THE HISTORY OF

THE ANIMAL AND RANGE SCIENCES DEPARTMENT

AT

MONTANA STATE UNIVERSITY

1893-2016

1895

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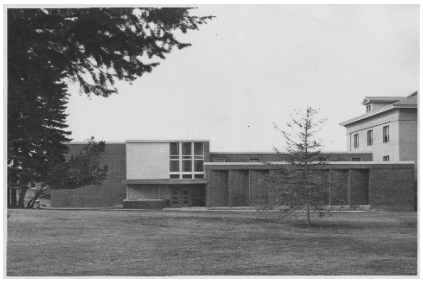

1956

2016

Compiled by James E. Knight, Professor Emeritus

Cover Photos:

The Agriculture Experiment Station Building (now Taylor Hall) was the first building on campus and housed the first animal scientists. **(MSU Library Photo Collection)**

Agriculture Hall (now Linfield Hall) was built in 1908 and provided classrooms, labs and faculty offices for the animal and range programs. **(MSU Library Photo Collection)**

An addition was built on the south end of Linfield Hall in 1956 to provide classrooms, labs and faculty offices for the animal and range programs. **(MSU Library Photo Collection)**

In 2010 the Animal Bioscience Building was constructed, primarily from private funds, to provide state-of-the-art housing for the Animal and Range Sciences Department.

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Compiled by James E. Knight, October 2016

Bozeman, Montana

TABLE OF CONTENTS

When it all started…

The history of the Animal and Range Sciences Department at Montana State University actually began before the start of the Agricultural College of the State of Montana in 1893. As Montana was settled, many farming and ranching practices which worked in the east were quickly found to be ineffective in the unique environmental conditions of the Rocky Mountain west and the Great Plains. The need for research and knowledge regarding livestock production in Montana was essential to provide food for the increasing population.

The Morrill Act of 1862 made land grants available for each state "to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislature of the states may prescribe". (1)

An important related bill, the Hatch Act of 1887 provided funding for an experiment station associated with the agricultural college. Station researchers were to develop basic knowledge in the agricultural sciences through experiments and practices at various locations throughout the state. (1) The Montana Experiment Station officially began July 1, 1893. (3)

Early on the importance of the relationship between teaching and research at Montana's Land Grant University was firmly established. All Experiment Station Staff were "employed in the dual capacity of experimentors and instructors". (3)

Likewise, the importance of extending the information available at the college to the people throughout the state was recognized from the beginning. During the first year, 49 meetings were held "in some of the most promising agricultural sections of the state". (3) These extension-type meetings were later known as Farmer's Institutes and provided a very efficient way to educate farmers and ranchers. The Farmer's Institute offered a number of short courses to producers, ranging anywhere from two hours to two days, on a variety of topics of interest to producers at the time, such as hog and cattle production.

When the site for the campus was selected as the 40 acres on "a low hill on the southwest edge of the city", the next step was to find suitable land for the Agricultural Experiment Station. There was 160 acres to the west of campus that was owned by Gallatin County. The county commissioners donated half the land and citizens pledged to purchase the remaining acreage. (1)

Looking at Bozeman from campus in 1894. (MSU Library Photo Collection)

Sloan M. Emery was Director of the Experiment station and salaried at $2500 in 1893. Luther Foster, an agriculture specialist from South Dakota State College received $2400 per year. Dr. W. L. Williams was a veterinarian paid $2000. F.W. Traphagen was a chemist paid $2400. These 3 made up the agriculture faculty during the college's first year. Of the 139 students, 15 were enrolled in agriculture. (1). There

was no distinction between students primarily interested in animal science from those students interested in crop farming. All the students were in “Agriculture”.

The Morrill Act prohibited the funds from being used for “the purchase, erection, preservation or repair of any building”. Therefore, when classes started in 1893, they were held in the Bozeman Academy (a converted roller rink) in downtown Bozeman and at the new Bozeman High School.

At this time, the expertise of each faculty member was very broad. For example, Luther Foster was an agriculture specialist and his first publication was on grain smut and his second was on pig feeding. F.W. Traphagen, a chemist, did an analysis of milk in dairy cattle his first year. Dr. W. L. William’s first publication was on “glanders”, a fatal, bacterial disease in horses and his second publication was on sheep diseases. (4)

The first agriculture classes began on April 17, 1893. (1) As in universities today, students took a number of general courses in addition to courses aimed at the specific discipline the student chose. The scope of animal science classes offered from the onset is impressive. Professor Luther Foster taught all the animal husbandry courses and students studied the most prominent breeds of domestic livestock. Course material included origins, history, characteristics, merits and defects, adaptability to climates and which breeds would be most suited to Montana. Professor Foster also taught principles of breeding, laws of heredity, causes of variation, formation of breeds, value of pedigree, atavism, crossing and stock selection. (8)

Morrill Act funds could not be used for construction of buildings but this is what the college needed badly. Experiment Station funds however, could be used for buildings and these were rapidly constructed. Everyone knew the buildings were supposed to be used for Experiment Station purposes and not academic purposes, but the practice of using them for classrooms continued for several years. (1)

The first classes were taught at the Bozeman Academy building in downtown Bozeman. (MSU Library Photo Collection)

Prior to 1896 enrollment in the basic agricultural curriculum was low because of the lack of scientific work in the field. General subjects took up more of the coursework than practical preparation for farm and ranch work. So in 1896 an optional agriculture short course was made available which consisted of 2 terms for 2 years instead of the 4 years previously necessary. (1) This short-course format was “offered for the benefit of the young men of Montana whose work on the farm prevents them from leaving it except for a short period during the winter season.” (9)

By the 10th year the college had existed, the curriculum had grown and included a greater variety of animal science classes. There were 8 courses of study at Montana State College, of which 1 of these was Agriculture. Students could “major” in agriculture which included a variety of agriculture courses including animal sciences. Luther Foster left the university in 1896. Professor Robert Shaw arrived in 1898 and taught both animal science and crop science courses. The animal science courses he taught included dairy husbandry, dairying, breeds and

breeding, principles of heredity, feeding of animals, care and management of livestock, veterinary anatomy, diseases of animals and animal nutrition.(9)

The capabilities and dedication of the early faculty was remarkable. All the animal science and crop science courses were taught by 1 faculty member until 1903. There were usually 6 courses taught by the faculty member each year. Additionally, the faculty members had an equally intense Experiment Station component to their position. Gathering teaching resources during this pre-electronic era must have been extremely time-consuming!

By 1906 there were 23 students in the School of Agriculture. The short course in agriculture was reorganized as a three year course of study during six months per year. To enter, a student must have finished the eighth grade and be able to read and write, or take a group of preparatory classes to enter. In 1906, the course bulletin showed the single course of study in Agriculture had been abandoned and a student could now select a major in agronomy, animal industry, dairy or horticulture. This was the first year a student at the College could select a major in the animal science field. (51)

In 1907 the number of students in the School of Agriculture had more than doubled from the previous year to 50. President Hamilton said there was nothing for students to work with, no space, no labs, and called for a new building for agriculture. The construction of Agricultural Hall (now Linfield Hall) in 1908 marked the shift from a fledgling college just starting up to a growing, thriving and well supported institution of higher education.

Early Animal Science research…

Sloan M. Emery

Agricultural experimental work began in 1893 at the same time classes started. S. M. Emery, as the first Director of Montana Ag Experiment Station, provided administrative leadership to get the Experiment Station started. Although he was a horticulturist, he recognized the need for research in the animal sciences and developed the base for a strong program in animal husbandry. In his May 24, 1894 report to the University Executive Board, he describes development of infrastructure so necessary in the early days of the unit. He describes a right-of-way trade with the Gallatin County commissioners for some buildings the station needed. He reported on the construction of fences, a hen-house and the purchase of horse teams and other livestock. During his tenure as Experiment Station Director, several prominent animal scientists were hired including Luther Foster and Robert Shaw. (2)

In the 3 years he was an Agriculturist in the Experiment Station, Luther Foster focused on providing basic information farmers and ranchers could use. His first Bulletin, Pig Feeding, was an example of information needed by farmers to understand scientific practices they could apply to be successful.

Robert W. Shaw conducted research and trials on livestock feeding and grazing. Between 1898 and 1902 he worked with cattle and sheep and wrote an Experiment Station Bulletin on Pork Production in Montana.

Sheep pens and a herd composed of 102, 2-year old wethers started the Experiment Station sheep work in 1898. Feeding trials began that same year.

Samuel Fortier took over as Experiment Station Director in 1900. His major policy change involved emphasis on the quality of the livestock. He replaced the “scrub swine” with “thoroughbreds” and exchanged the poorest cows and secured funds to buy “thoroughbred Shorthorns, and Herfords, as well as Rambouillet, Lincoln and Shropshire sheep.” (7) Fortier also started the practice of conducting experiments out in the state. In his first year he reported over 60 farmers as cooperators.

The Poultry Department started in 1900 and was managed by Henry C. Gardiner. (6)

The first range science work began in 1901 when Frank A. Spragg did work leading to his publication, Forage Conditions of Central Montana.

In 1902, F. B. Linfield was hired in the Montana Agricultural Experiment Station as a professor of agriculture, replacing R.S. Shaw. Linfield came to Montana after serving 10 years with the Utah Agricultural Experiment Station. Linfield’s early work included sheep, cattle and pig feeding and poultry management and disease prevention.

By the spring of 1903, the construction period of the station began. The legislature appropriated $16,000 for building construction and appropriations for maintenance to supplement the federal funds. In 1903 the Experiment Station had 7 faculty. In 1903 the station lands totaled 160 acres.

In 1904, Linfield was named Director of the Montana Agricultural Experiment Station following the resignation of Samuel Fortier.

In 1905, the Dairy Department and Animal Industry Department were made separate units from the crop units of the Experiment Station. Poultry was a division of the Animal Industry Department.

The Animal Industry Department at this time was conducting feeding experiments with steers sheep and hogs. This work culminated in 3 Experiment Station Bulletins. The Poultry Division had devoted considerable funds to building, grounds and stock. Two feeding tests with young cockerels were conducted and egg records as a basis of breeding selection was being investigated. The Dairy Department was conducting studies on “ripening of cream” and was doing a survey of dairy conditions in the state. (29)

Responding to a growing Montana…

The homesteading boom began about 1907. The importance of using livestock as a means of diversification became more important to Montanans and Experiment Station personnel. The Experiment station was scrambling to meet the information needs of the older and the newer settlers. A new trans-continental railway crossing the state had brought thousands of people to Montana, many of whom spread out over the dry bench lands. Director F. B. Linfield stated that, “With the agriculture development in the state there is an ever-increasing pressure to take up new problems and it is not an easy task to decide what to take up and what is left undone.” (30)

Between 1909 and 1923, settlers filed 114,620 homestead claims on 25 million acres in Montana.

The "Better Livestock Train" brought knowledge from campus to the people of Montana. (MSU Library Photo Collection)

In order to reach the many new farmers and ranchers throughout the state, more emphasis was placed on the agriculture extension efforts. In 1908, the first "special train" furnished by Northern Pacific railroad was organized by Experiment Station personnel in a major effort to extend information to Montanans. This first train was concerned with "Dairying" and included nearly all Experiment Station personnel as well as several dairy cows.

In 1913 Linfield was appointed as the first Dean of the College of Agriculture. Linfield called the first 10 years the "Pioneer Years" and the second 10 the "Construction Years". In 1903 the Experiment Station had 7 faculty and by 1913 there were 22.By 1913 over $135,000 had been given for buildings and improvements for agricultural work. During the 10 year period from 1903 to 1913, federal funds had doubled. Ten years later another 160 acres was purchased and

Early animal science complex facing west on Garfield. Left to right: Cattle Barn, Seed Barn, Steer Barn, Sheep Barn and Horse Barn. (MSU Library Photo Collection)

the state turned the Ft. Ellis lands over to the Experiment station for a total of 960 acres in Bozeman. At the substations around the state another 180 acres had been given to the state.

Dr. W. J. Hartman, had served as a livestock specialist for the Farmers Institute in 1911 and when the Extension Service started in Montana in 1914, he continued as the first Extension Specialist. Frank M. Hillman became the Dairy Specialist. (1)

The Steer Feeding Barn – 1911. (MSU Library Photo Collection)

By 1916 the Experiment Station had 25 staff of which 5 were animal science researchers. Director Linfield reported his belief that "the success of our country people in the future will depend to a large extent, as it has in the past, upon the development of their live-stock business." He noted that over 6,000 new brands had been registered the previous year and this indicated "that the settler is going into the livestock business". (31)

According to a report by Department Head C.N. Arnett, in 1916 the Animal Husbandry Department was working on the following: Beef Production on the Dry Land Farm, Production of Baby Beef under Montana Conditions, Grazing Breeding Beef Cattle, Soiling and Silage Crops for Dairy Cattle, Management of Dairy cattle, Growing Dairy Calves, Grazing Dairy Cattle on Irrigated Land, Wintering Breeding Sheep, Growing Lambs for Breeding Flock, Effect of Feed on the Breaking Strength of Wool, Comparison of Forage Crops for Swine, Wintering Brood Sows, and Reseeding and Improvement of Native Grass Pastures. (40)

In 1916 the Montana Agricultural College Experiment Station name was changed to University of Montana Agricultural Experiment Station. This did not change the emphasis of the work being done but when US declared war on Germany in 1917, Clare N. Arnett, the Animal Husbandry Department Head, and several other faculty, were called to the Army. Drought in 1917 through 1919 also placed additional demands on researchers as they shifted priorities to address serious forage shortages throughout the state.

Linfield described "the range problem" in 1919 as how to build up, maintain and use to the best advantage the range pasture of the state. He was frustrated that little was known about how to improve the range or how to determine the carrying capacity. He described plans for several western states to cooperate on studying the problems and opportunities. (11) It had been noted in previous reports that much of the land in Montana "is better adapted to beef production than to any other type of farming because of the water, grazing, winter feeding and marketing facilities". (31)

In 1927, Louis Vinke and C. N. Arnett published an Experiment Station Circular that firmly established Montana as a cow-calf state. (32) In the late 1870's, cattle were bought in Texas and trailed to the vacant ranges of the northwest. This was a very lucrative business and fortunes were made. However, the ranges became overstocked and with no provisions made for

winter feeding, the disastrous winter of 1886 caused an almost total extinction of the range cattle industry in Montana. Future speculators feared raising calves on the northern ranges so they trailed 2-year-old steers from the southwest to Montana where they kept them for 2 years and then marketed them. This strategy worked for a few years until the arrival of sheepmen, irrigation systems and dryland farming greatly diminished the “all-year-round” steer business. Vinke and Arnett contended that a cow and calf business better utilized the natural forage when supplemented by crops for winter feed. Other trends supported this strategy. Freight rates were increasing, so shipping from the southwest was not feasible. Also, the small land holdings of the settlers made it easier to start with a small number of cows rather than speculate on large numbers of steers. Finally, increased feed production in Montana made it cheaper to produce calves than to ship them in from the southwest.

By 1925 careful selection, breeding, feeding and management of the dairy herd had resulted in production of over 400 pounds of butterfat per cow which exceeded the results of most other Experiment Stations. A Holstein cow in the herd produced 3229 pounds of milk and 1052 pounds of butterfat to set a new worlds record at that time. (However, today’s milking cows produce over 10,000 pounds of milk.)(42)

Fort Ellis, just east of Bozeman, had been abandoned by the Army and had been used for cattle research until 1921 when the cattle were replaced by 380 head of Rambouillet ewes. Within a few years there were 500-600 head of sheep on the 640 acre tract. The federal government officially turned Ft. Ellis over to the Experiment Station in 1923. (42)

Aerial view of Fort Ellis viewed from the north in the early 1900’s. (MSU Library Photo Collection)

In the fall of 1923, the 60,000 acre Fort Keogh Military Reservation in Miles City was turned over to the U.S. Department of Agriculture. Within 3 years there were 2000-3000 sheep in cooperative studies with U.S.D.A. and the Animal Husbandry Department. (42)

The knowledge provided by the Experiment Station researchers greatly aided the ranchers and farmers of that time by supplying them with information on feeds and feeding, selection of breeding stock, utilization of range and pasture, reproduction strategies, recommended calving and weaning times, fattening cattle, shipping and marketing.

Dr. Jessie Richardson was hired in 1926 to head home economics research in the Agriculture Experiment Station. Dr. Richardson and Mrs. Helen Mayfield conducted studies for more than 20 years on palatability and nutritive characteristics of feeder lambs and beef and grass-fattened beef. (56)

In 1927 the Experiment Station at Montana State College (new name as of 1921) was working on the following projects:

1. Forage and pasture experiments with swine.
2. Supplemental feeds for swine.
3. Sunflower silage with other roughage for dairy cows.

4. Wheat and barley for pigs when supplemented with tankage.
5. Feeding of brood sows for maintenance.
6. Methods of feeding swine on pastures.
7. Management of sheep on farm and range.
8. Studies of wool production.
9. Effects of alfalfa hay and grain combinations on yearling steers.
10. Influence of wheat screenings on lambs.
11. Feeding dairy cows.

In 1930 there were 1.3 million cattle in Montana and over 4 million sheep. The number of farms in Montana had increased from 13,300 in 1900 to 47,500 in 1930. During the same period the population of Montana had more than doubled to 527,000 people. In his annual report, F. B. Linfield noted that from 1900 to 1930, milk production increased 5-fold while dairy cows only increased 3-fold. Chickens had increased 4-fold but eggs increased 5-fold. The 6 million sheep in Montana in 1900 produced only slightly more wool than the 4 million in 1930. Linfield stated those figures "would indicate that the task assigned to the Experiment Station 30 to 40 years ago has been carried forward with a fair measure of success, though those of us closest to the work during these years fully realize that there is much yet to be done." Work in Bozeman at this time was described as, "… a flock of sheep with a farm and range setting, a herd of dairy cows, and a large number of hogs, while a couple carloads of steers are fattened every winter for the east or west markets." (35)

Fredrick B. Linfield provided vision and support for animal and range sciences from 1902-1937.

