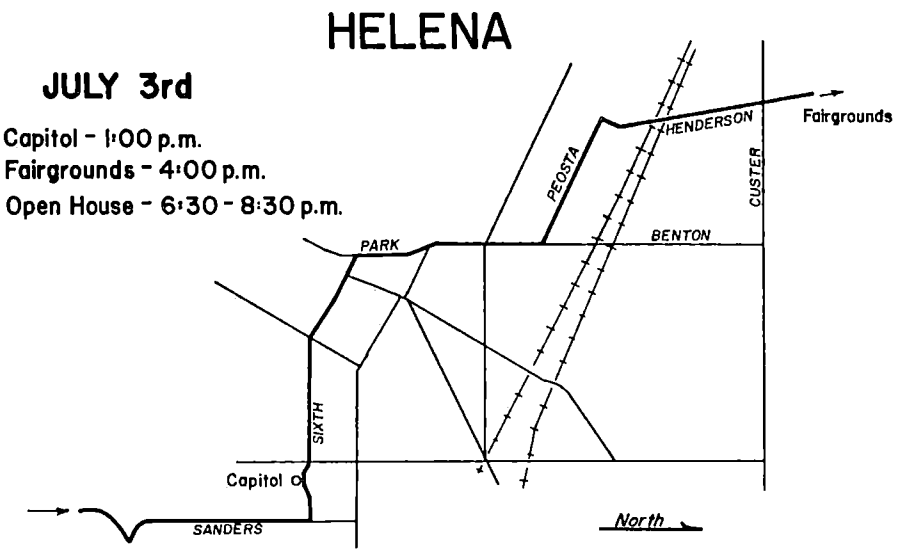
Jefferson City, 12 miles north of Boulder, also began as a stage station in 1864 on the Virginia City-Fort Benton route.

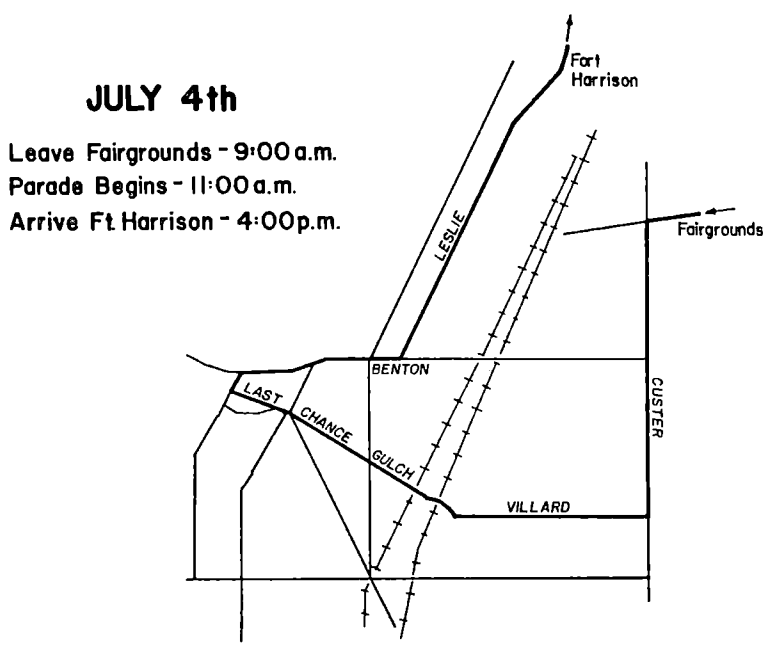
Sunday, July 2, Evening camp near Montana City's Exchange Club

Montana City will host an Indian dancing exhibition, and an outdoor buffet at the Exchange Club. A Western band will play. Breakfast on July 3rd will be prepared by Boy Scout Troop 229.

Monday, July 3, Evening camp in Helena at the Lewis and Clark County Fairgrounds

The wagon train finale begins with an 11:00 AM departure from Montana City and arrival at the Capitol Building at 1:00 PM. After a ceremony at the Capitol, the train will travel to the fairgrounds. The public is invited to visit the train from 6:30 to 8:30 that evening. Square dancing and other musical entertainment will be held. A local civic group will sell dinner to participants.





Towards Helena the area becomes mining territory once again. The town of Clancy was a silver camp in the late 1800s. The Legal Tender mine nearby once had 47 miners on the payroll. Kain Quarry, west of Clancy, provided granite for the State Capitol Building in Helena.

Montana City, the next stop on the wagon train route, was once a thriving gold camp and a contender for state capital. It was located on the Benton Road on "a large, level, and beautiful piece of ground...& an abundance of water." Diggings were started on Big Prickly Pear Creek near Montana City in the summer of 1862 and Montana City was settled that same year. With the location of the town on a major north-south road, the population soon exceeded 4000 prospectors, business adventurers, and other folk who saw opportunity in the new gold fields. Besides being a gold camp, Montana City boasts a prehistoric chert mine. Chert is a natural stone resembling flint, and can be easily worked into tools. It was much sought by prehistoric people for making tools and trading. The chert site is one mile east of Montana City. The site soon may be set aside as a historic preservation area.

Helena owes its beginnings to the Four Georgians who stopped in the gulch as a "last chance" at gold mining after hearing of the failure of a possible gold strike in the Kootenai, Idaho, area. The four camped in the gulch on the afternoon of July 14, 1864. The Georgians dug for gold and found several flat nuggets. Satisfied gold was present, they called the place Last Chance Gulch. They laid official plans for the camp; many of today's buildings sit atop those defined claims. By the following summer, the camp was in full "goldstrike" swing. It was a wild and rough mining camp, rent was $200.00 per month, wages were low, and shacks available for occupancy were hard to find.

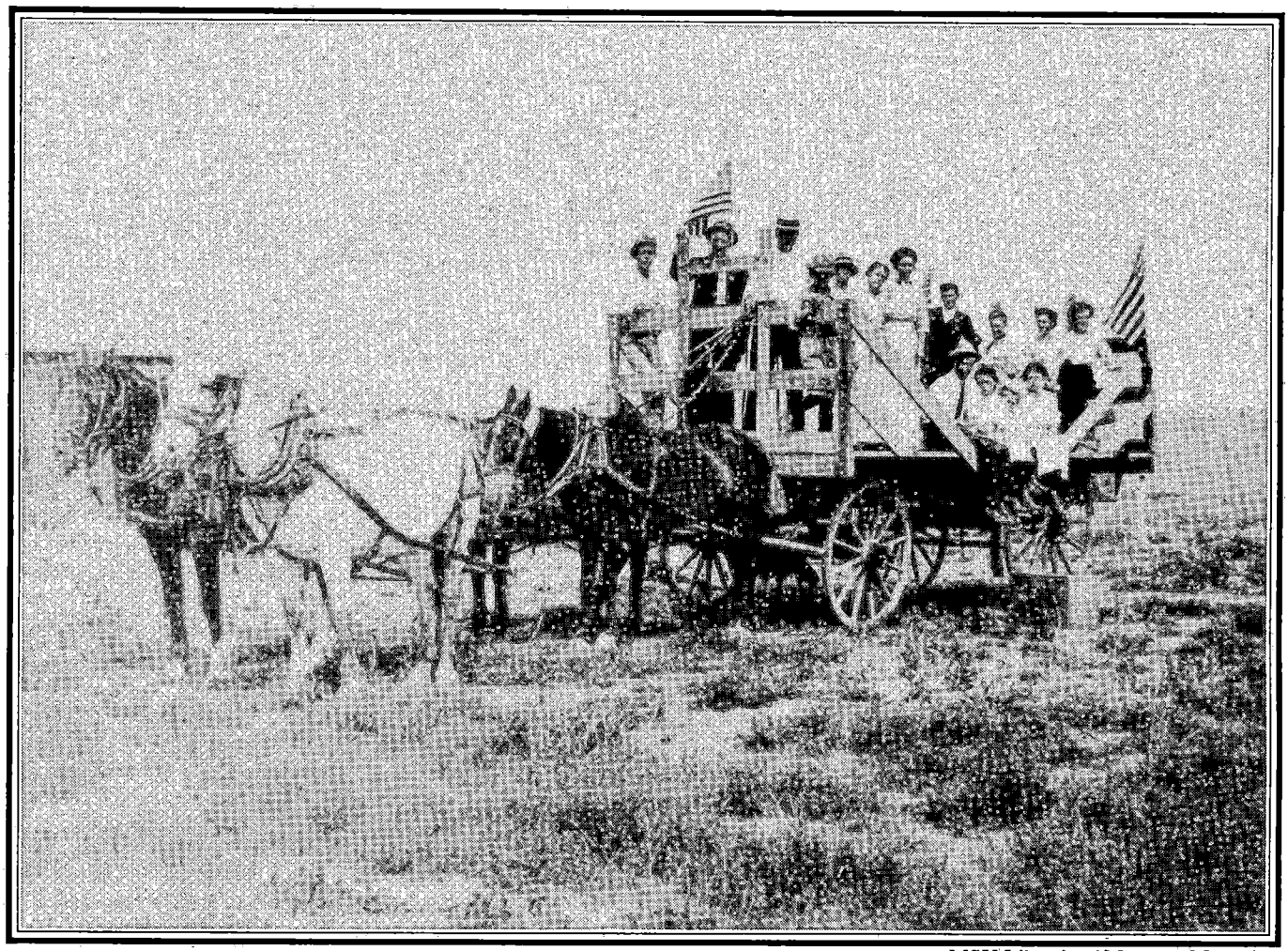
Last Chance is thought to have produced $170,000 in gold the first year and $10-$35 million before it played out. A display of gold can be seen at the Norwest Bank in Helena.

The story of Helena's designation as the territorial capital is one that involves many shady dealings. Excerpts from Montana: A History of Two Centuries summarize the events.

In 1865 the Legislature moved the seat of government to the center of population, Virginia City. However, Virginia City had a declining population by that time and Helena began to vie seriously for the honor. The Legislature ordered an election on the issue in 1867, which Virginia City won. As Helena continued to prosper, and Virginia City to decline, another election was held in 1869, this time amidst widespread accusations of fraud. Incredibly, after the ballots had been taken to the territorial secretary's office at Virginia City, an "accidental" fire destroyed them. Suspicions naturally abounded.

Tuesday, July 4, Evening camp at Fort Harrison

After a breakfast prepared by a local civic group, the wagons will depart at 9:00 AM and begin the July 4 Centennial parade in Helena at 11:00 AM, and then return to Fort Harrison. A potluck supper will be provided on this final evening with music provided by the Helena Energetic Seniors and Jake and Theresa Thomas.



Fourth of July, circa 1910 MSU Libraries / Montana Magazine

Helena, by now the hub of the territory, continued to press its case. The legislature ordered a third election on the issue for August of 1874, and this time the voters would choose only 'FOR OR AGAINST HELENA.' Again, widespread irregularities occurred. The Gallatin County vote was thrown out, and the returns from Meagher County were certified as fraudulent. The whole matter finally ended up in a great legal hassle. After the U.S. Supreme Court refused to consider the case on appeal, the Montana Supreme Court resolved the issue in Helena's favor.

The designation of Helena as state capital proceeded from the battling of the copper kings. W.A. Clark and Marcus Daly squared off in one of the most colorful political donnybrooks ever to come out of Montana. The Daly group, favoring Anaconda as capital, tried to overcome the "company town" image. The Clark group, favoring Helena, was blamed for its "social airs, cultural pretensions, and its Black and Chinese elements." The battle prompted "gala parades with imported bands, barrels of free booze, and even free money on occasion." A well-informed observer guessed that Daly spent over $2,500,000 and Clark at least $400,000 on this campaign. Since the state cast just over 52,000 votes in that one election, that rounded out to about $56.00 per vote.

When the territorial records were moved from Virginia City to Helena in April, 1875, they were moved by the Diamond R Freight Line. It was organized in Virginia City in 1864; by 1868 it had approximately 116 wagons, 700 oxen, and employed 70 men. The company continued to grow until pushed out by the railroad. Freight lines ran south into Utah, west to Walla Walla, Washington, north to Whoop-Up country in Alberta, and as far east as North Dakota. Diamond R freight caravans were huge, each consisting of 25 five-ton wagons and trailers, each hauled by 7 to 10 yoke of oxen. The Diamond R reputation for smooth and swift operation was deserved. It had the routes, the equipment, and the services, with billing offices throughout the eastern U.S. — in New York, Boston, Philadelphia, Chicago, St. Louis, and St. Paul. Goods from railheads in Corinne, Utah, for instance, could be delivered in Helena, 480 miles away, in just eight days. Rates were what the traffic would bear, ten cents per pound for 100 miles or less in 1876. Rates eventually did go down as railroads pushed West. All items owned by this company were branded with the Diamond R in conspicuous places: wagons, wheels, canvas, bows, harness, saddles, and animals.

Like the Four Georgians, the Centennial Wagon Train rolls to the end of its journey in Helena. The final campsite will be at Fort Harrison approximately 5 miles west of downtown Helena.

Fort Harrison has had many lives. Although first established in 1892 as an army post, it saw little active duty in that role. At the end of World War I, with over 200,000 wounded servicemen returning from overseas, Fort Harrison was converted into U.S. Public Health Hospital No. 72 with a bed capacity of 150. The hospital was assigned to the Veterans Bureau in 1922, and became a part of the Veteran's Administration in 1930.

The hospital served for brief time as a tuberculosis hospital between 1923 and 1925 but reverted to its original status as a general medical and surgical hospital in 1925. The 1935 earthquake so severely damaged the facility that many of the buildings had to be torn down.

Fort Harrison was a training base in World War II. To accommodate World War II casualties, Fort Harrison expanded to 450 beds. A new hospital building was completed in 1963 and the former hospital was converted to office space. Fort Harrison has returned to its original 150 bed capacity.

"By 1889, when the State of Montana was organized, the Indian and his tepee, the canoe and the mackinaw of the fur trader, the pan and the rocker of the gold prospector, the drive of the cattleman were memories only. The frontier period in Montana had come to an end." [from The Montana Frontier by Merrill Burlingame] And so the Centennial Wagon Train comes to an end, but memories remain.

These notes barely touch on Montana's rich past of fact and fiction. If you would like to read more about Montana history, visit your local library, or historical/genealogical society.

Fisk Expedition, 1866 Montana Historical Society

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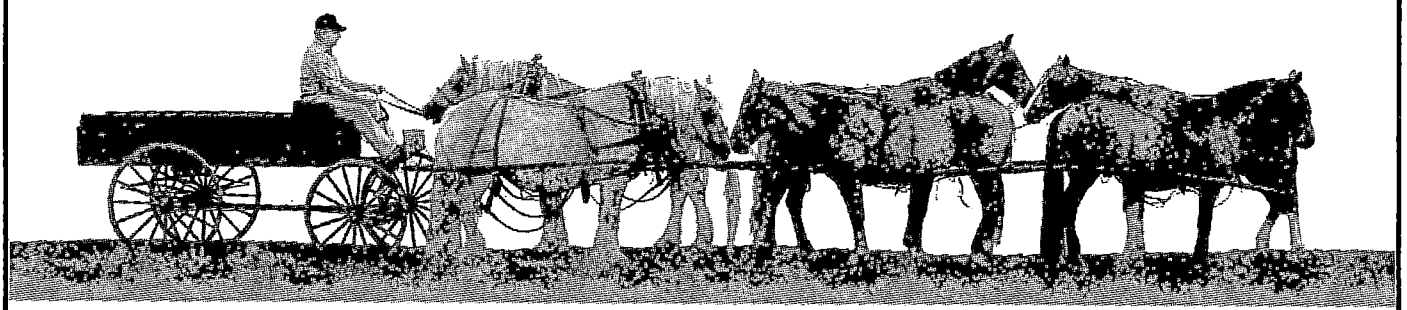

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The Centennial Wagon Train manifests the objectives of the Montana Draft Horse and Mule Association (MDHMA). But from the wagon train's conception in 1984 until its birth in 1989, oftimes our strategies and coordination resembled the picture above — Not Knowing If We Were Pullin' For Or Agin'!

Persistence, four years of hard work, and a $12,000 bequest from the Montana Centennial Commission, combined with many hours and dollars from those who believed in the project brought the wagon train to reality.

The Montana Draft Horse and Mule Association was created in 1976 in Lewistown. A ten-member Board of Directors, representing areas throughout Montana, oversees the non-profit organization's activities.

1989 MDHMA Directors

President - Forrest Davis, Ronan; 1st Vice President - Bill MacIntosh, Avon; 2nd Vice President - Keith Horne, Helena; Secretary-Treasurer - Marlene Teague, Helena; Director-at-Large - George Miller, Absarokee; NW Director - Charles Jensen, St. Regis; SW Director - Jim Lotan, Stevensville; NE Director - Sue Taylor, Vida; SE Director - Don Huffman, Billings; Ex-Officio -Roland Moore, Norris.

The annual membership ranges from 100 to 170 singles and families. A single membership costs $6.00; a family membership costs $10.00. Members receive quarterly newsletters. For more information call or write: Marlene Teague, 2710 E. Lincoln Rd., Helena, MT 59601, (406)458-9841.

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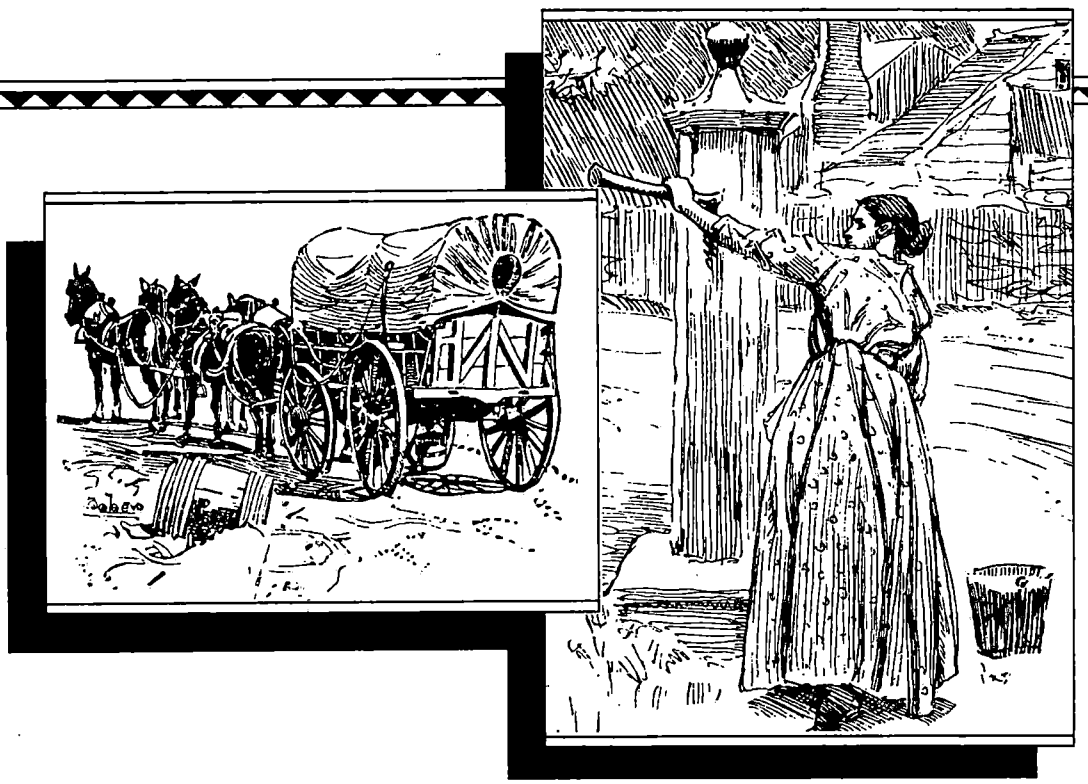

Dedication, cooperation, perseverance and a sense of adventure . . . some of the main ingredients of the pioneer spirit that created Montana. Those attributes shine again this Centennial year. We salute the adventurous participants in the Montana Centennial Wagon Train—and all who join in marking our state's 100th year.

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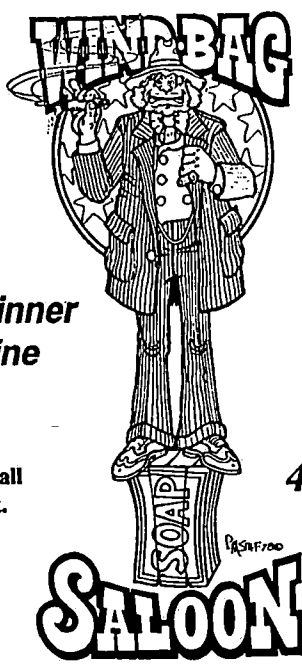

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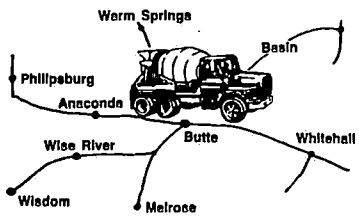

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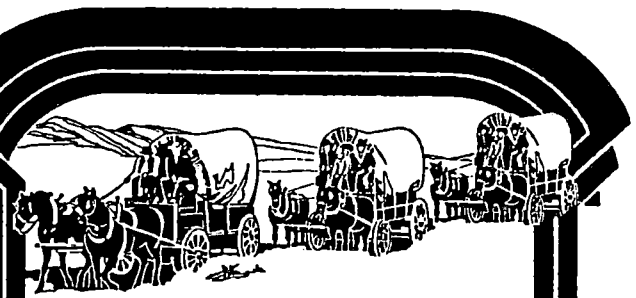

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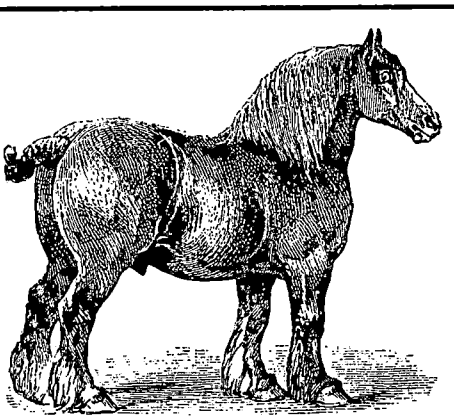

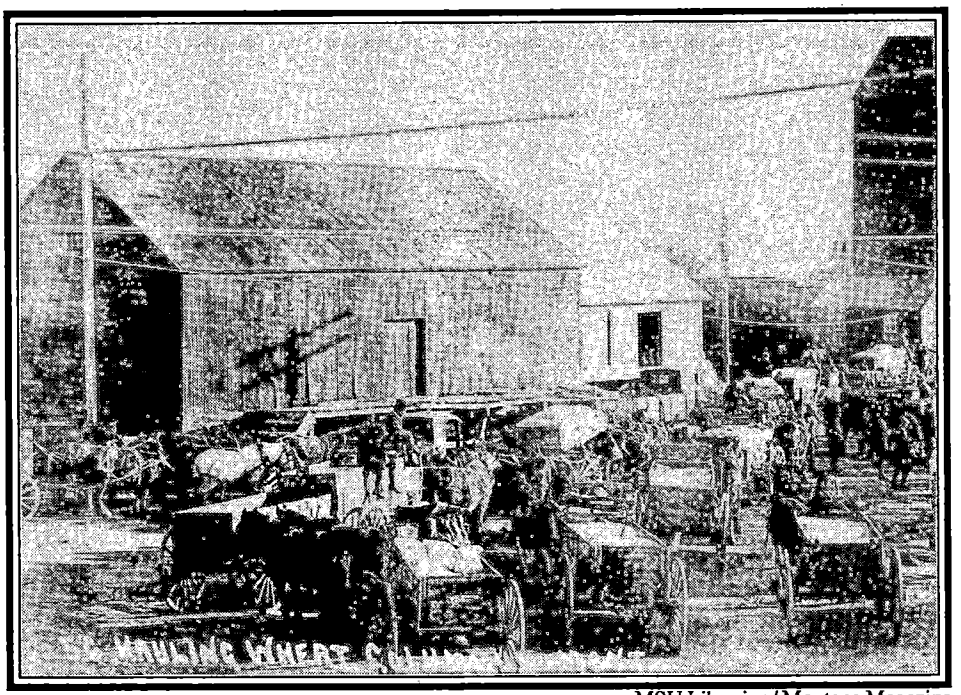

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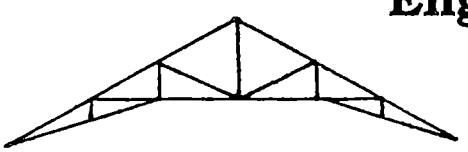

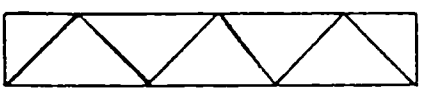

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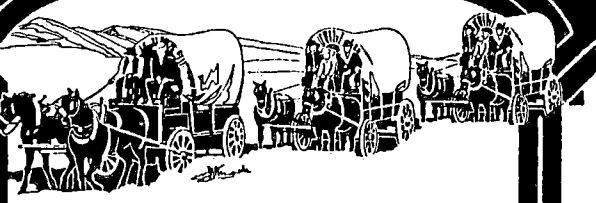

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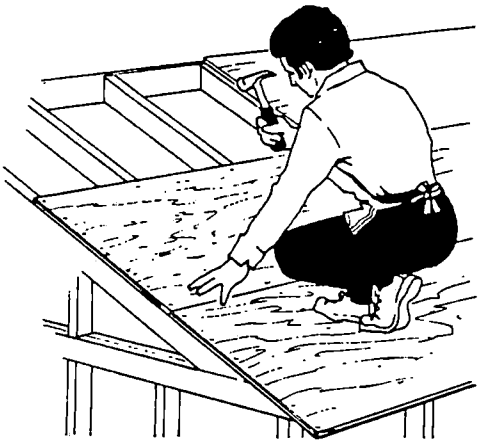

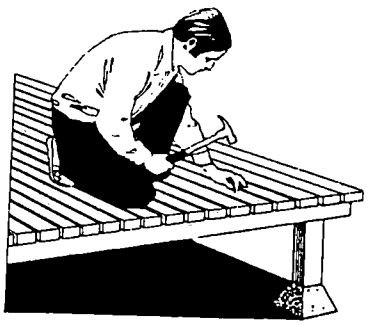

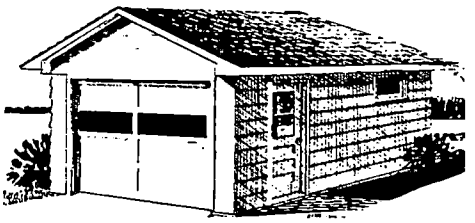

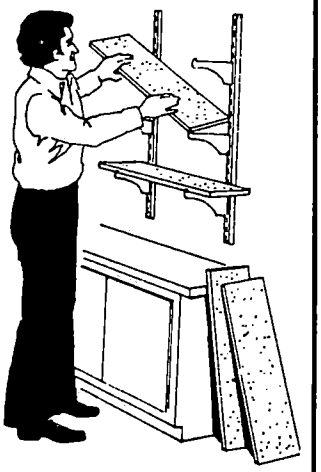

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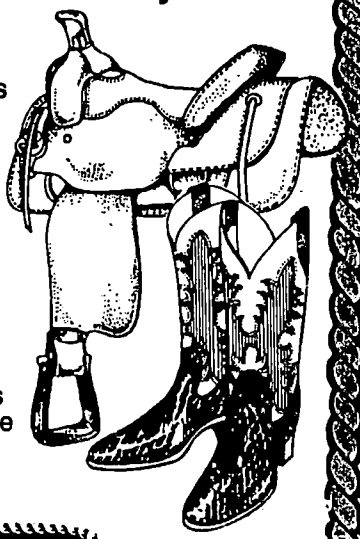

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311 Waterloo Road
Whitehall, MT 59759

Calendar of Events for Gold West Country

JUNE

Bannack
Montana Centennial Wagon Train Departure
Butte
Family Fun Days Carnival
Reid Brothers Circus
Dillon
LIttle Britches Rodeo
Renfro Trap Shoot
Ennis
Ennis Pioneer Days
Kid's Fishing Derby
Helena
Governor's Cup Centennial Marathon
Montana Traditional Jazz Festival
Jackson
International Shoot
Virginia City
Virginia City Days Celebration
Buffalo Runners' Shooting Matches
Brewery Follies Begin

JULY

Anaconda
Lostcreek Raceway Races
Crazy Days
"Art in the Park" Copper Village Art Center
Anaconda Saddle Club Horse Show
Augusta
Augusta Rodeo
Avon
Avon Flea Market
Bannack
Bannack Days
Butte
Shakespeare in the Park
Butte Vigilante Rodeo
Butte Jazz Festival
4th of July Parade, Fireworks, Circus, Picnic
Deer Lodge
4th of July Flagday Tournament
Grant Kohrs Ranch Birthday
Old Car Days
Dillon
Dillon 4th of July Jaycee Fireworks Display
Demolition Derby
Crazy Days
Drummond
Drummond Rodeo
Ennis
4th of July Rodeo
Fly-in and Cowboy Artists of America Rendezvous
Ennis Gun Show
Hole in Wall Gallery Art Show
Ambulance Service Art Auction
Grant
Hang Gliding Show
Helena
Montana Centennial Wagon Train Arrival
Centennial Exhibit of the Arts
Last Chance Stampede and Fair
Jackson
Old Timers Day
Lima
BBQ and Fun Day
Lincoln
4th of July Rodeo and Parade
Annual Tug-of-War, Craft Bazaar, Flea Market
Ovando
4th of July Barbeque
Philipsburg
Flint Creek Valley Days and Centennial Celebration
Townsend
Car Show and Flea Market
Townsend July Festival
Virginia City
4th of July Fireworks Display
Road Agent Swing Square Dancing
Volkswalk
Whitehall
Crazy Days
Frontier Days Parade and Celebration
Wisdom
4th of July BBQ, Street Dance, Fireworks, Horseshoe Tournament

AUGUST

Anaconda
Anaconda Garden Club Show
Boulder
Jefferson County Fair and Barn Dance
Butte
Butte Ethnic Festival and Celebration
August Arts Festival
Butte-Silver Bow County Fair
America's Favorite Pre-teen Pageant
Deer Lodge
Tri-County Fair
Dillon
Seniors Golf Tournament
Beaverhead County Fair
Ennis
Rope and Stroke Golf and Roping Tournament
Helena
Western Rendezvous of Art
Jackson
All-Girl Rodeo
Lincoln
Annual Fiddler's Contest
Bob Pertie Tournament
Virginia City
Virginia City Arts Festival
Ozzie Softball Tourney
Wisdom
Wisdom Gun Show
Black Powder Shoot

SEPTEMBER

Dillon
Beaverhead County Fair
Labor Day Parade, Concert, Jaycee Rodeo
Ennis
Labor Day Silver Dollar Swine Dine
Helena
Adult Electrum XVIII Exhibition and Marketplace Celebration of the Arts
Lincoln
Labor Day Craft Sale and Rodeo
Annual Corvette Rally
Turkey Shoot
Virginia City
Fall Horseback Poker Run
Whitehall
Tobacco Root Poker Run

For more information, write to GOLD WEST COUNTRY, 1155 Main Street. C, Deer Lodge, Montana 59722
Produced in cooperation with Travel Montana, Montana Department of Commerce.