The depression and war years…

By 1934, Department of Animal Husbandry researchers were studying heritability with beef cattle. One of the first lines developed and one of the most productive was known as "line-1", and was later estimated to have been genetically represented in 60% of Herefords registered by the American Hereford Association. Much of this work was a cooperative effort between Bozeman, Havre and Miles City researchers. (42)

During the 1930's and 40's, department researchers cooperated with the USDA Sheep station at Dubois, Idaho in developing a new breed, the Columbia. Another cooperative crossbreeding and selection program developed the Targhee breed which is still popular today in Montana and throughout the country. (42)

Teaching of meat science began when E.R. McCall joined the Animal Husbandry faculty in 1936. A summary letter written by J. R. Dynes described early slaughter facilities as, “a pole tripod and block and tackle behind the Agronomy machine shed with a meat cutting table in an unheated storage shed and winter weather supplying refrigeration.” (56)

Meats research and education was much different than today! (MSU Library Photo Collection)

The Annual Report of 1940 was the first time the name; Department of Animal Industry and Range Management, was used. (37) Prior to this it was the Department of Animal Husbandry. Beginning with Linfield’s analysis of “the range problem” in 1919, the Experiment Station was increasing its attention to range management issues. Experiments designed to indicate the suitability of forage plants and their carrying capacity was conducted by station personnel in the Bear Paw mountain area in 1936. (36)

World War II had a profound influence on the work of the animal and range scientists. Changes included several faculty who were called up to serve in the military and emphasis was placed on supporting the war effort. Administrators encouraged researchers to examine their work and evaluate the results in terms of service or contributions so Montana farmers and ranchers could conduct their operations under a war-time economy and conditions. The Animal Industry and Range Department emphasized actual production of animal products to support the war-time food needs. In 1942, Bozeman campus production included 59,000 pounds of cattle, 99,000 pounds of lamb, 50,000 pounds of hogs and 22,000 pounds of wool. They stated it was their intention to maintain this production in keeping with the agricultural war production program. (38)

The Dairy Industry Department responded to the government calling for more milk production by introducing a program to obtain more milk per cow through better feeding and management and by substituting a dry meal containing skim milk powder for calf feeding. This was more economical than milk for calf feeding and provided more milk for the “defense” effort. (38)

The MSU dairy herd about 1940. (MSU Library Photo Collection)

After World War II ended, growth of the Department of Animal Industry and Range Management was very significant and the resultant research results provided benefits to Montana livestock producers.

By the mid-1940’s range researchers began investigating methods of obtaining full utilization of grazing lands by livestock without deterioration of the forage. They were also looking at building up depleted lands to greater carrying capacities. Deferred and rotational grazing studies noted increases in stands of native vegetation with greater carrying capacities under these systems. (38) Range researchers began working with the US Forest Service on problems of inadequate range nutrition on the plains ranges. (39)

The Montana Wool Laboratory was authorized by the 1945 Montana Legislature. (39) The Wool Lab utilized a dependable method for sampling wool for shrinkage. This led to development of marketing strategies and Montana receiving higher prices for their wool than other states. The Wool Lab also did work allowing growers to realize higher prices for pre-shearing clippings and tags.

Montana State University Wool Lab.

Sheep researchers were investigating feeding, breeding and management strategies in conditions as similar as possible to Montana ranch conditions. Three thousand sheep were being used to provide answers to problems encountered by Montana sheep producers.

Performance testing of beef cattle by researchers showed considerable variation in returns depending on sire groups. In 1946, animal science researchers pioneered the procedure known as “bull indexing” as a tool for beef cattle improvement. The department was also studying the problem of mineral deficiencies in beef cattle.

A new breed of hog, the “Hamprace”, had been developed by Experiment Station researchers in cooperation with the US Range Livestock Experiment Station. It was claimed to be prolific and efficient in converting feed into pork.

The Dairy Industry researchers were studying cottage cheese flavor as influenced by manufacturing methods and the effect of strong flavored feeds such as wild mustard seeds and grain screenings, resulting in off-flavored milk. They continued looking at factors effecting milk production including management procedures, milking techniques, calving care, nutrition and genetics. (39)

The Poultry Industry Department, since being reinstated in 1945 after a lapse of almost 20 years, was studying factors to expand the gross income from poultry in Montana from the $12.5 million in 1952. They were investigating the economy and efficiency of feeds as well as other growth factors, market qualities, livability, egg production, and hatchability.

The 1950’s were a period of rapid change in agriculture. Production standards and management practices of previous years were no longer good enough. The animal industry and range researchers were challenged to respond to the needs of Montana’s livestock and range industry which was over $200 million in income annually. New practices and techniques using implants, fistulas, antibiotics and other developments meant faculty had expectations and questions from clientele they had not experienced before. (53)

Animal scientists were looking at cattle nutrition research and education including irrigated pastures, feed additives, pelleted rations, and trace mineral additives. Sheep nutrition studies included nutrition levels, management practices and sheep behavior. Pelleted rations for hogs were studied along with economic benefits of alfalfa hay and barley as slower and cheaper gains.

Animal scientists were also looking at breeding as a major way to improve livestock production. Hybridization was studied in sheep to help predict staple length, open faces, smoothness and body conformation related to better and more meat. Beef breeding work was aimed at identifying advantages to crossing unrelated lines to select for soundness, growth to weaning, feedlot performance and general conformation. (53)

Beef cattle judging in the 1950's. (MSU Library Photo Collection)

Meats Research was looking at carcasses of lambs, swine and cattle to see if carcass data could be used in selection trials and nutritional treatments to improve carcass quality. Modern facilities were provided in 1956 when the Meats Lab was built on the far west side of Linfield Hall. It included a laboratory with a kill floor, 3 coolers, 2 walk-in freezers and a large cutting room. This facility provided for research, study and training in meat processing from slaughter to cutting and freezing. This lab is still in use today.

Range researchers were studying chemical composition of range forages, amount and kind of forage consumed by cattle, livestock grazing behavior and grazing influences on range vegetation.

Student instruction involved a great amount of hands-on work. Meats courses dealt with slaughtering, processing, identification, grading and classifying various meats. Animal industry classes practiced fleece grading and evaluation and data collection with animal scientists. Range students spent considerable time in the field learning and practicing range monitoring methods. (53)

Between 1955 and 1958, the Towne, Girvin and Boldt properties, located just west of campus, were purchased for use in livestock experiments and teaching. In 1956, 13,000 acres were acquired at Red Bluff, a ranch 30 miles west of Bozeman. The Red Bluff Range Research facility was used for range nutrition and breeding studies with cattle and sheep and for teaching opportunities. (42)

The Red Bluff Research Ranch was purchased in 1956. (MSU Library Photo Collection)

The Dairy program was a regional leader in the 1950's.
(MSU Library Photo Collection)

A new Dairy Center, costing $1.8 million, was built 1 mile west of campus (today's BART Farm) in 1959. (1) The old facility, built in 1903, no longer offered the research and teaching facilities needed to do the job. The new Dairy Center had 17 buildings, 2 bunker silos, and yards covering 3 acres. It could handle a milking herd of 100 cows plus dry stock, heifers and bulls. The new facility had a light-controlled, soundproof observation room so visitors could observe without disturbing the cows. Cows were milked 3 at a time in about 5 minutes. (52)

Expanding Education and Research…

In 1962 the Departments of Animal Industry and Range Management, Dairy Industry and Poultry Industry combined to form the Department of Animal Science and Range Management. The Department of Animal Science and Range Management name changed to **Animal and Range Sciences** in 1964. (26). Montana State University became the new University name as of 1965.

In the 1960's the energy crisis intensified and large coal fired generators started at Colstrip, MT. With this the demand for coal increased. State and federal laws mandated reclamation of the mined areas but there was no research information available for the Northern Great Plains nor were there trained reclamation experts available to do the work required. Thus, the Reclamation Research Unit was established in 1964 and attached to the Animal and Range Sciences Department because most of the work required rangeland expertise. There were 2 scientists in the unit who relied on grants and contracts for over half their salaries. From the beginning of its existence, the Reclamation Research Unit provided guidance for M.S. students and taught courses in reclamation. A Master's Degree in Land Reclamation was available.

In 1968, 83% of the Animal and Range Sciences tenure track faculty positions were in the general area of animal science (19.5 FTE's)and 17% (4 FTE's) were in the range science area

In 1968, the cattle, horse and swine work was moved from the main campus to their present location west of campus on what was then known as the Towne Farm. This move to the new livestock facilities was a difficult one because of lack of sufficient funds to complete the livestock facilities to the point where they would effectively house animals. This was a period of fairly high inflation and from the time that the money was appropriated, "inflation had eaten into the budget so much so that, for example, slotted floors could not be put into the swine barn and there were few pens inside for pigs, gravel parking was not available so vehicles were constantly getting stuck in the mud, no outside pens for swine were constructed and no concrete slabs were there for outside housing, the nutrition center could not be completed, the beef cattle facility lacked fencing and the feed bunks would not restrain the cows and the feed mill was just a shell of a building with no bins and nothing in it." All of the additional improvements had to come from work funds thus reducing the research effort. (41)

The equine science program was growing. The Livestock Pavilion was built in 1968 as part of the move of animal buildings from the main campus. In 1979 it was renamed the Robert W. “Bob” Miller Pavilion in honor of Bob Miller who was on the Animal and Range Sciences faculty until his death due to a horse accident in 1974. Bob started the horse management and equitation classes in the department. He started the horseshoeing school and helped to design the pavilion. The Miller Pavilion is 100’ X 220’ and is insulated and heated. The pavilion is still used for labs in horse management, equitation classes, livestock judging, horse shows and rodeo practice.

MSU Horseshoeing School.

In 1971 the Horseshoeing School was started by Professor Bob Miller and Dr. Jack Catlin, a local veterinarian, and still operates today as the MSU Farrier School. The Animal and Range Sciences Department sponsored the school from the onset. The first instructor was Scott Simpson. Tom Wolf was instructor from 1979-2012. Bryce Kawasaki is the current instructor.

An external review of the Animal and Range Sciences Department in 1978 identified some strengths of the department but it also raised some questions about the need for some of the programs. They emphasized the benefits of the combination of animal and range disciplines in one department. They were complementary of, 1) the Disturbed Land Reclamation scientists in terms of their production and grants, 2) the uniqueness of the course work and research conducted in the Wool Lab, 3) the nutrition and breeding research and, 4) the considerable research in range given the small FTE number allocated to it (1.8 FTE).

The review team noted that in Extension 1.0 FTE was assigned to range science and another 1.0 FTE to beef cattle and sheep production. The report stated, “Income derived from the cattle industry and rangeland grazing, equals nearly half of the total state agricultural income. Dairy and poultry science each have 1.0 FTE even though the combined income from these commodities only total of 5% of state agricultural income.” (54)

During the 1980’s, the Animal and Range Sciences Department was reviewed by an external team of scientists. (45) They identified the strengths of the department as having excellent young scientists, land and animal resources, strong collaborative efforts, administrative support, research centers out in the state, relatively stable budgets and an acceptable M.S. program. Weaknesses included poor physical plant and laboratories, outdated laboratory equipment and few grants or contracts.

At this time, the 14 Animal Science faculty conducted research in animal breeding, nutrition and reproductive physiology. The 5 Range Science faculty worked in range production, riparian grazing, range monitoring methods, livestock grazing strategies, and range plant manipulation. The Reclamation Research Unit (2 faculty) worked on revegetation of mine spoils and the effect of toxic minerals on livestock and forage production. The Meat Science program (1 faculty member) was in transition between a retiring faculty member and a new one so focus was on teaching and identifying research needs. Wool research (1 scientist) was investigating wool and related characteristics. (45)

Since the beginning of the department, beef cattle research and education has been a priority.

In the 1990's the department was focusing on range-livestock research conducted with cattle and sheep under western range conditions. At this time the department was experiencing rapid growth in external funding, in part due to special grants at the federal level. Funding through grants and contracts was $443,000 in 1994 and by 1999 it had increased 460% to over $2 million!

The primary research emphasis of the 9 animal science faculty in the 1990's was 1) Breeding and Systems, 2) Nutrition and, 3) Physiology. The research in Breeding and Systems was in the following areas; 1) genetic factors that effect reproductive performance, 2) genetics of body composition, 3) importance of scrotal circumference on fertility, 4) genetic evaluation of beef cow size, forage intake, and maternal efficiency, 5) selection for antagonistic and reproductive traits, and 6) systems approach to evaluating effects of genetic change on body composition of cow-calf production efficiency and estimates of biological and economic efficiency of different biological types of beef cattle. (43)

Research in the Nutrition area emphasized, 1) the utilization of barley and other Montana feedstuffs by beef cattle, sheep and swine, and 2) supplementation programs for beef cattle, and sheep grazing range pastures.

Research in Physiology emphasized; 1) evaluation of developmental changes in the reproductive tract that are involved with altering fertility of young female ruminants, 2) evaluation of social and endocrine factors associated with resumption of cycling activity in postpartum cattle and, 3) determining specific physiological processes that are altered by genetic selection for prolificacy in male and female sheep.

The six range research faculty covered 6 areas:

1. Development of strategies for providing maximum opportunity for agriculture producers while protecting and enhancing Montana's natural resources.
2. Identification of biological and physical processes which influence riparian ecosystems.
3. Approaching watershed issues with an ecosystem perspective.
4. Managing habitat use by wildlife and livestock.
5. Evaluating the effects of herbivory and herbivores on the environment.
6. Assessing grazing strategies to control noxious weeds and to minimize winter hay feeding costs.
7. Investigating shrub ecology and shrub-herbivore relationships.

Rangeland ecology research covers a wide range of disciplines.

The 3 land rehabilitation research faculty worked in 4 areas:

1. Plant selection for inhibitory rootzone materials
2. Soil remediation to reduce pyytotoxic properties of the rootzone
3. Hazardous waste amelioration, stabilization and revegetation
4. Technical oversight support for government agencies and private industry

In the 1990's there was still the traditional Extension emphasis on providing programing on the various components of livestock production and management. These programs were covered by a Beef Cattle Specialist, a Sheep Specialist, a Swine Specialist and a Range Management Specialist. However, with more concern about environmental regulations and the influence of the growing environmental movement, agricultural producers now needed assistance beyond the traditional programing. To address this need in the mid-90's, an Extension Wildlife Specialist and an Extension Natural Resource Specialist joined the faculty. (43)

In 1995, 65% of the Animal and Range Sciences tenure track faculty positions were in the general area of animal science (11 FTE's) and 35% (6 FTE's) were in the range science area. There were 6.32 FTE's in teaching, 6.38 in research and 4.5 in extension.

The undergraduate and graduate program in the Land Reclamation Unit was revised during this time. Abused Land Rehabilitation, was initiated in 1993 and became very popular because of good job placement. When the College of Agriculture reorganized in 1998 the Reclamation Research Unit was moved to a new Department of Land Resources and Environmental Sciences. (41)

In 1995, the mission statement of the Animal and Range Sciences Department was" *The scholarly pursuit of science and technology supporting livestock, rangeland and other renewable natural resources in economically profitable, ecologically stable, and socially acceptable systems."*

The Department conducted an intensive strategic planning process from 1995-1998. The Mission Statement of the Department of Animal and Range Sciences resulting from this process is the same as it is today: *"The mission of the Animal and Range Sciences Department is to create, evaluate and communicate science-based knowledge to enhance the management of Montana' s livestock and rangeland resources in ways that are economically, socially and ecologically sustainable."*

As part of the College reorganization in 1998-99, the Rangeland Watershed position was moved to the new Department of Land Resources and Environmental Science and the Extension Forage Specialist position was transferred to the Animal and Range Sciences Department.

The New Millennium…

By 2000, 62% of the departmental FTE's were in the animal science area (13 FTE's) and 38% (8 FTE's) in the range area. This was a shift from 1968 when there were 83% of the FTE's in the general area of animal science and 17% in the range science area. This shift was in recognition of the importance of natural resource issues for the livestock industry as well as the state and nation. (44) Reasons for this included, 1) Coping with state and federal regulations, 2) increased activity and pressure from environmental groups and, 3) an increased awareness by the general public of the importance of natural resource management.

In 2000, 9 of the 21 tenure track faculty had Extension appointments.

Emphasis in the Animal Science area included: Studies on nutrition and feed in cattle, horses and sheep, wool research, reproduction in ruminants, evaluation of barley feed, Montana Beef Network, and systems analysis of livestock enterprises. Emphasis in Range Science included, riparian processes, wildlife-livestock interactions, livestock behavior, noxious weeds and grazing management. The Swine Center was closed in 1995 due to budget constraints and was not reopened because of environmental concerns. (44)

A Doctor of Philosophy in Animal and Range Sciences was first offered in 2002 with either an Animal Science or Range Science emphasis.

During the 2000's there was a shift in emphasis in curriculum in the department. Student interest and encouragement from potential employers prompted the department to offer more classes in the areas of range-wildlife and in equine animal science. (46)

By 2006 the Animal and Range Sciences Department offered a Bachelor of Science Degree in Animal Science and a Bachelor of Science Degree in Natural Resources and Rangeland Ecology. The B.S. in Animal Science provided a choice of 3 Options: Equine Science Option (available beginning in 2002), Livestock Management and Industry Option and the Science Option. The B.S. in Natural Resources and Rangeland Ecology offered a Rangeland Ecology and Management Option, and a Wildlife Habitat Ecology and Management Option (available beginning in 2006).

In the Range Science area there was demand for wildlife habitat training to complement the already popular range management curriculum. State and federal agencies were selecting new employees with expertise in practical range management and wildlife habitat management. The Natural Resources and Rangeland Ecology, Wildlife Habitat Ecology and Management Option provided students with a broad background in wildlife habitat, rangeland ecology, and wildlife livestock interactions.

There was also an increased interest in Equitation and Horse Science. The Animal Science, Equine Science Option, emphasized science and technology combined with practical aspects of management, horsemanship and training. This program prepared students for employment in breeding, nutrition, and management of facilities and land, as well as the allied industries such as sales, feed, tack and equipment.

Equine science has greatly influenced the growth of the department since 2000.

Growth in undergraduate students in the Animal and Range Sciences Department was dramatic after the turn of the century. There were 170 majors in 2001 and 311 in 2011. The increase was primarily attributed to adding the wildlife option to the Natural Resources and Rangeland Ecology Major and the equine option in the Animal Science Major. (46)

In August of 2008, construction of the new Animal Bioscience Building began and it was open for use in July, 2010. This building would be the new home of the Animal and Range Sciences Department and provided faculty offices, laboratories and classrooms. This new building represented a milestone for the department not only because the state-of-the-art facility provided an excellent teaching and research environment, but because it demonstrated the value the livestock industry and other constituents placed on the Department of Animal and Range Sciences. The $16 million cost of the new building came from 3 primary sources: $3 million from the MSU Foundation (partial funds from sale of land historically used by the Department), $6 million from State legislatively appropriated funds and $7 million from private sources. The private sources, almost 45% of the total cost, was unique for funding a public

building and indicated the strong support of the public for the department. There were numerous private donations including 141, Rancher Circle members who donated $10,000 or more.

Beyond 2010 the Department of Animal and Range Sciences continued the varied and multidiscipline research programs. Individual projects were often conducted with participation from several faculty members. In Animal Science, nutritional management projects included supplement studies for cattle, reproductive studies investigated pheromonal activity, microbiology evaluated reproductive tract microbiome in sheep and microbiology of meat products and entomology worked with fly and parasite control in sheep and cattle.

The Range Science research programs concentrated efforts on water quality and quantity, noxious weeds, animal behavior and management and wildlife habitat ecology.

The Extension programs in the department included education, research and certification activities across discipline areas of cattle, sheep, entomology, forage, equine, natural resources, pesticide education, range management and wildlife.

In 2013, 11 tenure-track faculty worked in the Animal Science area and 5 were in the Range Science area. Five of the tenure-track faculty had Extension appointments.

In 2016, the Society of Range Management reviewed and accredited the Range Science program. The Animal and Range Sciences Department has 350 undergraduate and 33 graduate students.

The Nancy Cameron Endowed Chair was established in the Animal and Range Sciences Department in 2016. The position was the department's first endowed chair, meant to develop a rich research profile and program in range beef cattle nutrition and management that serves Montana and the region's beef Industry. The position was heavily supported by Montana producers and university stakeholders, including a foundational $2 million gift from Nancy Cameron, a descendant from a Montana pioneering ranching family. Dr. Tim DelCurto was selected to fill the chair after a national search by a search advisory committee of MSU faculty and private stakeholders.

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Appendix A

HISTORY OF CURRICULUM IN ANIMAL AND RANGE SCIENCES

In **1893** Agriculture was one of the 3 “courses” of study offered the first year the Montana College of Agriculture and Mechanic Arts was opened. The other 2 curriculum areas were Domestic Economy and Applied Science. As in universities today, students took a number of general classes in addition to classes aimed at the specific discipline the student chose. The scope of animal science classes offered from the onset is impressive. Professor Luther Foster taught all the animal husbandry courses. Students studied the most prominent breeds of domestic livestock. Material included origins, history, characteristics, merits and defects, adaptability to climates and which breeds would be most suited to Montana. Professor Foster also taught principles of breeding, laws of heredity, causes of variation, formation of breeds, value of pedigree, atavism, crossing and stock selection. (8)

By **1895** there were 19 students in Agriculture. The enrollment in the basic agricultural curriculum was low because of the lack of scientific work in the field. General subjects took up more of the coursework than practical preparation for farm and ranch work. So in 1896 an optional agriculture short course was made available which consisted of 2 terms for 2 years instead of the 4 years previously necessary. (1) This short-course format was “offered for the benefit of the young men of Montana whose work on the farm prevents them from leaving it except for a short period during the winter season.” (9)

By the **1903** the curriculum had grown significantly during the first 10 years and included a greater variety of animal science classes. There were 8 courses of study at Montana State College, of which 1 of these was Agriculture. Students could “major” in agriculture which included a variety of agriculture courses including animal sciences. Professor Robert Shaw taught both animal science and crop science courses. The animal science courses he taught included Dairy Husbandry, Dairying, Breeds and Breeding, Principles of Heredity, Feeding of Animals, Care and Management of Livestock, Veterinary Anatomy, Diseases of Animals and Animal Nutrition.(9)

By the junior year of study, students could take a course in Principles of Animal Feeding in which the physiology and requirements of animals were taught. Chemical composition of foods, animal nutrition, and values of different foods were discussed. Balancing rations and consideration of animal use was also covered. Dairy Husbandry and Veterinary Science were electives students could take after their freshman year. (8).

In **1906**, the course bulletin showed the general course of study in Agriculture had been abandoned and a student could now select a major in agronomy, animal industry, dairy or horticulture. <u>This was the first year a student at the College could select a major in the animal science field.</u> (51)

In **1910,** students could obtain a Bachelor of Science Degree in the Division of Agriculture with a choice of emphasis in; Agronomy, Animal Industry and Dairying, or Horticulture. The animal industry work consisted of study in judging, feeding, breeding and caring for farm animals. The work in dairying consisted of the handling, manufacture and marketing of milk and its various products. The course was "designed to prepare young men for agriculture college and experiment station work, federal government work, farmers institute work, positions as buyers and salesmen of livestock, teachers of animal industry and dairying in high schools, managers of large livestock and dairy farms, creamery and dairy inspectors, managers of dairy corporations and community milk depots, and above all, to furnish men with a scientific as well as a practical knowledge to operate their own farms in Montana." (24)

For use in the classes, there was a herd of 35 dairy cows, 6 herds of pure-bred cattle, Percheron horses, 3 breeds of swine, and 3 breeds of sheep.

Faculty: William F. Schoppe, Poultry. Harvey P. Griffin, Animal Industry. Roy C. Jones, Dairying.

Courses included: Animal Types, Breeds of Live Stock, Stock Judging, Feeding Live Stock, Herd Books and Pedigrees, Care and Management of Live Stock, Poultry, Farm Dairying, Milk and Milk Testing, Dairy Manufactures and Cheese Making.

In **1920**, students could study toward a Bachelor of Science Degree in Agriculture and could take electives in Animal Husbandry, Dairy and Poultry Husbandry.

The Animal Husbandry courses were designed to prepare students for work in practical and scientific stock farming or to work in teaching and research in animal husbandry or other fields. (15)

Faculty; C. N. Arnett, R. C. McChord, W.E. Joseph, J. O. Tretsven

Courses: Livestock Judging, Breeds of Livestock, Nutrition of Farm Animals, Breeding Farm Animals, Beef Cattle and Sheep Production, Horses and Swine Production, Experimental Feeding, Handling and Fitting Livestock, Principles of Feeding.

The Dairy courses prepared students to meet the rapidly growing demand for workers trained in practical, modern dairy science as applied to farm, factory and the markets.

Faculty: G. L. Martin

Courses: Farm Dairy, Community Dairying, Inspection of Milk Products, Creamery Butter Making, Cheese Making, Market Milk, Factory Management, Dairy Technology

Poultry Husbandry taught students the care and production of poultry. Courses covered breeds, feeding, facilities and products.

Faculty: W.F. Schoppe

Courses: Poultry Management, Poultry Breeds, Poultry Houses, Marketing Poultry Products, Poultry Breeding, Poultry Culture, Incubation, Brooding, Feeds and Feeding (15)

1923 was the first year Animal Husbandry or Dairy Manufacturing could be declared as a Major. Prior to this, these disciplines were just selected as fields of emphasis. (17)

1927 was the first year a Master of Science Degree was available in Animal Husbandry.

In **1930** students could receive a Bachelor of Science Degree in Agriculture with a Major in Animal Husbandry or Dairy Industry. A Master of Science Degree was available in Animal Husbandry. (14)

The Animal Husbandry Major provided education and training needed in the practice of livestock production and in vocations requiring a thorough knowledge of the livestock industry.

Faculty: H. W. Vaughan, Oscar J Tretsven, Louis Vinke, Ross H. Miller

Courses; Livestock Judging, Livestock Breeding, Livestock Feeding, Livestock Management, Wool and the Wool Industry, Veterinary Science, Beef Cattle Production, Sheep and Hog Production, Range Livestock Management, Diseases of Animals and Sanitary Science

The Dairy Industry Major dealt with the various phases of handling milk and cream on the farm and in the factory. Also discussed was the theory and practice of butter and cheese-making and frozen dairy products. Education was included on management and operation of private and cooperative dairy plants.

Faculty; J. A. Nelson, Glenn C. Sands

Courses: Dairy Mechanics, Feeds and Feeding, Dairy Bacteriology, Dairy Chemistry, Manufacture of Butter, Manufacture of Cheese, Manufacture of Ice Cream, Judging Dairy Products, Technology of Milk, Testing and Inspection of Dairy Products, Market Milk, Management of Dairy Plants (14)

By **1940**, students could receive a Bachelor of Science Degree in Agriculture with a major in Animal Industry, Range Management (after 1941), Dairy Manufacturing or Dairy Production. A Master of Science Degree was available in Animal Husbandry. (13)

The Animal Industry Major was organized to give students fundamental knowledge and training in market requirements, breeds, judging and breeding, feeding and management of livestock as related to Montana and other western states.

Faculty: R.T. Clark, E.R. McCall, J.N. Cummings

Courses: Breeds of Livestock, Animal Breeding, Feeds and Feeding, Veterinary Physiology and Anatomy, Obstetrics, Genetics, Livestock Judging, Pasture Management, Beef Cattle and Sheep Production, Meats, Horse Production, Dairy Cattle and Hog Production, Wool and Wool Industry, Range Livestock Management, Sanitary Science, Common Diseases, Parasitic Diseases

Dairy Manufacturing was organized to give students training in the fundamentals and modern methods of processing and preparation of dairy products.

Faculty: J.A. Nelson, J.O. Tretsven, T.I. Hedrick, D. A. Whitman

Courses: Dairy Mechanics, Marketing, Dairy Bacteriology, Dairy Chemistry, Butter, Judging Dairy Products, Market Milk, Ice Cream and Concentrated Milk, Dairy Cattle and Hog Production, Sanitary Bacteriology, Cheese

The Dairy Production curriculum dealt with the sanitary and economical production and processing of milk and cream.

Courses: Marketing, Farm and Ranch Management, Feeds and Feeding, Dairy Bacteriology, Judging, Market Milk, Dairy Farming, Parasitic Diseases

The Range Management program began in **1941**. It was designed to give students fundamental training in range management and basic sciences. The intention was to train students for careers in, 1) actual management of livestock operations, 2) range technicians for government agencies, or 3) extension work in range management, (13)

Faculty: R.T. Clark, G. Curtis Hughes, A.C. Kegel, Oliver S. Walsh

Courses: Management of Range Livestock, Plant Taxonomy, Plant Physiology, Surveying, Range History and Laws, Principles of Range Management, Range Literature, Plant Ecology, Land Economics, Farm Ranch Management, Conservation of Soil and Water, Range Management Methods, Game Management

In **1950**, Montana State College offered curricula leading to a Bachelor of Science Degree in Agriculture with a Major in Animal Industry, Range Management, Dairy Manufacturing or Dairy Production. A Master of Science Degree was also offered in these majors. There was a Department of Poultry Industry and a Department of Veterinary Science but these were non-degree granting departments. (21)

The Animal Industry Major was organized to give students fundamental knowledge and practical training in the market requirements, the breeds, judging and breeding, feeding and management of livestock in Montana and other western states.

Faculty: Fred S. Willson, William H. Burkitt, Alva E. Flower, G. C. Hughes, Leroy Van Horn, D. B. Watt, J. Drummond, E. P. Orcutt, F.A. Ralston

Courses included: Agriculture Marketing and Co-ops, Forage and Pasture Crops, Meats, Breeds of Livestock, Animal Breeding, Livestock Judging, Principles of Range Management, Veterinary Physiology, Genetics, Animal Nutrition, Swine and Horse Production, Sheep Production, Beef Production, Wool and Wool Industry, Infectious Diseases of Animals, Common Diseases of Animals, Parasitic Diseases of Domestic Animals.

The Dairy Manufacturing Major pertained to the study of modern methods of processing and preparing dairy products for market.

Faculty: J. A. Nelson, J.O. Tretsven, E.A. Keyes, John L. Brence, Ervin P. Smith.

Courses included; Dairy Mechanics, Dairy Bacteriology, Dairy Chemistry, Butter, Dairy Farming, Market Milk, Ice Cream, Dairy Products Quality Evaluation, Concentrated Milk, Cheese, Dairy Operation, Market Eggs and Poultry.

The Dairy Production Major studied dairy cattle, breeds selection, breeding, physiology of reproduction and milk secretion, feeding, judging, herd classification and sanitary production of milk.

Faculty: J. A. Nelson, J.O. Tretsven, E.A. Keyes, John L. Brence, Ervin P. Smith

Courses included: Forage and Pasture Crops, Dairy Bacteriology, Dairy Farming, Dairy Cattle Improvement, Market Milk, Dairy Cattle Judging, Veterinary Physiology, Farm and Ranch

Management, Animal Nutrition, Livestock Production, Dairy Cattle Production, Poultry Production, Common Diseases of Animals, Parasitic Diseases of Domestic Animals.

The Range Management curriculum gave students fundamental training in range management and the basic sciences to prepare them for careers in livestock operations, agencies or extension work.

Faculty: Gene F. Payne, R. G. Johnson

Courses: Animal Breeding, Plant Physiology, Plant Ecology, Agrostology, Forage Value of Native Plants, Principles of Range Management, Conservation Engineering, Forage and Pasture Crops, Sheep Production, Beef Production, Range Policy and Administration, Principles of Political Science, Range Surveys and Management Plans

In **1960**, Montana State College offered curricula leading to a Bachelor of Science Degree in Agriculture Production with a Major in Animal Industry, Dairy Production, Poultry Industry or Range Management. A Bachelor of Science Degree in Agricultural Science was offered with a Major in Animal Industry, Dairy and Food Technology (formerly Dairy Manufacturing), Dairy Production, Poultry Industry or Range Management. A Master of Science Degree was offered in all these majors except Poultry. (23)

The Animal Industry Major was organized to give students fundamental knowledge and practical training in the market requirements, the breeds, judging and breeding, feeding and management of livestock in Montana and other western states. The Meats Lab was noted as an opportunity for students to participate in all phases of meat processing. The Montana Wool Laboratory was noted to provide excellent facilities for wool studies.

Faculty: Fred S. Willson, Alva E. Flower, Leroy Van Horn, O. O. Thomas, D. W. Blackmore, J.R. Dynes, Arthur Hoversland, R.W. Miller, James Drummond, James Bassett,

Courses included: Feeds and Feeding, Forage and Pasture Crops, Meats, Classification and Grading of Meats, Animal Genetics, Physiology of Reproduction, Veterinary Physiology, Genetics, Animal Nutrition, Swine Production, Sheep Production, Beef Production, Horse Management and Training, Wool Judging, Wool and Wool Industry, Wool Technology

The Dairy Manufacturing Major terminated at the end of the 1961-62 school year and was replaced by courses in Dairy and Food Technology. The Dairy and Food Technology program was the business and science of converting the raw food materials into a consumer-acceptable form. Consideration was given to transportation, processing, packaging, storage and distribution of food. Changes in the dairy curriculum were an attempt to prepare students to prosper in various fields of the dairy industry

Faculty: J. C. Boyd, J. A. Nelson, E.A. Keyes, Raymond R. Hedrick, John L. Brence, Ervin P. Smith, Neil C. Quesenberry

Courses included; Dairy and Food Technology, Concentrated Milk, Butter, Cheese, Market Milk, Ice Cream, Dairy Products Quality Evaluation, Dairy Plant Management, Dairy Operation

The Dairy Production Major was the business and science of feeding, breeding and management of dairy cattle for the production of milk. In 1960, dairying was the largest segment of American agriculture.

Faculty: J. C. Boyd, J. A. Nelson, E.A. Keyes, Raymond R. Hedrick, John L. Brence, Ervin P. Smith, Neil C. Quesenberry

Courses included: Applied Dairy Production, Dairy cattle Production and Selection, Dairy cattle Feeding, Dairy Farm Practices, Dairy Cattle Breeding, Milk secretion, Artificial Insemination, Endocrine Physiology of Domestic Animals

Poultry Industry was designed to help students apply scientific principles of nutrition, genetics, bacteriology and other disciplines to the production, processing and distribution of poultry products.

Faculty: George T. Davis, Allen F. Beekler, Edmund Guenther

Courses included: Poultry Production and Processing, Poultry Nutrition and Feeding, Avian Physiology, Poultry management, Poultry Genetics, Applied Poultry Production

In **1960**, the Range Management curriculum was designed to train students who intended to operate range livestock ranches, work in federal or state agencies as range scientists or serve as representatives of agricultural companies in sales or technical positions related to range management. (23)

Faculty: Gene F. Payne, D.E. Ryerson, G.M. Van Dyne,

Courses: Range Management Practices, Range and Range Plants, Forage Value of Range Plants, Range Policy and Administration, Applied Range Production, Range Renovation Practices, Grazing Influences and Practices, Range Surveys, Range Management Planning, Range Nutrition, Grazing Influences

In **1962,** the Departments of Animal Industry and Range Management, Dairy Industry and Poultry Industry combined to form the **Department of Animal Science and Range Management**. (26) Effective **July 1, 1964**, The Department of Animal Science and Range Management name changed to the **Department of Animal and Range Sciences**. (48)

The Reclamation Research Unit was established in 1964 and attached to the Animal and Range Sciences Department, because most of the work required rangeland expertise. There were 2 scientists in the unit who relied on grants and contracts for over half their salaries. From the beginning of its existence, the Reclamation Research Unit provided guidance for M.S. students and taught courses in reclamation. A Master's Degree in Land Reclamation was available.