Explore GOLD WEST COUNTRY

Powell County

Montana Territorial Prison
Grant Kohrs Ranch
Towe Antique Ford Collection
Yesterday's Playthings, Deer Lodge
Powell County Museum & Arts Foundation
Bob Marshall Wilderness Area
Coopers Lake
Upsata Lake

Granite County

Granite Ghost Town
Gem Mountain Sapphire Mine
Georgetown Lake
Garnet Ghost Town
Granite State Monument
Pintler Scenic Route
Discovery Basin Ski Area
Princeton Ghost Town

Deer Lodge County

Georgetown Lake
State Fish Hatchery
Wraith Hill Ski Area
Copper Village Museum & Arts Center
Hearst Free Library
Historic Washoe Theatre
Washoe Park
Pintler Scenic Route

Beaverhead County

Big Hole National Monument
Elkhorn Hot Springs
Jackson Hot Springs
Bannack State Park
Beaverhead Museum
Red Rock Refuge
Lewis & Clark Memorial
Maverick Mountain Ski Area
Deep Creek Ski Area

for further information contact:
GOLD WEST COUNTRY OF MONTANA, INC.
1155 Main St. • Deer Lodge, MT 59722
406-846-1943

Lewis & Clark County

Bob Marshall Wilderness
Charlie Russell Art Gallery
Frontier Town
Capital Building
Gates of the Mountains
Marysville Ghost Town
Canyon Ferry, Holter and Hauser Lakes
Castles Sapphire Mine
Original Governor's Mansion
Great Divide Ski Area
Montana Historical Society

Broadwater County

Canyon Ferry Lake
Broadwater County Museum
Confederate and Hellgate Recreation Areas
Mount Baldy
Deep Creek Canyon
Diamond City Ghost Town
Silos and White Earth Recreation Area
Missouri Headwaters State Park

Jefferson County

Elkhorn Ghost Town
Boulder Hot Springs
Radon Health Mines
Parrot Castle
Lewis & Clark Caverns

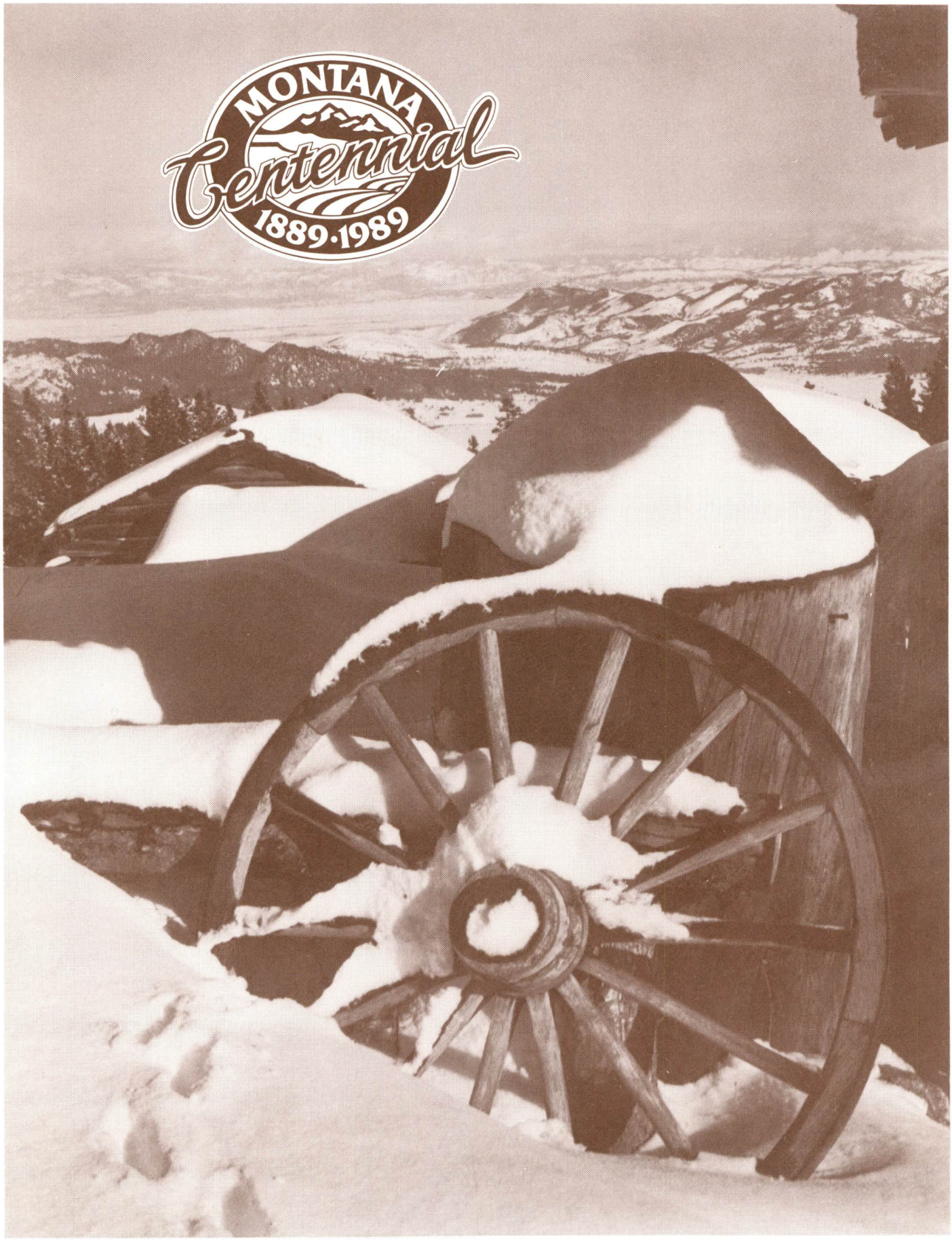
Silver Bow County

Neversweat-Washoe Historic Tour Train
Old No. 1 Trolley
Butte National Historic District
Fairmont Hot Springs
Berkeley Pit
World Museum of Mining
Butte Arts Chateau
Copper King Mansion
Beef Trail Ski Area
U.S. High Altitude Sports Center
Mineral Museum
Lady of the Rockies

Madison County

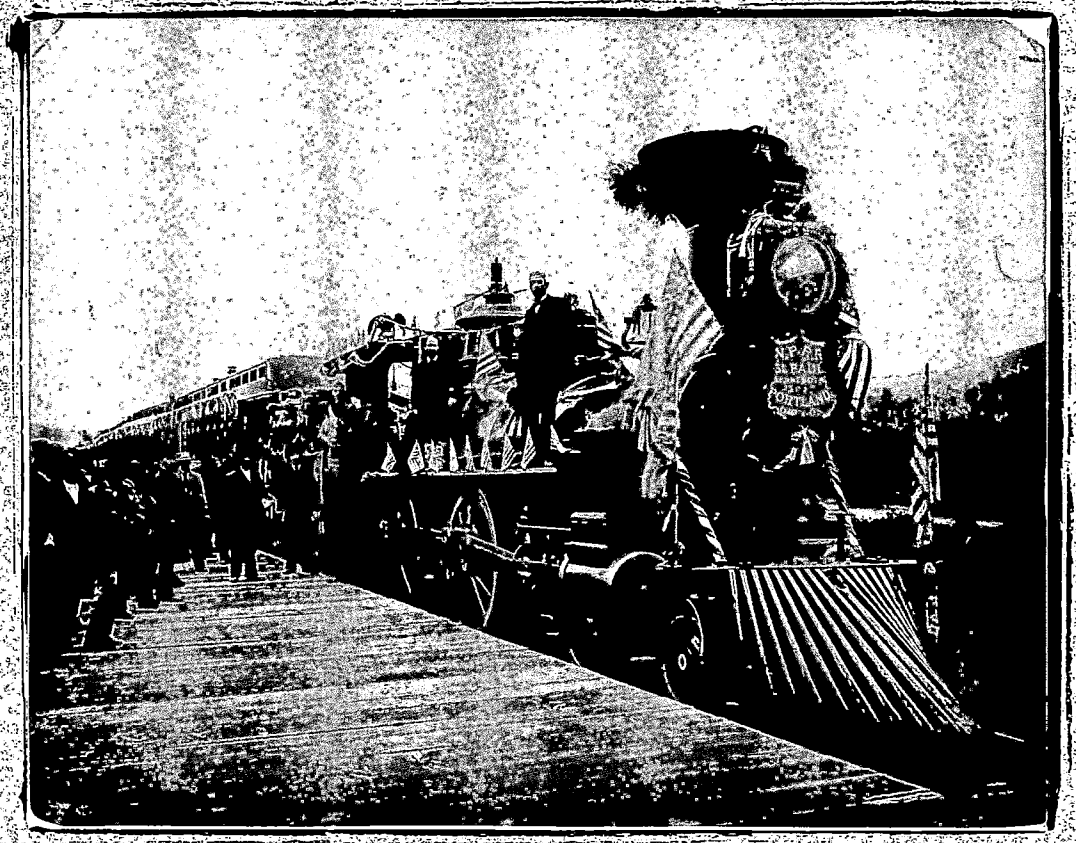
World Famous Madison River
Virginia City National Historic Area
Nevada City Ghost Town and Museum
Quake Lake Memorial Monument
Robbers Roost
Potosi Hot Springs
Ennis Lake
Lee Metcalf Wilderness Area

#1 Vacationland Southwest Montana!


MONTANA
Centennial
1889·1989

MONTANA

AND THE RAILROADS



MONTANA Centennial 1889-1989

CHIEF TWO-GUNS WHITE CALF. *Until the railroads opened up the territory to the average citizen, the West was pictured as a land of terrifying and forbidding terrain. Portrayals like this one of Chief Two-Guns White Calf, a Piegan Indian who welcomed visitors to Glacier National Park, helped change that image. Two-Guns White Calf served as one of the models for the "head" on the buffalo nickel. (Burlington Northern collection)*

THE RAILROADS AND A LAND CALLED MONTANA.

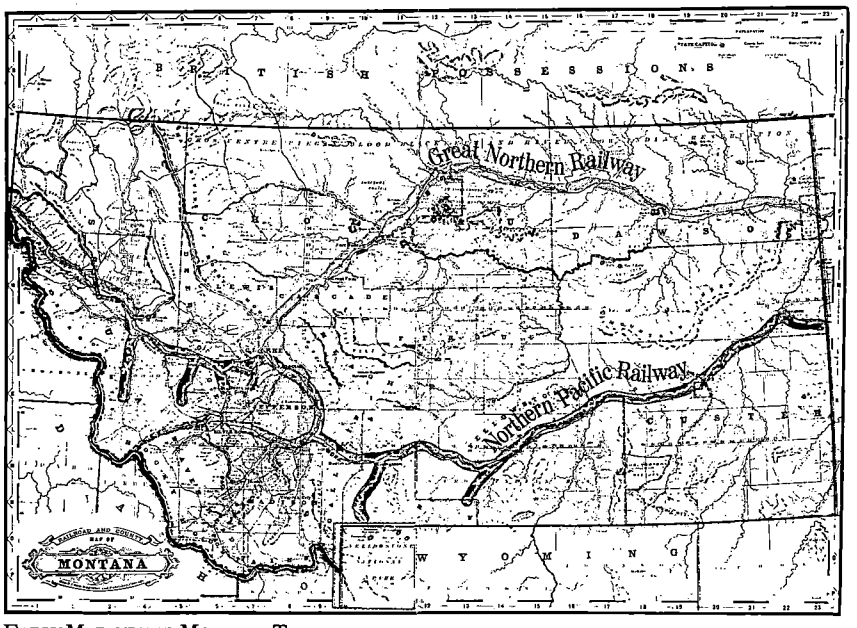
Montana. When railroad surveyor Isaac Stevens and his party explored it in 1853, surveying a route for a railroad that would link the Great Lakes with the Pacific Northwest, Montana was a rugged, unnamed territory. Some Americans thought Montana would never be successfully settled.

Settlement depended on a railroad, and the cost of a railroad was astronomical. It would be an engineering feat unparalleled by anything up to that time in history; an expensive adventure of unprecedented scope and cost that might never survive the harsh climate, nor the Indian attacks.

But visionaries saw a land bridge that could link trade from Asia to Europe, and bring the newly settled Pacific Coast within commercial reach of the lucrative Eastern markets.

On May 26, 1864, Congress created the Montana Territory. In the 25 years that followed, two transcontinental railways, the Northern Pacific and the Great Northern, opened Montana to the world. The influx of settlers from all over the world was so strong that, in 1889, Montana became a state.

As much as the roaring winds and flowing glaciers that gave shape to the land, the railroads carved out the society we know today as Montana.



EARLY MAP OF THE MONTANA TERRITORY.

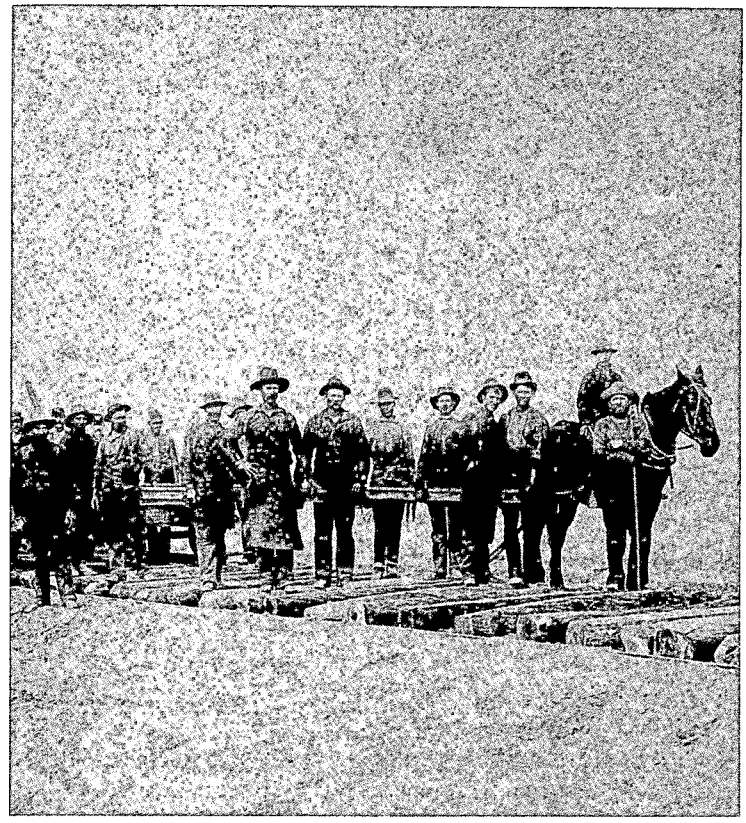
SURVEYORS' CAMP, 1882. *These surveying engineers at Terry's Landing, Montana Territory, traveled ahead of the railroad construction crews and were often subject to Indian raids. To protect them, the Army sent military escorts. Called by one admiring engineer the "priests of the new epoch," these well-starched young men represented the cream of the Eastern engineering colleges.*

COVER:
THE GOLD SPIKE SPECIAL. *On September 8, 1883, the last spike was driven at Gold Creek, near Garrison, Montana, completing the first northern transcontinental railway, the Northern Pacific. This train was one of four that carried hundreds of dignitaries across the country.*

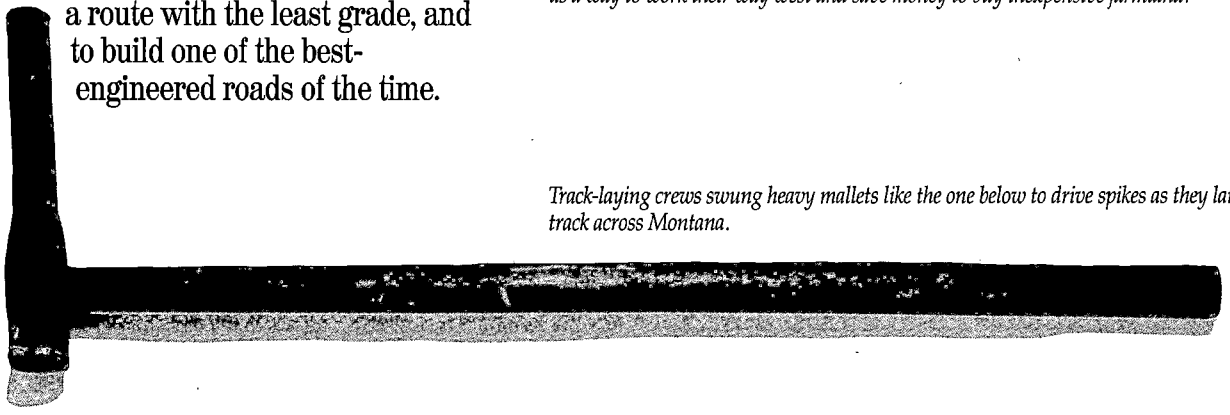
ACROSS A CONTINENT. The obstacles in carving railroads out of 2,000 miles of wilderness were inconceivable. From the Mississippi to the Pacific lay almost every type of terrain. Grading was done by hand, with horse-drawn tools, and with dynamite when the going got rough. All supplies had to be brought from the East by rail. West of the Mississippi, there were few sources of supply.

Financing for the railroad depended on massive sales of railway bonds, and on large government land grants along the proposed route. With the land, the railroads hoped to lure settlers whose produce would provide ready-made goods for freight shipments east.

First across Montana was the Northern Pacific, completed in 1883, followed by the Great Northern ten years later. Although the Northern Pacific, led by Henry Villard, was the first of the northern transcontinentals, the Great Northern, powered by empire-builder Jim Hill, was built largely with private funding. This forced Hill to find a route with the least grade, and to build one of the best-engineered roads of the time.



LAYING GREAT NORTHERN TRACK TO FORT ASSINIBOINE, 1887. *The heavy steel rails were brought by train from the East and then by horse-drawn wagon to the end of the track. Teams of men would hoist the rails – five men to a 500-pound rail – and, with drill-team precision, place them on the roadbed. When the going was good, two teams could lay four rails per minute, from two to five miles per day. The crew pictured here had just completed laying seven miles of track in one day between Havre and Fort Assiniboine, a record-breaking feat. Along the way, they were serenaded by the band of the 20th Infantry. Tough as the work was, railroad work was much sought after. Many men used it as a way to work their way west and save money to buy inexpensive farmland.*

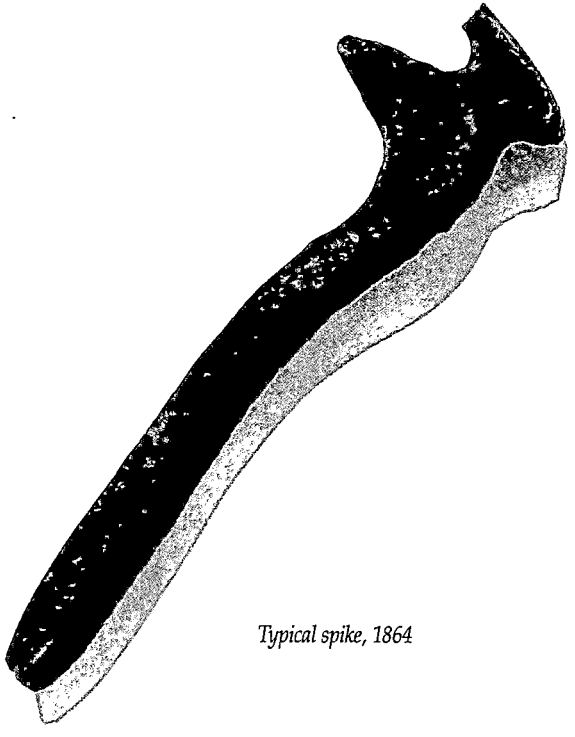


Track-laying crews swung heavy mallets like the one below to drive spikes as they laid track across Montana.

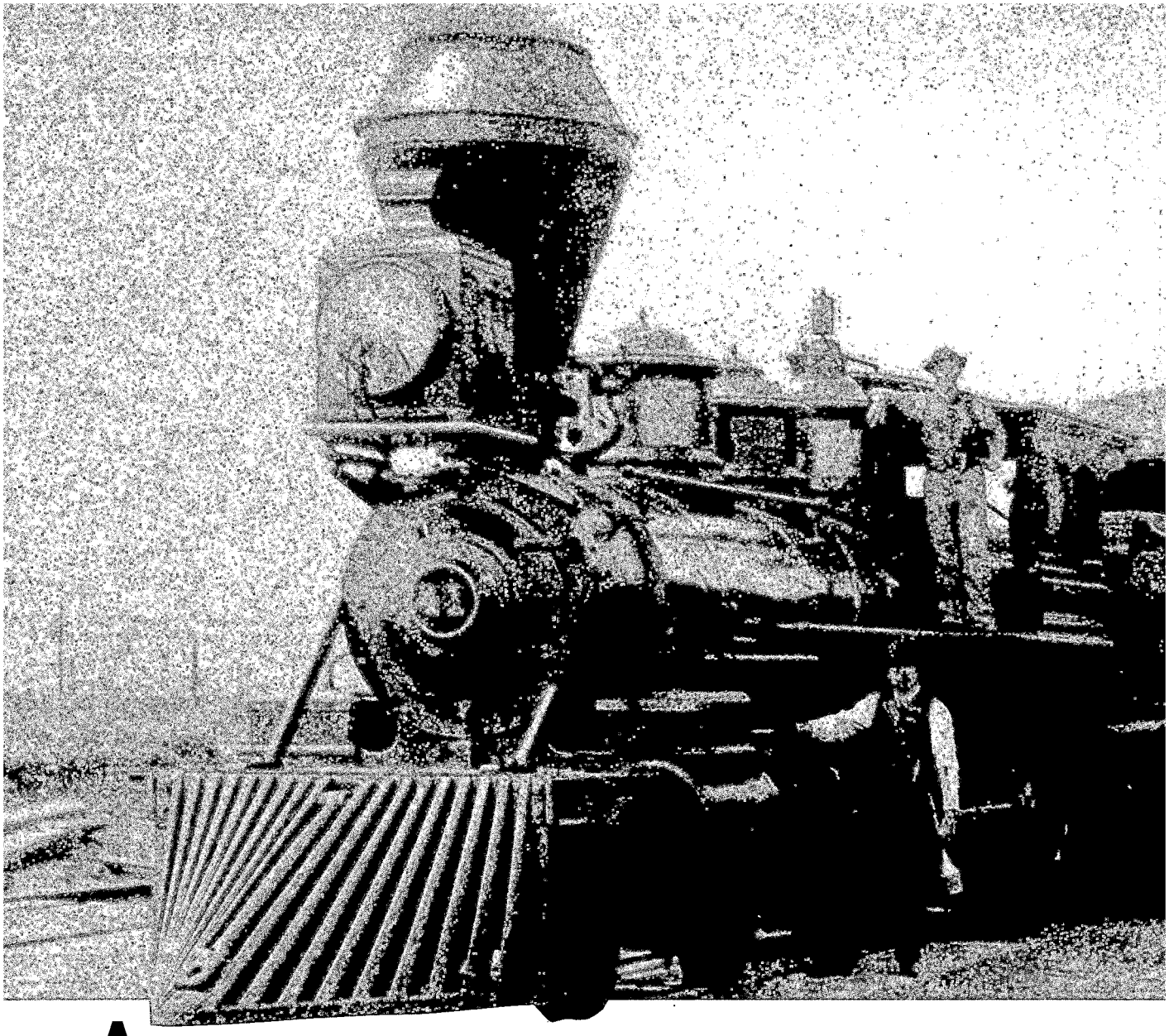
PREPARING FOR TRACK-LAYING CONTEST, LAST-SPIKE CEREMONY, NORTHERN PACIFIC LINE, 1883 (top). *Although the actual track had been completed weeks before, a special track-laying contest was arranged for the official celebration, complete with viewing stands and speeches. The "east" team is shown here getting ready for the contest. With them is a horse that had pulled construction wagons over 750 miles of track.*

KITCHEN WORKERS AND FRIENDS (bottom). *Somewhere on the Great Northern line approaching Great Falls, kitchen workers posed for this picture. Workers slept in three-tiered dormitory cars like the one on the right and ate in dining cars where they were served buffalo dinners in shifts. To speed service, tin plates were nailed to the table and washed off between sittings.*

GENERAL CUSTER AND HIS SCOUTS. *George Armstrong Custer was assigned the duty of protecting the Northern Pacific's surveying and construction crews from Indian attack. In this picture taken in Montana in the early 1870s, he is shown with his favorite scout, Bloody Knife, an Arikara Indian who was later killed with Custer at Little Big Horn.*



Typical spike, 1864



As the railroad moved west, the promise of land, adventure and even wealth drew families from all across the East and Europe. While many came to farm, some came for the greatest adventure of the day: to work on the railroad.

It was tough, dangerous work. In 1888 alone, more than 2,000 U.S. railroad workers were killed. Switchmen, in particular, were short-lived, since their jobs often required them to run between moving cars and connect heavy couplings. Too often, accidents happened.

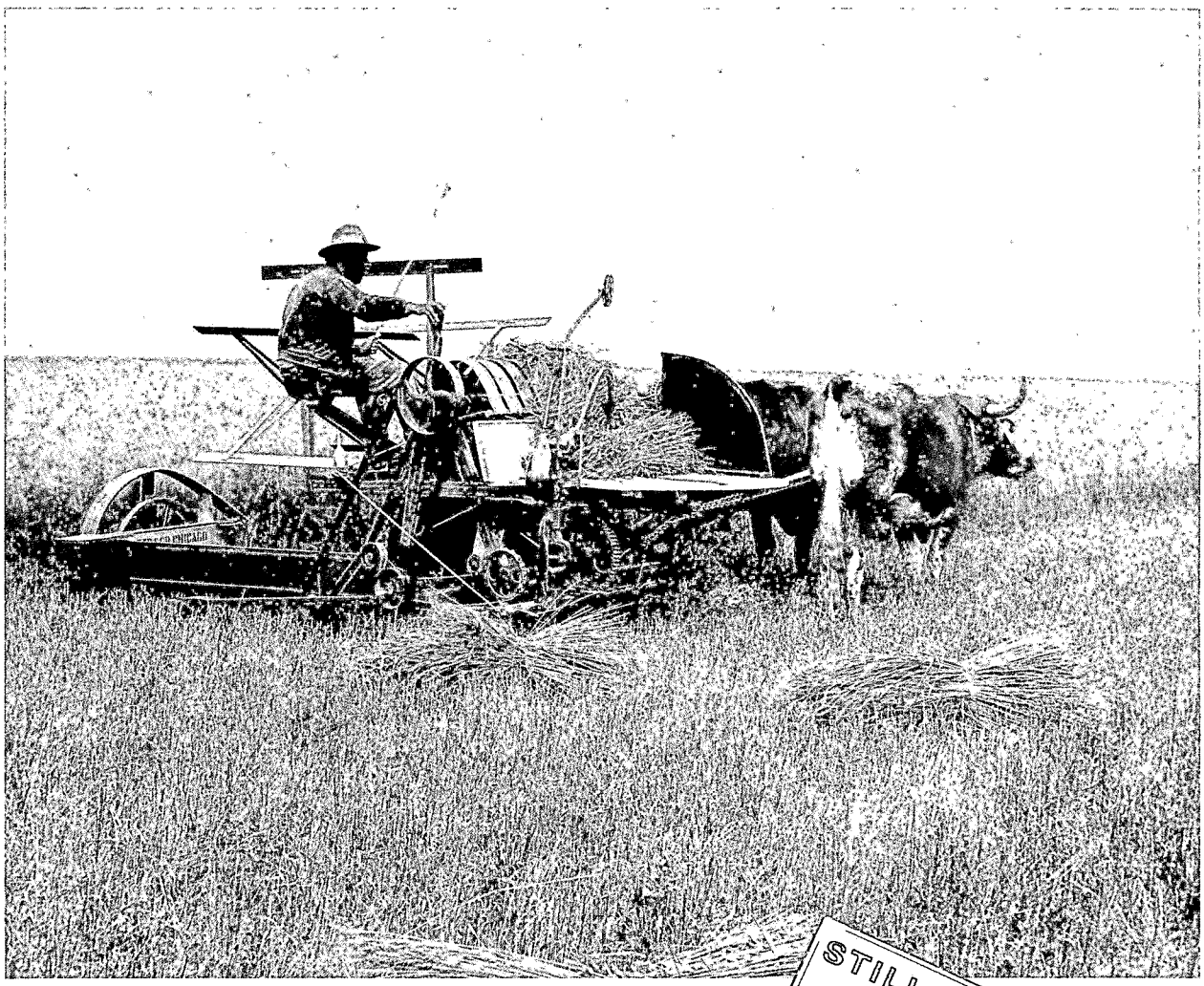
Brakemen earned $45 per month and had the use of the caboose, which they turned into

THE FIRST NORTHERN PACIFIC PASSENGER TRAIN COMES TO TOWN, 1883. *It was always a big day when the first train came to town. For Western towns, prosperity and future growth depended on being linked to America's growing network of rail.*

a comfortable home on wheels. But winter weather brought treacherous footing as they jumped from one car roof to another turning brake wheels.

Engineers were the captains of their own ships, and often went down with them when accidents occurred. They took virtual ownership of their engines, choosing their own paint schemes, and often drawing from their $4-a-day wages to have fittings nickel-plated.

Conductors, with their bright brass buttons and gold watches, faced their own dangers, from throwing cardsharks off the train to delivering newborn babies.



MARSH SELF-BINDER DRAWN BY OXEN, 1877. *The railroads were heavy promoters of the new mechanized farming technology, including this revolutionary self-binder. They set up experimental farms where prospective settlers could see mechanized farming at work, and introduced new strains of seed for the wide, dry plains. Farmers heading west needed help like this. Labor was scarce and the acreages larger than the farms they'd left behind. The success of the railroads depended on the ability of these farms to produce crops for shipment east.*

LIFE ON THE BANKS OF THE YELLOWSTONE RIVER, 1881. *This was one of many pictures that were widely circulated to show Easterners the civility of the West. Emigrants paid $40 for the transcontinental trip and rode on rows of wooden benches. Cheap land and proximity to the railroad offered a chance at a prosperous life. The railroad found markets for settlers' crops and products, and brought them the latest goods from the Eastern cities.*

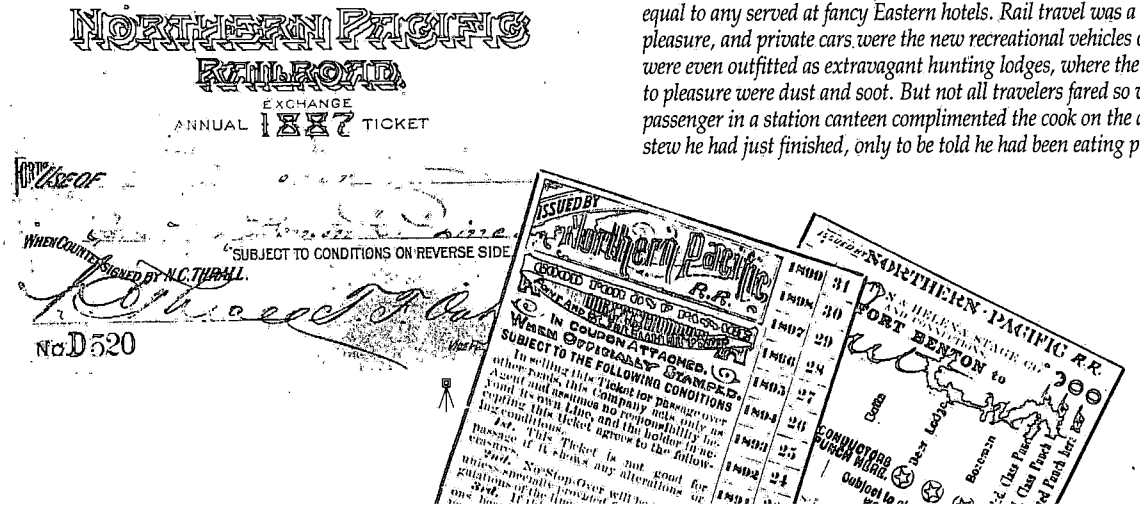
CROW INDIAN COUNCIL AT LAST SPIKE, 1883. *An image of civilization like the photo above was important to prospective settlers, who thought of the West in terms of terrifying Indian attacks on settlers. In fact, Indians like these Crows (right) at the Northern Pacific last-spike ceremonies at Gold Creek, near Garrison, made significant contributions to the settlement of Montana.*

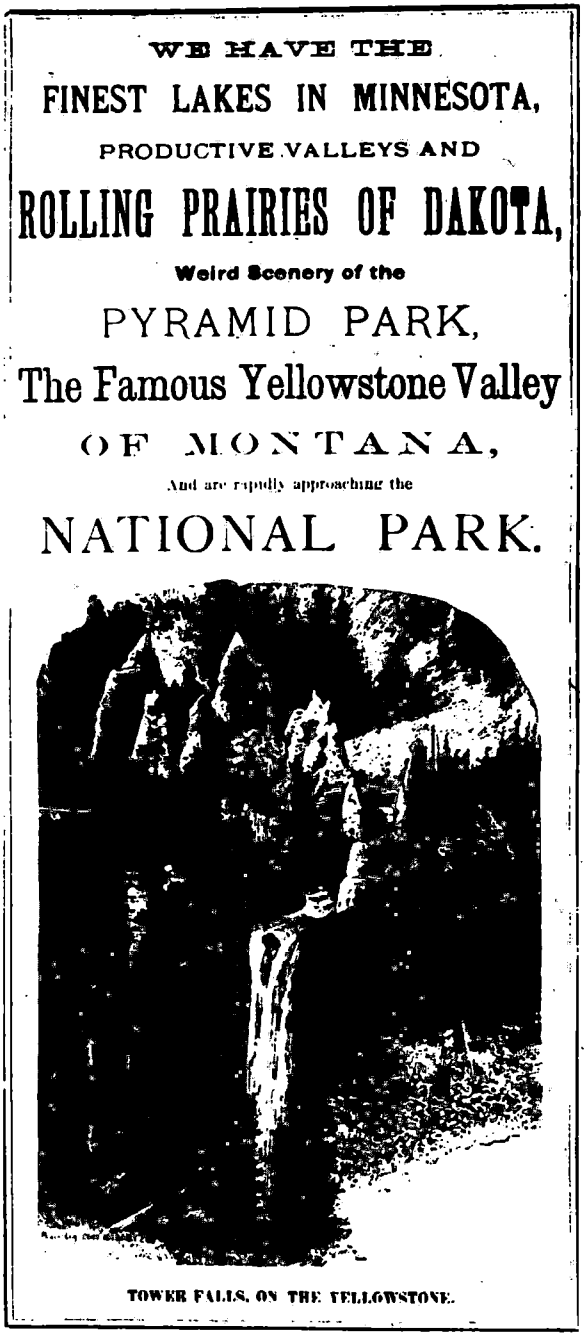
RAIN FOLLOWS THE PLOW. The railroads were built so quickly that it was years before the investment saw a return. To build up settlement on railway lands in Montana, land agents labored to attract settlers from Russia, Scandinavia, Germany, the Netherlands and Great Britain. Governments obliged, sometimes emptying jails and orphanages.