By **1970**, the Department of Animal and Range Sciences was one of 4 departments in the College of Agriculture. A Bachelor of Science Degree could be obtained in one of 4 general curriculum areas in the College;1) Agricultural Business, 2 Agricultural Education, 3)Agricultural Production and 4) Agricultural Science. Animal Science and Range Management were each Majors that could be selected under Agricultural Production or Agricultural Science. A Master of Science Degree was available in both Animal Science and Range Management. (26)

The Animal Science Major dealt with the broad aspects of livestock production and the processing and utilization of animals and animal products. Students received education in the application of physical and biological sciences and economics of the breeding, feeding and management of livestock. Training also related to the marketing, and processing of livestock and livestock products.

Faculty: R. L. Blackwell, J. C. Boyd, M. L. Burris, G. T. Davis, J. Drummond, A. M. El-Negoumy, O.O. Thomas, J.L. Van Horn, F. S. Willson, B. Winchester, J. R. Dynes, A. E. Flower, N. A,. Jacobsen(Extension), R.W. Miller, C.W. Newman, E.J. Peace (Extension), A.F. Beeckler, P.J. Burfening, K.L. Colman, E.L. Moody, B.R. Moss, L.C. Gagnon

Courses: Equitation, Utilization of Agriculture Products, Livestock Evaluation, Meats, Feeds and Feeding, Horse Management, Grades and Standards of Agriculture Products, Poultry Production, Meat Animal and carcass Evaluation, Animal Genetics, Principles of Animal Breeding, Swine Production, Beef Production, Sheep Production, Wool Evaluation, Dairy farm Practices, Animal Nutrition, Animal Metabolism Measurements, Physiology of Reproduction, Endocrine Physiology, Commercial Feeds and Feeding, Wool and Wool Industry, Animal Behavior, Behavioral Genetics

The Range Management Major prepared students to understand and manage the soil-plant-animal complex. Emphasis was on understanding grazing animal production within the framework of multiple land use and total resource management.

Faculty: G.F. Payne, D. E. Ryerson, N.W. Jefferies, J.E. Taylor, G.K. Eulert

Courses: Range Management Practices, Ranges and Range Plants, Range Renovation Practices, Field Evaluation of Range Types, Grazing Influences and Practices, Range Surveys, Watershed and Recreational Demands on the Range Resource, Range Policy and Administration, Range Measurements, Renovation Problems and Techniques, Range Nutrition, Applied Range Production

In **1980**, students could obtain a Bachelor of Science Degree in Agriculture with a major in either Animal Science or Range Science. Both majors provided the same general training as was described for 1970 but beginning in 1978, students would select a Production Option or a Science Option within the Major. A Master of Science Degree was available in both Animal Science and Range Science. (27)

The Animal Science, production option, prepared students for careers in livestock production and related careers such as feedlot management, stock buying and evaluation. The Animal Science, science option, stressed more technical aspects and prepared students for graduate school or careers in research.

Faculty: R. L. Blackwell, J. C. Boyd, M. L. Burris, J. Drummond, A. M. El-Negoumy, O.O. Thomas, J. R. Dynes, C.W. Newman, A.F. Beeckler, P.J. Burfening, K.L. Colman, E.L. Moody, B.R. Moss, L.C. Gagnon, E.P. Smith, J. M. Bryant (Extension), R. M. Brownson (Extension), D. D. Kress, R. W. Whitman, R. P. Ansotegui

Courses: Equitation, Artificial Insemination, Struggle for Food, Livestock Evaluation, Meats, Feeds and Feeding, Horse Management, Poultry Production, Meat Animal and Carcass Evaluation, Principles of Animal Nutrition, Animal Nutrition and Feeding, Physiology of Gestation, Lactation and Growth, Physiology of Reproduction, Animal Genetics, Sheep Production, Beef Production, Wool Evaluation, Dairy Production, Physiology of Gestation, Commercial Feeds and Feeding, Wool and Wool Industry, Computerized Beef Selection, Swine Production, Beef Cattle Management, Ruminant Nutrition, Non-Ruminant Nutrition

The Range Science, production option, was designed to fulfill the needs of students who intended to operate range livestock ranches or seek employment in fields closely related to the

direct production of range livestock. The Range science, science option emphasized more technical aspects and prepared students for graduate school or careers in research.

Faculty: J.E. Taylor, Carl Wambolt (Extension), Brian W. Sindelar

Courses: Principles of Range Resource Management, Range Vegetation, Range Biomes, Range Ecosystem Functions, Range Renovation and Improvement, Western Range Ecosystem, Range Analysis, Range-Wildlife Relationships, Resource Policy and Administration

In **1990** students could obtain a Bachelor of Science Degree in Animal Science with a Production and Management Option or a Science and Technology Option. A Bachelor of Science in Range Science was also available. Also available was a Master of Science Degree in Animal Science and Master of Science Degree in Range Science. (34)

The Animal Science curriculum was designed to prepare students for careers in livestock production, related agriculture business, animal research or public service. The Animal Science, production and management option, stressed the applied aspects of animal science and prepared students for careers in production agriculture. The Animal Science, science and technology option, was designed for students interested in research and was recommended for those considering graduate school. Dairy Production was no longer offered in the department so students interested in this field were encouraged to participate in the National Student Exchange after taking a few specific classes offered in Animal and Range Sciences.

Faculty: C.W. Newman, P.J. Burfening, L.C. Gagnon, J. M. Bryant (Extension), R. M. Brownson (Extension), D. D. Kress, R. P. Ansotegui, A. C. Linton, W. F. Gipp, V.M. Thomas, J. G. Berardinelli, D.G. Gray, R.W. Kott, M.K. Peterson, T.W. Wolfe

Courses: Animal Science in Agriculture, Equitation, Artificial Insemination, Strategies for Global Hunger, Animal Production Technology, Live Animal and Carcass Evaluation, Meats, Feeds and Feeding, Colt Breaking and Training, Recreational Horse Management, Meat Animal Growth and Development, Fundamentals of Animal Nutrition, Applied Animal Nutrition, Physiology of Reproduction, Animal Genetics, Principles of Animal Breeding, Sheep Production and Management, Beef Production, Horse Production and Management, Endocrine Physiology, Wool and Wool Industry, Computerized Beef Selection, Pork Production and Management, Beef Cattle Management, Ruminant Nutrition.

The Range Science degree allowed students to acquire an understanding of grazing, wildland recreation and other land uses within the framework of total resource management. The degree prepared students for careers with land management agencies, range livestock production, land resource consulting, land reclamation operations and general agriculture.

Faculty: J.E. Taylor, Carl Wambolt, Brian W. Sindelar, K. M. Havastad, C.B. Marlow, J.R. Lacey

Courses: Rangeland Management, World Rangelands and Rural Societies, Range Vegetation, Range Biomes, Range Ecology, Range Improvement Practices, Western Range Ecosystems, Grazing Influences and Management, Range Animal Nutrition, Range Analysis, Range-Wildlife Relationships, Resource Policy and Administration.

The undergraduate and graduate program in the Land Reclamation Unit was revised during this time. Abused Land Rehabilitation, was initiated in 1993 and became very popular because of good job placement. When the College of Agriculture reorganized in 1998 the Reclamation

Research Unit was moved to a new Department of Land Resources and Environmental Sciences. (41)

In **2000**, students could obtain a Bachelor of Science Degree in Animal Science with a Livestock Management and Industries Option or a Science Option. A Bachelor of Science in Range Management was also available. Also available was a Master of Science Degree in Animal and Range Science. (28) The Doctor of Philosophy in Animal and Range Sciences was first offered in 2002 with either an Animal Science or Range Science emphasis.

The Animal Science, Livestock Management and Industries Option, stressed the applied aspects of livestock production, incorporating courses in agricultural economics and business. The coursework choices were designed to prepare graduates to manage livestock enterprises or for employment with companies producing or marketing livestock, animal feeds and health products or for employment with communication and service organizations such as breed associations, commodity groups, livestock publications and government agencies.

The Animal Science, Science Option emphasized greater depth in the basic sciences and was designed for students who had an interest in graduate training or professional school.

Faculty: R. P. Ansotegui, J. G. Berardinelli, J. A. Boles, J. G. Bowman, P. J. Burfening, R. N. Funston, L. C. Gagnon, W.F. Gipp, P. G. Hatfield, R. W. Kott, D. D. Kress, J. A. Paterson, M. W. Tess, T. W. Wolfe.

Courses: Introduction to Animal Science, Western Equitation, Today's Livestock Industry, World Food, Colt Breaking and Training, Animal Packing, Applied Techniques- Swine, Applied Techniques- Sheep, Applied Techniques- Beef Cattle, Applied Techniques- Horses, Meat Science, Animal Nutrition, Reproductive Physiology, Principles of Animal Breeding, Swine Production, Assisted Reproductive Technologies, Sheep Management, Beef Cattle Management, Feedlot Management, Nutrient Metabolism of Domestic Animals, Range Nutrition Techniques

The Range Science degree allowed students to acquire an understanding of grazing and other land uses within the framework of total resource management. The degree prepared students for careers with land management agencies, range livestock production, land resource consulting and general agriculture.

Faculty: S. D. Cash, P. B. Hook, J. E. Knight, C. B. Marlow, J. C. Mosley, B.E. Olson, B. F. Sowell, G. W. Surber, C. L. Wambolt.

Courses: Principles of Rangeland Management, Range Livestock Production, Range and Pasture Monitoring, Principles of Natural Resource Ecology, Rangeland Field Ecology and Management, Riparian Ecology and Management, Range Vegetation, Range Biomes, Grazing Management and Improvements, Range-Wildlife Relationships, Rangeland Resource Measurements, Conflict Resolution in Natural Resource Management, Range Nutrition Techniques Range Ecosystem Measurements, Range Ecophysiology, Riparian Processes and Functions.

In **2010** the Animal and Range Sciences Department offered a Bachelor of Science Degree in Animal Science and a Bachelor of Science Degree in Natural Resources and Rangeland Ecology. The B.S. in Animal Science provided a choice of 3 Options: Equine Science Option, Livestock Management and Industry Option and the Science Option. The B.S. in Natural

Resources and Rangeland Ecology had choices of Rangeland Ecology and Management Option, and Wildlife Habitat Ecology and Management Option. Also available was a Master of Science Degree in Animal and Range Sciences and the Doctor of Philosophy in Animal and Range Sciences with either an Animal Science or Range Science emphasis.

For undergraduates, the Animal Science, Equine Science Option, emphasized science and technology combined with practical aspects of management, horsemanship and training. This program prepared students for employment in breeding, nutrition, and management of facilities and land, as well as the allied industries such as sales, feed, tack and equipment.

The Animal Science, Livestock Management and Industries Option, stressed the applied aspects of livestock production, incorporating courses in agricultural economics and business. The coursework choices were designed to prepare graduates to manage livestock enterprises or for employment with companies producing or marketing livestock, animal feeds and health products or for employment with communication and service organizations such as breed associations, commodity groups, livestock publications and government agencies.

The Animal Science, Science Option emphasized greater depth in the basic sciences and was designed for students who had an interest in graduate training or professional school.

Faculty: J. G. Berardinelli, J. A. Boles, J. G. Bowman, W.F. Gipp, P. G. Hatfield, R. W. Kott, J. A. Paterson, R. L. Endecott, S. J. Moreaux, A.E. Shockley, G. Johnson,.

Courses: Introduction to Animal Science, Western Equitation, Equine Nutrition, Horse Management, English Equitation, Equine Lameness, Equestrian Instruction, Equine Form to Function, Equine Reproduction, Colt Breaking and Training, Applied Techniques- Swine, Applied Techniques- Sheep, Applied Techniques- Beef Cattle, Applied Techniques- Horses, Meat Science, Meat Processing, Muscle and Growth Biology, Meat Evaluation, Animal Nutrition, Reproductive Physiology, Principles of Animal Breeding and Genetics, Swine Production, Assisted Reproductive Technologies, Sheep Management, Beef Cattle Management, Diseases of Domestic Livestock, Veterinary Entomology, Calving Management, Livestock Evaluation, Beef Cattle Nutrition, Ruminant Nutrition, Nutrient Metabolism of Domestic Animals.

The Natural Resources and Rangeland Ecology, Rangeland Ecology and Management Option was designed to emphasize management of rangeland environments. This option trained students for employment with land management agencies as well as private industry or graduate school. The Natural Resources and Rangeland Ecology, Wildlife Habitat Ecology and Management Option provided students with a broad background in wildlife habitat, rangeland ecology, and wildlife livestock interactions. These students were prepared for employment in private industry, government agencies, or graduate school.

Faculty: S. D. Cash, J. E. Knight, C. B. Marlow, J. C. Mosley, B.E. Olson, B. F. Sowell, C. L. Wambolt, M. Frisina.

Courses: Natural Resource Conservation, Range Livestock Production, Range and Pasture Monitoring, Natural Resource Ecology, Riparian Ecology and Management, Vegetation of Western Wildlands, Montana Range Plants, Biomes of Western Wildlands, Grazing Management and Ecology, Range Ecophysiology, Riparian Processes and Functions, Nature of Yellowstone, Small Pasture Management, Wildlife-Livestock Range Nutrition, Grazing Ecology

and Management, Fire Ecology and Management, Wildlife-Livestock Habitat Restoration, Wildlife Habitat Management, Wildlife Habitat Ecology, Habitat Inventory and Analysis.

In **2016,** the Animal and Range Sciences Department offers a Bachelor of Science Degree in Animal Science and a Bachelor of Science Degree in Natural Resources and Rangeland Ecology. The B.S. in Animal Science provides a choice of 3 Options: Equine Science Option, Livestock Management and Industry Option and the Science Option. The B.S. in Natural Resources and Rangeland Ecology have Options of Rangeland Ecology and Management Option, and Wildlife Habitat Ecology and Management Option. Also available is a Master of Science Degree in Animal and Range Sciences with an Animal Science Emphasis, a Range Science Emphasis or a Biology Emphasis. The Doctor of Philosophy degree is available in Animal and Range Sciences. (49)

For undergraduates, the Animal Science, Equine Science Option, emphasizes science and technology combined with practical aspects of management, horsemanship and training. This program prepares students for employment in breeding, nutrition, and management of facilities and land, as well as the allied industries such as sales, feed, tack and equipment.

The Animal Science, Livestock Management and Industries Option, stresses the applied aspects of livestock production, incorporating courses in agricultural economics and business. The coursework choices are designed to prepare graduates to manage livestock enterprises or for employment with companies producing or marketing livestock, animal feeds and health products or for employment with communication and service organizations such as breed associations, commodity groups, livestock publications and government agencies.

The Animal Science, Science Option emphasizes greater depth in the basic sciences and is designed for students who have an interest in graduate training or professional school.

Faculty: J. G. Berardinelli, J. A. Boles, J. G. Bowman, P. G. Hatfield, R. L. Endecott, S. J. Moreaux, A.E. Shockley, C.Yeoman, J. M. Thompson, T. Murphy, H. DelCurto, M. Van Emon, W. Stewart, G. Johnson, C. Tharp, T. Murphy

Courses: Introduction to Animal Science, Western Equitation, Equine Nutrition, Horse Management, English Equitation, Equine Lameness, Equestrian Instruction Methods, Equine Form to Function, Equine Reproductive Management, Horses: Ground Level, Starting Colts, Developing the Young Horse, Equine Ethology: Understanding Horse Behavior, Equine` Exercise Physiology Livestock Management-Sheep, Livestock Management- Beef, Meat Science, Meat Processing, Muscle and Growth Biology, Meat Evaluation, Animal Nutrition, Reproductive Physiology, Principles of Animal Breeding and Genetics, Assisted Reproductive Technologies, Sheep Management, Beef Cattle Management, Diseases of Domestic Livestock, Veterinary Entomology and Parasites, Calving Management, Livestock Evaluation, Beef Cattle Nutrition, Ruminant Nutrition, Nutrient Metabolism, Livestock in Sustainable Systems, Anatomy and Physiology of Domestic Animals, Physiology of Animal Reproduction, Professional Development in Beef Production Systems, Professional Development in Beef Feedlot Systems .

The Natural Resources and Rangeland Ecology, Rangeland Ecology and Management Option is designed to emphasize management of rangeland environments. This option trains students for employment with land management agencies as well as private industry or graduate school. The Natural Resources and Rangeland Ecology, Wildlife Habitat Ecology and Management Option provides students with a broad background in wildlife habitat, rangeland ecology, and

wildlife livestock interactions. These students are prepared for employment in private industry, government agencies, or graduate school.

Faculty: C. B. Marlow, J. C. Mosley, B.E. Olson, B. F. Sowell, C. L. Wambolt, M. Frisina, L. B. McNew, E. Glunk, C. Carr

Courses: Natural Resource Conservation, Range and Pasture Monitoring, Natural Resource Ecology, Riparian Ecology and Management, Montana Range Plants, Biomes of Western Wildlands, Riparian Processes and Functions, Small Pasture Management, Forages, Wildlife-Livestock Nutrition, Grazing Ecology and Management, Fire Ecology and Management, Wildlife-Livestock Habitat Restoration, Wildlife Habitat Ecology, Habitat Inventory and Analysis, Rangeland Ecology Theory and Application, Yellowstone Wildlife Habitat Ecology, Rangeland Wildlife Ecology and Management, Natural Resource Law, Range and Wildlife Policy and Planning, Forages, Vegetation of Western Wildlands, Wildlife Habitat Measurement

APPENDIX B

BUILDINGS AND FACILITIES

When the college first opened in 1893, there were no office or laboratory buildings on campus, so Experiment Station Director Emery and Agriculture faculty Luther Foster and W. L. Williams were housed and officed in the Bozeman High School. Students had classes in Bozeman Academy building and some of the rooms in the new Bozeman High School. These buildings were only a few hundred feet apart.

The first buildings on campus for both the College and the Experiment Station were an assortment of structures built on land from the City of Bozeman's poor farm, a few log cabins and small outbuildings.

Although funds from the Morrell Act (which created the Land Grant University system) could not be used for badly needed buildings, funds from the Hatch Act (which created the Agriculture Experiment Station system) could be used for buildings. Buildings were supposed to be used for Experiment Station purposes but were, for several years, also used as classrooms. Campus in 1894 was composed exclusively of Experiment Station buildings that included a poultry house, a granary and a barn. The most noteworthy building was a $3,516 brick Experiment Station building which is today known as Taylor Hall and located just south of today's Linfield Hall. (1)(3)

The Dairy Building, constructed in 1902, was a 2-story frame structure with a 1-story wing. This contained a butter and cheese-making room, offices, store rooms, a milk-testing lab and classrooms. The dairy barn was remodeled in 1922 and a separate milk cooling and storage room was constructed. (55) The Dairy Building was west of what is now 11th Street and was located where Howard Hall now stands. It was where many of the Animal Industry classes were taught. The Dairy Department used this facility until the new dairy was built just south of West College Street in 1958. In 1959 the old dairy barn was used to house a museum which became the Museum of the Rockies when it moved to its current location.

The Cattle Barn was built in 1903 and was a 2-story frame building with extended wings. One wing was used for dairy cows and breeding stock and the other for breeding bulls, young stock and calves. A 40 square foot stock-judging room was between the wings. The second story was used for storage of hay. The Cattle Barn was also west of 11th Street.

Support from the Montana legislature, federal funds and private contributions soon improved the building situation for animal science. By 1905, just 12 years after the start of the college, buildings and facilities for teaching and research in animal science was much improved. Much of the Experiment Station Building (now Taylor Hall) was used by animal scientists for laboratory work and classrooms.

The Horse Barn, built in 1909, was a 2-story building that could accommodate 13 horses with room for feed storage. The Horse Barn was west of today's Taylor Hall.

Horse barn, 1911. (MSU Library Photo Collection)

Sheep barn, 1911. (MSU Library Photo Collection)

The Piggery, also built in 1909, had a main building with 2 wings. The main building had feeding rooms and a slaughter room and the wings provided 12 pens. (10)

The Poultry Buildings were constructed in 1910 and included a main building with 20 pens and yards 100 feet on a side, a brooder house, an incubation cellar and a feed room. They were located just south of today's Taylor Hall.

Poultry barns about 1930. (MSU Library Photo

Animal science complex about 1930. Notice Linfield, Taylor and Montana Halls in the background. **(MSU Library Photo Collection)**

The livestock building complex was located on the west side of 11th Street where Howard Hall now stands across from the pond. Most of the livestock complex was west and south of Howard Hall.

Throughout the years some improvements were made to buildings and grounds to facilitate teaching and research needs. In 1959 the swine production unit was able to market 1000 pigs annually. Cleaning could be done by tractor and an auger system completely mechanized the feeding. (53)

With the exception of the dairy, these buildings were occupied until 1968 when the Facilities were moved to the Towne Farm west of 19th Street. The Towne Farm is today known as the BART Farm (Bozeman Agricultural Research and Teaching Farm). (41)

A new Dairy Center was built 1 mile west of campus (today's BART Farm) in 1959 at a cost of $1.8 million. (1) The old facility, built in 1903, no longer offered the research and teaching facilities needed to do the job. The new Dairy Center had 17 buildings, 2 bunker silos, and yards covering 3 acres. It could handle a milking herd of 100 cows plus dry stock, heifers and bulls. The new facility had a light-controlled, soundproof observation room so visitors could observe without disturbing the cows. Cows were milked 3 at a time in about 5 minutes. (52)

Agricultural Hall (Linfield Hall) was built in 1908. At the time there were only three significant brick structures on campus. The construction of Agricultural Hall was the first constructed with 20th century techniques, such as the use of concrete, and cost $80,000 to construct.

Cheese-making lab in Linfield Hall. **(MSU Library Photo Collection)**

In 1956 an addition (costing $382,000) was built onto the south end of Linfield Hall (then called Morrill Hall) and the addition housed the Animal Industry Department and the Range Management Department on the second floor. The Dairy Industry Department and the Poultry Department were primarily on the first floor. (1) This area housed the Animal and Range Sciences Department until the move to the Animal Bioscience Building in 2010.

The Meats Lab located on the far west side of Linfield Hall was also built in 1956. It included a laboratory with a kill floor, 3 coolers, 2 walk-in freezers and a large cutting room. This facility provided for study and training in meat processing from slaughter to cutting and freezing. This lab is still in use today.

The Montana Wool Laboratory was created by the 1945 Legislative Assembly. It was built in 1947 and was 1 of only 3 such labs in the country at that time. It was incorporated into the Department of Animal and Range Science in the 1980's.

In the early days, the lab supplied basic information for selling a wool clip based on its merits. The laboratory's primary functions included research, service and education. One of only two research wool labs in the United States, this building housed the most advanced technological equipment for measuring fiber diameter. The Montana Wool Lab has been instrumental in improving Montana's wool quality and continues to educate students and growers on the economic and environmental benefits of sheep.

The Montana Wool Laboratory's purpose was to support MSU Sheep Extension, research, and teaching efforts. In addition, research projects associated with objective measurement of wool were conducted. This laboratory still collaborates with many scientists throughout the west concerning wool aspects of their research activities. Cooperative work is currently being conducted with the University of Nevada, the U.S. Sheep Station of Dubois Idaho and University of Minnesota.

The Montana Wool Lab was established for the following purposes: 1. **Service--** Sampling, testing and scouring wool clips and fleeces of Montana Wool Growers to ascertain yield (shrinkage), strength, fineness, length of staple, uniformity and character of wool. 2. **Research**--Conducting scientific and practical research for the purpose of obtaining knowledge of Montana wool industry and wool pools to increase wool income to the producer by the use of value-added and marketing strategies. 3. **Education--** Develop complete and accurate knowledge of Montana wools to conduct wool schools; teach within the sheep production/practicum classes at the collegiate level; offer workshops within the 4-H, FFA and local communities; and institute field service.

The Towne Farm

In 1955, the Montana State University Agricultural Experiment Station was authorized by the State Board of Education to use Morrill Act Funds to purchase farmland west of the MSU campus. This land was purchased from Norman L. Towne and Lola L. Towne for $56,000. The warranty deed states: "Party of the second part (MSU/MAES) agrees that so long as said lands are used as a farm in connection with the Agricultural Experiment Station of Montana State College that the same shall be named and designated Norman L. Towne Experiment and Research Farm". The Towne Farm is today known as the BART Farm (Bozeman Agricultural Research and Teaching Farm).

In 1968, the cattle, horse and swine work was moved from the main campus to their present location west of campus on what was then known as the Towne Farm. This move to the new livestock facilities was a difficult one because of lack of sufficient funds to complete the livestock facilities to the point where they would simply house animals. This was a period of fairly high inflation and from the time that the money was

appropriated, inflation had eaten into the budget. Slotted floors could not be put into the swine barn and there were few pens inside for pigs. Gravel parking was not available so vehicles were constantly getting stuck in the mud. No outside pens for swine were constructed and no concrete slabs were there for outside housing. The nutrition center could not be completed and the beef cattle facility lacked fencing. The feed mill was just a shell of a building with no bins in it. All of the additional improvements had to come from work funds thus reducing the research effort. (41)

The Livestock Pavilion was built in 1968 as part of the move of animal buildings from the main campus. In 1979 it was renamed the Robert W. “Bob” Miller Pavilion in honor of Bob Miller who was on the Animal and Range Sciences faculty until his death due to a horse accident in 1974. Bob started the horse management and equitation classes in the department. He started the horseshoeing school and helped to design the pavilion. The Miller Pavilion is 100’ X 220’ and is insulated and heated. The pavilion is used for labs in horse management, equitation classes, livestock judging, horse shows and rodeo practice.

The C.H. Perry Swine Center was on approximately 5 acres. It was a farrow to finish combined confinement and open lot facility. It was a swine test station until the program was discontinued (1971-1993). The swine center was described in a 1995 report as: “The facility consists of an environmentally regulated confinement barn constructed in mid-1960, a naturally ventilated confinement finisher barn constructed in 1971, an open front naturally ventilated boar test building constructed in 1980, 6 individual farrowing units constructed in the mid 1980’s and 22 dirt lot pens for housing the breeding herd and overflow finisher hogs. There is also an office area, small classroom, feed storage areas, and bulk grain and feed storage bins. Farrowing room is a 30’X 35” space in the main barn housing 15 farrowing crates (5’ X 8’) with slotted floors over collection pits. Six farrowing units with a 6’x’ hutch and 8’x8’ outside pens. Nursery room is 30’x35’ in main barn housing 120 head in 12 pens with slotted floors and collection pits. Grower-finishing room is 15’x105’ in the main barn housing 80 head in 20 pens. Having 75% slotted floors and collection pits. Finisher barn is 4 pens for 48 head with slotted floor constructed in 1971 by Montana Pork Producers. Boar test building is an open front with 12 pens and constructed in 1980.” (43)

The Swine Center was closed in 1995 due to budget constraints and was not reopened because of environmental concerns.

The Oscar Thomas Nutrition Center was built in 1967-68. Along with the laboratory facility there was an environmentally controlled metabolism room for small and large animals. There was also an attached barn with four individual pens. The Livestock Research and Teaching Center had a research feedlot, Calan gate facility, feedmill, and artificial insemination building. Surrounding pastures and hayfields supported the animals housed there.

Research focused on swine, beef and dairy cattle, horse, poultry, and sheep nutrition. The current focus is research with horse nutrition, barley feedlot research, feedlot and grazing animal behavior, extension programs, student training in research techniques, educational demonstrations and tours. Facilities in 1995 included 2 fully equipped wet chemistry laboratories (800 sq. ft. each), 2 instrument rooms, a microcomputer room and sample preparation room and a staff office.

The Horseshoeing School (now known as the Montana State University Farrier School) was established in 1970. The facility has a blacksmith shop (30 X 50 feet) including forge area, bathroom/locker room, supply welding room, 8 gas forges, 5 coal forges and workspace for 7 horses indoors. Classroom (20 X 20 ft.) and office building. Holding pen. Outside work area to accommodate 12 horses and stocks for draft horses.

The Beef Center consists of 2 barns, 4 small pens with concrete feed bunks. The main barn is the center of operations for the Towne Farm.

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Fort Ellis

The first off-campus facilities were built at Fort Ellis, just east of Bozeman.

On May 7, 1909 Governor Norris appointed Experiment Station Director Linfield as Custodian of Ft. Ellis which had been abandoned by the army.

It had been used for cattle research until 1921 when the cattle were replaced by 380 head of Rambouillet ewes. Within a few years there were 500-600 head of sheep on the 640 acre tract.

The federal government officially turned Ft. Ellis over to the Experiment Station in 1923. (42) The Montana Legislature approved State Concurrent Resolution No.13, which said Fort Ellis Military Reservation would be transferred “to the Agricultural Experiment Station of Montana for use in carrying on experimental work in agriculture in accordance with the several legislative enactments providing for the establishment and control of said Agricultural Experiment Station”.

In 1930 Fort Ellis farm was dedicated as the headquarters for the range sheep investigations conducted by the Montana Agriculture Experiment Station. A power line was extended to provide electricity at Ft. Ellis; a water system was completed with an automatic electric pump with pressure tank and pipe lines leading to all buildings and winter feed lots and ground was prepared for shelter belts.

Red Bluff Research Ranch

The Red Bluff Research Ranch located at Norris, MT, approximately 40 miles west of Bozeman, occupies most of the once thriving late 19th-early 20th century gold mining community in the Hot Springs Mining District which was second only in gold production to Alder Gulch. The ranch nearly surrounds the town of Norris. The founder of Norris, Alexander Norris may have owned much or all of the Red BIuff Ranch at one time.

In 1956, the Red Bluff Research Ranch (previously known as the Rowe Brothers Ranch) was purchased for $164,000 ($16.83 per acre). The total acreage was 9,746. Two U. S. Forest Service Grazing Permits (Muddy Greek, Cache Creek) in the Gallatin National Forest came with the Rowe property. Some small additional land exchanges and purchases have taken place over the last 45 years. The grazing permits were returned to the Forest Service in 1976.

A new lambing facility and mixing barn at the ranch was constructed in about 1990. New cattle working facilities were built in 2005 with new handling facilities, with a Silencer squeeze chute and corrals, built in 2011. New shop and housing facilities were built in 2010.

There are currently about 170 head of cattle and 900 head of sheep maintained on a year round basis at the research ranch. These livestock along with the range areas are used for both teaching and research. (41)

Bandy Experimental Ranch

The Bandy Ranch was a 1,437 acre operating cattle ranch located in the Blackfoot River drainage, 50 miles northeast of Missoula, Montana. In 1993 the Montana Forest and Conservation Experiment Station of the University of Montana, Missoula, entered into an agreement with the Agricultural Experiment Station at Montana State University, Bozeman to conduct joint operations and cooperative research on the property. The ranch is comprised of 1,827 acres of timberland, 1,226 acres of native pasture and water which includes a 50 acre reservoir, and 384 acres of irrigated hay land. Past research on the ranch included; analysis of riparian-wetland vegetation; effects of wildlife and livestock grazing on riparian areas; effects of early spring elk use on summer livestock pastures; and studies of wildlife fencing techniques for livestock.

The Bandy Ranch is now being operated entirely by the University of Montana. The Animal and range Sciences Department currently has no projects being conducted at the facility.

APPENDIX C

ASSOCIATED PROGRAMS IN ANIMAL AND RANGE SCIENCES

The Montana Nutrition Conference

Although the name has changed from the Montana Nutrition Conference to the Montana Livestock Nutrition Conference to today's Montana Nutrition Conference and Livestock Forum, for 67 years the Department of Animal and Range Sciences has partnered with the Montana Feed Association to present this annual conference as a forum to present new information and discussion on nutrition and feeding. The conference is directed at professionals in livestock production, feed manufacturing and other areas of animal science. Dr. Oscar Thomas was chairman of the conference from 1953 until his death in 1986 when Dr. Roger Brownson took over. Roger chaired until his retirement in 1996. Dr. John Paterson was chairman from 1996 through 2011. Dr. Rachel Endecott is the current chair.

Ag Lenders Range School

Professor Don Ryerson, Mr. Bob Ross, and several agricultural lenders started the Ag Lender Range School in 1964. The first school, held at the Northern Research Station near Havre, was attended by about 15 people. The original intent was to meet and study range management in an environment free of telephones, paperwork, and office interruptions. Hands-on learning in an outdoor classroom was the preferred approach to understanding the relationship between range condition and the economics of range livestock operations.

The Animal and Range Sciences Department, Montana's Extension Service, Soil Conservation Service and occasionally personnel from other federal and state agencies provided the formal instruction at the schools. The school is still held each summer.

Undaunted Stewardship

A voluntary program started in 2001 providing a balance between land productivity, preservation, and recreational use. The program is a partnership between Montana State University, Montana Stockgrowers Association, and the Bureau of Land management. In the program farms and ranches become certified as Undaunted Land Stewards. The program aims 1) to demonstrate that sustainable agriculture and environmental principles can be compatible and, 2) to inform landowners, policy

makers, urban citizens and others about the ways incentive based approaches can be used to sustain and enhance the environment. By 2010 Undaunted Stewardship had 66 ranches totaling over 1,000,000 acres under certification.

Montana Beef Network

This program provided a systems approach to raising feeder calves.

Beef Quality Assurance (BQA)

This program was administered through the Animal and Range Sciences Department and provided training and a supply train management approach to the beef industry for the ranch, feedlot and packing plant. BQA linked beef producers with livestock production specialists, veterinarians, nutritionists, marketers, animal health companies, and food purveyors interested in improving the quality of beef in the US.

Farrier School

In 1971 the Horseshoeing School was started by Professor Bob Miller and Jack Catlin a local veterinarian and still operates today as the MSU Farrier School. The school receives no state funding and is supported entirely with student fees. The school offers a 16-week program designed specifically for those who wish to pursue careers as farriers. This professional course provides students with the opportunity to obtain a solid background in the field of farrier science through the application of sound principles in a practical hands-on setting. Students have the opportunity to obtain the knowledge and develop the skills necessary to establish their own practice, qualify for licensing at major race tracks, and prepare for the American Farrier Association Certification exam. Further study in an advanced class is also offered. The Animal and Range Sciences Department at Montana State University sponsors the Farrier School.

The first instructor was Scott Simpson. Tom Wolf was instructor from 1979-2012. Bryce Kawasiki is the current instructor.

Steer-a-Year Program

Steers are donated to the MSU Steer-a-Year program by private producers. These steers are used for several classes at MSU and sold when finished. This gives students an opportunity for hands-on experience in feeding cattle, and feedlot management.

Collegiate Cattlewomen

The Collegiate Cattlewomen's organization is open to women enrolled at MSU who are interested in the future of beef, agriculture, and their communities. Their goals include public education and promotion of the business of agriculture. The club also assists Montana Cattlewomen and the Montana Beef Council in their efforts to promote the welfare of the beef industry.