Agents were helped in their efforts by a bizarre theory put forward by the scientist Ferdinand Hayden, who claimed that "rain follows the plow." According to Hayden, intensive cultivation of the Western plains would let the land absorb more water, allowing more moisture to evaporate and causing life-giving rain to fall. By coincidence, the plains then experienced several years of increasing rainfall. But when devastating droughts hit in 1873 and 1874, many farmers were wiped out.

Nonetheless, settlers came and prospered, finding the good life in Montana much to their liking.

NORTH COAST LIMITED OBSERVATION CAR, 1900. *If building the railroad was an exercise in roughing it, traveling on it was not, at least not for first-class passengers. Pullman cars, built by George Pullman, offered sumptuous accommodations, while Pullman chefs and waiters turned out 12-course meals equal to any served at fancy Eastern hotels. Rail travel was a new avenue of pleasure, and private cars were the new recreational vehicles of the day. Some were even outfitted as extravagant hunting lodges, where the only impediments to pleasure were dust and soot. But not all travelers fared so well. One tired passenger in a station canteen complimented the cook on the delicious chicken stew he had just finished, only to be told he had been eating prairie dog.*





TOURIST ADVERTISEMENT. *Tourists thrilled to the "weird scenery" of the West, and the wealthy took vacations on railway excursions. Many were lured by the photographs of F. Jay Haynes, who operated one of the first photography studios in the Dakota and Montana territories in the rail car at right.*

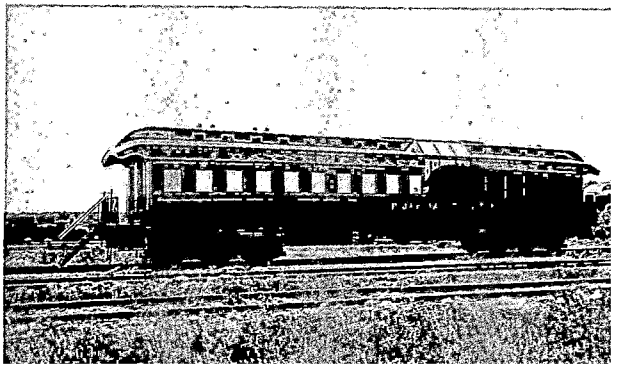
These photos from Haynes Foundation Collection, Montana Historical Society, in Helena.

THE ROAD TO STATEHOOD. Efforts to populate the railroad lands were so successful, and population, mining and commerce increased so rapidly, that within six years after the completion of the Northern Pacific Railway, Montana became a state. Ranching, farming, mining and industry sustained the growing populace while parklands attracted tourists from all over the world.

One hundred years later many things have changed; but one thing remains the same: Montana and the railroads still depend on each other for their continued growth and prosperity. Over the years, the Northern Pacific Railway and Great Northern Railway grew to become part of the nation's largest network of rail, Burlington Northern. BN transports Montana's harvest to the far corners of the globe, and brings the earth's bounties back home.

Montana and the railroads. One hundred years of growing together.

BURLINGTON
NORTHERN
RAILROAD



Registered with the
Official Montana Statehood
Centennial Commemoration

The hundred-year history of Montana and the railroads is the history of the working men and women of America's transportation unions. No statement of history would be complete without a mention of the following:

American Train Dispatchers Association

Brotherhood of Locomotive Engineers

Brotherhood of Maintenance of Way Employes

Brotherhood of Railroad Signalmen

International Association of Machinists and Aerospace Workers

International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers & Helpers

International Brotherhood of Electrical Workers

International Brotherhood of Firemen & Oilers

Sheet Metal Workers' International Association

Transportation•Communications International Union

United Transportation Union

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2ND STORY of Level 1 printed in FULL format.

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September 8, 1989, Friday, Final Edition

SECTION: FIRST SECTION; PAGE A21; THE FEDERAL PAGE;TALKING POINTS

LENGTH: 105 words

HEADLINE: From the Mailbag

BYLINE: Maralee Schwartz, Bill McAllister, Ann Devroy

BODY:

Sen. Conrad Burns (R- Mont.) issued a press release yesterday with this rather long title: " Montana Senator Conrad Burns Says Enjoyed Meeting the Queen in London but Looking Foward to Centennial Cattle Drive."

The press release announced Burns's arrival back home for the state celebration after "attending the 125 nation Interparliamentary Union Conference in London, England, as the vice chairman of the U.S. Senate Delegation and personally meeting Queen Elizabeth II."

The senator added, "I would rather be along on the last great cattle drive through this Big Sky country than back fighting traffic in Washington, D.C."

TYPE: NATIONAL NEWS

SUBJECT: CONGRESSMEN

NAMED-PERSONS: CONRAD BURNS

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7TH STORY of Level 1 printed in FULL format.

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August 29, 1989, Tuesday

LENGTH: 773 words

BYLINE: By Alice Greenway, States News Service

DATELINE: WASHINGTON

KEYWORD: Burns

BODY:

Montana's freshman Senator Conrad Burns has said he brings a dose of good old-fashioned "horse sense" to the tangled politics of Washington.

But eight months after the former livestock auctioneer and farm radio broadcaster won his surprise election victory, observers say they have yet to see the self-styled "country boy" make his mark in the big city.

Burns says he has assembled an experienced and skilled staff and taken a lead on issues close to Montana. But there are still doubts that the former Yellowstone County commissioner has the necessary political experience and broad vision to be effective.

"Burns appeals to a kind of populist, anti-elitist, anti-Eastern strain in Montana voters," said Tom Payne, a political science professor at the University of Montana. "They kind of like his relatively unpretentious, straight shooting, Western style.

"But Montana also has a tradition of Senators who were nationally regarded leaders, like Mike Mansfield and Lee Metcalf, and certainly no one thinks Burns is in that category," he added.

Terry Murphy, president of the Montana Farmer's Union, agreed: "Burns is well-known and well-liked personally, but his lack of experience and background is somewhat dismaying to a lot of people."

Burns seems to revel in his hayseed style. When Montana's congressmen gathered recently near Washington's Lincoln Memorial to plant a centennial tree, Burns grumbled that he had neglected to wear his cowboy boots, but made up for it by taking off his jacket and stamping his shoes in the soil.

Afterwards, while his colleagues chatted with park officials and journalists, Burns ambled off to inspect the teeth of a nearby police horse. "She's lost the cusp," Burns said poking his finger against the lip of the reluctant mare. "Looks like it's time to float the teeth."

Interviewed in Washington, just before he left for the August recess, Burns said his "country bumpkin" image can be traced to his rural roots.

"Keep in mind, I've carried the dinner bucket. For the first 54 years of my life, I've been thinking of just making a living and feeding my family," he said. "When I vote, I got to say, 'Okay, when I was in business or when I was working how would this affect me? How does it affect the people who really

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make this country go?' "

Burns added that the press and voters should look past his style to his record. "It's like the score cards you have in golf. It doesn't say how . . . . It says he took a three."

The score card so far: Burns used his position on the Energy and Natural Resources Committee to fight more restrictive environmental control over mining claims. He worked with Democratic Sen. Max Baucus to secure timber cutting in the Yaak.

He also sought assistance for Montana cherry growers whose crops were wiped out in a winter freeze, and he introduced legislation to ease the burden of insurance coverage for small gas station owners.

These are fairly typical activities for a rookie senator, and observers said it is still to early to judge how effective a lawmaker Burns will ultimately be.

Baucus said Burns has impressed him. "I'm struck with his efforts to work with me, to be cordial, to co-ordinate on Montana projects and to ask my advice."

"There's a learning process here," Baucus added. "One shouldn't expect him to be the world's greatest expert on some arcane subject, and he isn't but he's trying to become well versed."

One of the junior senator's more controversial crusades has been his forceful advocacy of access for miners to Montana's wilderness. In the process, he has alienated environmentalists by comparing them to Vietnam-era draft dodgers.

"When you call people traitors to the country, it doesn't set the tone for conversation," said John Gatchell, president of the Montana Wilderness Society. "Right now I need a heck of a high-powered magnifying glass to tell the difference between his position and industry's."

Gatchell and other environmentalists also fear Burns is moving toward the right-wing fringe of the Republican Party. They point to his votes against conservation and his links to the pro-development Wise Use Movement.

"Burns' campaign slogan was 'You Bet!' " said Jim Murry, executive secretary of the AFL-CIO in Montana. "Shouldn't somebody ask the question, 'You bet what?'"

On the other side of the fence, Burns won warm praise from Gary Langley, head of the Montana Mining Association. "Conrad comes across as a good old boy, but don't let that fool you," Langley said. "We've found him very accessible and sympathetic to our needs, but he's not going to roll over and play dead."

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United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

TRANSMISSION NOTICE

This message is electronically transmitted on a Burroughs DEX 3600 automatic machine.

Transmission Number: 202-343-3561

Verify Number: 202-343-4203

TO: Name Peggy Dooley

Agency/Phone # ~~456-3450~~ 456-6218

FROM: Selma Sierra (343-4203)

Office of the Secretary
18th & C Streets, N. W.
Washington, D. C. 20240

No. of pages to follow: 9

Date: 9/11/89

Time: 3:40 p.m.

Celebrating the United States Constitution

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

September 11, 1989

MEMORANDUM

To: Peggy Dooley, White House Staff

From: Selma Sierra SS, Assistant to the Secretary, Director of External Affairs

Subject: Material for Montana

Attached per your request is a list of activities by some of the bureaus at the Department. The list of activities is specific to Montana. If you need additional information, please let me know.

FISH AND WILDLIFE SERVICE
INITIATIVES AND ACHIEVEMENTS
MONTANA

- FWS operates the Bozeman Fish Hatchery and Technology Center which has an international reputation for its blood and tissue fisheries work. The Center responds to Federal and State agency requests for fishery assistance related to fish nutrition, the needs of cool and cold water fish, and short term (1-2 year) research needs. The Center has been conducting a special nutrition study of walleye fry. This is a cooperative program with six States (Illinois, Indiana, Missouri, Nebraska, South Dakota, and Wisconsin) providing Federal Aid funding to conduct the study. First year results have been very positive with the development of new rearing tank designs, new feed formulations, use of a new feed manufacturing procedure, and improved survival of fry. These new feeds should have broad application for fishes such as striped bass, sturgeon, and others. The study is in its first year of a planned 3-year program. The number of States supporting this program is expected to increase.

- Under the North American Waterfowl Management Plan and Prairie Pothole Joint Venture, the FWS is involved in cooperative efforts with the Bureau of Land Management, Bureau of Reclamation, the State of Montana, Ducks Unlimited and private land owners to improve habitat for waterfowl, including water development projects which will also benefit agriculture and livestock. Montana has the highest potential in the Prairie Pothole region for duck production and other non-game species with naturally good nesting habitat. Efforts are currently underway to develop cooperative agreements designed to commit personnel and dollar resources in support of cooperative projects.

- The Grizzly bear is a threatened species that occurs in six ecosystems in the lower 48 States. Recovery of the grizzly in the Northern Continental Divide ecosystem in Montana has progressed to where that population is at, or near the recovery goals. FWS and other Federal and State agencies have created an effective partnership to develop a conservation strategy plan and agreements to protect this population once it is delisted. In the Cabinet/Yaak ecosystem in the western part of the State, the grizzly population is so small that it will be necessary to augment the population in the Cabinet Mountains if the grizzly is to be recovered there. A citizen's involvement group was formed in the local community, and the Service plans to augment the population with two young females in 1990.

- The Ennis National Fish Hatchery, Ennis, Montana, is the largest producer of trout eggs in the United States. The Hatchery has six strains of rainbow trout which produce 25 million eggs annually. These eggs are sent to 25 national fish Hatcheries across the country, 18 States, and numerous research programs. These eggs are a major contribution to the national recreational fishing program. The Service is continuing to look at ways to improve hatchery operations, egg production, genetics, and nutrition. Efforts are being made to develop hybrids strains to improve the genetics, fish growth, spawning time and catchability of trout.

- FWS is working with the State of Montana, Corps of Engineers and others, to develop ways to save from extinction two ancient fish species, the pallid sturgeon and paddlefish, of the Upper Missouri and Yellowstone Rivers. The pallid sturgeon is currently proposed for listing as an endangered species, and the paddlefish has been petitioned for listing as a threatened species. The Service has increased its population censusing work on both species and has begun to develop the fish culture techniques necessary to propogate these fish in hatcheries to help assure their survival.

NATIONAL PARK SERVICE
INITIATIVES AND ACHIEVEMENTS
MONTANA

- IMPLEMENTATION OF NEW NATIONAL FIRE POLICY ASSURED QUICK RESPONSE AND COORDINATION WITH OTHER FEDERAL AGENCIES, THUS PRECLUDING ANY SERIOUS BLAZES IN MONTANA NATIONAL PARKS AND NATIONAL FORESTS IN 1989.

- NPS HAS PROGRAMMED $4.3 MILLION IN FY 90 TO BEGIN REPAIR AND REHABILITATION ON THE LAKE MCDONALD SEGMENT OF THE GOING-TO-THE SUN ROAD IN GLACIER NP, WITH WORK ON ADDITIONAL ROAD SEGMENTS TO FOLLOW AT THE RATE OF ABOUT $3 MILLION EACH YEAR UNTIL COMPLETION OF THE TOTAL $50 MILLION PROGRAM.

- FIRST NATIVE AMERICAN NAMED AS SUPERINTENDENT IN NATIONAL PARK SYSTEM -- BARBARA BOOHER, CUSTER BATTLEFIELD NATIONAL MONUMENT.

- DEPARTMENT APPROVED NATIONAL PARK SERVICE COOPERATIVE AGREEMENTS WITH NEIGHBORING NATIVE AMERICAN TRIBES EAST OF GLACIER NATIONAL PARK TO DEVELOP JOINT BLACKFEET CULTURAL CENTER AND WAYSIDE EXHIBITS; NATIVE AMERICAN RELIGIOUS FREEDOM IN GLACIER NP; NATIVE AMERICAN CULTURAL INTERPRETATION IN THE PARK; AND SOLID WASTE DISPOSAL PACTS WITH TRIBAL COUNCIL.

- NPS JOINED STATE OF MONTANA IN SUPPORTING RECOMMENDATIONS BY INTERNATIONAL JOINT COMMISSION THAT PROPOSED CABIN CREEK COAL MINE IN SOUTHEAST BRITISH COLUMBIA NOT BE CONSTRUCTED AT THIS TIME. IMPACTS ON GLACIER NATIONAL PARK'S TOURISM VALUES CITED AS A PRINCIPAL REASON.

- NPS WORKING WITH U.S. FOREST SERVICE ON JOINT VISITOR CENTER FOR GLACIER NATIONAL PARK/FLATHEAD NATIONAL FOREST TO BOOST LOCAL TOURISM AND COMMUNITY ECONOMIC DEVELOPMENT.

- THE SECRETARIES OF INTERIOR AND TRANSPORTATION SIGNED AGREEMENT IN 1984 THAT WOULD REINFORCE 2000-FOOT MINIMUM ALTITUDE FOR SCENIC HELICOPTER FLIGHTS OVER GLACIER NATIONAL PARK.

- NPS RECEIVING FULL COOPERATION FROM CANADIANS, U.S. FOREST SERVICE, AND U.S. FISH AND WILDLIFE SERVICE IN WOLF RECOVERY PROGRAM FOR NORTHWESTERN MONTANA/GLACIER NATIONAL PARK. CURRENTLY THREE PACKS (20-25 WOLVES) OCCUPY THE INTERNATIONAL BOUNDARY AREA ON THE WEST SIDE OF GLACIER. GENERAL PUBLIC SUPPORT FOR PROGRAM.

- THE GREATER YELLOWSTONE COORDINATING COMMITTEE, INVOLVING THE NATIONAL PARK SERVICE AND THE U.S. FOREST SERVICE, WAS CREATED TO ASSURE THAT FEDERAL LANDS IN THIS ECOSYSTEM BE MANAGED IN AN INTEGRATED AND COORDINATED MANNER.

- 1500 ACRES HAVE BEEN ADDED TO THE GRANT-KOLHRS RANCH NATIONAL HISTORIC SITE TO IMPROVE SCENIC VISTAS.

- MAJOR RENOVATION OF LAKE MCDONALD LODGE AT GLACIER NATIONAL PARK IS NEARLY BEEN COMPLETED.

- FUNDING HAS BEEN APPROPRIATED TO CONSTRUCT HORSESHOE BEND MARINA AT BIGHORN CANYON NATIONAL RECREATION AREA.

- NPS HAS ISSUED ENVIRONMENTAL ASSESSMENT AT CUSTER BATTLEFIELD RELATIVE TO PLANS TO BUILD A MEMORIAL TO AMERICAN INDIANS WHO FOUGHT IN THE BATTLE OF THE LITTLE BIGHORN. SITE ALREADY HOLDS MONUMENT TO SLAIN U.S. 7TH CAVALRY TROOPS.

SPECIAL NOTES

- VISITATION TO MONTANA NATIONAL PARK SITES INCREASED BY THREE (3) PERCENT FROM JANUARY THROUGH JULY 1989 OVER SAME PERIOD LAST YEAR. TOTAL VISITATION FOR 1989: 2,070,932, WHICH INCLUDES 756,071 FOR MONTANA ENTRANCE TO YELLOWSTONE NATIONAL PARK.

- PROPOSED 1990 BUDGET (COLLECTIVE) FOR MONTANA NATIONAL PARKS, WHICH INCLUDES THAT STATE'S SHARE FOR YELLOWSTONE NATIONAL PARK, IS $9,626,424; UP FROM $8,215,434 FOR 1989.

PREPARED BY GEORGE BERKLACY
NPS 343-6843
SEPTEMBER 11, 1989

Message 620-317
Subj: Environmentally Positive stuff... Deliver to Joe Zillencar

EMS September 11, 1989

To: Director (130), MIB room 5600
From: Montana Public Affairs Staff
Subject: Briefs on Environmentally Positive Actions

Sikes Act Habitat Enhancement Program

Montana Bureau of Land Management, U.S. Forest Service--Northern Region, and Montana Department of Fish, Wildlife and Parks have recently implemented a 2-year trial program to improve fish and wildlife habitat on BLM and USFS-administered lands. The program is authorized by the Sikes Act, a federal law that allows states to enter into agreements with federal land managing agencies to provide funds for habitat improvement projects on public lands. The Department of Fish, Wildlife and Parks has provided $125,000, which will be matched by the federal agencies.

A five-member sportsmen's advisory committee representing hunters, anglers, and trappers from points throughout Montana has been formed to review project proposals and recommend use of funds to the agencies. So far, the committee has recommended $50,000 to fund five fish and wildlife habitat improvement projects on BLM-administered lands in Montana to be constructed in FY90.

The three agencies are optimistic about future benefits from cooperative projects on public lands in Montana. If the trial effort of this statewide program proves successful, the agencies will discuss the possibility of entering into a long-term agreement for habitat improvement on federal lands.

Prairie Pothole Joint Venture (PPJV)

In 1988, the Beaver Creek Projects (Phillips County), including approximately 304 sections of which about 56 percent are public, was established as part of implementing the Montana portion of Prairie Pothole Joint Venture (PPJV). The project is designed to create about 800 ponds or an additional 3,800 acres of wetlands. It is generally acknowledged by participating groups and agencies that strong BLM partnership in the Beaver Creek Project is necessary to ensure success.

Locally, the Bureau of Land Management Lewistown District has implemented the Whitewater Lake (1970) and Prairie Potholes (1978) Habitat Management Plans (HMPs), which set objectives for increasing waterfowl production of BLM-administered lands within the Prairie Potholes Region. To date, the BLM has invested $895,000 to enhance or increase waterfowl and fisheries habitat in this area. Additionally, BLM has actively funded waterfowl research projects within the Prairie Potholes area since 1971.

Loss of breeding, migration, and wintering habitat has resulted in alarming declines in some waterfowl species throughout the United States and Canada. To reverse this trend, the North American Waterfowl Management Plan (NAWMP) was prepared by the U.S. Fish and Wildlife Service and signed in 1985 by the Canadian Minister of Environment and the U.S. Secretary of the Interior. This plans calls for the production of 62 million ducks with a breeding population of 8.7 million mallards by the year 2000. Currently, 34 important habitat areas are listed in the NAWMP. Of those, nine "Joint Ventures" involving Canadian and U.S. lands have been established as needing immediate attention. The Prairie Pothole Joint Venture (PPJV) is one of these and is the only venture that contains the most important duck breeding habitat in North America. About one third of the PPJV falls in the U.S. which provides habitat for about 14 percent of the continent's dabbling and diving ducks.

Signed by Director Burford in 1989, "Waterfowl Habitat Management on Public Lands--A Strategy for the Future," which tiers from the NAWMP, shows consistency with President Bush's wetland policy and identifies opportunities and actions required to accomplish national waterfowl goals and objectives outlined in Fish and Wildlife 2000 (1988).

Challenge Cost Share Program

The U.S. Congress initiated the Challenge Grant Program in FY 1986. The program is designed to encourage direct public involvement in managing habitats on public lands. The program has been very successful, and it has been increased each fiscal year with indications that this trend will continue.

Recently, the name of the program was changed to Challenge Cost Share (CCS), but the intent and function of the program has remained the same. In Montana, CCS projects have ranged from wetland development with Ducks Unlimited, Threatened and Endangered plant inventories with the Montana Natural Heritage Program, riparian fence construction with the Rocky Mountain Elk Foundation or the rancher, to the Sikes Act Habitat Enhancement Program with the U.S. Forest Service and Montana Department of Fish, Wildlife and Parks.

The BLM is optimistic about the future of this program since there are numerous sportsmen and conservation groups, foundations, and agencies who view the program as a way to meet common goals and extend available funds.

Oil and Gas Environmental Impact Statements

The Bureau of Land Management (BLM) and Forest Service are conducting a joint environmental impact statement (EIS) on an oil and gas drilling proposal by Phillips Petroleum along the Beartooth Mountain front in Montana. The drill site, originally scheduled to be drilled on the environmentally-sensitive tundra of Line Creek Plateau, has been moved to a much lower elevation in adjacent Ruby Creek valley. If approved as proposed, this will result in the longest deviated hole ever drilled in Montana but will preserve the untouched arctic-like conditions of the Line Creek Plateau.

The Bureau of Land Management is in the process of completing an environmental impact statement on the effects of oil and gas leasing and subsequent drillings on federal lands in eastern Montana. An extensive geologic study was carried out last year that resulted in a series of oil and gas development potential maps for these lands. These maps have in turn been used to predict where oil and gas wells will be drilled over the 15 year life of the plan. Based on this reasonable foreseeable development scenario, environmental impacts are being analyzed and mitigating measures are being proposed where needed.

Endangered Species

Endangered species management in as interagency effort in Montana. Montana BLM represents Montana, Idaho, Wyoming and Oregon on the Interagency Grizzly Bear Committee. Montana grizzlies are located in the Northern Continental Divide ecosystem. That population is currently in the process of being removed from the threatened species list.

Bald eagles populations have increased dramatically and may be downlisted from endangered to threatened after next year's breeding season. In 1980 there were 24 known nesting territories in Montana. This year, more than 80 have been documented -- an average increase of 14.8 percent annually.

Grazing and Riparian Management

Montana BLM is continuing efforts to improve riparian areas. Approximately 25 percent of our range improvement funds are used for riparian improvement. We are actively involved with the Montana Riparian Association which includes state and federal agencies as well as livestock, mining and timber interests. In Montana we strive to manage both the riparian/wetlands areas and adjacent uplands as a unit. The approach has proved successful--last year, the American Fisheries Society conferred awards on our Dillon Resource Area Office for management practices in effect on three separate grazing allotments. These allotments demonstrate that most riparian areas can be improved while livestock grazing continues. This generally requires changes in times and duration of grazing, not reduction or elimination of livestock. In Montana, BLM rangeland conditions are: 8 percent excellent, 59 percent good, 23 percent fair, 1 percent poor, with 9 percent unclassified (from Public Land Statisics, 1988).

Cooperative Management Projects

We have been active in recent years along the Blackfoot River. Cooperative actions with local landowners and environmental groups have resulted in a 40-mile stretch of the river being opened up to public access. A walk-in hunting area has been established which has led to an improvement in access and government-landowner relationships. At Kleinschmidt Lake, near the Blackfoot River, a cooperative project with Ducks Unlimited and others has led, through construction of nesting platforms, to a reintroduction of Canada Geese to habitat they had been absent from for some time.

Cooperative efforts with several local sportsmen's groups and the George Grant Chapter of Trout Unlimited led to a series of environmentally positive accomplishments along the Big Hole River in recent years. A fishing access area was acquired and developed, a critical access was purchased, a boat launch and recreation site was developed and a general upgrading of visitor's facilities along the river was carried out, all in line with local preferences and in accordance with the current guidelines of the Recreation 2000 program.

Transfer of Landfill Sites to Phillips County

On Friday August 25 Director Cy Jamison and Congressman Ron Marlenee conducted a title transfer ceremony at the Phillips County Courthouse in Malta. A patent and a deed for a total of 190 acres transferred the title to five solid waste disposal sites to the county. The transfer culminates action on an exchange in which the BLM received an equal value of land from the county. The land received by BLM contains wildlife habitat, recreational and grazing values and is felt to be more suitable for BLM to manage. The county will have full jurisdiction and management authority over the solid waste disposal sites, and BLM will no longer have the responsibility for overseeing this use, insuring compliance with all State and Federal rules and regulations and recovering ownership of the land if violations occur. It has been the policy of BLM since 1983 to not authorize any new sites for solid waste disposal and to transfer ownership to any existing sites through sale or exchange, not through the Recreation and Public Purposes Act which carries continued responsibility for BLM for compliance. BLM has neither the expertise nor the funding to properly manage this type of land use.

Some question exists as to whether this transfer is advisable from the standpoint of liability of BLM in the event of future problems with hazardous substances being discovered in or near these sites. BLM's liability will be reduced from any future contamination provided it could be shown that the contamination occurred after the sites were transferred. However, it is generally accepted that BLM may be liable if the substances were present prior to transfer or if the time of deposit of the substances could not be established. The decision to proceed was made based on the determination that no serious problems are likely. The bottom line is this is an environmentally positive action because it places the responsibility for the management of this land use in the proper place with the county. Our understanding is that the sites will be closed soon or converted to container sites because the county has a deadline for installing monitoring facilities by 1991. They have a strong incentive to keep the number of sites requiring these facilities to a minimum.

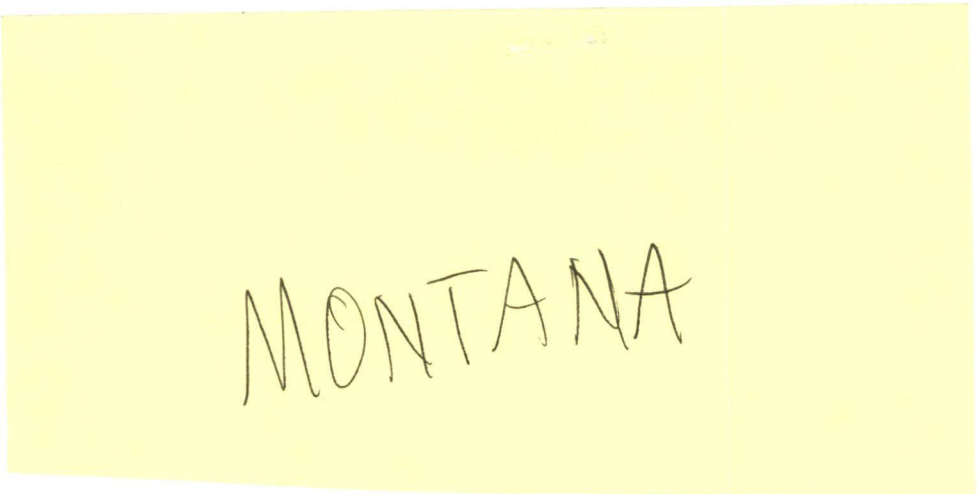
MT910D for W0130 13:23 EDT 11-Sep-89 Message 620-317 [3]

(0985B)

THE TIMETABLES OF AMERICAN HISTORY

Laurence Urdang, Editor

WITH AN INTRODUCTION BY HENRY STEELE COMMAGER



A TOUCHSTONE BOOK
Published by Simon & Schuster, Inc.
NEW YORK

	History and Politics		The Arts	
	America	**Elsewhere**	**America**	**Elsewhere**
	Harrison's 233. **4** Union Labor Party, United Labor Party, Industrial Reform Party, Equal Rights Party, and Prohibition Party nominate candidates for the presidential election this year. **5** New York State establishes electrocution for murderers condemned to die.	king of the Matabele tribe gives Cecil John Rhodes exclusive mining rights in Matabeleland and Mashonaland in South Africa. **10** Privy council is made an advisory body to the Japanese Emperor. **11** British privy council upholds the exclusion of the Chinese from Australia. **12** British establish a protectorate over Brunei, northwest Borneo. **13** Austrian and pro-Russian political factions fight for power in Serbia.	**4** Edward Bellamy, writer, publishes *Looking Backward, 2000-1887.* **5** Donnelly's *The Great Cryptogram* attempts to show that Francis Bacon was the author of Shakespeare's plays.	ing that stirs such controversy that he is expelled from Les Vingt ("The Twenty"), a group of progressive artists. **9** Rimsky-Korsakov composes *Scheherazade,* one of the most popular symphonic suites ever written. **10** Cézanne's mature style is shown by the landscape, "L'Estaque."
1889	**1** Kansas, North Carolina, Tennessee, and Michigan pass the first antitrust laws. New Jersey law authorizes the incorporation of holding companies within the state, which becomes the home of many large corporations. **[1890:HIST/1]** **2** Oklahoma (Indian Territory) is opened to white settlement. **3** Dakota Territory is divided into North and South Dakota. They are admitted to the Union as the 39th and 40th states, respectively. **4** Montana becomes 41st state. **5** Washington becomes 42nd state. **6** First Pan-American Conference meets in Washington, D.C., with the U.S. and 17 Latin American nations (all except the Dominican Republic) taking part. Inter-American organization, later called the Pan-American Union, is established (1890) to offer technical and informational service to all the nations. **7** U.S., Britain, and Germany conclude treaty providing for the neutrality of Samoa and setting up a tripartite protectorate.	**8** Naval Defense Act provides that the British fleet should be as strong as the French and Russian fleets combined. **9** Boulanger wins election in Paris but fails to seize control of the government at crucial moment. He flees to Belgium to escape arrest for treason. **10** Italy and Ethiopia conclude treaty of friendship and cooperation. **11** Turks put down uprising in Crete, encouraged by Greece. **12** Military leaders depose Emperor Pedro II and proclaim Brazil a republic. **[1840:HIST/6]** **13** British South Africa Company, headed by Rhodes, is granted a charter with rights and powers of government in territory north of the Transvaal and west of Mozambique. **14** Emperor grants a new Japanese Constitution. **15** Crown Prince Rudolf is found dead in his hunting lodge at Mayerling, near Vienna.	**1** The first Celluloid film in the U.S., *Fred Ott's Sneeze,* is made by William Kennedy Laurie Dickson. **2** Twain publishes *A Connecticut Yankee in King Arthur's Court.* **3** John Brisben Walker founds *Cosmopolitan Magazine.* **4** Angus Macdonald poses for "The Spirit of Service," a painting commemorating the Telephone Company's efforts to keep the lines up during the Blizzard of 1888. **[1888:SCI/4]** **5** Sousa composes "Washington Post March." **6** Loie Fuller, dancer, originates the "serpentine dance" using colored lights and lengths of silk for effect. **7** *The Wall Street Journal* is established. **8** William Holabird, Chicago School architect, designs the Tacoma Building, the first skyscraper with an all steel skeleton.	**9** Gerhart Hauptmann, Pol. Naturalist writer, is an overnight success with the performance of his tragedy, *Before Dawn.* **10** "The Yellow Christ" and "Bonjour Monsieur Gauguin!" show Gauguin's *synthétisme,* a primitive style of painting with bright colors and dark, bold outlines. **11** Richard Strauss, leading Ger. composer, completes *Don Juan,* a symphonic poem. **12** Van Gogh paints "Starry Night." **13** Tchaikovsky composes *Sleeping Beauty,* a ballet. **14** Tennyson publishes a collection of poems that includes "Crossing the Bar."

Science & Technology		Miscellaneous		
America	**Elsewhere**	**America**	**Elsewhere**	
lines in service between Boston and New York. This preserves the lines of communication between these cities during the great blizzard. **5** Van Depoele patents carbon brushes for use in railway motors. **6** America's first seismograph is installed at the Lick Observatory in California. **7** Oliver Shallenberger invents a successful electric meter that measures alternating current. **8** Pullman Car Co. builds an electric locomotive for hauling freight. **9** Incubators are used for premature infants.	yeast which revolutionize the brewing industry. **14** Heinrich R. Hertz, Ger. physicist, proves that heat and light are forms of electromagnetic radiation.	with the camera to the factory. Prints and reloaded camera are then returned to the owner. **3** Artificial straws for drinking are patented by M.C. Stone. **4** Blizzard on the east coast lasting 36 hours paralyzes New York City; 400 people die; property damage is extensive; transportation is stopped; and the city is cut off from the rest of the world. **[1888:SCI/4]**		
1 As the first director of the Johns Hopkins Hospital and Clinic, Osler establishes clinical training as part of the medical school curriculum. Osler further stresses the importance of a humane and personal approach to medical practice. **2** Charles M. Hall, Ohio scientist, patents an inexpensive process of producing aluminum by electrolysis. **3** Electric sewing machines are marketed by Singer. **4** Otis Brothers install an electric elevator in New York City. **5** Hoagland Laboratory opens in Brooklyn, N.Y., to study bacteria.	**6** Shibasabura Kitasato, Jap. physician, becomes the first to isolate the tetanus bacillus. **7** Oskar Minkowsky, Lith. physiologist, determines that insulin is secreted by the pancreas. Nellie Bly, U.S. newspaper reporter and world traveler.	**1** First classes begin at Barnard College for Women, founded as part of Columbia University, New York City. **2** A dam above Johnstown, Pa., breaks when the Conemaugh River is swelled by heavy rains. Four towns are destroyed; the river covers Johnstown with 30 ft. of water; about 2300 people die. **3** First safety bicycles are produced in quantity. Bicycling becomes very popular. **4** Football coach Walter Camp selects the first all-American football team. **5** Last bare-knuckle boxing championship fight takes place in Richburg, Miss., between John L. Sullivan and Jake Kilrain. Sullivan wins in 75 rounds. **6** Nellie Bly, a reporter for the *New York World,* starts on round-the-world trip. She beats the time of Jules Verne's fictional journey *Around the World in Eighty Days* when she reaches home in 72 days, 6 hours, 11 minutes, and 14 seconds.		**1889**

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FAX TRANSMISSION

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To: Peggy Dooley

From: Steve Shimek

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Voice phone of person sending FAX: 800-548-3390

Additional Remarks:

BRONC TO BREAKFAST

& other poems

MIKE LOGAN

003 MONTANA OF COMMERCE 13:07 09/01/89

Bronc To Breakfast

Dobie rode a bronc to breakfast.
That cayuse was plumb green.
He fed ol' Dobe some biscuits
Still in the fire, I mean.

The camp cook wasn't none too pleased
When Dobe went in the fire.
That bronc spilled all the coffee;
Stomped the bacon in the mire.

Now, Dobe was some preoccupied
That biscuit dough was hot
And the lid from that dutch oven
In his galluses was caught.

Them galluses plumb held that lid,
Three coals was caught inside
And ever' passin' second
Burned 'em deeper in Dobe's hide.

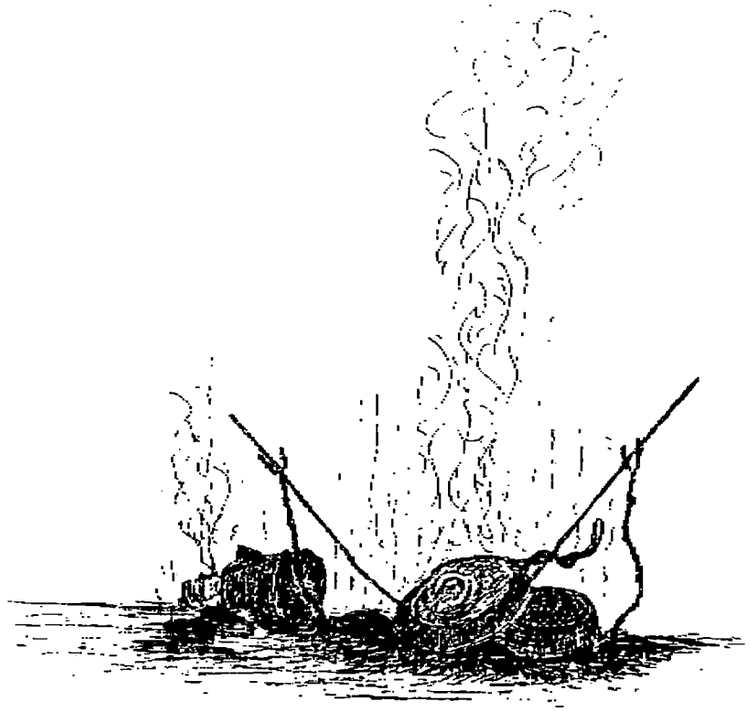
I've been to lots o' brandin's
But this one took the cake,
No matter how he jumped or stomped
Ol' Dobie shore did bake.

09/01/89 13:07 MONTANA OF COMMERCE 004

Now, Dobe, he finally shed that lid,
His chest was smokin' some
When that bronc that he rode in on
For another pass did come.

That hoss was stompin' bedrolls
And kickin' ropes and hats
And, passin', he just plants a kick
In ol' Dobe's smokin' slats.

Ol' Dobe sits back down in them coals.
His day ain't startin' right.
When he comes up for the second time
He comes up on the fight.



He grabs an ol' black fryin' pan
And whales that bronco's head.
That hoss went down so sudden
We was certain he was dead.

Now, Dobie he just stood there
Black skillet in his hand
And waited 'til that bangtail
Shook hisself and tried to stand.

005 MONTANA OF COMMERCE 13:07 09/01/89

With his vest and shirt still smokin'
Dobie swung up on his back,
Leaned forward with that fryin' pan
And gave him one more whack.

That bronco's knees, was wobblin'
But Dobie had the cure
He showed that bay just who was boss
And that was certain sure.

It turns out, with a fryin' pan,
Ol' Dobie was a champ.
A rhythm was developin'
As they tore out of camp.

He'd thump that hoss a time or two
Then spur him stem to stern
And then that cast iron skillet
Would get another turn.

That broomtail, he lines out to run.
He knew he'd lost the fight.
We raised a cheer for Dobie
As they flew out of sight.

When he rode back that mornin',
To change his shirt and vest,
A circle red and three dots
Was branded on Dobe's chest.

We called him Circle Three Dot
And he made that mark his brand.
A heap o' critters wore it,
'Fore he quit this big skied land.

Dobe's ride became a legend
In the hist'ry of the west.
And ol' Charlie Russell's paintin'
Prob'ly told the story best.

He rode a bronc to breakfast
But long after ol' Dobe died
They told of Circle Three Dot
And his famous mornin' ride.

006 MONTANA OF COMMERCE 13:08 09/01/89

Unsaddle David's Sorrel

Unsaddle David's sorrel
He'll ride no more these hills.
He's gone to greener pastures
Where ponies take no spills.

Unsaddle David's sorrel
And lead him to the stall.
Hang up that old gray battered hat
His spurs and ropes and all.

Unsaddle David's sorrel
And pitch him down some hay.
The world holds better memories
'Cause David rode this way.

Beef All Comes From Cellophanes

If milk all comes from cartons
And pickles come from jars
Then green beans sprout from labeled cans
And chocolate comes from bars.

If 'taters come from plastic bags
And cheese from slices neat
Then eggs all come from styrofoams
And juice from bottles sweet.

If shoes all come from boxes
And flour, it grows in sacks
Then beef all comes from cellophanes
And wool shirts come from racks.

Now if beef all comes from cellophanes,
And we all know that's true,
Then I wish somebody'd tell me,
What the hell do ranchers do?

09/01/89 13:08 MONTANA OF COMMERCE 007

Ode To LAX

(L.A. International Airport)

Noise,
People noise,
Assaults my ailing ears.
Bumped and jostled,
L. A. International Airported,
Attacked by monotoned announcings,
I think on other things.

I think on rams along the ridgeline.
I think on bulls along the Yellowstone.

Smog,
People smog,
Insults my suffering nose.
Belched and billowed,
L. A. high speed freewayed,
Stung by countless sulfured smokescreens,
I think on other things.

I think on wildflowers at the cow camp.
I think on breezes down the Great Divide.

Heat,
People heat,
Embroils my throbbing head.
Burned and blistered,
L. A. Southern Californiaed,
Driven frantic by the steamings,
I think on other things.

I think on cutthroat in the Beartooth.
I think on glaciers in the sky.

I think on mountains in the sunshine.
I think on snowfall in the rimrocks.

I think on home.

09/01/89 13:09 MONTANA OF COMMERCE 008

Ol' Cooky

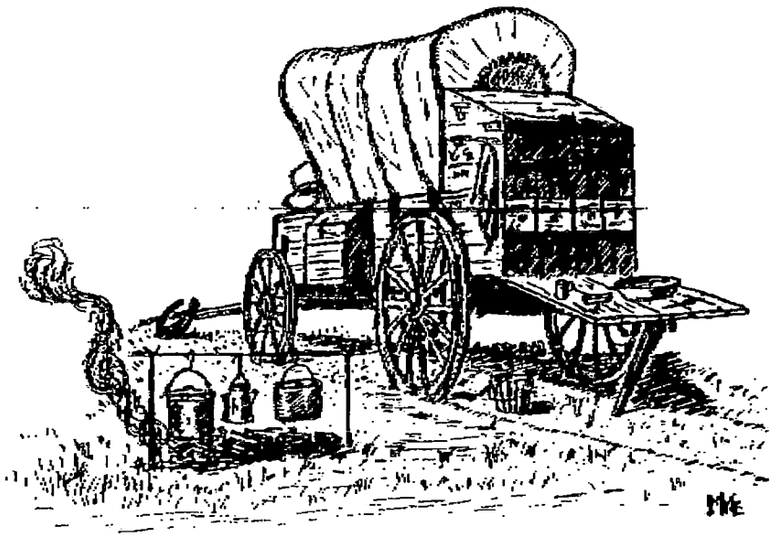
Now, Ol' Cooky was some ugly
An' he surely weren't no rose.
If you lost him in a stampede
You could find him with your nose.

Cooky wasn't scared of water.
Shoot, he used it ever' day
Makin' coffee, beans and biscuits,
But wash in it? No way!!!

Now, I ain't faultin' Cooky.
He could sure 'nuff rustle grub.
But he'd get just plain insulted
At the mention of a tub.

Cooky's apple pie was heaven.
It just seemed some angel's blend.
Punchers purt' near fought for seconds,
But they always ate upwind.

Cooky's wagon, it was spotless.
Plates and cups was shiny clean.
But you just mention bathin'
An' Ol' Cooky'd get plumb mean.



You really cain't blame Cooky.
He only had one shirt.
We never knowed which parts was cloth
An' which parts grease and dirt.

09/01/89 13:09 MONTANA OF COMMERCE 009

I roped a skunk for Cooky once.
Just did it for a joke!'
When I drug him up to Cooky,
Well, I thought that skunk'd choke.

We lost Ol' Cooky that year.
At a crossin' on the Platte.
Chuckwagon tipped in midstream.
We only found his hat.

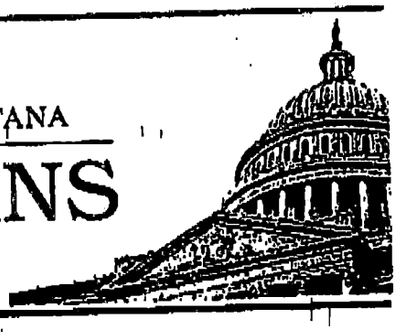
Ol' Cooky never learned to swim.
A fact, too late found out.
'Course, I always thought if watered right
Ol' Cooky'd prob'ly sprout.

He's likely makin' pine trees, now,
With needles long and green.
He lived his life in one old shirt,
But he met his Maker clean.

FAX

UNITED STATES SENATOR • MONTANA

CONRAD BURNS



FAX TO: Peggy Dooley

OFFICE: White House

PHONE: _____

DATE: 9-11 TIME: _____

PAGE 1 OF ~~11~~ 7

SUBJECT: Montana

FROM: Bryce Dustman

United States Senate • Washington, D.C. 20510-2603 • (202) 224-2644 FAX (202) 224-8594

falls to scratch horse.

Bosal. A type of bridle used for breaking horses.

Brand. A design burned on an animal for identification.

Broomtail. Wild mare.

Bronco, bronc. Mexican word for "mean," shortened to bronc or "bronk," in cowboy parlance; a vicious, unbroken horse.

Bronco peeler or buster. One who breaks or gentles or busts a horse.

Bronc-buster. A cowboy who "breaks" broncs.

Buckaroo. A cowboy.

Bucking, buck-jumping. The gyrations of a bronc in trying to unseat his rider.

Bulldogger. A steer wrestler.

Bulldogging. Throwing an animal by grasping its head and neck, or horns. Originally it meant throwing an animal by biting its lip. Common reference in rodeo lingo to steer wrestling.

Chinks. A type of leather pants protectors; a cross between chaps and a blacksmith's apron.

Chuck wagon. Food and equipment wagon used on range.

Cinch. Strap or belt which holds a saddle in place.

Doughbelly. A hand- or pail-fed calf.

Drift. The act of livestock marching in large numbers away from a particular locality.

Eating gravel. Being thrown from a bucking bronc or wild steer.

Four footing. Catching an animal by the feet with a rope in order to throw same for handling.

Fuzz-tail. A wild horse.

Gentling. Breaking a horse.

Glass-eye. A white-eyed horse.

Grabbing the apple. When a bronc rider grabs the horn of a saddle to keep from being thrown.

Hackamore. Same as bosal.

Hazer. Bulldogger's assistant. After bulldogger has leaped from pony to steer, the hazer, mounted, picks up former's mount and also protects him from being gored when he releases steer.

High roller. Horse that leaps high when bucking.

Hobbled stirrup. When tied down under a horse's belly.

Hondo or honda. Eyelet or ring through which rope passes to make a lasso.

Hull. A saddle.

Hurricane deck. The saddle seat

ble of great distance and speed.

Marks. Cuts made on ears or additional proof of ownership.

Mail-order cowboy. A tenderfoot in custom-made cowboy regalia and

changing direction and s
quickly.

Pickup man. A nec
arena cowboy who ri

Medical care available to drive's participants

By JIM GRANSBERY
Of The Gazette Staff

AS YOU swing into the saddle or settle into the Conestoga cockpit on the morning of Sept. 4, you might glance around and spot cowgirls and cowboys wearing mauve and blue bandannas.

They are the good guys and gals.

A large, volunteer contingent of nurses, doctors and emergency medical technicians are going on the Big Drive of '89.

And, while it does not equal an Army MASH unit — sagebrush surgery is NOT planned — the emergency medical services available to participants will be the best around during the Great Montana Centennial Cattle Drive.

"We want to let participants know that we are going to be out there," said Jim Ross, an EMT from Roundup.

There will be emergency medical personnel on the drive. The bandannas will serve as a badge of recognition. The mauve is from Deaconess Medical Center, and the blue is from St. Vincent's flight colors."

St. Vincent Hospital has a medical helicopter emergency flight team.

Both hospitals will have their emergency rooms alerted during the drive, according to an extensive plan put together with their cooperation.

Ross said there will be a medical team — an advanced critical life support nurse, an EMT and a doctor — for every 15 to 20 wagons. Each will be equipped with two-way radios. A base station at the top of the Divide in the Bull Mountains will be set up so that radio communications will be unhindered.

Ross said four emergency medical teams with a packer will accompany the drovers moving the herd itself. A medical wagon, staffed with RNs, radio and emergency equipment will move with the riders and the wagon train.

Ross said the group hopes to have National Guard helicopters available for medivac. Four four-wheel drive Suburbans manned by fire department personnel will also be available at certain points along the route, said Ross.

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Harry and Eva Pearson of Worden participated in one of the many pre-drive events, a centennial cattle auction.

uring branding time.

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ling to the saddle

addle horse capa-
e and speed.
le on ears or addi-
rship.
boy. A tenderfoot
owboy regalia and

devoid of range experience.

Maverick. An unbranded animal more than 1 year old. (The term is said to be derived from a Texas rancher named Samuel Maverick, who refused to brand his cattle.)

Mustang. A type of small range horse.

Open brand. A brand not framed or boxed.

Outriding. Inspecting parts of range distant from headquarters.

Palomido, Palamino. A cream-colored horse with flaxen mane and tail.

Peg horse. Saddle horse proficient in stopping suddenly in his tracks, changing direction and starting again quickly.

Pickup man. A necessary rodeo arena cowboy who rides alongside the bronc after the 10-second whistle, grabs the animals and assists the contestant off.

Pinto. A spotted horse.

Pitching. Same as "bucking" or "buck-jumping."

Pothooks. Spurs.

Pulling leather. Holding onto saddle with the hand while riding a bucking animal, prohibited by rules of all contests and scorned by all real cowboys.

Riata. A rawhide rope; lasso; rope; lariat.

Rodeo. An exibition of riding, roping, etc.

Rodera. A roundup.

Resadero. A wide, leather shield sewn to pack of a stirrup leather.

Rough string. Unbroken horses.

Roundup. To herd to a single point all animals within territory over which operation extends.

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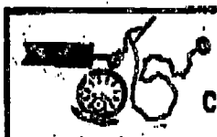
Children occupying the same room



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Wagon leader sad to see end

By DENNIS GAUB
Of The Gazette Staff

MOST PARTICIPANTS in the Great Montana Centennial Cattle Drive smiled about seeing the end of the trail — and city amenities — on Saturday.

But, some had bittersweet feelings about trading horses for motorized vehicles Saturday in Billings.

"It was too soon," said wagon master Dave Stephens, a dry-land wheat farmer from Dutton. "I wish the city limits would have been another 50 miles down the road.

"I'd say 95 percent of the people felt that way — that we should head over the hill and head for Cody."

Stephens' wagon was among about 170 wagons that completed the drive at the PAYS stockyard; the other 30 finished at Metra. All had participated in a parade through Billings Heights Saturday morning, along with 3,700 cattle and 3,400 riders.

When the horses came to a halt, "it was anti-climatic," Stephens said. "We're in here and the drive is over.

"There's something at Metra (the Lee Greenwood concert Saturday night), but these people aren't party-goers. That's for whoop-'er-uppers. These people keep to themselves," he said.

Stephens and a member of his wagon contingent, George Kremer, praised the six-day event, which brought people and riders 60 miles from Roundup to Billings without major setbacks.

"It was smooth as silk," Stephens said. "It worked like clockwork."

Kremer, who operates a welding and metal-repair shop in Dutton and leases out his cropland, said the drive drew strength from its ranks.

"The reason it came off is people willing to pitch in and make it happen. They had good cooperation."

> "I wish the city limits would have been another 50 miles down the road.
>
> —Dave Stephens
> wagon master

If someone decided to stage another cattle and wagon drive next week, "I'd do it — provided my wife would let me," said Kremer, whose wife is recovering from surgery.

The two Dutton men said Roundup residents deserve credit for banding together to give the drive a high-spirited launch.

The start last weekend was valuable in another way, Stephens said.

"I think the good Lord gave us a little challenge on Sunday night when we got three-tenths of an inch (of rain) in a couple hours," he said. "That told us to pound our stakes deeper and tie our ropes tighter.

"It was enough to say, keep your act together," Stephens said.

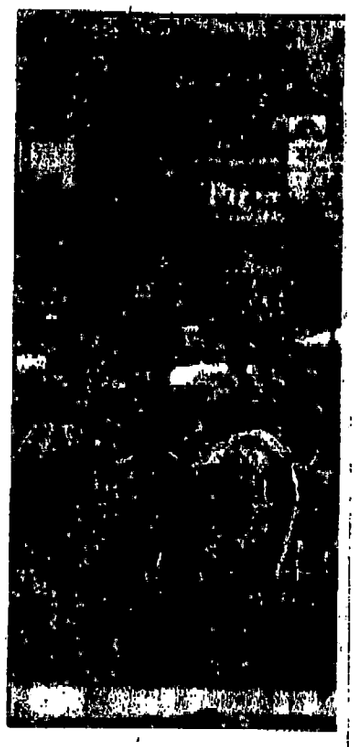
Many cattle drive participants were farm and ranch people "used to horses and outdoor ways. When the hills got steep, they just lightened the load," he said. Or, said Kremer, "we talked to the horses a little louder."

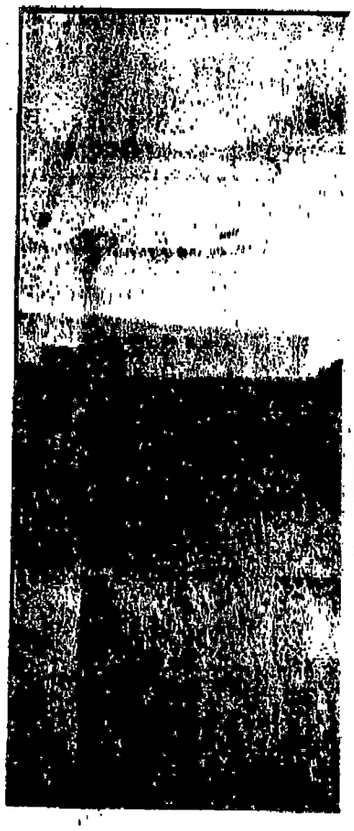
Stephens, 61, a veteran of a couple earlier wagon trips, called the drive "the greatest experience of my lifetime."

He signed up early for the Latigo Corps-organized event, getting a participant number of 66.

"I've been at it two years, rebuilding the wagon and getting the horses ready," he said.

"I'm a believer," Stephens said.





Spectato:

By CLAIR JOHNSON
and RITA MUNKENBECK
Of The Gazette Staff

SPECTATORS FOR Saturday

ON TRAIL

By JIM GRAINGER
Of The Gazette Staff

"ANYONE who isn't smiling on this drive, came without one."

Barb Anderson, of Helena, was standing in the chow line with her family Friday morning under the Budweiser tent. That's how she summed up the Great Montana Centennial Cattle Drive.

Yellow rain slickers and dusters were dress of the day. Gentle rain dripping from the tent edge competed with quiet conversation over the morning paper and coffee.

The Big Drive of '89 was four days gone, and the participants are sure they took part in a once-in-a-lifetime affair.

The Cattle Drive ended Saturday with a parade of the trail herd down Main Street in Billings Heights.

Will it happen again?

"No. Never."

Do you think there are those who are sorry they didn't come?

"You better believe it," said Loren Jenkins, of Big Sandy.

Anderson said, "There are a lot of people knocking their heads for not being here."

Jenkins, riding as a participant, attended the first organizational meeting in Great Falls last year. "I thought it was a good idea then, and in Roundup last Saturday it was just tremendous to see."

"The people made this work," he said. "Everyone on this train, they came here determined to show that it could be done."

Jenkins echoed the belief of most that the people at all levels of the organization of the drive were the matrix of success.

Jenkins praised the courtesy among the participants.

"There were a lot of 'Doubting Thomases,'" said Jenkins. "Last night people were coming up wanting to sign on for the rest of the drive."

He described Thursday's Family Night activities as "Western Woodstock."

That night, an estimated 20,000 people drove north of town to rub dusty shoulders with the 2,400 riders and 200 wagon contingents camped on the prairies beneath a large butte. They attended a evening of Western music and humor.

Another 5,000 people were turned away. Traffic going to the wagon circles tied up traffic for hours.

"I don't own a pair of Birkenstock's," said Susan Lachman, of Missoula. She was refering to a brand of sandals popular with the laid-back crowd that probably doesn't own cowboy boots either.

Lachman and her cousin Lisa Stelling from Leadore, Idaho, rode in the drive.

"I feel sorry for the people who could not make it," said Stelling. "And I don't think they could make it happen again."

The registered nurse grew up in Deer Lodge, she said.

The past couple of days had been dusty and dry on the trail. Lachman said that one member of her wagon circle wanted to know if she "had a valve stem for my lips, they were so swollen," she said.

A good number of children were on the drive. Riding horses, wagons and working in the herds.

Jamie McDowell and her brother Troy rode with parents Jock and Kathy.

"One boy had to stay home if he wanted to play football," said Jock McDowell, who used to spend his Labor Day's winning the saddle-bronc competition at the Dillon Rodeo.

Several members of the family were in the drive, he said. Both Troy and Jamie said "Nope" when asked if the cattle drive would happen again. The children have to submit a report to their teachers as part of getting out of school.

Troy may spend future Labor Days riding in Dillon. When asked if he was going to ride broncs like his dad, he said, "Yeh. Hopefully."

"It was a most picturesque ride yesterday," said Dusty Dunbar, of West Yellowstone.

"If I have any complaint, I wish we could have seen more of the main herd," she said. "Maybe get a shift riding with the herd for three hours."

"And I want to see my cow," she said with a laugh.

Those participants who did not own cattle could rent a cow to put in the herd. Dunbar would like to know what it looked like.

The cohesiveness of the wagon circles and the riders were on Neil McCaslin's mind.

"I love it," he said. "The comradery, the neighbor helping neighbor, the old people telling history makes it all worth it."

Like the original longhorns, Paul Martin of Billings, came up from Texas.

He boiled it down to three items: "Great time, great people and the greatest thing I've participated in my life.

"Everyone has worked like a team of horses getting in the collar."

Drive rooted in wonder

The Great Montana Centennial Cattle Drive is a web of energy undulating across the prairie north of Billings.

Like the black holes of outer space, it sucks passersby into its maw, sends a million volts through their bodies and minds and spits them out on the prairie again, dazed, dumfounded and with a silly grin on their faces.

This drive is larger than life, a jiggawatt jolt on the big empty of Eastern Montana, big enough to raise hair on the napes of necks in the Soviet Union and France and Norway and Canada and all points south.

It is a celebration of what has been and what is and what will be.

Dig past Montana's buffalo grass and wild rose and Bitterroots. Dig down in the loam and clay and silt of long-dead oceans to the tap roots of modern Montana and you'll find men and horses and cattle.

GAZETTE OPINION

The Great Montana Centennial Cattle Drive — The Big Drive of 89

Sept. 4-9, 1989

Dig into the soils of Europe and Asia and Australia and Africa, and you'll find the bones of men and horses and cattle.

The drive is primal, driven by the beat of horse's hooves and a country band and set to grins wide as the Montana sky.

The Great Montana Centennial Cattle Drive is an affirmation of life, of the stubbornness and creativity and grit-your-teeth-and-go-to-it attitude that prevails here.

It is drawn from a common pool of the stuff that makes Billings the Magic City.

We owe our thanks to all the people who dreamed this dream and then turned it into reality. Despite the odds and adversity and opposition, they gave us something to build memories on.

When times tough this company runs

Guest columnist

Beulah Tufton

The reputation of every big company rests primarily on the people who represent it to the public. Fat cats in a board room might make policy, but it is the man on the local scene who attracts customers and who keeps them.

Cliff Hansen of Hansen Implement in Wolf Point has spent a lot of years building up and maintaining the reputation of J.I. Case-International Harvester in northeastern Montana and western North Dakota. His customers knew they could rely on Cliff whether it was in the middle of the night, Sunday or whenever. He was proud of his product and he was proud of the service he delivered.

Well, in August, Cliff got his reward from this company he's served so faithfully for so many years. They took away his dealership because he hasn't sold enough new equipment. The fact that this entire region words?

Will it be your state to be hit by prolonged drought next? Your state to have its implement dealers shut down, told "we don't need you"? After enough states have lost their small town dealerships, how long will it be before Case-IH factories begin to cut back or close, laying off workers, because demand for their products is way down? who will be on hand to provide them w parts and service. Only an idiot buys mething that can't be serviced locally. A only an idiot buys from any company t demonstrates that it considers its repres tatives and customers expendable in t times.

Case-IH is a combined company n and owned by Tenneco — whoever that During the devastating 1930's drought wh hit the whole country, I wonder if eith Case or International Harvester had licies such as those that rule their roost n I don't think so. If they had, I doubt that y would find a piece of Case or IH equipm anywhere in the country today — some years later — if they hadn't stuck by th dealers and customers then. Farmers do forget who treats them like dirt.

J.I. Case, International Harvester once highly respected names. All it take a few short-sighted people in the power p tions in some far-off city to turn them i the Edsel of agriculture. Case-IH seems have an over-abundance of short-sigh idiots.

Our immediate problem is the clos of our Case-IH dealer but how long is going to be before the small-town dealers other machinery manufacturers get the from other board rooms? How long are going to sit still and see our local access

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THE BILLINGS GAZETTE

Sunday, September 10, 1989

Section B

Drive of '89

'Now wasn't that something!'

by Jane Gassaway
Staff Writer

Downtown Main Street Saturday morning as the first of cable from the Great Montana Centennial Cable Drive ended the six-mile journey from Huntley.

The cheerful faces of hardworking men, exposed to the elements, predominated. The simple, but elegant style of metal wagons and the smiles of young — some very young — children formed the ranks of the largest gathering of spectators in the state's history.

Most of the 2,400 riders, 2,200 cows and 200 wagons passed through a throng of spectators that began at the Alexander Road north of Billings and ended at the city's two livestock auction yards.

The wagons and riders got in line ahead of the herd and went through town in a brisk clip. That was to keep the herd from loafing up and making around, creating panic.

Hat problems

"I feel proud," said Jay Stovall, the trail boss for the Cowboy Museum, everyone was proud — proud of themselves, their animals and their state.

It was raining when the cattle drive crawl went to bed Friday night, with heavy rain and wind throughout the early hours.

A large trouble called the thirsty and vagrant to break.

Just as 5 a.m. A mist was still falling.

There was no delight. It was all business to get the herd ready to go.

At the junction of Alexander Road and Highway 87, each of the wagon circles, ended by color, and their riders, paused smartly.

Customers were county — mostly ranchers and drivers. At the crest of the hill, the cattle appeared, led by the two steers that were running their drive the drive before.

The new pushed the gray around on the eastern horizon to color on the embankment of a frosted heat began in the last of May.

Spectators were gunners with their promise of the drive. "Thank you, thanks for the show." Friends and acquaintances greeted each other along the route.

Through the cabins of hundreds of volunteers, working thousands of hours and spending large amounts of their own money, the dream of Stan Lynde, Barry McWilliams and Jim Wenger came about.

"I knew there were cowpokes," said Stovall. "But I knew we could do it all the time.