The club has three main projects: "The Perfect Cheeseburger" where a short presentation is given to an elementary class, a campus beef promotion in which they hand out beef samples and answer questions, and an educational forum where guest speakers present current topics within the beef industry. Members also attend national and state conventions, have fundraisers, BBQ's, and much more. The club offers women an opportunity to expand their communication and leadership skills while working with their peers to educate the community.

Collegiate Stockgrowers

Collegiate Stockgrowers at Montana State University is a committee within the Montana Stockgrowers Association designed to develop collegiate students into tomorrow’ s leaders. This is a place for young ranchers and supporters of the beef industry to get together, share ideas, promote the industry, and have fun!

Membership is open to all students if they pay dues of ten dollars per year and are a student in good-standing at Montana State.

Horseman’s Club

The Horseman's Club is about networking horse people and non-horse people alike, while having an option to be a member of the MSU IHSA Equestrian Team. Through the Intercollegiate Horse Show Association team, riders of all levels compete against schools in Montana, Idaho, and Utah. The Horseman’ s Club welcomes any and all students interested in horses. Ownership of a horse is not required. Club activities include movie nights, bowling nights, fundraisers, and demonstrations by equine experts throughout the Gallatin Valley.

Intercollegiate Horse Show Association

The Intercollegiate Horse Show Association (IHSA) team travels and competes throughout Montana, Idaho, and Utah in four disciplines, Hunt Seat Equitation, Equitation Over Fences, Western Horsemanship, and Reining.

Livestock Judging

Students involved in livestock judging learn how to sharpen their decision making and communication skills, and gain knowledge about a wide variety of segments of the livestock industry in different parts of the country. Livestock Judging Team members have the opportunity to travel to different National Livestock Judging Contests, and through judging, students learn valuable skills that they will use for the rest of their lives.

Meat Judging

The MSU Meat and Meat Processing Center is a state-inspected facility with the capability for processing meat animals. It has much of the equipment necessary for sausage and ham manufacturing. In addition, there is a chemistry laboratory for analysis of a wide range of physical and chemical properties of meat. Students learn to cut carcasses and manufacture sausages and ham in this facility. The MSU Meat Lab also supports the Meats Judging Team and provides hands-on experience for students interested in meat and carcass evaluation.

Range Management Club

The Range Management Club is open to any student who is interested in range ecosystems and the principles of their management. This club has close ties to the International Society for Range Management. Functions include sponsorship of an Undergrad Range Management Exam Team (URME), and an International Range Plant Identification team; promotion of guest speakers that are controversial, entertaining, and informative; and field trips. We also support a variety of social functions.

Students interested in Range Science should try out for the competitive Range Plant Identification Team and the Undergraduate Range Management Exam Team. These teams are sent to represent MSU at the annual contests held in conjunction with the annual International Society for Range Management Convention.

APPENDIX D

ANIMAL AND RANGE SCIENCES FACULTY

Luther Foster, Agriculturist. 1893-1896

W.L. Williams, Veterinarian. 1893-1896

F.W. Traphagen, Chemist. 1893-1903

Frank Beach, Agriculturist. 1896-1898

E. V. Wilcox, Biologist. 1896-1899

Robert Shaw, Agriculturist.1898-1902

Henry C. Gardener, Poultry. 1899-1903

F. B. Linfield, Agriculture, Experiment Station Director, College of Agriculture Dean. 1902-1937

W. J. Elliot, Dairying, Department Head. 1903-1909

James Dryden, Poultry, Department Head. 1904-1905

Robert W. Clark, Animal Husbandman. 1907-1915

J. Oscar Tretsven, Animal Husbandman, Extension Dairy Specialist. 1909-1956

Harvey P. Griffin, Animal Industry. 1909

W. J. Taylor, Veterinarian. 1909-1913

R. C. Jones, Professor of Dairying. 1909-1910

William F. Schoppe, Poultryman, Head Poultry Department. 1909-1923

R. F. Miller, Animal Husbandman. 1910-1915

Howard Welsh, Veterinarian. 1913- 1951

W. J. Hartman, Extension Livestock Specialist. 1914

P. N. Flint, Animal Husbandman, Department Head. 1914-1915

R. R. Dodderidge, Animal Husbandman. 1915-1916

Clare N. Arnett, Animal Husbandman, Department Head. 1915-1925

W. E. Joseph, Animal Husbandman.1916-1931

Robert C. McChord, Animal Husbandman. 1919-1929

Richard B. Miller, Extension Livestock Specialist. 1920-1923

R. L. Smith, Extension Poultry Specialist. 1920

Harriette E. Cushman, Extension Poultry Specialist. 1921-1950

W. J. Hall, Veterinarian. 1921-1924

A. L. McMahon, Animal Husbandman. 1922

E. J. Haslerud, Animal Husbandman. 1922

George P. Goodearl, Poultryman. 1922-1925

J. A. Nelson, Dairy Industry, Department Head. 1922-1961

Robert L. Wadell, Extension Livestock Specialist. 1923-1928

Erwin Jungherr, Veterinarian. 1924-1930

Louis Vinke, Animal Husbandman, Department Head. 1925-1933

George Ford, Poultry. 1925-1927

H. W. Vaughan, Animal Husbandman, Department Head. 1927-1930

D. E. Richards, Extension Livestock Specialist. 1928-1932

Ross H. Miller, Animal Husbandman. 1929

W. F. Dickson. Animal Husbandman. 1930-1936

Frank Barnum, Animal Husbandman. 1930-1936

I. M. C. Anderson. Extension Livestock Specialist. 1932-1937

D. W. Chittenden, Animal Husbandman, Department Head. 1933-1938

Anne Nechanicky, Veterinarian. 1934-1938

Ernest R. McCall, Meat Science. 1936-1943

Howard G. Lewis, Extension Livestock Specialist. 1937-1940

R. T. Clark, Animal Husbandman, Range Management, Department Head. 1938-1947

John N. Cummings, Animal Husbandman. 1939-1941

C. H. Hughes, Animal Husbandman. 1939

Dana W. Whitman, Dairy Industry. 1939-1940

Fred A. Wilson, Animal Industry and Range Management, Department Head. 1939- 1971

G. Curtis Hughes, Animal Industry and Range Management.1940-1947

E. P. Orcutt, Extension Livestock Specialist. 1940-1962

John L. Brence, Dairy Industry. 1941-1960

Arthur C. Kegel, Animal Industry and Range Management. 1941

Olives S. Walsh, Animal Industry and Range Management. 1941

Harold F. Heady Animal Industry and Range Management. 1943-1946

Everett A. Keyes, Dairy. 1944-1968

Francis A. Ralston, Extension Livestock Specialist. 1944-1950

Arne W. Nordskog, Animal Industry. 1944

Carl F. Sierk, Animal Industry. 1944

Gene F. Payne, Animal Industry and Range Management. 1945- 1979

Charles E. Poulton, Range Science. 1946-1947

Russell L Davis, Meat Science. 1945-1949

Everett R Halbrook, Poultry Industry, Department Head. 1946-1956

Thomas B. Keith, Animal Industry and Range Management. 1946

Thomas B. Wadkins, Animal Industry and Range Management, Sheep. 1946-1979

J. Leroy Van Horn, Animal Industry and Range Management. 1947- 1979

James Drummond, Wool Laboratory. 1948-1980

Glen P. Lofgreen, Animal Industry and Range Management. 1948

Ervin Smith, Poultry. 1948-1956

William Burkitt, Animal Industry and Range Management. 1949-1950

Alva E. Flower, Animal Industry and Range Management. 1949- 1973

Ray Johnson, Extension Range Management Specialist. 1949-1951

John Butcher, Animal Industry and Range Management. 1950

Desmond B. Watts, Meat Science. 1949-1951

Oscar O. Thomas. Animal Industry and Range Management, Nutrition. 1952- 1983

N. A. Jacobson, Extension Livestock Specialist. 1952- 1971

Karl G. Parker, Extension Range Specialist. 1952-1962

Farrel A. Branson, Animal Industry and Range Management. 1951-1957

J. R. Dynes, Meat Science. 1951-1984

Arthur S. Hoversland, Animal Industry and Range Management. 1952- 1969

James W. Bassett, Wool Technology. 1952-1962

Raymond R. Hedrick, Dairy. 1954-1960

Edmund Guenther, Poultry, 1954-1960

Robert W. Miller, Animal Husbandry, Equitation. 1957-1974

Donald E. Ryerson, Range Management. 1957-1980

J. C. Boyd, Dairy Industry, Department Head. 1958- 1979

E. P. Smith, Dairy Industry. 1958- 1981

R. K. Bergman, Dairy Industry. 1958

A. O. Jacobs, Extension Dairy Specialist. 1958

Neil C. Quisenberry, Dairy Industry. 1958-1962

George T. Davis, Poultry, Department Head. 1958- 1973

Allen F. Beeckler, Poultry. 1958- 1977

David W. Blackmore, Animal Genetics. 1960-1966

E. J. Peace, Extension Dairy and Swine Specialist. 1960- 1977

L. G. Young, Animal Husbandry. 1962

K. L. Coleman, Wool Technology. 1962-1987

D.D. Gallinger, Wool Technology. 1963- 1964

George M. Van Dyne, Range Management. 1963-1989

A. M. El-Nogoumy, Agriculture Products.1964- 1985

John E. Taylor, Range Science. 1963- 1991

C. Walt Newman, Animal Science, Nutrition. 1964- 1996

Robert L. Blackwell, Department Head. 1966- 1980

M. J. Burris, Animal Science, Genetics.1968- 1987

Burl Winchester, Geneticist. 1968-1971

Peter J. Burfening, Reproductive Physiologist. 1968-2001

Leonard C Gagnon, Animal Science, Equitation, Department Head. 1969- 2009

Ned W. Jefferies, Extension Range Specialist. 1968- 1970

G. K. Eulert, Range Management. 1969-1971

Don D. Kress, Animal Science, Genetics. 1970- 2005

Carl I. Wambolt, Range Management, Extension Range Specialist. 1970-2011

Roger M. Brownson, Extension Livestock Specialist. 1971- 1997

Edward L. Moody, Animal Physiology. Physiology. 1971-1981

Brian W. Sindelar, Range Management. 1971-1991

Frank F. Munshower, Reclamation Research. 1972- 1996

Dennis R. Neuman, Reclamation Research. 1973-2006

Douglas J. Dollhopf, Land Reclamation. 1974-1995

Richard W. Whitman, Beef and Sheep Nutritionist Science. 1975- 1984

Raymond P. Ansotegui, Animal Science. 1976-2000

J. M. Bryant, Extension Dairy Specialist. 1978-1990

Tom W. Wolfe, Farrier Instructor. 1979- 2012

Clayton B. Marlow, Range Science. 1980-Present

Wayne F. Gipp, Extension Swine Specialist, Department Head. 1980- 2009

Rodney W. Kott, Extension Sheep Specialist. 1980-2013

James G. Berardinelli, Animal Science, Reproduction Physiologist. 1981- Present

Buelon R. Moss, Animal Science. Dairy. 1981-1982

Art C. Linton, Department Head. 1982- 1994

W. W. Kezar, Animal Science.1982-1983

J. S. Simpson, Animal Science. 1982-1984

Kris M. Havstad, Range Science. 1981-1988

John R. Lacey, Extension Range Specialist. 1981-1994

Mark K. Peterson, Animal Science. 1984-1991

Verl M. Thomas, Animal Science, Sheep. 1985-1995

Doug G. Gray, Animal Science, Meat. 1985-1990

Michael W. Tess, Animal Science. Department Head. 1988-2009

Bret E. Olson, Range Science. 1990- Present

Robyn W. Tierney, Range Science. 1991-1993

Janice G. Bowman, Animal Science. 1993- Present

John A. Paterson, Animal Science. Department Head, Extension Beef Specialist. 1993- 2012

Bok F. Sowell, Range Management. 1993- Present

Gene W. Surber, Extension Natural Resource Specialist. 1994- 2006

James E. Knight, Extension Wildlife Specialist. 1994- 2014

Paul B. Hook, Range Management, Watershed. 1994- 1998

Jeffrey Mosley, Extension Range Management Specialist. 1995- Present

Patrick Hatfield, Sheep Nutrition and Production. Department Head. 1997- Present

Rick Funston, Extension Beef Cattle Specialist. Miles City. 1998- 2002

Jane Ann Bowles, Meat Science. 1999- Present

S. Dennis Cash, Extension Forage Specialist. 2000-2011

Andrea E. Shockley, Equitation Instructor. 2002-Present

Tracy K. Brewer, Range Science. 2004-2008

Greg Johnson, Extension Entomologist. 2005-Present

Rachel L Endecott, Extension Beef Cattle Specialist. 2006- Present

Tommy Bass, Extension Livestock Environment, 2007-Present

Mike Frisina, Range Management, Wildlife. 2007- Present

Janice Rumph, Geneticist/Breeder. 2006-2008

Shannon J. Moreaux, Equine Science. 2008 – Present

Cecil I. Tharp, Pesticide Education Specialist. 2008- Present

Glenn Duff, Professor and Department Head. 2010-2015

Craig Carr, Rangeland Ecology. 2012- Present

Bryce Kawasaki, Farrier School Instructor. 2012-present

Jennifer M. Thomson, Animal Geneticist. 2012-Present

Carl J. Yeoman, Microbiologist/Microbial Ecologist. 2012- Present

Emily Glunk, Extension Forage Specialist. 2014- Present

Megan Van Emon, Extension Beef Cattle Specialist. 2014 – Present

Hannah DelCurto, Animal Science. 2014- Present

Craig Carr, Rangeland Ecology. 2014- Present

Lance McNew. Wildlife Habitat Ecology. 2014- Present

Whit Stewart, Extension Sheep Specialist. 2015- Present

Thomas W. Murphy, Animal Science. Sheep. 2016-Present

Timothy DelCurto, Range Beef Cattle Production, Endowed Chair. 2016-present

APPENDIX E

ANIMAL AND RANGE SCIENCES FACULTY SKETCHES

Professor Luther Foster, 1893-1896

Luther Foster taught the first animal husbandry courses at the Agricultural College of the State of Montana. Professor Foster's coursework included material about the most prominent breeds of domestic livestock, origins, history, characteristics, merits and defects, adaptability to climates and which breeds would be most suited to Montana. Professor Foster also taught principles of breeding, laws of heredity, causes of variation, formation of breeds, value of pedigree, atavism, crossing and stock selection. In addition to teaching responsibilities.

Luther Foster was an agriculture specialist so he also taught the cropland courses. He had an appointment with the Experiment Station and his first publication was on grain smut and his second was on pig feeding. Professor Foster served as Acting President when the new college opened until A. M. Ryon took over as permanent president later that year. (1)

Professor Robert Shaw, 1898-1902

Professor Robert Shaw taught both animal science and crop science courses. The animal science courses he taught included dairy husbandry, dairying, breeds and breeding, principles of heredity, feeding of animals, care and management of livestock, veterinary anatomy, diseases of animals and animal nutrition.(9) In his capacity with the Experiment Station, Robert Shaw conducted studies on feeding livestock and pork production.

Professor Shaw left in 1902 to go to Michigan State University where he later served a long and distinguished term as president of that institution. (1)

Frederic B. Linfield, 1902-1942

Frederic Linfield was hired for his dairy husbandry expertise but between 1902 and 1906 he conducted studies and published on sheep feeding, steer feeding, poultry management, poultry diseases, feeding pigs and fattening cattle. During his term as Director of the Experiment Station and as the Dean of the College of Agriculture, Linfield secured a great deal of public trust and support for the college. Early on as Experiment Station Director he insisted all experiments be completed before releases were made. He felt it was important to resist pressures for premature endorsement to new developments in agriculture. His early recognition of the importance of rangeland management created support for this new discipline. (11)

Robert W. Clark, 1907-1915

Robert W. Clark was Animal Husbandman for 8 years. During this time he conducted studies and wrote publications on steer and horse feeding and conducted experiments with pigs.

William F. Schoppe, 1909-1923

William F. Schoppe was hired as a poultryman and head of the Poultry Department.

J. Oscar Tretsven, 1909-1956

J. Oscar Tretsven was Animal Husbandman and Extension Dairy Specialist for 47 years. He came to the college in 1909 as dairy and beef cattle herdsman. He became an instructor in 1912 and started taking courses toward his BS in Animal Husbandry which he received in 1922. (55) He was affectionately known as the Father of Dairying in Montana. He gave ingenious assistance to help the dairy industry adjust to the new dairy machinery and encouraged farmers to keep production records. For many years he was in charge of the agriculture short course. (1)

Dr. Howard Welsh, 1913-1951

Dr. Howard Welsh, a veterinarian and animal scientist, was part of the animal science effort 38 years. In cooperation with other faculty, Dr. Welsh worked on a problem of a hairless condition of new-born animals, especially pigs. The team discovered the condition was due to a thyroid malfunction caused by a mineral deficiency in soil. The remedy to the problem resulted in great savings for swine producers across the country. (1)

Dr. W. J. Hartman, 1914

Dr. W. J. Hartman was hired in 1914 to be the Extension Livestock Specialist. He was the first Extension Specialist in Montana. He had served as a livestock expert for the Farmers Institute in 1911. (1)

Harriette E. Cushman, 1921-1950

Harriette E. Cushman was Montana's Extension Poultry Specialist for 29 years. She was one of the nation's few female extension specialists in agriculture. She was well-known for her poultry expertise but also for her work with Native Americans. She became interested in Indian affairs when she worked with Montana's 7 reservations with poultry projects. Throughout her career and into her retirement she continued to provide youth and educational programs to the tribes. (50)

John A. Nelson, 1922-1961

John A. Nelson came to the Animal Industry Department in 1922 and prepared a degree curriculum for Dairy Industry which started in 1923. He was head of the department from 1929-1956. Nelson also devoted much time to extension activities by promoting the annual Dairy Industry Week and other dairy association activities. (1) (55)

E. P. Orcutt, 1940-1962

E. Paul Orcutt was Extension Livestock Specialist for 22 years. He secured cooperation of ranchers in adopting a program of performance testing of beef cattle. This led, in 1956, to the formation of the Montana Beef Performance Association. (1)

Dr. Gene F. Payne, 1945-1979

Dr. Gene Payne served as a Range Management teacher and researcher from 1945 until 1979. For 5 years Dr. Payne was the sole Range faculty member in the department. He served as a forage specialist for 3 months in Mexico with ICC-Crefal, taught at Edgerton College in Kenya for 2 years and spent 3 months in Saudi Arabia at the agricultural research station.