"It went smooth," he said. "The rain quit, it was cool and I had the best trail cowdogs in the world."

The drivers brought about 2,200 head through Main. One hundred fifty were trucked, being used for the parade for various reasons. Two cows died, one killed before the drive and the other died. Two calves were born. Both are in the yards with their mothers, Stovall said.

Stovall was accompanied on the drive by his wife and aunt and a daughter-in-law. His son Tyler was injured Friday and missed the conclusion of the drive, spending Saturday in the hospital.

"The drive went smooth," said Jay Stovall.

One participant summed it up her feet about everybody

State of Montana
Office of the Governor
Helena, Montana 59620
406-444-3111

STAN STEPHENS
GOVERNOR

DATE: 8/31/89

TO: Peggy Dooley

FROM: Margie Hannah

RE: FAX TRANSMISSION

Number of pages in transmission (including this one) 2

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GOVERNOR

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STAN STEPHENS

Official Biography

Stan Stephens, a Calgary, Alberta born businessman serving his first term as Montana governor, has worked in all phases of broadcasting. His 38 year broadcast career has involved news and editorial writing along with announcing for radio operations in Canada, Korea and the United States. He has also served as chief executive officer for three cable TV systems in Montana.

During his broadcast career, Stephens received many state and national awards for excellence in news and editorial writing. Most notable is his 1975 Edward R. Murrow award for journalistic excellence in editorials uncovering a scandal in Montana's Workers' Compensation Program.

He represented his home community of Havre in the Montana Senate for 16 years starting in 1969. He is the only Montana legislator elected by his peers to every leadership position in the senate. He served as Senate Republican Floor Whip in 1977, majority leader in 1979 and 1981, Senate President in 1983 and minority leader in 1985.

He retired from the Montana Senate in 1986. That same year he was recognized by the National Republican Legislators Association as one of the country's ten most outstanding state lawmakers.

In January of 1987, Stephens announced as a candidate for Montana Governor and was elected in November of 1988. His four year term as the state's 19th chief executive includes presiding as the Centennial Governor in 1989.

Stephens married Ann Hanson of Havre in 1954. They have two daughters, Lannie Gillin of Great Falls and Carol Donaldson of Missoula. Their five grandchildren include Stephen, Ann, Teri, Tammie and Richard.

THE WHITE HOUSE
WASHINGTON

Peggy —

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Thanks!

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THE WHITE HOUSE
WASHINGTON

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Conservationist actions
by state?

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19TH STORY of Level 1 printed in FULL format.

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June 17, 1987, Wednesday, Home Edition

SECTION: Part 1; Page 1; Column 1; National Desk

LENGTH: 7152 words

HEADLINE: MAN'S DOMINANT RAW MATERIAL;
THE VANISHING FORESTS;
NEED FOR WOOD FORESTALLED CONSERVATION

SERIES: THE VANISHING FORESTS: SECOND IN A SERIES. Next: The consequences of deforestation.

BYLINE: By A. KENT MacDOUGALL, Times Staff Writer

BODY:

When the Carthaginian explorer Hanno sailed down the Atlantic Coast of Africa about 520 BC, he recorded seeing great fires inland for days on end, accompanied at night by the terrifying sounds of drums, gongs and wind instruments.

"Although Hanno failed to comprehend their nature, these fires must have been due to the annual 'burning of the bush' to beat back the forest and provide land for agriculture and grazing," according to the late botanist Wendell H. Camp. "Thus we have evidence that for at least 2 1/2 millennia -- and how much longer we shall never know -- great forest tracts in Africa have probably been regularly despoiled by fires purposely set by man, much as they are today."

Fires and other destructive human activities contributed significantly to the desertification of the Sahel Zone, the coast of which Hanno skirted, long before the recent droughts, population pressures and overgrazing usually cited as the culprits.

So it goes around the world and through the ages. Just about everywhere humans have lived they have been hard on forests. This is true of migratory bands of primitive hunters and gatherers presumed to be in tune with nature, and it is even truer of today's sophisticated, supposedly enlightened industrial civilizations.

Cutting trees without much regard for their replacement has been the rule throughout recorded history. Not until the late 18th Century in Europe and the mid-20th Century in the United States did the practice of cultivating and restocking forests take hold. And this progressive step has largely been offset by the advent of modern machines able to mow down forests quickly and industrial processes that poison them inadvertently.

If the world ever ran out of forests, it would be no small matter, given the central role wood has occupied in human affairs. Without the warmth and shelter provided by wood, humans could not have survived and flourished in northern latitudes. Wood has been the dominant construction and industrial raw material for nearly all of recorded history. The production of mineral wealth through mining and metallurgy has depended on wood. And wooden ships dominated the seas for several thousand years, permitting Europe to colonize much of the world.

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(c) 1987 Los Angeles Times, June 17, 1987

Five causes of deforestation that have been pervasive around the world and through the ages, and that continue today, are the use and abuse of forests to farm, graze livestock, provide timber, supply firewood and wage war.

Farming

Long before they developed tools capable of clearing forests, primitive people used fire to thin them out and beat them back in an effort to improve the yield of food and fodder.

Historians say that people have set fires in forests from time immemorial to clear away underbrush and make it easier to find nuts on the ground and dig for edible roots and tubers. Fire also has been used to improve the harvest of berries and to encourage willows and hazels to sprout and produce pliable shoots for basket weaving.

Hunters have used fire to open up dense forests that conceal animal and human enemies, thereby improving visibility and making hunting safer. They have set fires both to drive game out of the woods into ambush and to create grassy clearings to which game is attracted by succulent new forage and the salt content of ashes.

Some ecologists maintain that centuries of burning by primitive people created and maintained such great grasslands as the savannas of Africa, the steppes of Eastern Europe and Russia, and the pampas of Argentina. Some think American Plains Indians enlarged the Great Plains by firing forests to expand the range of the buffalo. They point to the fact that northwestern Illinois and southwestern Wisconsin were mostly prairie when first visited by white explorers but reverted to forest when the Indians were driven out.

Avoiding Swinging an Ax

Forest-dwelling American Indians used fire to clear plots for farming. First they gouged a strip around the trunk of each tree, preventing the sap from flowing and mortally wounding the tree. Then they planted corn under the leafless tree, later cutting it down and burning it to make a better field. White settlers followed the Indian practice, girdling trees to spare themselves the backbreaking toil of swinging an ax day after day.

Although the Indians who farmed clearings in the dense forest that blanketed the Eastern United States generally lay lightly on the land, forest farmers in many other parts of the world were much more destructive. Take Hawaii, for instance. The Polynesians who arrived about AD 700 slashed and burned large swatches of lowland forest (especially between 1300 and 1700, when their numbers burgeoned) to plant crops and provide fodder for their pigs and thatch for their houses.

Contrary to the common assumption that the Polynesians' impact was minimal, their forest clearing caused widespread soil erosion. And in combination with hunting and the introduction of pigs, chickens, dogs and -- inadvertently -- rats, deforestation had a devastating effect on the ecology, wiping out a third to a half of the known species of snails and birds by the time the Europeans arrived in 1778.

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Humans suffer with other species when fragile rain forest environments are overtaxed. Some scholars trace the collapse of the Mayan civilization in Central America about AD 900 to population pressures that caused overcropping, erosion and a decline in the land's productivity.

Soils in the Tropics

Tropical moist forests are generally less productive when cleared for farms and pastures than temperate forests. With most nutrients tied up in the vegetation, tropical forest soils are generally unsuitable for continued crop farming. But they will support crops for several years when enriched by the ashes of trees that are felled and burned. If the plots are then allowed to lie fallow and regain fertility for 20 years or so, they can again grow crops.

Shifting slash-and-burn cultivation is environmentally sustainable when there are limited numbers of people and they have room to move from place to place, leaving the wounded forest behind for time and nature to heal. But when populations grow too dense and the land is overused, the forest loses its recuperative capacity, often degenerating into scrub.

That's what is happening today in many Third World countries, as landless peasants desperately attempt to farm forest soils permanently. Environmentalists say farmers are the leading cause of tropical deforestation, more so than timber loggers, cattle grazers or firewood gatherers. "Amounting to roughly one in 20 of all people on Earth, these farmers represent the most pervasive form of environmental degradation overtaking the tropics," according to Norman Myers, author of "The Primary Source: Tropical Forests and Our Future."

To be fair, most of these forest farmers have little choice. In tropical countries, wealthy people typically own and occupy most of the best land -- the river valleys and the gentle slopes. This relegates peasants to small subsistence plots and marginal areas. As single-crop plantations and cattle ranches have expanded in recent decades to meet growing demand by the elite and exports to rich countries, millions of tenant farmers have been squeezed out, joining an army of landless seasonal laborers. Many head for the only "free" land left -- the forest.

Taking the Easier Path

Just as the U.S. government encouraged white settlers to take over the American frontier from the Indians, the current governments of Brazil, Indonesia and some other developing countries seek to secure national sovereignty over remote forests by colonizing them. They have found it easier to hand out land occupied by forest tribes who can't stand up to modern weapons than to redistribute already cultivated, generally more suitable, farmland owned by the wealthy elite.

"Rain forests are often used by governments as safety valves to defuse pressure for land reform," according to Catherine Caufield, author of "In the Rainforest." "The true cause of agricultural settlement in rainforests is often inequitable land distribution rather than simple overpopulation."

There's no question that tropical deforestation began long before overpopulation became a factor. Indeed, the large areas of the Caribbean and North, Central and South America that Europeans deforested in the 16th to 19th

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centuries were so underpopulated that slaves were brought in from Africa to provide essential labor.

New World forests disappeared in favor of cotton, sugar, coffee, rice and banana plantations. In West Africa, it was cotton and peanuts. In northeastern India, it was tea. And in Burma, the British transformed the forested Irrawaddy Delta into the world's greatest rice-exporting area.

Shift in Cotton Production

Deforestation accelerated in the 19th Century along with the spread of imperialism and the expanding world market. The U.S. Civil War, by cutting off Southern cotton exports and increasing the price of cotton on the world market, prompted much deforestation in western India.

"The rapid expansion of monocrop commodity production in the 19th and early 20th centuries in the world's colonies and dependencies was one of the primary reasons for today's dangerous imbalance between the First World and Third World," according to historians Richard P. Tucker and John F. Richards, co-editors of "Global Deforestation and the 19th Century World Economy."

A case can be made, for instance, that Brazil's northeast is economically depressed because much of it was deforested by the end of the 19th Century for sugar and coffee. Similarly, one of the reasons Haiti is the most deforested (and poorest) country in the Western Hemisphere is that its forests fell to sugar, coffee and cotton.

Although no longer a colonial dependency, Hawaii has followed the typical Third World development pattern, losing its forests to sugar, coffee and pineapple fields, many of which have subsequently been abandoned with rising labor costs and glutted world markets. Hawaiian ecologist Frederick R. Warshauer fumes: "Hawaii is a colony of the United States. It's locked into an import-export economy that is harmful to both the environment and the state's economy."

Export-Oriented Agriculture

Of course, the continental United States also practices export-oriented agriculture, much of it also at the expense of forests, to produce wheat, corn, rice, cotton, soybeans and other crops mainly for sale to other affluent countries that can afford to buy them rather than to hungry countries that can't.

More than 5 million acres of forest in the lower Mississippi River Valley from southern Missouri to southern Louisiana have been cleared since 1950. The major replacement has been soybeans, much in demand here and in Europe as a livestock and poultry feed.

The federal government has facilitated the deforestation with drainage and dredging projects to dry out the low-lying, seasonally flooded land, tax deductions for land clearing and drainage expenses, low-interest loans that encourage farmers to expand operations and subsidized crop insurance to reduce the risk.

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Environmentalists oppose the conversion of these so-called bottomland hardwood forests as increasing marginal farmland at the expense of excellent wetland and wildlife habitat. And even some government officials agree.

"In the long haul, it was not a good idea," says Stanley L. Krugman, director of timber management research for the U.S. Forest Service. "Serious floods and soil loss have resulted. A lot of soybean fields have reverted to flood plain, while the soil has washed away into the Gulf (of Mexico)."

Wheat production also has been expanded at the expense of trees, again with government encouragement. In the early 1970s, when the Soviet Union ran short of grain and made its first large purchase of U.S. wheat, Agriculture Secretary Earl Butz exhorted farmers to plant their land from "fence row to fence row" to maximize production. Forgetting the hard lesson of the past, thousands made room for more wheat and big new farm machinery by tearing out rows of trees, many of them planted as windbreaks after the 1930s Dust Bowl. As a result, parched topsoil once again was gone with the wind.

Grazing

Herders are hard on forests, too. They have a tradition of hacking down trees to provide fodder for their hungry cattle, sheep and goats, and of starting forest fires to replace trees and shrubs with tender young sprouts and grass.

Where they spare the woods but pasture livestock in it, their heavy-hooved cattle trample small trees, expose tree roots to the extremes of heat and cold, cave in stream banks and accelerate soil erosion. Sheep eat grass and other plants down to the roots. And goats, preferring to browse on shrubs and trees, pick them clean when given the chance.

"Goats made permanent the deforestation of thousands of square miles of Mediterranean hillsides by eating every seedling tree that ventured to show its head, until there were no more left," University of Denver historian J. Donald Hughes says in "Ecology in Ancient Civilizations."

When Europeans colonized the New World, they took with them their destructive propensity to allow herds to overgraze. As a result, large areas became as treeless as the Mediterranean hillsides they had left behind.

Today, pastoralists and their herds are on the defensive in many Third World regions, as expanding plantation agriculture squeezes them onto smaller and less favorable grazing ranges. Reflecting the ability of sheep and goats to get along on less favorable forage than cattle, African herders have responded by increasing their sheep and goat herds three times faster than the cattle population since 1970. Given goats' propensity to devour tree shoots and seedlings, this has helped increase the continent's deforestation rate.

Ranchers Move On

In tropical rain forests, pasturing cattle not only damages the forest but, like farming, is usually unsustainable. As environmentalist Myers points out, "Formerly forested soils quickly become exhausted of nutrients, and pastures feature poorer and poorer grass unless they receive ever greater amounts of fertilizer." Toxic weeds invade. Soil erodes. And ranchers move on to another patch of forest.

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Such "shifting ranching" helps Third World countries earn foreign exchange when the beef is exported. But in Central America, where cattle raising remains the leading cause of deforestation, beef exports and revenues have fallen sharply since 1979. The drop reflects revolutionary Nicaragua's shift from raising cattle for export to growing food crops for domestic consumption; the fighting there and in El Salvador, and declining beef consumption in the United States.

The United States has its own huge cattle population, and it has been doing its share of deforestation for their benefit. In the Southwest, the Forest Service and the Bureau of Land Management cleared several million acres of pinon pine and juniper woodlands on federal land during the 1950s, '60s and '70s in an attempt to increase grass and water for cattle grazing.

Dragging Anchor Chain

The usual method was for two bulldozers moving abreast to drag a ship's anchor chain between them, uprooting trees in their path. But chaining demolished countless Indian archeological sites, undermined the self-employment of Indians who collected pinon pine nuts for sale and helped radicalize outraged Paiutes and Soshones. Chaining also was ineffective in increasing water yield or grazing forage in many areas. And because the chain passed over seedlings and saplings, allowing them to spring back and survive, it didn't even get rid of the woodlands permanently.

"In some places, clearing increased range productivity and the impact on other things was low enough" to justify chaining, says R. Max Peterson, who retired as chief of the Forest Service earlier this year. "In other areas, removing juniper-pinon didn't make environmental or economic sense. In hindsight, we had twice as much juniper-pinon clearance as we should have."

Chaining continues today, but on a vastly reduced scale. The Bureau of Land Management in Utah, for one, says it is chaining much smaller blocks, following natural contours more often, and leaving islands of unchained woodlands to protect wildlife.

Timber

Humans have been logging forests to provide timber for thousands of years.

In ancient Greece, after deforestation made wood scarce, large stone and brick buildings still needed wooden beams, rafters, doors and roof shingles. Even the stone Gothic cathedrals of the Middle Ages were heavily dependent on wood scaffolding, cranes and windlasses to raise the stones.

London and Paris were wooden cities until deforestation forced substitution by stone, brick and tile. When London was rebuilt after the fire of 1666 consumed 12,000 houses, wood was so scarce it had to be imported from Norway and the Baltic region.

The pines of Muskegon, Mich., built Chicago twice -- before and after the great fire of 1871. And forests as far south as Big Sur were logged to provide lumber to rebuild San Francisco after the 1906 earthquake and fire.

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Construction in timber-rich America was often wasteful. Log cabins used whole logs, which saved sawing but wasted wood. Gingerbread Victorian houses with elaborate, superfluous ornamentation used wood extravagantly, to the delight of lumber merchants who distributed architectural plans promoting the style. Less-wasteful modern designs reflect not only changing public tastes but the declining abundance of lumber.

Wood-short societies have long looked to better-forested neighbors. Ancient Egypt, Israel and Babylonia all exploited the forests of Lebanon and Syria.

The Egyptian Pharaohs imported shiploads of Lebanon's cedars to build their palaces, temples and tombs. King Solomon exchanged wheat and olive oil for the Lebanese cedars that went into the construction of his temple in Jerusalem.

Burden Goes to Canada

Nowadays, the United States gets a nearly third of its softwood lumber and three-fifths of its newsprint, among other forest products, from Canada. The lumber imports are controversial because they reduce U.S. industry profits and employment. But they also help spare U.S. forests from further depletion.

The search for timber has spurred exploration, conquest and colonization. When the cedar, pine and cypress that covered their home mountains in Lebanon and Syria grew scarce, the Phoenicians set sail to exploit the forests of Cyprus and Crete. After deforesting their own country, the Greeks colonized well-wooded southern Italy and Sicily. And when the Romans, in turn, ran low on wood, they depleted the forests of Morocco, Algeria and Tunisia.

More recently, another island nation, Japan, plundered the forests of Taiwan, Korea and Manchuria in turn. Since the end of World War II, which put a stop to their taking timber by force, the Japanese have been buying what they need from Southeast Asia, the United States and other suppliers.

The United States, with vast forests of its own, hasn't needed other nations' forests to maintain strategic superiority. But it has never been averse to making money from them. After taking over the Philippines in 1899, the United States introduced modern logging, clear-cutting virgin forests and introducing dipterocarp lumber, mistakenly called "Philippine mahogany," to the world market.

Illegal Logging Rampant

Deforestation of the Philippines has accelerated since the end of World War II. Presidential decrees have transformed forests used communally by tribal groups for thousands of years into government property. Then logging companies have mowed them down. Illegal logging is also rampant. As a result, forest cover has dropped from 70% of the Philippines' land area in 1900 to about 40% today.

Exploiting public forests for private profit is nothing new, of course. It has been going on at least since Greek and Roman times. In some cases, governments have granted or sold timber rights to individuals. In others, government officials have personally profited.

One all-but-forgotten case involves Hawaiian kings and the Yankee ship captains who as early as 1790 saw an opportunity to profit from the islands'

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extensive stands of sandalwood trees, whose fragrant oily heartwood was then in great demand in China and India.

The captains tempted King Kamehameha and his successors to exploit the sandalwood in exchange for such items as an $800 looking glass and $10,000 brass cannon. The kings also wanted some of the white man's sailing ships and paid for them with an equal or double amount of sandalwood.

By 1836, the sandalwood was exhausted. Slow-growing and unresponsive to nursery propagation, sandalwood exists today only in scattered remnants, a reminder of the shortsightedness of opportunistically mining forests for export earnings with no thought to sustained yield.

Conscripting commoners to find, cut and haul timber wasn't limited to Hawaii. The Chinese emperors of old used to burn the palaces of their predecessors, then order fabulous replacements with proclamations mobilizing peasants into deforestation crews.

Mechanization of timber harvesting makes logging less labor-intensive nowadays. But it also increases its destructiveness. Consider the situation in California. When the horses and oxen that used to skid logs from the woods to small sawmills were replaced by steam locomotives, and later diesels, clear-cutting of extensive areas was facilitated. And sparks from the locomotives and the application of brakes set many fires.

Steam power freed sawmills from dependence on manual whipsawing or locations near flowing water. In the San Francisco Bay area, steam power hastened the clear-cutting of a redwood forest that covered 25 square miles of the Oakland Hills.

"These mills were very efficient and very thorough," historian Sherwood D. Burgess has recounted. "By 1860 only a sea of stumps marked the site of the East Bay redwoods. In tune with the unsentimental economy of the day, not a single original redwood was saved for posterity."

A Loss of Accuracy

When the gasoline-powered chain saw replaced the backbreaking two-man crosscut saw, it increased production, but it also caused more waste in the woods. "The chain saw traded volume for accuracy," says Dean Huber, program manager for forest products utilization for the Forest Service in San Francisco. "When it took two men all day to cut a single log, they made the cut carefully. When one guy could make the same cut in 20 minutes, he cut less carefully and made up for mistakes by cutting more trees."

The heavy, efficient machinery developed since World War II cuts down trees and gets out logs even faster. But it also leaves landscapes looking like targets of saturation bombing, as bulldozers gouge and loosen the soil, burying slash and debris. Carelessly cut logging roads cause hillsides to wash away.

"Technology has overrun the forest's ability to withstand what man might want to do with it," says Zane G. Smith Jr., the Forest Service's Pacific Southwest regional forester. "We can do anything we want to, including wrecking the whole business overnight."

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Firewood

Humans have gathered around wood fires since the earliest times to keep warm, cook their meals, repel wild animals and insects, relieve the darkness and enjoy one another's company.

Today, an estimated 60% of all the wood cut in the world is burned as fuel. Firewood is in desperately short supply, and firewood gathering is a major cause of deforestation in many Third World regions. The shortage is particularly acute in areas that were lightly wooded to begin with, such as the semi-arid savannas of Africa, and where regrowth is slow, as in the Himalayas of Asia and the Andes of South America.

"Nearly 1.5 billion people in 63 countries, or about 60% of the people who depend on fuel wood as their principal source of energy for cooking and heating, are cutting wood faster than it can grow back," the World Resources Institute and the International Institute for Environment and Development say in their joint study, "World Resources 1986." The result is a firewood deficit that the two policy research organizations expect will double by the year 2000.

Third World population pressures usually get the blame for the firewood crisis. The contributory role of industry is less widely acknowledged. Yet many countries, including Australia, India and Brazil, still depend on wood-derived charcoal for their iron and steel industry. And many countries consume enormous quantities of firewood to refine sugar, preserve fish and cure tea and tobacco.

Smokers Elsewhere Benefit

In east and central Africa, it typically takes two acres of trees to cure the tobacco grown on one acre, says John Spears, senior forestry adviser to the World Bank. "Most of the tobacco is exported" for the benefit of smokers elsewhere, he says, while local residents suffer the consequences of the desiccation, soil erosion and declining productivity that follow deforestation.

Firewood shortages are impeding the industrial development of many nations that lack adequate alternate sources of energy. And the deforestation overtaking these countries is a replay of what happened when many already developed countries went through the industrialization process. Some of these countries have recovered fairly well from past fuel wood crises, while others have never been the same.

Mining and metallurgy have been major causes of deforestation for thousands of years. In the ancient Mediterranean and Middle East, iron, copper, tin and lead miners not only used timbers in great numbers to brace underground tunnel ceilings and walls, but they set wood fires underground to crack resistant rocks.

Even more wood was consumed extracting metals from the rocks brought to the surface. Humans discovered smelting by observing how forest fires melted mineral outcrops naturally. They discovered charcoal when the black material left over from previous fires burned with a higher, more-even heat than firewood, and with much less smoke and flame. Putting the two discoveries together, early societies were soon burning mountains of charcoal to smelt mountains of metallic ore.

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Boromir Jordan, professor of classics at UC Santa Barbara, and ecological historian John Perlin trace the fall of the once-flourishing Mycenaean civilization in about 1150 BC to the deforestation of Cyprus and Aegean islands that had supplied the copper needed for this bronze-age civilization. "Lacking adequate stores of bronze to make arrowheads, spearheads and sword blades, the Mycenaean kingdoms fell to the blows dealt by their better armed foes," they say.

Smelting required such enormous stretches of forest to supply the charcoal needed for the smelting process that Europeans generally found it cheaper to move the ore to the forest than vice versa. So the manufacture of iron, copper, tin and lead was typically conducted by small establishments scattered through the forest that moved when the local supply of wood gave out.

The invention of the reverberatory furnace in the 1680s made it possible to switch from charcoal to coal to smelt nonferrous ores. But the production of iron and steel remained dependent on charcoal as a heat and carbon source until the introduction of coke distilled from coal in 1709 and the invention of the puddling process in 1784. After that, England's iron industry moved from the decimated oak forests of the south to the coal fields of the north.

On the Continent and in the United States, where the shortage of wood was less acute, it wasn't until well into the 19th Century that smelting with coke derived from coal became widespread. Charcoal was used to produce all U.S. pig iron until 1832, and coal did not overtake wood until 1887. The last charcoal blast furnace in this country shut down only in 1945.

In Nevada, the silver mining boom of the 1860s and 1870s consumed an estimated 750,000 acres of pinon pine woodlands to supply the immense quantities of wood needed for mine pit props, fuel wood and charcoal. According to historian John Richards: "So voracious were the charcoal kilns . . . that the kilns at Eureka alone consumed the produce of 50 acres of pinon per day. From every mining center, a deforested zone radiated outward as much as 50 miles."

Fewer American forests have died to supply fuel wood since its use has been eclipsed by other energy sources. But these alternatives have been hard on forests, too.

Appalachian Landscapes

Underground coal mining, with its pit props, surface facilities, waste piles and land subsidence, has had a major impact on once-forested hillsides in the Appalachians. And strip mining has taken an even greater toll, leaving former forests looking like desolate lunar landscapes, the topsoil eroded away and runoff of toxic metals and sulfuric acid discouraging reforestation. Unreclaimed coal-stripped land, most of it originally forested, occupies an area larger than Rhode Island.

Insatiable demand for electricity leads coal- and oil-burning power plants to spew out air pollutants that damage forests downwind. It also leads to forests being inundated behind dams. When Canada built the Mica Dam on the Columbia River in the early 1970s, it drowned enough trees to supply a pulp mill for 30 years because it didn't want to take the time to harvest the trees beforehand.

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And now firewood itself is making a comeback, both for home heating and to generate electricity. What's different this time is that U.S. forests contain only a fifth as much timber as before the first Industrial Revolution. And this raises the question: Can they withstand a second?

Warfare

Military preparations and warfare have contributed significantly to deforestation around the world. And the toll continues.

In the days of wooden sailing ships, many a forest disappeared into a naval fleet, and many a fleet disappeared in battle. As the French historian Fernand Braudel pointed out, "Every fleet, in no matter what country, required for its construction the destruction of enormous expanses of forest."

Robert G. Albion, a Princeton historian whose 1926 study, "Forests and Sea Power: The Timber Problem of the Royal Navy 1652-1862," remains the definitive work on the subject, drew a parallel between the strategic importance of ship timbers in centuries past and the 20th-Century oil situation: "Oak, like oil today, was a natural product very abundant at the outset, but liable to ultimate exhaustion. . . . For want of an adequate domestic supply, nations sought colonies and exerted diplomatic pressure in those days for ship timber as they do now for oil."

Access to forests spelled the difference between political ascendancy and decline. "Macedonia, an insignificant backwater country on the fringes of the Greek world until the 5th century BC, became the immensely rich and powerful central power of the world when the Greeks exhausted their supplies of wood and came to depend on Macedonia's forests," according to Jordan, the classics professor, and Perlin, the ecological historian. "The Macedonians soon translated their wealth into political and military power resulting in the conquest by Alexander the Great of nearly the entire known world, from Egypt to India."

Similarly, the center of Italian civilization shifted during the declining years of the Roman Empire from deforested central and southern Italy to still well-wooded northern Italy. Much later, during the Renaissance, northern Italy exhausted its forests and allowed its hillsides to erode away, and ascendancy moved northward once again.

Even the thick forests of central and northern Europe fell in their turn. England and France, the principal northern European powers, engaged in so many maritime wars and so depleted their own forest resources that both conducted a worldwide search for ship timbers from the mid-17th to mid-19th centuries.

Their ships became international floating forests. The typical 74-gun English man-of-war contained the wood from 2,300 oaks obtained from 44 acres of English or Irish woodland. It had a mainmast of white pine from Maine, a topmast of fir from the Ukraine, spruce spars from Norway and cabins of Caribbean mahogany or Indian teak. Tar, pitch, resins, varnish and other naval stores from American Southern pines sealed joints and retarded rot.

In those days before the use of creosote and other wood preservatives, marine borers from without and fungous dry rot from within caused ships to decay quickly and have an average life of only 15 years. Masts usually had to be

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replaced after 12 years when their resin dried up and deprived them of strength and resilience.

The English prized the white pines in New England's virgin forests for their size (some were 200 feet tall with trunks nine feet across), straightness, strength, resilience and durability. Representatives of the Royal Navy marked the best of the white pines in the name of the king and prohibited the colonists from felling trees the navy would someday need. This conflicted with the colonists' desire to exploit the forests themselves and provided one of the grievances that led to the American Revolution.

If shipbuilding and naval warfare have been hard on forests, land and air warfare have been even more devastating. For one thing, firing forests has long been a potent weapon of war. During the U.S. Civil War, for instance, fires set willfully or accidentally in battles and by marching troops, as well as by non-military vandals and arsonists, burned extensive areas of forest in the South.

Some forests have been burned several times. One such is the pine forest in the Landes region of southwestern France. In 407 AD, invading Vandals razed villages, dispersed the population and set fire to the forest. This destroyed the cover of a vast sandy area. With the trees gone, winds sweeping in from the Atlantic Ocean piled the beach sands into dunes. The dunes rolled inland, choking streams and creating malarial marshes.

The forest has been damaged several times since then, most recently in World War II when incendiary bombs started fires that destroyed half a million acres.

Devastation From Agent Orange

The most devastating deforestation in warfare probably took place in Vietnam during the 1960s and early 1970s. In an attempt to deny ground cover and crops to their Vietnamese enemies and to break their spirit, American forces used bulldozers, explosives, napalm and 19 million gallons of Agent Orange and other herbicides to defoliate and destroy forests, rubber plantations, farm fields and other areas of what had been a beautiful, verdant countryside.

The defoliation campaign constituted the "deliberate destruction of the environment as a military tactic on a scale never before seen in the history of warfare," the Swiss-based International Union for Conservation of Nature and Natural Resources concluded in a 1985 study.

According to that study, the forests have not recovered, and even trees that survived must be harvested and sawn with extreme care because many are riddled with shell fragments. Wildlife has not returned, the productivity of cropland and fisheries remains depressed, one-third of the country is now considered wasteland, and there has been a great increase in toxin-related disease and cancer.

Less widespread, but still very real, destruction continues elsewhere. In El Salvador, U.S.-supported government forces make a practice of cutting down fruit trees and killing livestock in areas in which local peasants support anti-government guerrillas. Meanwhile, bombing raids cause both deliberate and inadvertent damage to forests.

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The situation in nearby Nicaragua is mixed. On the one hand, raids by U.S.-backed rebels have prompted ranchers to flee border areas with their cattle, allowing forests to regenerate. On the other hand, farmers displaced by the fighting have turned to slash-and-burn agriculture on forested hillsides. And contra-started forest fires and attacks on reforestation crews have forced the Sandinista government to suspend reforestation efforts.

The Price of Progress

Industrialization has both relieved and intensified pressure on the world's forests. In developed countries, industrialization has permitted the substitution of metals and fossil fuels for wood in many applications. But in developing countries, the rapid population increases and widening economic and social inequalities long associated with early industrialization have multiplied exploitation of forests for farmland and firewood.

No area of the world better illustrates the price of progress than the West African Sahel, that semiarid sub-Saharan region that stretches eastward from the Atlantic Ocean through Senegal and Mauritania into Mali.

Pre-industrial damage to forests in the Western Sahel was extensive. By burning the bush to make tender, green forage available to wildlife and livestock, primitive hunters and herders turned many forests into grasslands, after which the grasslands degenerated into desert.

When they got guns from European traders in payment for slaves, Moorish herders virtually eradicated the wild carnivores that had preyed on livestock entering forests. This permitted herds to swell and chomp through the woods.

But the most destructive development has involved tapping the once-extensive acacia forests in the Western Sahel for gum arabic. Long prized as a thickener and stabilizer in the manufacture of printing inks, pharmaceuticals, adhesives and other products, gum arabic is obtained by peeling pieces of bark from the acacia tree and then collecting the gum that oozes from the wounds.

Acacia Forests Die Out

"The more stressed the tree, the greater the yield of gum" -- and the greater the tree's susceptibility to drought and disease, the National Research Council notes in a 1984 study.

Destructive tapping by the Dutch as early as 1448, and later by the French and English, effectively destroyed inland acacia forests by the turn of the 20th Century. Exploitation since then has finished off the acacia forest that used to run the entire 400-mile length of Mauritania's now desert coast.

Scattered acacia trees have survived, mostly in and near farm fields where their usefulness in fixing atmospheric nitrogen and fertilizing the soil has long proved their worth. But in recent decades a switch from subsistence farming for local consumption to mechanized farming for export doomed many of these trees as well.

Peanut farming in Senegal typifies the trend. As recounted by the U.N. Food and Agricultural Organization: "The land was originally worked by hand, left fallow every few years, and benefited from the fertilizing action of stands of

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acacia trees. But demands for more intensive production of ground nuts soon led to mechanization and the removal of tree cover so that tractors and animal-drawn equipment could work more easily."

With the trees gone, soil fertility fell. Artificial fertilizers took up the slack -- for a time. But when fallowing was discontinued as well, "soil fertility dropped so much that the amount of artificial fertilizer that had to be applied began to make the crop uneconomic." The upshot was many treeless, cropped-out farms left open to the desert winds and sands.

Mechanization's Mixed Effects

Modern agriculture has had mixed effects elsewhere. In the United States, switching from horse-drawn to petroleum-powered farm machinery has permitted many fields formerly needed to feed the horses to revert to forest. Greater crop yields per acre have rendered other fields superfluous.

On the other hand, petroleum-powered machinery has facilitated the dredging and clearing of seasonally flooded forests, most notably in the South. It has enabled strip miners to peel away forest floors to get at coal and other minerals. And it has opened up formerly inaccessible forests to loggers.

"A petrochemically intensive economy, great transportation network, and the Caterpillar tractor have enabled us to deforest America so fast," says Tim McKay of the North Coast Environmental Center in Arcata, Calif.

Worse may be in store. Devastating as deliberate deforestation has been in this and other countries, the inadvertent poisoning of forests throughout the industrialized world by airborne pollutants is potentially even more destructive.

One pollutant is ozone, created when ultraviolet rays in sunlight react with hydrocarbons and nitrogen oxide exhausted from autos, power plants and factories. Another is acid rain, created when the oxides of sulfur and nitrogen from smokestacks and motor vehicles react with atmospheric moisture and fall to earth as acidic rain, snow, fog or dust.

Losses in California

Ozone has damaged trees in national forests and parks in Southern and Central California, including 58% of the pine and oak trees in Yosemite National Park and 87% of the pines in Sequoia and Kings Canyon national parks. It has reduced tree growth. It has weakened trees so that they are more susceptible to damage from root rot, bark beetles, drought, windstorms, fire, frost and other stresses. And it has killed trees indirectly, including 57% of all trees in the most affected areas of the San Bernardino Mountains downwind from Los Angeles.

In the East, acid rain is causing die-back in spruce and fir forests in the Appalachian Mountains from Maine to North Carolina. It is suspected of contributing to a 20% to 30% decline over the last decade in the growth of pine trees in the foothills and mountains of Southern Appalachia.

But the worst hit is heavily industrialized Central Europe. Signs of damage there have emerged rapidly, with little warning. Five years ago, 8% of West Germany's forests showed signs of damage. The figure had jumped to an alarming

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52% by 1985. The situation in heavily polluted Czechoslovakia and Poland is reportedly even worse. And in Switzerland, where 50% of forests are afflicted, fears have been raised that a continuation of the present trend will destroy tree cover that for centuries has provided natural barricades to mountain avalanches.

And now comes an even greater peril -- radiation. Last year's nuclear power plant disaster at Chernobyl in the Soviet Ukraine irradiated extensive pine forests in the area, prompting Soviet officials to conclude that the most heavily contaminated sections would have to be leveled and their trees buried.

This signals an all-time low in the fortune of forests. Long destroyed to provide lumber, farmland and other benefits, forests now stand in danger of being deliberately destroyed without yielding any benefits at all.

GRAPHIC: Chart, THE RAVAGES OF DEFORESTATION, PATRICIA MITCHELL / Los Angeles Times ; Photo, Lumberjacks in 1900, working at a deliberate pace, take a break from man-powered machine used to cut up huge fir log. Forest Service Collection, National Agricultural Library; Photo, Indian cooks over wood fire in Brazil; half of the world's people use wood for cooking, including millions of city dwellers. Los Angeles Times

TYPE: Series

SUBJECT: DEFORESTATION; FORESTS; PRESCRIBED BURNINGS; FARMLAND; LUMBER; SHIPBUILDING; ACID RAIN; WAR; AIR POLLUTION

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1ST STORY of Level 1 printed in FULL format.

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JUNE 14, 1989, WEDNESDAY

SECTION: FROM THE WHITE HOUSE

LENGTH: 1244 words

HEADLINE: CB
REMARKS OF PRESIDENT GEORGE BUSH
AT CEREMONY FOR WINNING DESIGN FOR KOREAN WAR VETERANS MEMORIAL
THE ROSE GARDEN, THE WHITE HOUSE

KEYWORD: BUSH-06/14/89 KOREAN WAR MEMORIAL

BODY:
PRESIDENT BUSH: Thank you, ladies and gentlemen. And thank you all. (Applause.) Thank you, General Davis and General Stilwell. Please be seated. General Goodpaster, our Commandant General Gray, Secretary Lujan, members of the Commission, winners, second place winners, third place winners, fellow veterans, distinguished guests, leaders of the Congress. It is a pleasure to welcome you to the White House. And I want to thank you for the privilege of sharing this occasion.

Woodrow Wilson once said, "A patriotic American is never so proud of his flag as when it comes to mean for others, as to himself, a symbol of liberty." Well, fittingly, we meet here on Flag Day, and the day of the US Army's founding, and as patriotic Americans to publicly unveil the winning design for a symbol of liberty -- the Korean War Veterans Memorial.

And there are, of course, many such symbols in this great capital of ours, memorials which rightly hail veterans from Bunker Hill to Gettysburg to the rice paddies of Vietnam. And they are a part of our history and of our lure -- monuments to the dead and the living. But until recently, the Korean War was not formally remembered, nor were the over 5.7 million American servicemen and women who were directly and indirectly involved.

And today we say, no more, it's time to remember, for we are here to pay tribute to America's uniformed sons and daughters who served during the Korean conflict, and to recall and American victory that remains too little appreciated and too seldom understood. We recall that when the war began the forces of totalitarianism seemed ready to overrun all of Asia. But it never happened, for Korea was the first allied effort in history to contain communism by combining strength. Fighting side by side under the flag of the United Nations, the freedom-loving countries of the United States and the Republic of Korea and other allies strove to halt aggression, and we succeeded and built a stable peace that has lasted for more than 35 years. And together we held the line. And today we are still holding it. And let me salute those American troops who guard the 38th Parallel. And I want to salute our allies, for they, too, have sacrificed on freedom's behalf.

And what'll happen in much of Asia we can't be sure, but of this we are certain: In retrospect, the policy of containment so exemplified by the Korean Conflict created the conditions for the tide toward democracy now changing and uplifting our globe.

The design we unveil today honors that democracy and the American men and women who took up arms and bore our burden so that freedom could survive. And our nearly five million Korean War veterans alive today, we honor them. Our

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103,000 wounded in the conflict, we honor them -- our more than 8,000 missing or unaccounted for, the 54,246 Americans who gave their lives, who gave, as Lincoln said, "the last full measure of devotion."

This day marks another step toward the memorial that Korean veterans deserve and will have, a process which began when President Reagan signed legislation authorizing the creation of a Korean War Veterans Memorial in the District. And last September, a site was approved for the Washington Mall. The memorial will be built in Ash Woods, a grove of trees near the Lincoln Memorial, across the reflecting pool from the Vietnam Memorial.

And its existence will be due to a number of friends. Among them are members of both parties who helped pass this legislation and, of course, the sponsors of this memorial. And in that context, I would like to thank the Battle Monuments Commission, ably chaired by General Goodpaster, who was years ago right in this building the staff secretary to President Eisenhower; and also the Korean War Veterans Memorial Advisory Board.

And now let me thank the men and women who chose this design and to Chairman Ray Davis my special thanks for chairing the committee. I want also to repeat, as General Stilwell has noted, that ever dollar of this funding has been privately financed and to commend, as he did, Max Jamieson (sp?), whose company donated a million dollars and then Abbie -- dear Abby -- Abigail Van Buren, whose readers raised almost unbelievably 330,000 for the Veterans Memorial.

General Davis has observed how the design for your memorial was crafted by four professional architects and designers on the faculty of Penn State, the Department of Agriculture -- you met them -- Dr. Leon Oberholtzer (?) and John and Veronica Lucas and to all of them, my congratulations. Somehow it seems that you might even eclipse Joe Paterno and the Nittany Lions as Penn State's most noted team.

But let me add that I look forward to the days when the memorial itself is unveiled, for it will stand as America's lasting tribute to those who fought so valiantly in an unknown land as Liberty's "Horatio at the bridge." And as you view it, think of such names as Ridgway and Van Fleet and MacArthur, shell-torn Uplands, Pork Chop, Bloody, Arrowhead. Remember Panmunjom and yes, Inchon, and the heroism of the soldiers who fought across the rugged snow-covered hills. Think of men like James Garner, Neil Armstrong or the many members of the United States Congress who served in Korea -- Warren Rudman, among them and John Glenn and John's wingman, Ted Williams. "Ball game Teddy," they called him -- the greatest hitter who ever lived or General Al Gray, sitting right here, who volunteered twice to sit on the front line, first as an enlisted Marine and later as a commissioned officer courageously leading an infantry platoon -- heroes who showed that ours would not be the land of the free if it were not also the home of the brave. And yes, think of them, honor them, remember how they served from Pusan to Pyongyang: Heroes like Rosemary McCarthy, a courageous Army nurse, or our good friend -- my good friend, Pete McCloskey, who endured superior forces to charge up and take his hill and whose troops so admired him that they named a baseball field in his honor in Korea. Or Wally Lukens (?), who braved enemy fire to replace another platoon leader and picked up a gravely wounded infantryman and carried him to the rear. His efforts to save that life were in vain, but his selfless devotion to his men, his grit and his guts lives on in the souls of all Americans in uniform today.

To my right sits such an American -- stands such an American -- he's supposed to be seated -- Ray Davis, who was a Lieutenant Colonel during the war, and received the Congressional Medal of Honor. And 37 years ago in this very place, President Truman, himself a veteran, presented the medal, and then he said, "Colonel, I'd rather have this than be president. Ray Davis won his medal for you and for me and our country and he's wearing it today and it makes us proud

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and so will this design of the veterans' memorial.
It speaks of walking toward freedom and toward home in the cold that was Korea. Mike McKevitt (sp?) was a fighter pilot in Korea, and he tells he he couldn't sleep for three nights after first seeing this memorial. And now we all are about to see why. So could me move over and -- (applause.)
(Model of Korean War Veterans Memorial is displayed.)
(Applause.)

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June 22, 1987, Monday, Home Edition

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HEADLINE: ENDING WASTE AVOIDS HUGE COSTS;
FOREST RECLAMATION: LAST RESORT AFTER CONSERVATION

SERIES: THE VANISHING FORESTS: LAST IN A SERIES

BYLINE: By A. KENT MacDOUGALL, Times Staff Writer

DATELINE: COPPERHILL, Tenn.

BODY:

As the sun beats down and the wind whips by, three federal reforestation experts proudly show off a 28-acre stand of loblolly pine trees hugging a hillside near this town on the Georgia border.

The eight-foot trees seem unremarkable enough. After all, these are the foothills of the thickly forested Southern Appalachian Mountains, where 100-foot oaks and hickories abound. These 28 acres used to be thickly forested, too. But that was before copper mining, smelter fumes and firewood cutting combined to denude 50 square miles of once verdant landscape, allowing wind and rain to carry away all the topsoil and several feet of subsoil as well, leaving deep gullies, a rocky cover of slate fragments and no vegetation at all.

Getting even grass to grow in the sterile, stony earth is considered an accomplishment. That 86% of the pine seedlings planted four years ago are still alive and thriving demonstrates that with ingenuity (such as inserting a marshmallow-sized pellet of fertilizer alongside each seedling), patience and luck, severely abused deforestation sites can be recloaked, reclaimed and returned to productivity.

"The lesson of the Tennessee Copper Basin is that even with extreme insult, nature has an amazing capacity to regenerate itself, particularly with man's help," says Gary Tyre, a U.S. Soil Conservation Service forester who helped plan the reforestation project.

Encouraging Example

Considered a classic of forest and soil destruction unusual even in the thick annals of land abuse, the Tennessee Copper Basin provides an encouraging case study of an attempt to remedy the ravages of deforestation that has relevance to other ruined landscapes the world over. If the Copper Basin can be reclaimed, so too can many other severely degraded former forests both temperate and tropical.

Reclamation, of course, is a costly, time-consuming last resort that often is only partially successful and sometimes has undesirable side effects. In land usage, as elsewhere, an ounce of prevention renders a pound of cure unnecessary. Ending destructive and wasteful habits not only spares forests, but spares

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societies the massive investments needed to rehabilitate them.

Unfortunately, far from preventing forest destruction, the world is making demands on forests for lumber, firewood, wood pulp, livestock forage and other products that far exceed their carrying capacity. Temperate forests in industrial countries are shriveling from the chemical stress of air pollution. Tropical forests in developing countries are retreating before the chain saw, the plow and the firewood gatherer.

Of all the countries in Latin America, Africa and Asia, only China and South Korea appear to be planting more trees than they are harvesting, according to Worldwatch Institute, a Washington research organization that analyzes global problems. What's more, Worldwatch estimates that worldwide reforestation programs would have to be expanded fivefold -- in Africa, fifteenfold -- to prevent forest cover from shrinking further.

"Forest resources for the future should be a mosaic of single-use plantations, multiple-use natural forests and intact undisturbed stands," Worldwatch senior researchers Lester R. Brown and Edward C. Wolf conclude.

Small Patches Also Needed

With trees natural to about half the Earth's land surface, experts say the world would be wise to maintain trees not only in solid blocks in forests but also in smaller patches in woodlots, windbreaks, shelterbelts, orchards, parks, and wherever thin, erodible soils, steep slopes and other damage-prone environments need the protection of tree cover.

The massive tree plantings required to protect environments and achieve self-sufficiency in forest resources are far from the only steps needed, however. Other measures include conserving wood, and thereby sparing forests, by fully utilizing timber in the forest and logs at the sawmill, economizing on the use of lumber in construction, recycling paper and reducing needless waste all along the line.

Another remedy is to manage forests to maximize sustainable yields, minimize losses to insects, disease and fire and avoid such shortsighted practices as taking the biggest and best trees, while leaving smaller trees and less desirable species to regenerate.

In the Third World, remedies include curbing rampant illegal logging and poaching of fuel wood, helping rural communities establish local woodlots and getting a grip on the economic and social problems that underlie much deforestation. Economic and social reforms that would relieve pressure on forests include redistributing land, increasing farm productivity, relieving poverty, improving the quality of life in and around threatened forests and reducing population growth.

Hope for New Land Ethic

Fully realizing such reforms would probably require a political revolution. But that isn't the only revolution environmentalists say is needed. What they have in mind is an equally profound ethical revolution that would instill in people the world over a sense of environmental responsibility, a land ethic, an appreciation that forests are a world heritage held in trust for future

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generations and a realization that forest conservation serves societies' long-run self-interest.

While it may be too much to expect billions of poverty-stricken Third World residents to see beyond their immediate survival needs, the industrialized, affluent First World has finally gotten around to cultivating, managing and developing forests -- at least some forests -- to provide for the future.

Although ancient Greeks and Romans cultivated plantations of trees, modern forestry dates to Germany in the 1780s. Until then, European foresters were mainly game wardens who patrolled hunting reserves for feudal landlords. Trees were cut without much regard for their replacement, as they still are in the tropics.

In the United States, there were no forestry schools and little forestry was practiced on either public or private lands until 100 years ago. Forestry was begun as a remedy for the devastation caused by reckless logging and the fires that often followed.

Stanley L. Krugman, director of timber management research for the U.S. Forest Service, says the federal government "didn't really practice forestry until the 1930s and 1940s," when the Civilian Conservation Corps undertook extensive reforestation projects. As for the commercial lumber industry, it "didn't discover forestry, and practice tending forests and regrowing them, until after World War II. Companies only harvested prior to that."

Something Left to Save

Thanks to the country's vast forests, rich soils, generally adequate rainfall and impressive biological healing capacity, forestry's belated arrival hasn't been ruinous.

"We've made most of the mistakes," Krugman says. "But the United States is large enough and has such a variety of forests and relatively low population pressures, that when we screwed up the East, the Great Lakes states and the South, we had the West to move to. With exceptions, such as the Tennessee Valley, we didn't denude cutover lands. We didn't eliminate the natural cover and degrade the soil. We harvested our interest, but we didn't bankrupt our principal."

With cut-and-run logging now the exception rather than the rule, a less dramatic, but no less insidious, threat to forests has taken center stage. This is the air pollution that is slowly sickening, stunting and even killing forests, both here and in most other industrialized nations.

When it comes to air pollution, no area of the United States better illustrates both the damage it can cause and the benefits of curbing it than the Tennessee Copper Basin.

From 1850, when the first mine opened, until early in this century, the basin's mine operators piled the ore they brought up from deep underground in the open, then roasted it with firewood from trees cut from surrounding hillsides. Roasting rid the ore of its main impurity, sulfur, but the great clouds of sulfur dioxide that rolled off the heaps killed the remaining vegetation and, combined with the loss of soil, prevented it from coming back.

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Smokestacks Extend Damage

Moving the smelting indoors to blast furnaces equipped with smokestacks reduced the concentration of deadly sulfur fumes. But it spread the fumes over a wider area, extending the damage and providing an early demonstration that the solution to severe pollution is not dilution.

Later, the sulfur fumes were captured and converted to sulfuric acid. Sulfuric acid is now the only remaining mine's chief product, demonstrating that costly controls on emissions can repay the polluters who foot the bill.

Easing air pollution, however, did not stop the denuded basin's soil erosion or provide a seed source to regrow the forest. Human help was needed. It arrived in the 1930s, when experiments to stabilize and rebuild the soil and reforest the hillsides began.

Since then, Tennessee Chemical Co., which operates the only remaining mine, and four federal agencies -- the Civilian Conservation Corps, the Soil Conservation Service, the Forest Service and the Tennessee Valley Authority -- have planted 14 million trees, perhaps half of which have survived. The denuded area has shrunk each year. But as the plantings have come closer to the heart of the basin, the lack of vegetation and topsoil, along with torrential rains and temperature extremes, have made reforestation increasingly difficult.

50% of Seedlings Lost

The 1986 drought that struck the entire Southeast has made survival particularly difficult for newly planted trees. Despite the 86% survival rate of the loblolly pines planted by the Soil Conservation Service in 1982, only about 50% of seedlings planted a year and a half ago on an adjoining plot remain alive.

Reforestation is not only uncertain but expensive. The TVA estimates that reforesting the 18 square miles of the Copper Basin that are still barren would cost $6.4 million. And even then it would take at least 250 years to rebuild the topsoil lost through erosion.

But not reforesting is costing even more. For one thing, soil washed from the basin into the Ocoee River has settled in three TVA reservoirs, nearly silting up one of them after only 43 years. The silt has clogged intakes, increased wear to hydroelectric turbines, reduced electric power generation and killed off nearly all fish and aquatic life in the river.

At the current rate of reforestation, another 40 years will pass before the Copper Basin is fully recloaked. Stepped-up public and corporate spending not only would shorten the process but pay dividends. Already, Tennessee Chemical is selling timber from areas replanted in the 1930s, indicating that reforestation can generate income as well as protect the environment and serve the public interest.

Man-Made Forests

Man-made forests are spreading throughout the world as an alternative to fast-shrinking natural forests.

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Called commercial forest plantations by some and tree farms by others, man-made forests that are intensively cultivated to produce preferred species of trees have the potential of relieving pressure on natural forests and woodlands. But their drawbacks, including adverse effects on soil and wildlife and increased vulnerability to insects, disease and fire, are prompting serious questioning of their appropriateness as a remedy for deforestation and as a supplier of wood.

Modern man-made forests date back 200 years to Germany. There, as throughout much of Europe, unregulated selective cutting had taken the biggest and best trees, leaving the poorer specimens to regenerate the forest. Many forests were overgrazed by domestic livestock, while forests used for hunting by the nobility were over-browsed by game. The resulting deterioration called for remedial action.

Foresters proposed that the only way to rehabilitate the forests was by clear-cutting and then making a fresh start by planting trees. Although proposed only as a remedial measure, clear-cutting, planting and harvesting on relatively short rotations became standard practice in Saxony and many other regions, and has continued since.

The dominant motive was, and remains, profit. Barons and other forest owners discovered they could make more money replacing natural but slow-growing oak and beech trees with faster growing spruce and fir.

Relatively Recent Practice

In the United States, 19th-Century railroads established plantations alongside newly laid tracks to provide replacement crossties and fuel for steam locomotives. But man-made forests became widespread only after World War II. Since 1950, timber companies and other private forest owners have converted more than 35 million acres from natural growth to artificially generated stands of commercially valuable trees, and the Forest Service has converted nearly 8 million acres in national forests.

Tree farming has also spread to Canada, the Soviet Union and China. Pine plantations have been established in such temperate Southern Hemisphere countries as Australia, New Zealand, Chile and South Africa. Worldwide, man-made forests make up roughly 3% of the world's forests, but produce a much higher, if undetermined, share of construction lumber and pulpwood.

The chief advantage of man-made forests is increased productivity. Trees grow faster than in natural forests. Species planted can be chosen for particular uses -- eucalyptus for firewood, pine for pulpwood, Douglas fir for construction lumber, teak for furniture. Regularly spacing trees in rows reduces maintenance and harvesting costs. And nearly every tree can be utilized, whereas commercially useful trees are few and far between in many natural forests.

In the tropics, trees typically grow five to 10 times faster in plantations than in natural forests. But tropical forest plantations are costly to establish, and returns on investment not only are delayed but uncertain because of timber price fluctuations and the ever-present possibility of nationalization. As a consequence, less than 10% of the world's man-made forests are in tropical regions.

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Poor Don't Always Benefit

Tree plantations in the Third World don't always benefit the local population and sometimes actually widen the already huge gap between rich and poor. In India, tribal people in the state of Bihar have protested the replacement of the natural forest on which they depend for firewood and other essentials with teak plantations. At last count, hundreds of arrests and at least two dozen deaths had resulted from this eight-year-old conflict.

Tree farming has environmental drawbacks as well. For one thing, short rotations reduce the recycling of nutrients from trees back to the soil. "Maybe there are only so many rotations," says Krugman of the Forest Service. "Some soils hold up, whereas others lose nutrients."

Nutrient loss tends to be greatest in plantations of pine, spruce, fir and other conifers. Conifers, which bear their seeds in cones, generally make better construction lumber and pulpwood than deciduous trees such as oak and cherry, which produce their seeds in nuts and fruits. But whereas deciduous trees have nutrient-rich broad leaves that fall to the forest floor each year and decompose into rich humus, conifers' needle-like leaves have a lower nutrient content and are shed only every five to seven years.

What's more, conifer needles are acidic. This causes problems in cool, humid areas such as northern Europe. Water filtering down through the soil of conifer plantations becomes acidic and dissolves iron and aluminum salts in the soil. The salts are redeposited in a hard pan below the surface that impedes drainage and causes waterlogging.

Not as Helpful to Watersheds

Conifer plantations also protect watersheds less adequately than the mixed deciduous-conifer forests they replace. "Broadleaf species respire more water, have larger root systems that draw moisture from a larger area and do a better job of sopping up excess water, stabilizing slopes and reducing soil erosion," says Andrew A. Leven, director of watershed management in California for the Forest Service.

Coniferous forests support less plant and animal life. According to conservationist A. Starker Leopold, even-aged stands of Douglas fir in Northern California offer so little food for wildlife that "a bluejay would have to pack a lunch to get across" one.

Coniferous forests have still other disadvantages. They suffer more from air pollution than deciduous forests because their needle-like leaves are exposed year-round. They are more vulnerable to insect and disease attacks than mixed, uneven-aged natural forests. And they are more susceptible to fire because conifers contain more flammable chemical compounds, maintain their foliage year-round and when even-aged, have crowns of uniform height that wind-whipped fire can race across.

To be sure, conifers aren't the only fire-prone trees. Flammable deciduous trees include the blue gum eucalyptus, a fast-growing, drought-resistant native of Australia that was planted all over California early in this century. Foresters thought blue gum plantations would make their owners rich, but the species' tendency to warp, shrink and crack when cut into lumber made it

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useful only for firewood and windbreaks.

Worse, blue gums proved fire hazards. Their oily leaves and peeling bark make ideal tinder, most dramatically demonstrated on a dry, windy September day in 1923 in Berkeley. A grass fire that started on the crest of the Berkeley Hills northeast of the University of California campus spread to a grove of blue gum eucalyptus trees. Flaming pieces of bark were blown by the wind, like firebrands, and set spot fires that destroyed 584 houses and other structures.

Third World Forests

In the Himalayan foothills of northern India, village women who spend long hours gathering firewood for home cooking and heating had their lives disrupted by unbridled commercial logging that wasted local firewood and caused soil erosion and landslides.

One day when commercial loggers arrived to cut down still another stand, the women adopted the Gandhian technique of nonviolent resistance by throwing their arms around the trees marked for cutting. The loggers, nonplussed, withdrew.

Out of this demonstration, in 1973, grew the Chipko Andolan, or "Hug the Trees," movement. Begun as a grass-roots revolt among a handful of village women, it has since expanded to include environmentalists, students and politicians. The movement has called public attention to rampant deforestation and it has pressured the government to call a moratorium on commercial logging in an area of 450 square miles, as well as to step up reforestation programs benefitting local villagers rather than outside commercial interests.

Going beyond protest, the Chipko activists have planted trees and reforested several thousand acres, establishing what American observers call one of India's most successful reforestation programs. Although lumbering and firewood cutting are still outstripping reforestation efforts in the Himalayan foothills, the movement's success in halting and even reversing some of the devastation demonstrates what poor, ill-educated peasants working together can accomplish.

Self-reliance is a necessity in most of the underdeveloped and developing countries of Asia, Africa and Latin America. Government policies typically favor the urban elite rather than the rural majority. Investments in forest rehabilitation are few and far between and usually are for large-scale projects run from the capital and of little benefit to villagers in the hinterland.

Community Forestry

Poor villagers planting and tending their own trees for their own benefit constitutes forestry by the people, for the people. It's called community forestry, and it provides many of the subsistence needs of rural dwellers: firewood, building poles, roof thatch, livestock fodder, fruits and nuts. Community forestry increases work opportunities and supplements farm income. Its environmental benefits include controlling soil erosion, preventing floods and landslides and increasing crop yields.

Multipurpose trees provide several benefits simultaneously. In China, trees planted around houses and villages and along roads and waterways -- the so-called "four-around" plantings -- reduce wind velocity and evaporation and raise crop yields. They provide leaves that are fed to hogs, sheep and

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rabbits. And they yield fruits, nuts and such marketable oils as tung and olive.

Community involvement and tree tenure rights are considered vital to the success of community forestry projects. "People have to identify with the trees they plant as their property, or the products of these trees have to be of direct benefit to the people, for programs to be successful," says Ken Newcombe, a World Bank senior energy specialist.

Where villagers have not participated in selecting, planting, weeding, watering and protecting reforestation sites, as in many African countries, seedlings have had a low survival rate and saplings have been destroyed by wood poachers, cattle and goats.

China's massive reforestation campaigns have produced mixed results. On the one hand, its windbreak and shelterbelt plantings are "legends, unmatched in magnitude anywhere in the world," according to the United Nations Food and Agriculture Organization. FAO researchers report that shelterbelts have more than doubled grain yields in some areas, reclaimed farmland covered by windblown desert sands and converted wasteland into fruit gardens.

Posts Dismal Record

On the other hand, the government reported in 1981 that of 250 million acres reforested since the 1949 revolution, only 67 million acres had successfully yielded new trees. It attributed this dismal record to poor-quality seedlings, planting inappropriate species, inadequate follow-up care, shoddy forestry management and widespread illegal poaching.

The post-Mao government has moved to improve the survival rate by extending the concept of private farming to forestry. As in farming, the state or collective retains ownership of the land, but individual households contract to plant and cultivate small woodlots under leases running up to 50 years. The trees they grow can be passed on to their heirs.

However, price controls, taxes, surcharges and government regulations restrict the free marketing of the output of woodlots, according to Lester Ross, a Purdue University political scientist who has studied Chinese forestry practices firsthand.

Although protection against poaching has improved in the last several years, illegal cutting remains endemic. And if poaching is a problem in strongly governed China, it is even more rampant in countries whose governments maintain weak control over remote forests. In Africa, weak control allows peasants to supplement their incomes by chopping trees in remnant forests into firewood or reducing them to charcoal, and then selling them to syndicates that transport them by camel, cart and truck into cities for sale.

The grossly unequal distribution of land, income and social services marking most Third World countries must be ameliorated if deforestation is to be arrested, development experts agree. According to the World Resources Institute, a policy research organization based in Washington, "the real causes of deforestation (are) poverty, skewed land distribution and low agricultural productivity."

Landowners Affected

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Discouraging colonization of forests that are unsuitable for intensive farming, for instance, depends on finding land for surplus farmers on already developed, productive land. And in most countries, that depends on giving them land now owned by others.

"Strong political commitment by national governments to pursue policies of land reform that would lead to more equitable land ownership would, in the short term, do more to relieve pressure on forest lands than any other single policy intervention or any conceivable level of investment in forest resources development," World Bank senior forestry adviser John Spears and Edward S. Ayensu, a former Smithsonian Institution botanist, have stated.

One idea awaiting a full tryout is to develop such tropical forest resources as wild game, rubber and nuts as an alternative to clearing the forests for timber, farming and cattle grazing. For instance, Brazilians who tap rubber trees and gather nuts in the Amazon have proposed the creation of "extractive reserves," protected areas of forest managed by those living in them.

Another approach is to preserve tropical forests in parks. Costa Rica, which has more species for its size than any other land mass on Earth, has set aside 10% of its land area in national parks and biological reserves. They attract researchers in tropical biology from around the world and provide a more stable source of income than such quick-and-dirty rain forest activities as cattle grazing.

International aid agencies and multinational development banks are also showing more concern for forest preservation in the Third World. The World Bank, for one, is scaling back funding for some hydroelectric, road-building and colonization projects in tropical forests, as well as schemes to replace natural forests with commercial tree plantations. "If the World Bank has been part of the problem in the past, it can and will be a strong force in finding solutions in the future," bank President Barber B. Conable Jr. said last month.

Conserving Wood

Coconut palms have long been valued for their beauty and their tasty fruit, but they have been shunned as a source of lumber because their wood is too wet.

That's changing now, at least in Sri Lanka. Having depleted its own timber resources, the tropical island nation has been forced to spend scarce foreign exchange on lumber imports. But a new process that reduces the moisture content of coconut wood permitted the domestic introduction of coconut lumber last year. The government hopes coconut lumber will reduce costly imports by utilizing trees that are uprooted when Sri Lanka's coconut plantations are replanted every 60 to 70 years.

As the advent of coconut lumber suggests, utilizing trees that now go to waste has the potential of stretching timber resources and sparing forests in both tropical and temperate regions. The main obstacle is that secondary species have unfamiliar drying, gluing, veneering and other manufacturing characteristics, and more research is required before they can make a significant impact on the world lumber market.

In the United States, timbermen generally prefer to grow, harvest and mill Douglas fir, spruce, pine and other needle-leaved, seed cone-bearing conifer

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trees. This is because conifers grow faster and generally have taller, straighter trunks with fewer limbs and knots than broad-leaved deciduous trees such as oak and cherry that produce their seeds in nuts or fruits.