Dr. Payne served as Executive Secretary for the Society for Range Management (SRM). Gene was active in the Northern Great Plains Section of SRM and was involved with the Range Science Education Council. Gene served on the Bureau of Land Management Advisory Council from 1963-1976.

Dr. Glen Lofgreen, 1948

Dr. Glen Lofgreen started his teaching and research career at Montana State University during the winter of 1948. He was in Montana less than a year before he joined the faculty of the University of California, serving on the Davis campus from 1948 to 1968, and subsequently at the University's Desert Research and Extension Center (in El Centro) until he retired in 1977. Glen will be remembered by science and industry most for his innovative insights that led to development of the California Net Energy System, a system that ascribed two NE values to each feedstuff: one for maintenance and one for gain. This system transformed cattle energetics into a practical tool for evaluating and predicting growth that is employed in commercial feedlots around the world. This energy system is still employed currently to describe the energy value of feeds and the energy requirements of beef cattle by the NRC.

James Drummond, Extension Sheep Specialist, Wool Lab. 1948-1980

James (Jim) Drummond was Animal Science Professor, Extension Sheep Specialist and Director of the Montana Wool Laboratory for over 3 decades. Through Jim's leadership, the Extension Sheep program and the Montana Wool Lab gained national prominence and provided immeasurable benefits to the sheep industry in Montana.

Well-known for his accomplishments as a World War II bomber pilot, Jim Drummond's career in the Animal and Range Sciences Department provided a framework later faculty could emulate. After his retirement he established the Jim & Betty Drummond Scholarship which is awarded to a student studying Animal Science.

Dr. Oscar O. Thomas, 1951- 1983

Dr. Oscar Thomas served as a Professor of Animal Nutrition for 32 years and as Department Head for 2 hears. Dr. Thomas was in charge of beef cattle nutrition research and taught at the undergraduate and graduate level. During his career he published many research articles and contributed articles to animal science textbooks. He served as chairman of the annual Montana Nutrition Conference from 1954 until his death. Dr. Thomas was past president of the Western Section of the American Society of Animal Science (ASAS), a fellow in the American Association for the Advancement of Science, past president of the MSU Chapter of Sigma Xi and a member of Alpha Zeta.

Dr. Thomas was selected by agriculture students as one of the outstanding teachers in the College of Agriculture on 4 occasions. Dr. Thomas has been honored with the Fellow Award from the ASAS in 1983. The O.O.Thomas Nutrition Center at Montana State University was named as a memorial to Dr. Thomas.

Dr. Donald E. Ryerson, 1957-1980

Dr. Donald E. Ryerson was a member of the MSU range science faculty from 1957 to 1980. He first served as the Extension Range Management Specialist, founding the Montana Youth Range Camp and the Montana Ag Lenders Range School, both of which are still thriving today. Later in his career Dr. Ryerson focused his exceptional teaching skills on-campus, receiving the MSU College of Agriculture Outstanding Teacher Award each year from 1975 to 1979. Dr. Ryerson's research focused on mechanical methods to control dense clubmoss and to improve water use efficiency by rangeland plants.

Robert W. (Bob) Miller, 1957-1974

Robert Miller joined the faculty in Animal Science in 1957 and developed the horse program. He also taught Beef Production and Animal Genetics. Bob was a nationally recognized authority on horses and served as a staff member of Dr. E.M. Ensminger's Horse Science School. He authored a university text, Horse Behavior and Training and Guide to Using Horses in Mountain Country. In addition to starting the horse management classes at MSU, Bob was also responsible for starting the MSU Horseshoeing School. Bob was a contestant in the first rodeo held at Montana State College in 1947 and was advisor to the Rodeo Club.

Bob Miller was awarded the Outstanding Teacher in Agriculture Award in 1974, the first year the award was made. The Miller Pavilion was named in his honor after his death resulting from a horse riding accident in 1974.

Dr. John E. Taylor, 1963- 1991

Dr. John “Jack” Taylor began his career in the Animal and Range Sciences Department in 1963, joining Drs. Ryerson and Payne to develop one of the leading range science programs in the United States. Dr. Taylor was well known for his dedication to students and led many field programs which students still recall fondly.

Dr. Roger Brownson, 1964-1996

Dr. Roger Brownson was Extension Beef Cattle Specialist in the Animal and Range Sciences Department. Prior to that he was a County Agent in Phillips and Carbon Counties. Roger produced numerous journal articles and popular press reports. He conducted beef cattle workshops in the western US and Canada. Dr. Brownson’s work included research on ranches and Experiment Station facilities. He developed a method of estrus synchronization and a tool for measuring back fat on growing bulls.

Dr. Brownson published the “Pocketbook for Beef Producers and contributed to the “Beef Cattle Handbook.” For many years Dr. Brownson coordinated the International Cattle Symposium between the northern Border States and Canada.

Dr. C.W. (Walt) Newman, 1964- 1996

Walt received his education at LSU and Texas A&M, joining the MSC (MSU) Animal and Range Science faculty on October 1, 1964. His initial responsibilities were teaching and research, primarily in animal nutrition and metabolism. In 1965 he accepted management of the swine program. He was involved in designing the new swine facility and nutrition laboratory (1966). His research was concentrated on swine feeds common to Montana, particularly barley, which led to projects with other US and foreign researchers. Walt represented MSU in the W-166 Project that included 8 Western universities and the USDA. Results of cooperative research with RK Newman (P & S) produced conclusive evidence that barley beta-glucans had significant positive effects by lowering serum cholesterol in humans. These results were verified by the USDA, resulting in FDA approval. Walt’s research results were reported in 64 peer refereed scientific journals, 145 abstracts, 23 invited papers and numerous articles in lay publications. He coauthored 11 book chapters and proceedings and 2 books on barley. He mentored 16 students for Masters Degrees.

Walt was a member of the Nutrition Society, American Society of Animal Science (ASAS), The American Association of Cereal Chemist, and the North American Barley Workers Association. Walt was elected to membership in Sigma XI, Gamma Sigma Delta, and Alpha Zeta. Honorary awards included the 1989 Distinguished Service Award (Western Section ASAS), 1989 Outstanding Researcher (MAES), 1992 McMasters Foundation Fellowship (Australia), and in 1994, Fellow ASAS.

Dr. Peter J. Burfening, 1968-2001

Dr. Peter Burfening served as a Professor of Reproductive Physiology from 1968 through 2001 and as Head of the Animal and Range Sciences Department from 1996 to 2001 when he retired and took a position as a National Program Leader for Animal Genomics at the National Institute for Food and Agriculture, formerly CSREES. He was on the outstanding Teacher Honor Roll for College of Agriculture 1974-75, 1976-77, 1978-79 and was awarded the Young Animal Scientist Award, Western Section American Society of Animal Science in 1982. His research showed that the principal cause of calving difficulty is calf birth weight. Calf birth weight can be reduced by sire selection thus reducing calving difficulty. Using estimated breeding values for calving difficulty when selecting sires, if available, is more effective in reducing calving difficulty than selection against large birth weights. A primary second prong of his research showed that selection for and against reproductive rate in sheep is effective in changing prolificacy. The primary correlated response to selection for or against reproductive rate was a change in ovulation rate with little or no change in embryonic survival. He authored or co-authored 70 referred publications, 5 reviewed papers, 27 popular articles and have presented 75 papers at scientific meetings. He also was awarded $1,945,000 in grants and contracts as either PI or Co-PI.

As Department Head he lead the department in significant changes in the departmental curricula to a curriculum that required more experiential learning and the integration of more critical thinking skills in courses. He also reinstated the Meat Science program and the Livestock Judging Team in the department.

Professor Leonard C. “Sandy” Gagnon, 1969-2009

Sandy Gagnon served as MSU Rodeo Coach, Equine Professor and Extension Horse Specialist from l969 to 2009. Sandy’s area of teaching was in the equine program, teaching classes in management, anatomy and physiology as well as riding and training. His research supported the horse industry in the areas of horse nutrition and how grazing behavior impacts forage production.

Sandy served as interim Animal and Range Science Department Head from 1990-1993 and as Special Assistant to the Dean of Agriculture from l993-l994. He served as the first Extension Horse Specialist from 2007-2009.

Sandy’s rodeo teams were successful regionally and nationally. MSU men’s rodeo teams won national championships in l972 and l975, along with twelve individual nation champions. Women’s teams placed third in l972 and second in l974. Sandy was instrumental in bringing the College National Finals Rodeo to MSU and managed it for the first ten years. He and his l975 men’s team were inducted into the MSU Athletic Hall of Fame in l990

Dr. Carl L. Wambolt, 1970-2011

Dr. Carl L. Wambolt served as a Professor of Range Science from 1970 until 2011. Originally hired as Extension Range Management Specialist, he held that position while teaching 3 Range

Science classes until 1980. In 1980 his appointment became teaching-research. His courses and research both emphasized his interests in shrub ecology and wildlife habitat ecology. These pursuits helped spawn the Wildlife Habitat Ecology major in the Department. The majority of his research involved ecological relationships of sagebrush, often with relevancy to wildlife habitat. His last 3 years involved a position with the Dean of Agriculture. Since 2011 he has continued to instruct a summer class each year, organize and chair a national symposium, and author 8 research papers.

Dr. Wambolt received the highest recognition awarded by the Society for Range Management for research. The W. R. Chapline Research Award presented in 2014 honored his career of research accomplishments.

Dr. Don D. Kress, 1970-2005

Dr. Don D. Kress taught and conducted research as an animal breeder/geneticist in the Department of Animal and Range Sciences. He taught animal breeding and genetics courses at the undergraduate and graduate level. He conducted research with beef cattle in the areas of crossbreeding, selection, and genetic relationships among antagonistic traits. One of his major research contributions was that maternal heterosis in beef cattle is of major importance, worth $70 per year per cow. His research showed that selection for yearling weight could be effective while holding birth constant. Much of this research was done in cooperation with scientists at the Northern Agricultural Research Center near Havre. He was invited to give many presentations on his research nationally and internationally.

Dr. Kress moved to the position of Associate Dean for the College of Agriculture in 1999. He worked with Associate Deans throughout the Western Region to coordinate programs and to sponsor Teaching Symposiums to assist faculty in teaching improvement.

He received numerous awards for his teaching and research, including the Outstanding Teacher Award, Teaching Excellence Award, Pioneer Award from the Beef Improvement Federation, Outstanding Service Award from the National Association of State Universities and Land Grant Colleges, Animal Breeding and Genetics Award from the American Society of Animal Science, and the Fellow Award from the American Society of Animal Science.

Dr. Brian Sindelar, 1971-1991

Dr. Brian Sindelar began a 20-year career in research and teaching at Montana State University in 1971. Much of his initial research involved mined land reclamation. His research with the Montana Agricultural Experiment Station was directed to rangeland improvement. During his tenure Dr. Sindelar taught 12 of MSU's Range Science and Land Rehabilitation courses, including five new courses which he developed. In 1973 he developed and taught the first land reclamation academic course in the western United States. He assisted in the development and implementation of the MSU Land Rehabilitation graduate curriculum and undergraduate coursework program in 1980. He chaired the graduate committee of the first graduate of the new Land Rehabilitation program in 1981. In 1983 he received a Teaching Award for Excellence and in 1985 and 1991 was elected to the Faculty Honor Roll in the College of Agriculture. In 1990 he received a Bush Grant for a faculty exchange with the University of ND. He served as chairman of 10 graduate committees.

In 1991 Brian left MSU to devote full time to his land management consulting business, Rangehands, Inc. He has provided services to clients throughout western United States and Canada.

Dr. Frank F. Munshower, 1972- 1996

Dr. Frank F. Munshower was Plant Ecologist and Director of the Reclamation Research. He helped establish both an undergraduate program and the first Master's Degree program in Land Rehabilitation in the United States. He is credited with teaching and mentoring the first generation of students entering into the field of land reclamation in the Western States. He was an internationally recognized ecologist, and expert in restoration of lands impacted by historical and modern resource extraction activities in the Northern Great Plains and Intermountain West. Dr. Munshower's contributions to the science of land restoration merited of Reclamation Scientist of 1992 Award by the American Society of Mining and Reclamation.

Mr. Dennis R. Neuman, 1973-2006

Mr. Dennis R. Neuman was Research Scientist in the Reclamation Research Unit. His research activities centered on the ameliorating plant limiting conditions (acidity, phytotoxicity, and fertility), plant species selection, and monitoring vegetation and soil response variables. Mr. Neuman also provided land restoration policy and data analyses to federal land and risk management agencies. Mr. Neuman was Acting Director of the Reclamation Research from 1996 to 2006. Mr. Neuman is an Associate Editor of the Journal of the American Society of Mining and Reclamation, having served on the Society's National Executive Committee, and as President (2009-2011).

R. W. "Butch" Whitman. 1975- 1984

Dr. Whitman became a Professor and Beef and Sheep Nutritionist in Animal and Range Sciences at Montana State University in 1975 where he taught classes in beef production and management and researched strategies for winter feeding, heifer development and herd replacement. His research relating cow body condition to rebreeding performance has been widely used in the cattle industry to help manage cowherds for optimum reproductive performance. In 1984, he resigned to become director of research and education for the American Simmental Association.

Dr. Whitman is certified in both beef and sheep nutrition by the American Registry of Professional Animal Scientists.

Dr. Raymond P. Ansotegui, 1976-2006

Dr. Ray Ansotegui accepted a one year, one time contract in 1976 to fill in for a professor on sabbatical leave. Ray retired in 2006 after 30 years of service. Ray taught over 30 different

classes and at Ray's retirement it was estimated that he had taught over 7,000 different students and assigned over 13,000 grades. During his tenure at MSU, Ray was granted two sabbatical leaves; one year at New Mexico State University where he completed a Ph.D., and six months with the University of Western Australia, evaluating shrub tree grazing in the outback, utilizing rumen evacuation techniques. Ray's research emphasis included Cow/Calf Nutrition, Range Forage Utilization, Estrous Synchronization, and Trace Mineral Nutrition. Some of his most significant Research included: Quantification of range forage intake, forage intake relative to milk intake, & ruminal kinetics by suckling calves on native range; demonstrated combinations of progestins and prostaglandins for successful synchronization; effects of forms and intake of trace minerals on immune function, effects of antagonist minerals on Cu and Zn status, and demonstrated inaccuracy of using serum as a measure of mineral status on beef cattle.

Some of Ray's teaching awards include: Western Section American Society of Animal Science Distinguished Teacher Award, James and Mary Ross Provost's Award for Excellence in Teaching and Scholarly Activity, Mortar Board Exemplary Performance as an Educator, Outstanding Teacher-College of Agriculture (4X), Alpha Zeta Professor of the Year, and Faculty Honor Roll for Outstanding Student Instruction (5X).

Tom W. Wolfe, 1979- 2012

Tom Wolfe was an instructor in the MSU Farrier School for 33 years. He was the 2nd instructor in the history of the school. Tom provided students with the opportunity to obtain a solid background in the field of farrier science through the application of sound principles in a practical hands-on setting. The students Tom has trained over the years bear testament to his success. It was said Tom brought that rare combination of professional expertise and the ability to share it with others. Tom had students from South Africa, Italy, England, Chile, Japan and Australia.

In 2011 Tom was inducted into the International Horseshoeing Hall of Fame for his contributions to farrier education.

Dr. Clayton B. Marlow, 1980- present

Dr. Clayton B. Marlow joined the faculty as a Range Scientist in August 1980. He taught grazing management, range ecophysiology, world food (an early university core course) and natural resource policy and administration. Later Dr. Marlow developed and taught undergraduate and graduate courses in riparian ecology and management, a senior capstone course for all department majors, an undergraduate course in habitat restoration and fire ecology. Dr. Marlow conducted research to identify and define the processes that create and maintain riparian ecosystems. He investigated the linkage between wildfire patterns and riparian processes. He also conducted an assessment of grazing management practices for the protection and enhancement of water quality and riparian ecosystems.

In 1989 Dr. Marlow began serving as Associate Dean for Resident Instruction in the College of Agriculture. Ten years later he returned full-time to the department where Dr. Marlow was part of the faculty effort to re-structure and re-name the Range Sciences undergraduate degree

program and by 2016 the Natural Resources and Rangeland Ecology degree was accredited by the Society for Range Management.

Dr. Rodney W. Kott, Extension Sheep Specialist, 1980-2013

Dr. Rodney Kott was Extension Sheep Specialist for over 30 years. During the later years he also supervised the activities of the Montana Wool Laboratory. Throughout his tenure at MSU he provided educational assistance to Montana sheep producers. He maintained a close working relationship with the Montana Wool Growers Association. Key accomplishments include being part of a team that developed the National Sheep Improvement Program (genetic evaluation program) and development of targeted grazing prescriptions for using sheep and goats to control invasive plants, and then facilitating the implementation of these programs in Montana. Dr. Kott provided leadership in the adoption of objective measurement tools in evaluating wool. Dr. Kott's applied research efforts provided key information that was utilized in the NSIP, targeted grazing and wool programs.