The construction industry also prefers "softwood" lumber from conifer trees because it is generally easier to saw and nail and provides more strength for the same weight than "hardwood" lumber from deciduous trees.

New Materials Used

However, as softwood supplies shrink and prices rise, techniques are being developed to produce construction lumber from such previously shunned hardwoods as poplar and aspen. These and other less valuable hardwoods are also finding increased use in the interior layers of plywood, in particle board, in lower-grade furniture and in pulp and paper manufacture.

Wood needs are also being addressed by stepped-up efforts to reduce waste in the woods and at the mill. Thinner, sharper saw blades cut more accurately and leave less sawdust. Whereas sawdust, chips and shavings used to be burned in cone-shaped "tepee" burners just to get rid of them, these residues now go into boilers to generate electricity, to pulp mills to make paper and into particle board, fiber board and other panel products.

Conserving wood in construction is also helping to conserve forests. Some timber-short countries in Europe now use more particle board than either lumber or plywood. U.S. home builders are saving lumber by reducing floor space, lowering ceilings, using hollow-core doors and substituting tile or carpeting for hardwood floors.

Recycling Expands

Many industrialized countries are conserving wood fiber by expanding the recycling of paper and paperboard. Japan and the Netherlands both reuse nearly half of their paper and paper board. In contrast, U.S. recycling has dropped to about 21% from 36% at the end of World War II as the cost of collecting, sorting and transporting waste paper has risen. Other drawbacks include contaminants such as ink and glue, loss of strength during reprocessing and inconsistent quality.

Waste in burning firewood is being reduced with newly designed stoves that produce a slower-burning, longer-lasting fire that releases more of a log's thermal energy. Unfortunately, many of the new stoves also produce smokier fires that pour more pollutants into the air.

In wood-short West Africa, inexpensive metal stoves have been found to achieve a 30% to 35% savings in fuel over traditional open-fire cooking. Substituting aluminum cooking pots for traditional clay pots further reduces fuel needs. But many Africans object to the taste that aluminum imparts to food, and many prefer an open fire because it provides light, and its smoke keeps away unwanted insects.

U.S. Forests

Most U.S. forest land producing or capable of producing timber in commercial quantities is privately owned. And not by corporations producing lumber,

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plywood, paper and other forest products. Farmers own about 24% of commercial forest land, and individuals and companies outside the forest products industry another 34%.

Thus, the tasks of remedying deforestation, protecting soil and water, and assuring adequate timber supplies are largely in private hands. Unfortunately, this means they are largely in inexpert, often indifferent hands.

According to Forest Service estimates, only 15% to 20% of the nation's 7.8 million non-industry owners of forest land are managing their holdings reasonably well. Many forests in New England and Appalachia are not harvested at all, while many others are logged indiscriminately.

What's needed, foresters and environmentalists say, is stepped-up technical assistance and increased financial incentives to encourage private owners to improve timber stands, replant cut-over forests and conserve soil and water, along with more stringent controls on forest owners' rights to use and abuse their land as they see fit.

"People still have a right to do with their land what they wish," says Al Schacht, associate deputy chief of state and private forestry for the Forest Service. "Most states don't prohibit indiscriminate logging."

Schacht estimates that 10 states, including California, have strong forest-practices acts regulating logging; 15 states have weak acts, and 25 states have no regulations to speak of.

States Require Reforestation

Taking a cue from Switzerland and Sweden, which have made reforestation compulsory since the turn of the century, some states now require landowners to restock their cutover lands. Oregon not only requires successful re-establishment of trees within three to six years, depending on area, but also specifies that only Douglas fir and other fast-growing species suitable for commercial lumber and pulpwood be planted.

"Until the last few years, there were virtually no state-funded programs to help private landowners apply soil and water conservation practices or plant trees," according to the conservationist American Forestry Assn. "Today, more than half of the states have active soil conservation programs and over a half-dozen support reforestation on private lands with substantial funding. Those numbers will grow, we feel, as more states realize that sensible natural resource programs are in their own self-interest."

Production-minded foresters emphasize the need to harvest neglected private forests and to maximize sustainable yields of marketable timber. They estimate that the timber yield from non-industry private forests could be doubled and even tripled with proper management.

But most owners sell off their trees when they need the money and let nature do the regenerating. "A lot of these people think that if they leave the land alone, trees will grow back," says Forest Service economist Dwight Hair. "But they won't get the kind of tree that has the highest market value. If they cut pine, they have to do something to get pine back. Otherwise they'll get a mixed pine-hardwood stand" of, say, sweet gum and maple, for which there is no

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market in many areas.

Some Wait for Strip Mining

Many owners don't think of their forests as potential income producers, valuing them instead as woods to walk, hunt and gather firewood in. Those who have leased mineral rights to coal companies see no sense in improving forest land that will be strip mined sooner or later. Many owners lack the capital to invest in reforestation, while others think the long payoff period not worth the risks.

The federal government has started to make it easier for farmers to invest in reforestation. Its new "Conservation Reserve" program provides payments to farmers to take marginal, erosion-prone cropland out of production and put it in trees. The farmer pays half the tree-planting costs, the government the other half, and the farmer agrees to keep the land in trees for at least 10 years.

Similar to the "Soil Bank" program of the late 1950s and early 1960s, the new program is expected to cost the government less than the crop subsidies it now pays on the land to be forested. What's more, experts say that much of the cropland expected to revert to forest should never have been plowed in the first place and would yield higher rates of return growing pines.

The 1985 farm law that authorized the Conservation Reserve program also includes a "swampbuster" program to deny price-support loans, subsidized crop insurance and other federal benefits to farmers who drain wetlands to grow crops. The program won't bring back the 19 million acres of forested wetlands in the lower Mississippi River Valley that already have been drained and cleared of trees, but environmentalists and wildlife advocates hope it will slow down conversion of the 5 million acres that remain there, as well as help preserve seasonally flooded forests elsewhere.

Windbreaks Repay Investment

Soil conservationists would like to see the federal government help farmers replace the windbreaks around their fields that many ripped out in the 1970s to maximize crop production. Re-establishment of windbreaks would repay many farmers' investment, inasmuch as studies show that half a dozen rows of trees slow down the wind for a distance of 40 to 50 times the height of the trees, protect crops from burial by windblown sand and fine soil, help retain moisture in the soil and increase crop yields. Windbreaks also encourage birds and other wildlife, and some provide fruits and nuts.

Many of the bald patches that pockmark the 156 forests in the national forest system are the legacy of the prevailing practice of cutting every tree in a given area, and then replanting the area with an even-aged stand of commercially valuable trees.

Clear-Cutting Has Advantages

The main advantage of such clear-cutting is that it allows tree species that make the best construction lumber, such as Douglas fir, but that don't grow well in the shade of taller trees, to flourish without competition from other species. Clear-cutting also reduces logging costs, minimizes the length of logging roads, makes it easier to dispose of logging debris and removes

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diseased trees that could escape harvest and spread infection.

The disadvantages are also considerable. Clear-cutting fosters soil erosion, removes small trees that could form the basis of the next stand, encourages brush, shrubs and "nuisance" tree species to invade and compete with the planted preferred species, increases the hazard of destructive crown fires that race across the forest canopy at uniform tree-top level and leaves clear-cut sections of land looking like heavily shelled battlefields.

Under public pressure, Congress and the courts have restricted the Forest Service's discretion in clear-cutting. The size of clear-cut sections has dropped -- to a maximum of 100 acres in Alaska's Tongass National Forest, 80 acres in southern pine forests, 60 acres in Pacific Northwest Douglas fir country and 40 acres elsewhere.

In California, the average clear-cut section is 20 acres, and Zane G. Smith Jr., regional forester with the Forest Service, says "the pattern in the future will be cuts of from one-third to two or three acres," laid out in a mosaic pattern so that each clear-cut section is bordered by uncut forest.

The Forest Service has also been getting more restrictive about how much wood from national forests it will let lumber, plywood and pulp producers cut. The service has been selling timber from about 80 million acres in the 191 million-acre system, and this is expected to drop to 60 million acres as environmentally sensitive areas and those uneconomical to sell timber from are withdrawn from timber sales.

About 600,000 to 700,000 acres are actually cut each year. Timber companies would love to get their saws on still more trees, but as long as the Forest Service carries out its legal obligations to cut no more than can be sustained indefinitely and to replant harvested areas, deforestation should remain a localized rather than a system-wide problem.

Environmental Ethics

Perverse as it may seem, many people who live in the ravaged Tennessee Copper Basin aren't pleased that it is being reforested.

The local weekly newspaper reported recently that some residents regard the moon-like landscape as "a beloved scar they have lived with all their lives and, thus, have come to love."

Merchants fear tourists would stop driving out of their way to see the raw, red hills if they reverted to green like most others. Jannie Edwards, who works at the basin's mining museum, worries that "it wouldn't be a tourist attraction anymore."

Call it local pride in the area's reputation as the Tennessee Badlands -- the ugliest place in the South -- ignorance, arrogance or avarice, the resulting insensitivity to environmental concerns is all too familiar to students of deforestation. It's reminiscent, for instance, of the attitude of the Spanish who conquered Mexico four centuries ago and destroyed upland forests not only for timber and to graze their cattle, but also because they craved a landscape resembling their own treeless homeland of Castile.

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Lest ancient and costly errors continue to be repeated, ecologists see the need for a worldwide ethical revolution that would replace the prevailing attitude that humankind owns all environmental wealth and has the right to dominate and exploit it at will with an awareness that humans are themselves inseparable from, and an interdependent component of, that environment.

"The problem is that we set economic tasks and then go about accomplishing them at any price. As a result, we're incurring a mounting debt to nature -- a debt that will eventually have to be repaid, whether we like it or not. Man is a part of nature, and in struggling against nature we're fighting ourselves."

The 'Psychological Connection'

That statement sounds as though it could have come from an Earth First! zealot. But it was made instead by the Soviet writer S. P. Zalygin during a roundtable discussion among Russian writers and scientists on the Soviet economy, ecology and ethics. Zalygin went on:

"In ancient times, people sensed not just their attitude toward, say, a forest or a herd of animals, but also the attitude of that forest or herd toward them. Now all we know is what we need from nature. We've lost the psychological connection that would let us know the natural world's attitude toward us. Maybe we're not as smart as we think we are when we laugh at the pagans who drew no distinction between animate and inanimate objects."

American Indians regarded trees, like animals, "as having immortal spirits and the power to help or hurt," J. Donald Hughes, an historian at the University of Denver, says in "American Indian Ecology." "Accordingly, when the forest Indians gathered bark, they stripped it off only one side of the tree, so that the tree would not be girdled and killed."

In Europe, Druids and other pagans revered natural groves of trees as the dwelling places of gods who brought sunshine and rain, and they maintained the groves as sacred temples.

The pantheistic Ancient Greeks first protected groves of trees as sacred sanctuaries, punishing poachers with ritual curses and a 50-drachma fine for a free man and 50 lashes for a slave. But as wood shortages worsened, the groves were cut down one by one to build fortifications, siege engines and sailing ships.

A Lower Order of Creation

As the need for timber came to override reverence for trees, forests -- and the natural world in general -- came to be relegated to a lower order of creation. This was clearly expressed in the Book of Genesis' injunction to humans to "have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth."

Early Christian fanatics abhorred the worship and bloody sacrifices that took place in sacred groves and chopped them down. They have been at it ever since. And they're not the only ones. During China's 1966-76 Cultural Revolution, communist fanatics took revenge on "decadent" Buddhist temples and monasteries by destroying groves of trees around them.

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It has been said that the best way to get people to care for the earth is for them to look at, smell and taste it sensuously. If so, raising city-bound Americans' environmental consciousness depends partly on encouraging them to use forests to rest, relax, enjoy beauty, get back to nature and regain physical and spiritual strength.

To environmental responsibility and human self-interest, conservationists could add generational justice as reason for preserving forests. As Larry D. Harris, a professor of forest wildlife ecology at the University of Florida, argued recently in opposing further clearing of forests in the lower Mississippi River Valley, "Stewardship of land should be based on the principle that resources are not given to us by our parents, but are loaned to us by our children."

No one more clearly saw deforestation's role in robbing succeeding generations than the late Walter C. Lowdermilk. In the 1920s and 1930s, this American soil conservationist studied environmental devastation and economic deterioration that deforestation had caused in China, the Near East and elsewhere in the world. Seeing what had become of the Promised Land, Lowdermilk concluded that if God had foreseen the consequences of misuse of the land, he might have been inspired to give Moses another Commandment, the 11th:

"Thou shalt inherit the Holy Earth as a faithful steward, conserving its resources and productivity from generation to generation. Thou shalt safeguard thy fields from soil erosion, thy living waters from drying up, thy forests from desolation, and protect thy hills from overgrazing by thy herds, that thy descendants may have abundance forever. If any shall fail in this stewardship of the land, thy fruitful fields shall become sterile stony ground and wasting gullies, and thy descendants shall decrease and live in poverty or perish from off the face of the earth."

GRAPHIC: Photo, Tennessee's Copper Basin, ravaged by mining in the 1850s, is considered a classic of forest and soil destruction. Reclaimed areas, foreground, started in the 1930s, offer hope that other ruined land can be restored. ROBIN RUDD; Photo, Douglas fir stumps, above, poke from ground at tree farm in western Washington after clear-cutting in 1940. By 1960, a vigorous forest of second-growth trees, below, had swallowed up most of the old logging camp. Lack of shade from older trees allowed fir seedlings to grow faster. Weyerhaeuser Company

TYPE: Series

SUBJECT: FORESTS; DEFORESTATION; ECOLOGY; CONSERVATION; ENVIRONMENT; EROSION; REFORESTATION

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DROUGHT, FLOODS, EROSION ADD TO IMPACT OF TREE LOSS

SERIES: THE VANISHING FORESTS: Third in a Series. Next: Reforesting -- the benefits and problems.

BYLINE: By A. KENT MacDOUGALL, Times Staff Writer

DATELINE: MAUNA KEA, Hawaii

BODY:

When David Douglas, the Scottish botanist after whom the Douglas fir tree is named, hiked up this 13,784-foot volcanic mountain in 1834, he noted that the "highly picturesque and sublime" scene included a forest of mamane trees stretching up to 9,300 feet.

Today, there is no mamane forest at 9,300 feet, or even at 6,300 feet. Here and there, a lone tree stands out. But mostly this is a stark wasteland. The forest is gone, and much of the rich volcanic soil with it. Nothing has taken its place.

Mauna Kea's baldness is one of the temperate world's legacies here in the tropics. For it was English and Yankee ship captains who, eager to provide fresh meat for seafarers, loosed upon this island the cattle, sheep and goats largely responsible for eating the forest to death.

The subsequent slowness of the mamane forest to regenerate, even after removal of nearly all the herbivores, points up the fragility of island ecosystems. "On a small island it doesn't take much to destroy an entire ecological zone, and with it all the native plants and animals that have evolved over millions of years," says James Juvik, professor of geography at the University of Hawaii at Hilo.

Far from providing a model for tropical Third World countries of how economic development can go hand in hand with environmental protection, the no-longer paradisiacal Hawaii exemplifies the adverse impact of deforestation on soil, water, plants and wildlife. For one thing, a third of the islands' native bird species and subspecies have become extinct in the two centuries since the Europeans arrived. And most of those remaining, including the palila, a small bird that eats mamane seeds and is found only in Hawaii, are considered officially endangered.

Island ecosystems pose special problems, of course. Their plant and animal populations are smaller and more vulnerable to disruption. Having evolved without natural predators, many species are easy marks for predators that are introduced. Hawaii's native trees, for instance, evolved without thorns,

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poisonous sap, bitter-tasting bark or other protective defenses against goat and sheep attacks.

With plenty to eat and nothing to fear except occasional hunters, the few cattle, sheep and goats set free by Capt. James Cook and his successors soon turned into huge herds that roamed freely on this, the largest island in the Hawaiian chain, as on others. While the cattle trampled undergrowth and cut shallow tree roots with their sharp hooves, the sheep and especially the goats gobbled leaves and twigs and chewed sprouts and seedlings down to the ground, preventing regeneration. As the forest thinned, the land dried out, deteriorating in many areas to scrubby brushland.

As the creation of unproductive brushland indicates, deforestation usually entails more than just losing trees. Other environmental damage that in turn causes economic and social distress includes accelerated soil erosion, flooding and siltation of waterways.

Soil Loses Porosity

Consider the impact of deforestation on water flow. Forest soils rich in decomposed organic matter absorb and store more water than cultivated fields, grass-covered pasture and, especially, bare mineral soil, which tends to become hard and impermeable when exposed in the open. Tree roots increase the porosity of the soil by pushing into and loosening up new areas. When the roots die they add organic matter to the soil and leave channels through which water can percolate downward to recharge underground aquifers and to emerge downhill as springs.

Spongy forest soils help even out the flow of water, retarding runoff from heavy spring rains and melting snow and increasing the seasonally low flow in the summer. When a forest is cleared, streams often become roaring, destructive torrents in the rainy season and parched channels in dry periods.

In the Mediterranean climate, soil moisture is barely sufficient to sustain forests through the long, dry summer. When the forests are cut and subjected to the added stress of grazing and burning, they have a habit of never coming back. That happened in Ancient Greece, where eroded land too stony, hilly and dry to go back to forest was given over to olives and grapes. The oil and wine was then traded for timber and grain from the still-wooded Black Sea Coast.

California Forests

Low soil moisture, which experts say is a more critical determinant of drought than low rainfall, has also prevented the regeneration of forests in California. The Plumas National Forest north of Lake Tahoe, for one, has 56,000 fewer acres in timber than 40 years ago because of the failure of cut-over, dried-out forests to regenerate.

"California has places at high elevations where we harvested timber, but we're not getting it back, because of short growing seasons, drought, high soil temperatures and the harsh climate," concedes Zane G. Smith Jr., Pacific Southwest regional forester for the U.S. Forest Service.

Logging on shallow soils, on south-facing slopes that bake under the summer sun and on north-facing slopes that don't warm up enough, has also turned

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forests in California, Oregon and Washington into scrubby brush fields and tough grasslands. So has clear-cut logging that has removed seed sources and exposed large areas to the elements.

Even selective logging of just the biggest trees can result in an unintended clear-cut. This often happens in the tropics, where removing the larger trees exposes smaller trees they had shaded to fatal overheating.

In the British Isles, the cutting of trees in dry, windy areas with infertile soils has resulted in open heaths covered with pretty but unproductive heather.

In sandy areas where each tree is an oasis anchoring the soil against the clawing wind, removing the tree cover can cause sand to drift ominously. This has happened north of Coos Bay, Ore., on the south shore of Lake Michigan, on Cape Cod and in many other places.

Fires on Mt. Shasta

The hotter, drier, windier conditions that follow deforestation increase the hazard of fire and convert minor fires into major conflagrations. In California, several hundred thousand acres of timberland on the slopes of Mt. Shasta have degenerated into brush fields because of repeated fires since turn-of-the-century logging.

"The timber would have come back after the first fire, but subsequent fires removed the seed source and the seedlings," explains Richard Harrell, a Forest Service fire-management specialist.

Other forested areas that were repeatedly burned have gone back to forest but grow only stunted trees and commercially inferior species. In Michigan, white and Norway pines, hemlock and valuable hardwoods were almost entirely eliminated after logging and repeated burning, giving the land over to scrubby stands of jack pine, aspen and other less desirable species.

Removing trees in hot, arid regions permits the soil to wash or blow away. If hooves compact the earth, the chances of seeds germinating are remote. Little wonder, then, that as forests shrink, the world's deserts are spreading, swallowing up arable land, displacing villages, ruining lives.

Deforestation is expanding deserts not only in continental interiors but also along seacoasts where forests used to comb moisture from clouds and fog rolling in from the ocean. In Mexico, the cutting of forests along the Gulf of Mexico north of Veracruz to expand corn cultivation destroyed one of the corn farmers' most important sources of water, increasing aridity and inadvertently ruining more than 1,000 square miles of land. Similar disasters have taken place in coastal Peru and Chile.

Wet Regions Get Wetter

While making already-dry regions drier, deforestation often makes wet regions even wetter. For trees serve as both umbrellas and water pumps. Their canopies intercept rainfall and evaporate much of it from leaves and twigs before it reaches the ground. Meanwhile, their roots take up moisture from the soil and pump it up to the leaves, which transpire it into the atmosphere.

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When trees that used to shed excess moisture are removed, already wet soils tend to become waterlogged. In Britain, removing trees in areas of high rainfall and poorly drained soils has led to waterlogged moors and peat bogs. In the Upper Peninsula of Michigan, cutting trees in black spruce bogs has raised the water table, preventing regeneration.

Waterlogging is less of a problem worldwide than the erosive runoff of water. A certain amount of soil erosion and sedimentation is both natural and desirable, of course. Rivers need a little silt to stabilize their bed and banks and to replenish sandy beaches at their mouth. River valleys become more fertile when sediment is deposited gently over the millennia.

As long as no more soil is washed away than is formed, erosion is generally not a problem. But removing the vegetative cover greatly increases the erosion rate, replacing the beneficial process of geologic erosion with the destructive process called accelerated erosion.

Deforestation accelerates erosion because tree canopies and litter and humus on the forest floor are no longer available to break the impact of downpours. Raindrops that strike the bare soil dislodge fine-textured particles that clog pores in the soil, preventing water from being absorbed.

Danger From Steep Slopes

Water that runs off quickly on steep slopes causes the most destruction. Doubling the velocity of water increases its cutting power fourfold, its carrying capacity 32-fold, and the size of debris it can carry 64-fold. This helps explain how huge boulders can be carried down small streams once they turn into torrents.

A single rainstorm can carry away a layer of fertile topsoil that took centuries to build. Where runoff cuts channels in the earth, gullies are formed, growing deeper, wider and longer with each heavy rain.

In the Southeast, a region of hills, erodible soils and heavy rainfall, replacing the thick natural forest cover with cotton and tobacco fields cut gullies so deep and steep that when the Civilian Conservation Corps reforested in the 1930s, workers with seedlings had to be lowered into the gullies by rope.

For the world's deepest gullies, however, one must turn to China. The comparatively small percentage of level land in China explains the early extension of cultivation into mountainous areas. When the Chinese cleared the higher plateau lands through which the Yellow River flows, they exposed the fertile, fine-grained soil laid down by wind-blown dust. Predictably, summer rainstorms washed away the soil, in the process carving a lifeless maze of narrow, steep-sided gullies up to 650 feet deep.

The Yellow River has the dubious distinction of being the muddiest river in the world. The huge load of sediment from deforested highlands that it has carried for several thousand years has elevated the river bed in lower reaches. This aggradation, now averaging three to four inches a year, has forced Chinese peasants farming the fertile lowland plains to build levees to confine the river within its banks. Using their bare hands and baskets, the farmers have raised the levees a little higher each year, so that today the river runs 10 to 30 feet above the surrounding countryside.

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River Changes Course

Even then, heavy rainfall has overwhelmed the river's capacity, causing an average of one flood every other year between 206 BC and AD 1949. The river has changed course eight times since AD 11.

Since the early 1950s, tree-cutting along the Yellow River's middle and upper reaches has continued, and the siltation rate has increased more than 20%. What's more, Chinese scientists warn that the Yangtze, which flooded in 1980, 1981 and 1982, is in danger of turning into a second Yellow River because of deforestation and attempts to terrace hillsides for farming in the southwestern highlands.

China is also having problems with reservoirs. It has had to abandon many small reservoirs after just two or three years because of siltation from deforested watersheds. Siltation has similarly reduced the water-holding and power-generating capacity of both dams and reservoirs in many Third World countries, including the Philippines, Thailand, Kenya, Tanzania, Colombia and Costa Rica.

Even the United States is not exempt. Deforestation, mining and other misuse of hilly watersheds in the Tennessee Valley have silted up several Tennessee Valley Authority reservoirs. One of these, on the Ocoee River in Southeastern Tennessee, has lost 90% of its storage capacity. Accumulated silt blocks the intake of the tunnel that carries water from the reservoir to electrical generators. This necessitates periodic sluicing of the silt -- but that only transfers the problem downriver to another reservoir where the silt settles out to form mud flats.

Silt Extends Coastlines

Silt from deforested highlands also has a long history of clogging harbors and pushing coastlines out to sea. The northern Adriatic coast of Italy has been silting up and extending seaward for at least 2,000 years. Ravenna, once the chief Roman port on the Adriatic coast, lost its access to the sea long ago and is now six miles inland. Adria, built on an island near the mouth of the Po River, today is 12 miles inland, its streets 15 feet above the foundations of houses that the Etruscans built 2,500 years ago.

"The silt loads of the rivers began to accelerate during the Renaissance period, when the area had its most prosperous and glorious period in history," Vernon Gill Carter and Tom Dale report in "Topsoil and Civilization." "In other words, this region followed the familiar pattern. Its high point in civilization was achieved mainly by intensive use of the land and this, in turn, brought on the serious erosion that eventually resulted in decline."

Today, the same process is at work in many Third World countries. Silt from the Himalayan foothills has created navigational hazards at the port of Calcutta on the Hooghly River. Many ships can no longer reach its docks, and each year Calcutta loses more shipping to other Indian ports.

Silt has created entire new islands in the nearby Bay of Bengal. As soon as the islands are formed, landless peasants settle them, growing rice and grazing cattle. Several thousand of these people were drowned in May, 1985, when a

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cyclone swept over silt-formed islands off Dhaka, Bangladesh.

Malaria-Carrying Mosquitoes

Silt from deforested uplands deposited in low-lying coastal plains often creates marshes that can become breeding grounds for malaria-carrying mosquitoes. And this, too, has been going on for thousands of years.

Malaria became widespread in Greece around 400 BC and in Italy about 200 BC. The most notorious breeding ground was the Pontine Marshes at the mouth of the Tiber River near Rome. The Romans periodically drained these swamps, but the basic cause remained unsolved, and so did the prevalence of the disease.

Deforestation is also harmful to agriculture. For one thing, it alters the local climate, increasing temperature extremes and windiness and reducing rainfall and soil moisture. These effects were studied some years ago by the Forest Service in the Tennessee Copper Basin, most of which was denuded by smelter fumes and firewood harvesting by the turn of the 20th Century.

The Forest Service found that during the summer, soil temperatures in the open reached 127 degrees, compared with an 82-degree maximum in the nearby woods. Wind velocity was 13 times greater in the open. In the winter, soils in the open froze earlier and more deeply. And year-round, more than three times as much moisture evaporated from open spots as from the forest.

Fewer Rain Clouds Form

Despite greater evaporation from open spots, deforestation reduces rainfall. The enormous quantity of water that trees pump up from underground and transpire into the atmosphere rises as cool, moist air that often condenses into rain. In contrast, warm, dry air rising from deforested areas has more capacity to hold moisture, so it forms rain clouds less often.

With less rain falling on them, some heavily logged tropical rain forests are drying out enough during recurrent drought years to fall victim to a rare phenomenon: fire. Four years ago, a massive fire in the Ivory Coast in Africa destroyed 1,700 square miles of rain forest.

Deforestation can alter regional as well as local climate. The removal of rain forests on the Atlantic Coast of Africa is suspected of reducing the moisture that moves inland to help generate rainfall in the drought-prone Sahel Zone from Senegal to the Sudan. Deforestation in the Amazon Basin may be cutting down rainfall in Venezuela and Colombia to the north and in south-central Brazil to the south.

"Brazil's efforts to resettle the excess population from its northeast and south and to expand beef production by converting the Amazon rain forest to grassland may indirectly threaten food production in the country's agricultural heartland," Lester R. Brown, president of Worldwatch Institute, notes in "State of the World 1985."

The same kind of climatic deterioration that Brown sees reinforcing environmental deterioration in Brazil and Africa helped dry out the entire Mediterranean area long ago. Or so many experts believe.

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'Land of Milk and Honey'

"When Israel was the land of milk and honey, it was moister than today, and probably cooler," says Eric Bourdo, retired dean of the School of Forestry at Michigan Technological University.

The desiccation process triggered by deforestation can be seen even in remote Soviet Central Asia. There, deforested mountain slopes heat up in summer, melting nearby glaciers. One such glacier, the Zeravashan, has retreated 50 miles in the last century.

"There's no need explaining where this process can lead," a Tadzhik agricultural official told Pravda. "At present, it's fairly slow, but it's time we thought about stopping it. Otherwise, Central Asia may eventually lose its rivers."

The Soviets are worried about their lakes as well as their rivers. Again, their own timber harvesting practices are partly to blame. Soviet loggers commonly float individual logs down rivers to sawmills, rather than lashing them together in rafts. And they often fail to strip the bark off first. Many individual logs sink and many lose their bark. The bark rots on the bottom, poisoning the water, reducing its oxygen content and smothering fish-spawning beds. Sunken logs in rivers flowing into Lake Baykal have contributed to a sharp decline in the catch of the lake's most important commercial fish, the omul.

The United States has its share of logging-caused fisheries problems, too. Salmon spawning grounds on the South Fork of the Salmon River in Idaho were nearly wiped out in 1965 when heavy rains crumbled hillside logging roads into the river. Now at minimum survival levels, the salmon population will take a hundred years to recover, according to the Wilderness Society.

Logs Prevent Fish Migration

Silt has clogged spawning grounds in other Western rivers as well. Logs felled into streams have blocked upstream salmon migration. And trees removed from the banks of some streams have increased solar radiation and stream temperatures enough to disrupt spawning and kill fish eggs.

In many tropical regions, deforestation not only has despoiled fish habitats but deprived fish of food. Many species feed primarily on fruits and seeds that fall from trees into streams and rivers. When tropical forests are cleared, tree food declines, and fish populations with it.

Deforestation also damages offshore fisheries. Around the Caribbean, deforestation washes silt into clear coastal waters, reducing the waters' transparency and transmission of sunlight, and killing off grasses and coral reefs on which much marine life depends. Along the coast of Chile, shellfish beds have been smothered by sludge deposited following deforestation.

Deforestation's effects on wildlife are mixed. Deer and bear thrive on the new growth that follows clear-cutting of forests. Large clearings also benefit some small mammals, quail and other game birds, as well as birds of prey.

Birds Go the Way of Forests

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But most animals lose out. Elk go hungry when tree canopies no longer reduce snow accumulation over winter forage. Martens and fishers have declined along with the tall dense forests in the Pacific Northwest on which they depend. So have spotted owls. And in the South, ivory-billed woodpeckers have gone the way of mature hardwoods.

Several species of U.S. songbirds have declined in numbers because of the devastation of the forests in Central and South America to which they migrate for the winter.

And here in Hawaii, which has more endangered species than any other state, the palila and 28 other native birds on the federal list of endangered or threatened species barely hang on in what's left of the native forest. With many native plants extinct and others endangered, and non-native plants firmly in their niches, restoring the original biotic community is considered impossible.

Even the oysters that gave Pearl Harbor its name are gone, long ago smothered by silt from the harbor's deforested, eroded watershed. In both big and little ways, Hawaii is still paying for the deforestation that began when the Polynesians cleared lowland forests to plant crops and accelerated after the Europeans arrived in 1778.

In land usage, as in life, there is no free lunch.

RAVAGES OF DEFORESTATION

1. Deforestation entails more than just the loss of trees. The effects extend to soil, water, plant and animal life. the most visible immediate scars are on the land: a sea of stumps left after logging, access roads built for equipment, and tracks left by heavy machinery. But in fragile ecosystems, these are only the begining.

2. Rain falling on denuded hillsides washes past the spindly remains of inferior trees and creates channels. Spongy forest soils help even out the flow of water; when a forest is cleared, streams often become roaring, destructive torrents in the rainy season and parched channels in dry periods. With the runoff flows precious topsoil.

3. Eventually, the treeless slopes can no longer absorb the rush of water, and the hillside becomes undermined. Downstream, soil eroded from the hills and river banks settles out to form mud flats that somother fish spawning beds. The silt also builds up behind dams, blocking intake tunnels and reducing power-generation capacity, and clogs harbors.

4. Over the years, the gullies widen and deepen. New trees, most of them spindly and of commercially undesirable species, dot the landscape. The microclimate also has been altered: Temperatures and wind increase, and rainfall is reduced. The area has become desert-like, with barren soil that supports mostly drought-tolerant bushes and coarse grasses.

GRAPHIC: Chart, RAVAGES OF DEFORESTATION, PATRICIA MITCHELL / Los Angeles Times

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SUBJECT: DEFORESTATION; FORESTS; ENVIRONMENT; ECOLOGY; EROSION; FLOODS; DROUGHTS; ENDANGERED SPECIES

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BYLINE: By A. KENT MacDOUGALL, Times Staff Writer

BODY:

Humans owe a debt of thanks to forests. Forests clear the air, moderate the climate, protect soil from erosion and keep water clean. Forests provide lumber, fuel and food, as well as raw material for paper, plastics, medicines and a thousand other products. Forests offer refuge to the landless, the rebellious and the weary.

How have humans repaid forests? By chopping, sawing, slashing, burning, blasting and bulldozing them. By poisoning them with herbicides, mine tailings and acid rain; scarring them with logging roads, skid trails and sawmills; drowning them behind dams; clearing them for farms and pastures, and paving them over for highways and cities.

In the last 5,000 years, humans have reduced forests from roughly 50% of the Earth's land surface to 20%. This ages-old devastation is accelerating. According to United Nations estimates, Africa has lost 23% of its forests since 1950, Central America 38% and the Himalayan watershed 40%. Tropical rain forests are going fast. Acid rain has damaged half of West Germany's trees, killing many. U.S. forests continue to shrink in area and now contain only a fifth as much timber as they did when the Pilgrims landed.

Deforestation has exacted an enormous toll through the ages in environmental damage, economic deterioration and human misery. Soil erosion, flooding and silting of rivers, reservoirs, canals and harbors are among the environmental effects. Deforestation has created barren hillsides, creeping sand dunes, desert-like heaths, water-logged moors, malarial swamps.

Decline and Fall of Empires

Deforestation has had a major impact on society. Historians contend deforestation of Greece and Italy contributed significantly to the decline and fall of the ancient Greek and Roman empires. Ascendancy gradually passed from the deforested Mediterranean region to heavily forested Northern Europe. Much later, a deforested England lost control of its timber-rich American colonies.

Wars have been fought for possession of forests, and many a forest has deliberately been destroyed to punish an enemy. Conquerors and colonizers have taken forested foreign lands after deforesting and ruining their own. Cities

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have been abandoned and capitals relocated because of deforestation.

Deforestation has even influenced religion. Some scholars trace the Jewish and Moslem prohibitions against eating pork to deforestation of the Near East, which deprived pigs of their natural forest habitat and made them too expensive to feed and keep cool.

The deforestation currently taking place in the tropical Third World strikes experts as all the more tragic because it repeats mistakes the temperate First World already has made. Says Stanley E. Krugman, director of timber management research for the U.S. Forest Service, "A lot of countries aren't learning from our mistakes, just as we failed to learn from the Europeans."

Failure to learn from past mistakes and to correct the current situation has economic, political and social ramifications that extend beyond the areas undergoing deforestation. Far from being a narrow issue of concern only to residents of deforested areas, nature lovers and lumber merchants, deforestation in an increasingly interdependent world economy directly affects U.S. interests in terms of trade, investment and political stability.

To be fair, people aren't responsible for all deforestation. Windstorms, volcanic eruptions, lightning fires, drought and other natural disasters also take their toll. So do deer, porcupines, beavers, gophers, rats and other wild animals that feed on trees and sometimes kill them. Dwarf mistletoe and other parasitic plants suck and smother trees to death. And beetles, budworms, gypsy moths and other insects, along with rusts, rots, blights and other diseases, consume more trees than humans harvest.

Making Matters Worse

Still, humans have a history of making matters worse by altering the balance of nature and inadvertently causing deforestation. In the Pacific, the introduction of non-native deer, goats and pigs onto islands where they had no natural enemies swelled their populations and sent them rampaging through the forests like locusts. In Arizona, a government policy of making the Kaibab Plateau into a game preserve for deer by eliminating the coyotes, wolves and bobcats that had preyed on them increased their numbers beyond anything the region could support. As a result, the forest thinned and the deer starved.

Even more havoc followed the importation of the gypsy moth from France in 1869. Introduced into Massachusetts as part of a misguided silkworm-breeding experiment, the pest soon escaped from the laboratory to nearby woods. Since then it has spread across the country, leaving caterpillar-defoliated woods in its wake.

As the gypsy moth epidemic suggests, most environmental problems have no respect for political boundaries. The United States, for instance, generates air pollution from power plants, smelters and motor vehicles that falls in Canada as acid rain, sickening forests and killing trees. Germany imports acid rain from Great Britain and France -- and exports its own to Poland and Czechoslovakia.

The effects of deforestation are also international. Soil washed from the deforested foothills of the Himalayan Mountains in Nepal silts up rivers and farm fields upon which hundreds of millions of people in the lowlands of India and Bangladesh depend for survival. Over the years, the silt has created new

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islands in the Bay of Bengal and caused devastating floods that have reduced harvests and taken thousands of lives.

Many Dams in Trouble

Many Third World dams built with aid from industrialized countries are losing effectiveness as silt from deforested watersheds clogs the reservoirs behind them, reducing the dams' capacity to generate electricity, control floods and provide irrigation water. Siltation in the watershed of the Panama Canal has raised concerns over the canal's continued capacity to handle shipping.

Industrial countries have spent billions of dollars to feed victims of deforestation and revegetate denuded landscapes in the Third World. In Haiti, once lush but now the most deforested nation in the Western Hemisphere, one-tenth of the population depends on public and private aid from the United States. In the West African Sahel, more than $160 million has been spent since 1972 on plantations to supply firewood and on other forestry projects, most of which have failed. And in Ethiopia, according to World Bank senior energy specialist Ken Newcombe, "if we gave the country $500 million to reforest, it wouldn't do the trick."

Economic and social disruptions caused by deforestation often lead to unrest and bloodshed. According to a 1982 report prepared for the U.S. Agency for International Development, the "fundamental causes" of the civil war in El Salvador "are as much environmental as political, stemming from problems of resource distribution in an overcrowded land." The report concluded that "almost complete deforestation, massive soil erosion and loss of fertility," combined with high rural unemployment and unequal land distribution, had prompted many peasants to abandon farming to join the guerrillas.

Victims Become Refugees

Millions of victims of deforestation have become environmental refugees. Half-starved Africans flee barren lands for neighboring countries that can hardly support their own citizens. Desperate Haitians escape their denuded homeland to other Caribbean islands, the United States and Canada.

"One of the reasons we have Haitian refugees in Florida is that there is nothing but drought and ruin in deforested Haiti," says Catherine Caufield, author of "In the Rainforest."

The destruction of tropical forests is reducing the biological storehouse upon which the entire world depends for an astonishing array of products. Although covering just 7% of the world's land surface, the green forest belt around the Earth's equatorial waist contains about half of all known species of plants and animals, with many millions waiting to be discovered. Diminishing this immense reservoir of genetic diversity reduces opportunities to improve the characteristics of such tropical crops as bananas, cocoa and coffee by increasing their yields and resistance to drought, disease and insects. It also reduces opportunities to discover and develop new foods, drugs and other products.

Flow of Products Jeopardized

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Deforestation in both tropical and temperate regions jeopardizes the continued flow of forest products upon which First World economies depend even in this age of metals, plastics and fossil fuels. Most industrial countries are net importers of forest products. Despite its still vast forests, the United States imported $5.6 billion more in wood products in 1986 than it exported.

Europe demonstrates the link between deforestation and economic deterioration as well as any region. Consider Sicily. Once a well-wooded, fertile island and a flower of ancient Greek culture and prosperity, Sicily was so deforested by a succession of conquerors, including the Romans, Byzantines, Arabs, Normans and Spanish, that it became almost desert-like by the 13th Century and has never found its way back from the poorhouse.

Or take Ireland. Long since stripped of its forests by the English, Ireland is today the least-forested nation in Europe and also one of the poorest, its finances drained by the necessity of importing forest products and its job opportunities reduced by the lack of forest resources.

Overall, Europe has a greater area in forest now than at the turn of the century. But this minor comeback is threatened by acid rain.

The relative stabilization of forest cover in Europe and most other temperate regions is the exception. Worldwide, forests have been halved since 1850. This is only a rough estimate, of course, as precise measurement is impossible and experts disagree on the extent of tree cover necessary to distinguish a forest from open woodlands with scattered trees.

'Global 2000 Report'

The U.S. government's "Global 2000 Report," published in 1980, estimated that forest cover declined from more than 25% of the world's ice-free land surface in 1956 to 20% in 1978. It projected a further decline to about 17% by the year 2000 and 14% around the year 2020, and lamented that the downward trend marks a "transition from a period of global forest wealth to a period of forest poverty."

Even those gloomy statistics underestimate the decline. Much remaining forest is in the far north of Canada, Scandinavia and the Soviet Union, where trees are small, slow-growing and too distant from markets to be economically accessible. While the area of these sparse northern forests has remained stable, the sharpest decline has taken place in dense tropical forests with larger trees.

The Soviet Union leads the world in forest resources, with more than a third of its land surface in forest. But despite centralized ownership and planning, its forest management has been neither consistent nor always enlightened. While lightly utilizing forests in the far north and Siberia, the Soviets have been overcutting accessible areas near rivers, roads and rail lines, as well as in large portions of European Russia.

What's more, according to one Russian forestry official, A. S. Isayev, the Soviet Union is reforesting only one-third of the area on which it harvests timber, and "the gap between timber consumption and reforestation is still growing." As a consequence, he says, "Our timber resources will not last more than 50 years unless we step up our reforestation efforts."

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Canada Digs 'Long-Term Hole'

Canada is also cutting merchantable timber faster in accessible areas than it is being replaced and expects shortages of high-quality accessible timber within 20 to 30 years. "Canada is digging itself into a long-term hole to take advantage of a short-term market opportunity" in exporting to the United States, says R. Neil Sampson, executive vice president of the conservationist American Forestry Assn.

The situation in the United States is similarly solemn. Forests covered 50% of the United States when European colonists began arriving in the early 1600s, but they cover less than 33% today. Forests made a slight comeback after World War II as cropland and pastureland were idled and reverted to forest. But since 1962, forests, most notably in the South, have been shrinking again with conversion to fields and pastures, reservoirs, power lines, pipelines, highways, airports and urban sprawl. And the U.S. Forest Service expects the decline to continue.

What's more, the quality of what remains is inferior to the virgin stands of old, thanks to the historic practice of cutting the best and the largest trees and the preferred species. Across much of the country, heavy logging and repeated burning have permitted commercially less desirable hardwood species to encroach on more valuable softwood stands, leaving mostly small-sized, low-quality trees for which there is little or no commercial demand.

Repeating mistakes made by Europeans and North Americans in the past, Asians, Africans and Latin Americans are destroying their forests at an accelerated rate. Peasants clear land to grow food, ranchers move in to graze cattle, loggers mow down trees for export, and firewood gatherers grab what's left. According to the United Nations Food and Agricultural Organization, some 42,000 square miles of tropical forest, an area nearly the size of Louisiana, are disappearing each year.

"Instead of having a band of greenery around the equator, the Earth may eventually feature a bald ring," warns Norman Myers, author of "The Primary Source: Tropical Forests and Our Future." "These ecosystems, the most ancient on Earth, have been in existence for at least 50 million years, and they are being eliminated within a period of half a century or so, or one-millionth part of their history."

What most alarms environmentalists like Myers is that ecological recovery in the tropics will prove much more difficult than it has been in Western Europe and the Eastern United States where fairly flat land, gentle rainfall, good soils and natural regeneration have minimized damage from deforestation.

Where the land is hilly, the climate arid or rainfall torrential, soils shallow, and economic pressures prevent good husbandry, as they do in most of the Third World, removal of the original vegetation can set self-reinforcing processes in motion that lead to irreversible damage.

"Tropical forests are harder to manage than temperate forests," says the U.S. Forest Service's Krugman. "Soils are more fragile, less nutrient-rich, and when the nutrient flow is interrupted, they don't recover easily. We don't know how to manage the tropics, and the social, economic and population pressures prevent what we do know from being practiced."

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The rapid depletion of tropical forests can be traced in large measure to affluent life styles in temperate countries. The industrialized world's hunger for tropical hardwood furniture, wall paneling and other products has tempted many Third World governments eager for foreign exchange to overexploit their forests to the brink of exhaustion.

Japan Husbands Its Forests

Japan, which imports more wood than any other country, abets the overexploitation of Southeast Asian forests even as it husbands its own forests, keeping two-thirds of its mountainous land surface forested to protect watersheds and conserve its own timber against the day when overseas stocks run out.

As they have been for centuries, many tropical forests are being cleared to make way for plantations of bananas, pineapples, peanuts, coffee, cotton and other crops destined mainly for export to affluent industrialized countries. Other forests are converted to pasture to produce beef for overseas markets. Still others die to supply firewood to cure tobacco and tea, again mostly for export.

International aid agencies and multinational development banks are part of the problem as well as the solution. While sponsoring tree planting with one hand, they have opened up the Third World to further deforestation by funding large-scale agricultural, road-building and hydroelectric projects.

World Bank Finances Road

For instance, World Bank loans since 1982 to help Brazil build a 1,100-mile road into the Amazon frontier have opened a forested area the size of West Germany to rice growing and other development. The road has encouraged half a million land-hungry laborers displaced by farm mechanization elsewhere in Brazil to stream into the forest, invade areas set aside for indigenous Indian tribes and try to scratch a living from fragile soils unsuitable for either farming or grazing.

If Brazil and other Third World nations keep acting as though their natural resources are inexhaustible, they are only following the lead of the United States. When Europeans first explored what is now the United States, the dense forest that blanketed the eastern third of the country was so redolent that they could smell it at sea long before the coast came within sight.

Coming from a continent that already had been largely deforested, early settlers were astonished at the huge trees and primeval wilderness. So thick was the cover that it was said, probably without exaggeration, that a squirrel could travel in treetops all the way from the Atlantic Coast to the Mississippi River without ever touching the ground. And the virgin forest extended even beyond that, to the central Great Plains.

To the first white settlers, the forest was an obstacle to be cleared before agriculture could begin. And even after hacking out farms, the colonists saw the woods as a dangerous sanctuary for wild beasts and a base from which Indians could launch raids. So they kept enlarging the clearings and pushing back the dark, sinister forest. To them, the only good tree, like the only good Indian, was a dead one.

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Along with faith in the inexhaustibility of forest resources, this heritage of hostility became ingrained in the frontier spirit, hastening the indiscriminate, wanton destruction of forests long after they had ceased to be barriers to settlement of the country.

Forests Seen as Obstacles

So, too, today do tropical countries view their forests as obstacles to the agriculture needed to feed growing populations and as an underused asset needed to generate foreign exchange. Too busy surviving today to worry about tomorrow, they mine the forests rather than treat them as a renewable resource.

Just as today's environmentalists raise alarms at tropical deforestation, so a few lonely voices spoke out against the rape of U.S. virgin forests. Benjamin Franklin in 1749 urgently advocated an end to the reckless slaughter of the woods. Later, Henry David Thoreau lamented that if loggers were tall enough they would surely attempt to lay waste the sky. Unfortunately, Americans were too busy felling trees to pay heed.

Though the idea of conservation struck most Americans as ludicrous, the decline in the quality of U.S. forests began in Colonial times with the culling of New England forests for white pine masts and white oak timbers for the English navy. Stripping forests of the most valuable timbers left crooked, stunted trees and inferior species to regenerate. The legacy today is that choice walnut is so scarce that a single log sold recently for $25,000.

Today's lumber merchants could make fortunes selling the magnificent trees yesterday's loggers wasted. Felling an entire stand of trees and then taking only the choice butt logs was common. So was peeling the bark from ancient oaks and hemlocks and then leaving them to rot, while the bark was leached to obtain tannic acid to tan hides. And when lumberjacks weren't cutting off giant sequoias as much as 20 feet above the ground, letting the great tops crash to the forest floor and often splinter into uselessness, they were blasting them down with dynamite, wasting half the timber and setting fire to what was left.

Fire Used Indiscriminately

Both settlers and loggers used fire indiscriminately. Farmers eager to clear land as quickly and cheaply as possible often cut trees and then burned them where they lay. Loggers used fire to clear out underbrush before logging and to destroy debris afterward.

During drought and hot weather, fires often got out of control and raced across the land. The most deadly fire, in Wisconsin in 1871, burned 2,000 square miles and took 1,152 lives. In 1910, several small fires whipped by high winds formed a river of flame that burned a sixth of north Idaho's forests, killing 87 people and sending up a pall of smoke that darkened the sky as far away as St. Louis.

Fires often destroyed more timber than the amount cut. Worse, by wiping out young trees left on the cutover site, they delayed and sometimes prevented future timber crops. Still worse, fires damaged sandy and other fragile soils, creating desolate barrens where only stunted trees could grow. In the repeatedly blackened New Jersey Pine Barrens, where trees once towered over people, damaged soils now support only four-foot pygmy pines.

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The shortsighted abuse Americans heaped on their land and its natural resources continues today both here and abroad. Farmers who cleared forests in the lower Mississippi River Valley to grow soybeans and other crops in recent decades sold barely a third of the timber, bulldozing most of the rest into windrows and burning it.

Harvested Timber Wasted

Waste is even more appalling in the Third World. In Costa Rica, which has the highest annual percentage loss of forest in Central America, more than half of the timber harvested is burned or allowed to rot in place, according to biologist Rodrigo Gamez. And in Borneo, where the Indonesian government permits logging of huge tracts, logging debris left after harvesting fueled a 1983 fire that raced through the drought-parched rain forest for four months, burning an area larger than Massachusetts and Connecticut combined and destroying an estimated $6 billion in future harvestable timber.

Cut-and-run logging makes for boom-and-bust economies. After removing the biggest and best trees in the East, the U.S. lumber industry shifted production first to the Great Lakes states, then to the South, and finally to the West. Now, with the depletion of the last reservoir of old-growth timber in the West, the center is shifting again, this time to Canada and back to the South.

The cutting of superior, commercially valuable forests without thought to their regeneration leaves low-value forests, unemployed workers and ghost towns. Michigan is trying to diversify its economy to take up the slack left by the dispersion of its mainstay industry, motor vehicle manufacturing. But one of its options, revitalizing the once-booming lumber industry, is dimmed by the fact that the jack pine and other shrubby trees in its cut-over forests are suitable only for pulping. Says assistant state forester Gerald A. Rose, "The biggest problem in forest management in Michigan is finding markets for low-quality trees."

Clearing Unsuitable Land

Another mistake still being repeated is trying to grow food crops on land suitable only for growing trees. Just as American pioneers laboriously cleared many forests only to discover that their soils were too stony, sandy or soggy to sustain continued cultivation, so today many Third World farmers trying to wrest a living from the nutrient-poor, acidic soils typical of the tropics commonly give up and move on after several years.

One of the worst mistakes of all is removing the protective covering of trees in dry areas that lack the regenerative power of forests in better watered regions. The world is littered with the wreckage of civilizations that tried to farm and graze dry forest land, only to see the land dry out even more and the soil blow and wash away.

In India, where the northwest Rajasthan Desert now occupies more than a fifth of the nation's land area, the Harappan civilization had a thriving culture about 2000-1700 BC. But deforestation and overgrazing caused strong winds to blow away the soil. The consequent suspended dust caused the moist atmosphere to cool and sink, instead of warming and rising and forming precipitation. Rainfall declined and the civilization vanished.

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In the Near East and around the Mediterranean, vast expanses of arid landscape are less fertile and support fewer people today than they did thousands of years ago. North Africa, which had a forest belt between the coast and the interior desert in Roman times and exported timber, grain and olive oil, degenerated into today's arid adjunct to the Sahara once the ax took the trees and goats devoured the sprouts of their would-be replacements.

Spaniards' Destructive Habits

The Europeans who conquered the New World took their environmentally destructive habits with them. Coming from a dry land ruined by deforestation and overgrazing, the Spaniards duplicated the devastation in Mexico and Peru. According to William H. Prescott's classic "History of the Conquest of Mexico," replicating the treeless plains of their own Castile esthetically pleased the homesick conquistadors, while owners of giant haciendas cut down trees to prevent "lazy Indians on the plantation from wasting their time by loitering in their shade."

In California, timber cutting and fires set by modern-day sheepmen to "green up" the range have converted vast stretches of forests in the foothills of the Sierra Nevada and elsewhere to juniper, chaparral and sagebrush. Is even worse still to come?

"If you want to see what California will look like in a thousand years, all you have to do is look at Greece and the southern, more arid portions of Spain and Italy," says John B. Dewitt, a forester who heads the Save-the-Redwoods League in San Francisco. "When you start messing around with arid conditions and shallow soils, you can go from forest to brush to grass to bare rock."

Unfortunately, one needn't wait to see such ecological collapse. Erosion and desiccation are well under way in many parts of the Third World, particularly in sub-Saharan Africa where desertification is setting the stage for what former World Bank President Robert S. McNamara has called "a human tragedy of vast proportions."

Often Hard to Perceive

Because deforestation proceeds tree by tree, communities and countries often do not perceive a deforestation crisis until it is too late to take effective remedial action. Other societies see the dangers but ignore the risk.

Wealthy, sophisticated, land-rich nations such as the United States would seem to have less excuse to commit ecocide than do poor, mountainous countries such as China. China, which has suffered longer and more deeply from deforestation and soil erosion than any other major country, has so densely populated its fertile river valleys for so long that peasants have had little choice but to put their immediate survival ahead of the public good or even their own progeny's well-being.

The Communist government has tried to change all that. Experts say China has planted more trees since the 1950s than any other country. But it also has continued to convert forests to wheat fields, in accordance with Mao Tse-tung's "grain first" policy. During his ill-conceived Great Leap Forward of the late 1950s, forests were cut to provide charcoal for primitive "backyard" iron furnaces. And during the Cultural Revolution from 1966 to 1976, many private

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orchards and small woodlots were destroyed as "capitalist tails."

Since privatization of the economy began in the late 1970s, the construction boom in peasant housing has prompted poachers to sneak out at night and saw down trees and even telephone poles. Government statistics show that forest cover actually slipped from 12.7% of China's land surface in 1975 to 12% in 1981. That's an improvement on the 9% forest cover the Communists inherited in 1949, but it's a long way from the official goal of 20% by the year 2000, which American experts consider unattainable, and 33% eventually.

Lumber Shortages in China

Unfortunately, China doesn't have centuries -- not if it wants to continue to modernize. With only a tenth of the world average in forest resources per capita, the country already is experiencing shortages of railway crossties, transmission poles, mine pit props and construction lumber that are hampering industrialization.

At least China has extensive deposits of coal to keep its iron and steel industry going. But underdeveloped countries that have little or no coal to provide the heat and carbon necessary to smelt ores and refine metals, and that also are losing the forests that could provide a substitute in charcoal derived from wood, stand a dim chance of joining the industrial revolution anytime soon.

Like China, most developing countries are net importers of forest products, particularly paper, the production of which requires both wood and manufacturing plants. Paper products use a quarter of the world's commercial wood harvest, and this proportion is expected to increase in the decades ahead.

While shortages of paper slow the spread of technical information upon which modernization depends, shortages of firewood are deepening hunger and even threatening survival. Half of the world's people still use wood to cook their meals. When firewood grows scarce, they turn to burning twigs and leaves, straw and other crop residues, and dried animal dung. This diversion of organic matter and nutrients that should go to fertilize fields reduces crop yields, accelerating pressure to clear still more forests.

Time-Consuming Fuel Searches

As forests recede from villages in the Third World, women and children spend an inordinate amount of time -- often two days -- gathering a week's supply of firewood for their family. Scavenging for wood has created desert-like conditions in semi-arid regions of Africa, India and Latin America. And the rising cost of wood and its derivative charcoal forces millions of city dwellers to spend as much to cook their food as to buy it.

Generally, the poorer the country, the greater its reliance on wood as an energy source. Yet industrial countries have dramatically increased their firewood use since the early 1970s when petroleum supplies dwindled and prices soared. Half the timber cut in the Soviet Union is burned as firewood and an estimated 25% in the United States.

One in four American households now burns wood for at least part of its heating needs. And electric utilities in well-wooded New England and the Pacific Northwest are following lumber, pulp and paper mills in generating electricity

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from wood.

The forests of the future are expected to become increasingly important to help fill the gap left by the depletion of the coal, oil and natural gas formed from the giant ferns, mosses and other plants in the forests of the past. Wood's versatility as an energy source was demonstrated in World War II when many gasoline-short countries used gas derived from wood to run motor vehicles, including London buses, Danish farm tractors and German tanks. Currently, wood gas is powering electrical generators in several African countries, as well as coastal ships in the Philippines.

More Uses Found for Wood

Even the most technologically advanced countries stand to lose if deforestation continues to spread. For far from becoming obsolescent as technology advances, wood is finding more uses than ever. Nowadays one can dress entirely in textiles that originate in the forest. Even plastics have increased demand for wood, as wood cellulose is a necessary ingredient in many plastics, not to mention cellophane, rayon, many pharmaceuticals and artificial vanilla flavoring.

The average American uses twice as much wood as all metals combined. Wood constitutes more than 25% of all U.S. industrial raw materials, and the ratio has been rising since the mid-1970s as higher fossil-fuel prices have made energy-intensive substitutes such as steel, aluminum, cement and glass less competitive.

With 5% of the world's population, the United States now consumes more than 25% of all lumber, plywood and other solid-wood products in the entire world, as well as 33% of the paper and paperboard. Newspapers, magazines and books account for much of the paper use, but packaging even more.

With U.S. demand for wood rising faster than supplies, U.S. Forest Service economist Dwight Hair foresees "a future of intensifying competition for available wood and rising real prices for stumpage and most wood products." As prices rise, so will the cost of affordable housing.

Pressure on forests is also expected to intensify as wood is increasingly substituted for steel, aluminum, concrete, brick, glass, plastics and other materials.

Water Supplies at Stake

The forests of the future will also be needed to supply unpolluted water. Nearly two-thirds of all running water in the United States falls first on forests, which tend to occupy higher elevations and receive more precipitation. As underground water supplies dry up or become polluted, forested watersheds are expected to become an increasingly vital source of pure water for drinking and irrigation.

"Water is the No. 1 resource issue in California," says Zane G. Smith Jr., Pacific Southwest regional forester for the U.S. Forest Service. "Once you contaminate water, it doesn't clean itself readily." With contamination of water supplies by pesticides and other pollutants in the Central Valley "likely to surface in other places," he says, "we need to keep forests as pure as

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possible."

However enlightened California's forestry practices may prove, the propensity around the world is still to value forests more for the timber they yield than for their often far more important benefits in protecting the soil, moderating the climate and providing pure water, habitat for wildlife and opportunities for relaxation and recreation. Worse, instead of being valued, forests in many countries continue to be resented as competition for space needed for crops and flocks.

Clearly, the world has not yet come to grips with deforestation. Many governments act as though there were still virgin forests on the frontier to move on to, when in fact the world is fast running out of virgin forests. Many nations continue to mine forests for as long as the riches last, rather than maintain them as renewable resources. Most seem content to take the profit -- and let future generations take care of themselves.

Day of Reckoning Approaches

Putting short-run economic expediency over investment in long-term, sustained-yield production is understandable, given the 20- to 100-year gap between tree planting and payoff. But with forests in 76 tropical countries being cleared 10 times faster than they are being replanted, according to a U.N. estimate, and forest renewal lagging behind exploitation even in advanced societies such as the United States, the day of reckoning cannot be long delayed.

In most of the Third World, the economic and social problems that underlie much deforestation remain unaddressed. As Erik Eckholm points out in "Down to Earth: Environment and Human Needs," "Usually, uncontrolled deforestation is a symptom of a society's inability to get a grip on other fundamental development problems: agricultural stagnation, grossly unequal land tenure, rising unemployment, rapid population growth and the incapacity to regulate private enterprise to protect the public interest."

Developing nations have only a third as many forest resources per capita as industrialized nations, and this disparity is widening as both population growth and deforestation rates in the Third World outpace the industrialized world's. Unless this trend is reversed, deforestation could contribute to widening the economic gap between the rich industrialized world and poor developing nations.

Another unsettling possibility is climatic change. As forests are cleared and wood is burned or left to rot, the carbon dioxide released into the Earth's atmosphere adds to the heat-trapping greenhouse effect. Many scientists expect a continued build-up of carbon dioxide and other trace gases to warm the world, melting glaciers and some of the polar ice caps and causing oceans to rise and coastal cities and plains to be flooded. Global warming, in turn, would change the pattern of rainfall, benefiting some regions and harming others.

Sooner or later, then, the debt that humans owe for 5,000 years of deforestation must be repaid. Trying to overpower nature succeeds, in the end, only in impoverishing the planet.

1.	Brazil	3,656
2.	Columbia	2,025
3.	Indonesia	1,482

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4.	Mexico	1,470
5.	Nigeria	741
6.	Ivory Coast	716
7.	Peru	667
8.	Malaysia	630
9.	Thailand	622
10.	Paraguay	469
11.	Zaire	450
12.	Madagascar	370
13.	India	363
14.	Venezuela	309
15.	Nicaragua	299
16.	Burma	259
17.	Laos	247
18.	Philippines	225
19.	Guatemala	222
20.	Honduras	222
21.	Bolivia	215
22.	Nepal	207
23.	Cameroon	198
24.	Costa Rica	161
25.	Viet Nam	161
26.	Sri Lanka	143
27.	Liberia	114
28.	Angola	109
29.	Zambia	99
30.	Guinea	89
31.	Panama	89
32.	Ecuador	84
33.	Kampuchea	62
34.	Congo	54
35.	Ghana	54
36.	Papua New Guinea	54
37.	Kenya	47
38.	Guinea-Bissau	42
39.	Gabon	37
40.	Mozambique	24
41.	Tanzania	24
42.	Uganda	24
43.	Belize	22
44.	Bangladesh	20
45.	Ethiopia	20
46.	Pakistan	17
47.	Sierra Leone	15
48.	Brunei	12
49.	Central African Republic	12
50.	El Salvador	12

COUNTRY	PERCENT
Ivory Coast	5.9
Paraguay	4.6
Nigeria	4.0
Costa Rica	3.9
Nepal	3.9
Haiti	3.1
El Salvador	2.9

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Gambia	2.8
Benin	2.6
Guinea-Bissau	2.6
Nicaragua	2.7
Honduras	2.4
Thailand	2.4
Ecuador	2.3
Liberia	2.2

GRAPHIC: Photo, part of the 1,100-mile Trans-Amazon highway, above, threads through jungle, opening a forested area the size of Germany to development. Associated Press; Photo, Dr. James Juvik of the University of Hawaii, below, stands amid former mamane tree forest at the 7,000-foot level of Mauna Kea that was destroyed by animals imported by Yankee sea captains. ANACLETO RAPPING / Los Angeles Times ANNUAL LOSS OF TROPICAL FORESTS(Top fifty countries,in thousands of acres, 1981-1985) Source: World Resources Institute and International Institute for Environment and DevelopmentHARDEST HIT COUNTRIES(By yearly rate of deforestation)In percent ; Chart, DEFORESTATION WORLDWIDE Forest cover will decline to an estimated 17% of the world's ice-free land surface by the turn of the century, compared with 25% three decades ago. Much of the remaining forests will be in northern latitudes, where trees are small and slow-growing. In the United States, forests covered 50% of the land area when colonists arrived; now they cover less than 33%. Deforestation is a crisis of worldwide proportions, but the loss of forests in the tropical Third World is all the more tragic because it repeats mistakes made over the centuries by industrialized nations. The destruction of these forests -- which cover just 7% of the world's land surface but contain about half of its known plant and animal species -- is reducing the biological storehouse upon which we depend for an astonishing array of products. Each year, the world loses forests that would cover an area nearly the size of Louisiana. But what most worries environmentalists is that Third World soils, rainfall, husbandry practices and economic pressures will make recovery there much more difficult than it has been in temperate climates. Europe now has more forest land than it did at the turn of the century, but the comeback is threatened by acid rain. China has suffered longer and more deeply from deforestation than any other country but is replanting furiously. The Soviet Union, the world's leader in forest resources, is reforesting only a third of the area on which it harvests timber. ; Table, ANNUAL LOSS OF TROPICAL FORESTS; Table, HARDEST HIT COUNTRIES

TYPE: Series; Non Dup

SUBJECT: DEFORESTATION; FORESTS; ECOLOGY; ENVIRONMENT

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