Dr. Kott's contributions to the sheep industry have been recognized by receiving the Extension Award (Western Section American Society of Animal Science), Flock Guardian Award (American Sheep Industry Association), Wool Excellence Award (American Wool Council), Silver Buffalo Award (Montana Extension Service) and Agency Weed Fighter of the Year Award (Montana Weed Control Association.)

Dr. Wayne F. Gipp, 1980-2009

Dr. Wayne F. Gipp served as Extension Swine Specialist in the Department of Animal and Range Sciences from 1980-2009. Dr. Gipp served as Department Head from 2005-2006. His Extension program focused on swine nutrition, swine health and diseases, production efficiency, marketing, pork quality and environmentally sound waste management programs for adult and youth producers. Dr. Gipp made particular effort to deliver intensive workshops to 4-H and FFA youth covering all aspects of swine production. He developed and managed the Swine Symbol of Excellence program and promoted the use of ultrasonic evaluation as means to utilize carcass data to supplement visual appraisal in swine selection programs. Dr. Gipp was manager of the C.H. Perry Swine Test Station from 1984 -1994 which served producers throughout the Northwestern U.S. Dr Gipp's research focused on the nutritional value of alternative grains, such as Triticale, Faba Beans and Peas, and their appropriate use in the formulation of swine diets. His teaching program focused on teaching Swine Production, advising undergraduate students, and serving as the Departmental Degree Certifying Officer for all undergraduate programs in the department.

Wayne's contributions have been recognized by the Montana Pork Producer Council's Friend of the Industry Award, the Western Section American Society of Animal Science Extension Award, and election to the Montana 4-H Council Hall of Fame.

Dr. John Lacey, 1981-1994

Dr. John Lacey was the Extension Range Management Specialist for the Animal and Range Science Department from September 1981 to 1994. His efforts focused on developing and

supporting a state-wide education program, and practices to improve grazing management on the ground.

Dr. James G. Berardinelli, Ph.D. 1981- present

Dr. James G. Berardinelli has served as a Reproduction Physiologist from 1981 until the present. He specializes in physiology of large domestic and wild animals with emphases on basic and applied research areas related to reproductive efficiency. He is recognized as a national and international expert in the field of the mechanisms related to biostimulatory effects of males on reproductive cyclicity and fertility of anovulatory females in beef cattle and sheep. More recently, Jim has developed expertise in area of metabolomics by evaluating metabolic hormone and NMR metabolic profiles related to the regulation of reproductive processes in domestic sheep and cattle, and in many species wild, ruminant ungulates. Also recognized for his teaching expertise, Dr. Berardinelli has worked in enhancing the learning experience of students in the reproductive sciences with multimedia platforms and problem solving approaches.

Dr. Berardinelli contributions in research have been recognized by peers through numerous invited lectures and seminars, invitations and appointments on a variety of national peer-reviewed journal review boards, and state and nation grant panel review boards. He was the recipient of the Mershon Award of the Montana Academy of Science in recognition for his scientific excellence, and the advancement of science in Montana and service to the Montana Academy of Sciences. In recognition of teaching, Dr. Berardinelli was nominated twice for the MSU President's Award for Excellence in Teaching, and has received the Montana State University and Bozeman Chamber of Commerce Award for Excellence in Academic Teaching and Service, and he was the 2012 recipient of the Distinguished Teaching Award of the Western Section of the American Society of Animal Science.

Dr. Mark K Petersen, 1984-1991

Dr. Mark Petersen was Professor of Ruminant Nutrition in the Department of Animal and Range Sciences from 1984 until 1991. His research program focused on two main areas: 1) winter adaptability by range beef cow, investigating supplementation strategies utilizing ruminally undegradable protein and; 2) the interaction of body condition, protein nutrition on reproduction in two and 3-year-old range cows. He enjoyed the collaborative work environment and the opportunity to advise outstanding graduate students. He was also active with undergraduate students advising, the Animal Science Club, Beef Project, Farm House Fraternity and Agriculture Honor Society. Dr. Petersen has won numerous awards for teaching, research and extension collaborations.

In 1991, Mark joined the graduate faculty at New Mexico State University as a Range Livestock Nutritionist and continued working with Master and PHD students many of which were undergraduates at Montana State University. In 2009, he returned to Montana as Research Leader at the USDA-ARS Fort Keogh Livestock and Range Research Laboratory in Miles City.

Dr. Verl M. Thomas, 1984-1996

Dr. Verl M. Thomas was a ruminant nutritionist in Animal and Range Sciences from 1984 until

his death in 1996. Verl taught sheep production and beef nutrition classes, Dr. Thomas served as the Alpha Delta chapter's advisor for Alpha Gamma Rho fraternity.He distinguished himself as a complete scientist who dedicated his program to providing applicable and meaningful research to students and producer groups. His research was among the first to demonstrate the nutritional value of sunflower silage as an alternate crop in the Pacific Northwest. Verl conducted intensive studies to evaluate the influence of supplements on forage intake, nutrient balance, reproductive wastage, wool production and lamb mortality.

Dr. Thomas passed away in 1996 and the Verl M. Thomas Memorial Scholarship Fund, Animal and Range Sciences Department, was established in his memory.

Dr. Michael W. Tess, 1988–2009

Dr. Mike Tess served on the faculty of the Animal and Range Sciences Department from 1988-2009. He taught courses in Beef Cattle Management, Calving Management, Research Methods, and Animal Breeding. His research focused on genetics and beef cattle production systems, and addressed a range of topics including: bio-economic breeding objectives, cytoplasmic inheritance, the economic impacts breed substitution, crossbreeding, and heterosis on cow-calf, feedlot, and integrated production systems, economic evaluation of alternative grazing, calving, weaning, and marketing strategies for cow-calf enterprises, and the economic impacts of wildlife on beef cattle enterprises.

Dr. Tess served as Department Head from 1996-1997 and again from 2001-2005. He was chairman of the BIF Commission on the integration of genomic markers in national cattle evaluation systems (2008-2009), and Executive Director of the Ultrasound Guidelines Council (2009-2014). Recognitions include: Outstanding Alumnus - College of Agriculture, California State Polytechnic University, Pomona (1994), Continuing Service Award – Beef Improvement Federation (2010), and Pioneer Award – Beef Improvement Federation (2011).

Dr. Bret E. Olson, 1990-present

Dr. Bret E. Olson has been a Range Ecologist at MSU from 1990 until present. He was interim head of the department from 2006 until 2010 which encompassed the time that the Animal Bioscience Building was planned, funded and constructed. Early in his career, Dr. Olson taught several undergraduate and graduate courses, but has primarily taught “Natural Resources Ecology” and “Habitat Inventory and Analysis” (formerly “Range Measurements”) at the undergraduate-level, and “Range Ecophysiology” at the graduate-level since the mid-1990s.

In his career, Dr. Olson’s research has included: 1) physiological ecology and population biology of native and invasive plants in Montana, 2) livestock (sheep, goats, cattle) behavior and nutrition while grazing rangelands dominated by invasive forbs, 3) ecophysiological and social implications of grazing winter range with cattle as an alternative to feeding hay, and 4) metabolic rates of cattle. In some of the invasive plants studies, stable C and N isotopes, used as tracers

or ambient levels, e.g., water-use efficiency, were used to assess why invasive plants are so competitive with native plants.

Dr. John Paterson, 1993-2012

Dr. John Paterson was on the faculty in the Animal and Range Sciences Department from 1993 until 2012. He was Department Head for the Animal and Range Science Department from 1993 to 1996 followed by being the Extension Beef Cattle Specialist from 1996 to 2012.

Among the numerous industry awards Paterson has received are the Pfizer Animal Health National Extension Award from the American Society of Animal Science and the Distinguished Service Award from the Western Section of the American Society of Animal Science. He was named a Fellow in Extension from the American Society of Animal Science and an Emeritus Professor. He has authored and co-authored more than 200 peer-reviewed and proceedings papers and given more than 250 presentations to beef producers

Dr. Janice G.P. Bowman, 1992-present

Dr. Janice G.P. Bowman has been a Professor of Ruminant Nutrition in the Department of Animal and Range Sciences since 1992. Her research program focuses on two main areas: 1) forage utilization by range beef cattle, emphasizing supplementation strategies, variation in individual supplement intake, and multi-faceted effects on agroecosystems in northern mixed grass prairies; and 2) feedlot nutrition, including identifying genes in barley that control feed quality. She has collaborated with plant breeders to develop barley varieties for cattle, which reduce feeding costs while providing Montana's barley growers with an additional market. Her feedlot research led to the release of the barley variety 'Valier,' the first barley selected for improved feed quality, yield and regional adaptation. Calves fed 'Valier' had 10% greater average daily gain than calves fed other commonly available feed barleys. In addition, 'Valier' has improved lodging resistance, 10% greater yield than 'Harrington' (the most widely grown barley variety in Montana) and increased test weight. She has received grants for more than $5.2 million since 1992.

Dr. Bowman has taught undergraduate courses in Feeds and Feeding, Animal Nutrition, Topics in Beef Cattle Nutrition, and Equine Nutrition, as well as a graduate course on Nutrient Metabolism in Domestic Animals. Dr. Bowman's contributions have been recognized with five awards for teaching excellence, including selection as a Lilly Teaching Fellow, and the Outstanding Young Teacher Award in the College of Agriculture during 4 years at Ohio State University. At Montana State University, she received another five major awards, including the Cox Family Fund for Excellence Faculty Award for Creative Scholarship and Teaching, the Western Section American Society of Animal Science Distinguished Teaching Award, the College of Agriculture Outstanding Professor Award, and the Western Section American Society of Animal Science Young Scientist Award. Dr. Bowman has served as the major advisor to 5 Ph.D. students and 12 M.S. students.

Dr. Bok Sowell, 1993-present.

Dr. Bok Sowell has taught classes in range ecology and wildlife habitat ecology since 1993. His past research has concentrated on range livestock nutrition, feedlot nutrition and feeding behavior. In the past 10 years, his research has focused on wildlife habitat issues including livestock grazing and sage-grouse, elk and aspen relationships, grizzly bear habitat use, and plant responses to wildlife use.

Dr. Sowell has taught several undergraduate courses including Natural Resource Conservation, Montana Range Plants, Grazing Ecology and Management, Wildlife and Livestock Nutrition, and a graduate level course on Grazing Ecology. He has received several teaching awards, including the President's Excellence in Teaching Award at Montana State University and the Distinguished Teacher Award from the Western Section of the American Association of Animal Science.

Dr. James E. Knight, 1994-2014

Dr. James E. Knight was Extension Wildlife Specialist from 1994-2014. His programs assisted agriculture in coping with wildlife-human interactions and emphasized the benefits of ranching and livestock grazing for wildlife. Jim developed numerous wildlife damage control techniques and practices including efficient fence designs to exclude ungulates from high-value pastures. His handbook, Wildlife Damage Control for Organic Farmers (2014) and his book, Manage Your Land for Wildlife (2008) are nationally recognized sources of scientific information for wildlife management. In 2014 he developed and published the national hunting curriculum for 4-H Shooting Sports.

Dr. Knight served as Extension Agriculture and Natural Resources Program Leader for MSU Extension from 1998-2001. In 2006, Dr. Knight was hired as Associate Director of Extension until his retirement in 2010 when he returned half-time as Extension Wildlife Specialist. Jim's contributions have been recognized through many awards including the National Extension Natural Resources Award, the Wildlife Society's Professional of the Year Award and the Epsilon Sigma Phi Distinguished Service Award.

Gene W. Surber, 1994-2006

Gene Surber was Extension Natural Resources Specialist from 1994 until 2006. Gene's primary programs included: Livestock Water Quality Management, Riparian Area Management, coordination of the Montana Ag Lenders Range Management Annual School, Program Leader for Western Integrated Resource Education (WIRE) Program and the Montana Program leader for the National USDA/EPA Environmental Management Program.

Dr. Paul B. Hook, 1994-1998

Dr. Paul Hook was assistant professor of Watershed Science in the Department of Animal and Range Sciences from 1994 until1998 when the college was reorganized and he went to the Department of Land Resources and Environmental Sciences. Dr. Hook's research focused on

streamside and wetland ecosystems, addressing ecological restoration, weed ecology, water quality functions of riparian buffers, and use of engineered wetlands for treatment of organic waste. He taught courses in Watershed Management, Wetland and Riparian Ecosystems, Range Ecosystem Measurements, and Advanced Natural Resource Ecology.

Dr. Jeffrey C. Mosley, 1995-present

Dr. Jeffrey C. Mosley has served as the Extension Range Management Specialist in the Animal and Range Sciences Department from 1995 until the present. Jeff's work focuses on grazing management, emphasizing invasive plants and livestock grazing relationships with fish and wildlife. He is a leading authority on using targeted livestock grazing to enhance wildlife habitat and to suppress noxious weeds. His efforts in rangeland monitoring and conflict resolution promote collaborative conservation that integrates ranching, wildlife, recreation, and other uses while respecting the health of the land and the people who rely on the land.

Dr. Mosley's professional service activities have included President and Board of Directors of the Society for Range Management (SRM), President of the International Mountain Section of SRM, and President of the Range Science Education Council. Honors and awards have included teaching and academic advising awards from the University of Arizona, the University of Idaho, and the Range Science Education Council. Jeff received the Visionary Leadership Award from Montana State University Extension, and Jeff was named a Fellow of the Society for Range Management.

Dr. Patrick Hatfield, 1997-present

Dr. Pat Hatfield conducts sheep nutrition and production research and teaches five classes and advises students. Patrick's research uses a team approach, incorporating expertise from agronomy, soil science, entomology, weed ecology, agricultural economics, and community development. All team members focus on the profitable and environmentally sound incorporation of sheep into crop production systems. Patrick started his career as a research scientist at the U.S. Sheep Experiment Station for eight years. Since joining MSU in 1997, Patrick secured more than $7.5 million dollars in extramural competitive funding. Patrick's publications include more than 70 peer reviewed journal articles. In addition to research and teaching, Patrick developed a free, online sheep ration program that has over 2000 active accounts in more than 60 countries. Patrick has served as major advisor or committee member on 25 graduate committees.

Dr. Hatfield served as Western Section American Society Animal Science (WSASAS) President in 2003 and was honored with the WSASAS distinguished service award in 2013. In 2013 Patrick was asked to serve as interim department head and in 2015 he became the permanent head of the Animal and Range Sciences Department.

Dr. Jane Ann Boles, 1999 – present

Dr. Jane Ann Boles has been a professor of Meat Science in the Department of Animal and Range Sciences since 1999. Her research program focuses mainly on rearing practices effects

on meat quality but also helps processors with food safety. She has served the state of Montana as the processing authority for meat processors since 2000. Dr. Boles leads the Montana HACCP training group which offers a Hazard Analysis Critical Control Points training course every year serving meat and food processors in the state.

Dr. Boles has taught the Introduction to Animal Science, Introduction to Meat Evaluation, Meat Science, Meat Processing and team taught Introduction to Livestock Evaluation. She also developed an online version of the Introduction to Animal Science. At the graduate level she has taught Muscle and Growth Biology. She has been nominated multiple times by students for the MSU President's Excellence in Teaching Award and has been recognized by the North American Colleges and Teachers of Agriculture with a Teaching Award of Merit.

Dr. Dennis Cash, 2000-2011

Dr. S. Dennis Cash was MSU Extension Forage Specialist in the Animal and Range Sciences Department from 2000 through 2011, and the Plant, Soil and Environmental Sciences Department (1992-1999). His research and Extension programs addressed optimizing the use of high-quality introduced forages for Montana producers. Dennis performed a significant amount of field research examining alfalfa stand longevity, sustainable alfalfa crop rotation practices, annual cereal forages, forage quality and livestock utilization which resulted in over 125 publications in popular and scientific literature. Dennis developed or co-released eight forage varieties – 'Willow Creek' winter wheat, 'Montana' and 'MacBeth' meadow bromegrass, 'Delaney' and 'Shoshone' sainfoin, and 'Shaw', 'Melton' and 'Cooper' alfalfa. Dennis coordinated the "Nitrate QuikTest" program to detect potentially toxic cereal hay in collaboration with up to 45 individual county or reservation Extension faculty in four states annually.

Dr. Cash served on many faculty, graduate student, Extension, University, and industry committees. He traveled extensively every year, and presented educational programs in all Montana counties and most reservations in conjunction with the MSU county faculty. Dennis served as Secretary/Treasurer and President of the Montana Association of County Agricultural Agents (MACAA), and received the Achievement Award and Distinguished Service Award from the National ACAA. In 2011, Dennis received the MSU Extension Silver Buffalo career award. Dennis' highlighted accomplishments were his close professional and personal relationships with hundreds of Montana agriculture producers, industry clients, agency partners, students and faculty. Dennis was named MSU Professor Emeritus of Forages in 2012.

Andrea E. Shockley, 2002-present

A. Shockley started as a part-time adjunct instructor for some of the Equitation Classes offered by the Animal and Range Sciences Department in 2002. In the fall of 2004 her status moved to a full-time capacity teaching a full load of classes as well as the day to day management of all equine housed on the Towne Farm and the student crew to care for them. Over time her position brought on the duties of managing the Miller Stock Pavilion (MSP) as well. In the fall of 2009 she introduced a new club and new passion to MSU students. The inception of the MSU Driving Team (Club) brought forth yet another dimension to the already popular Animal Science Equine option degree program, although students from all majors take part in the club as well as

the classes she teaches. As needed Shockley assists in any equine research studies the department undertakes.

She received an award of excellence for the guidance, inspiration, and contributions to the academic excellence of a student in 2007. Through her years at MSU she has provided many outreach opportunities for the equine community and continues to strive for a greater partnership between community and college. In 2014 her position shifted once again at the realization her teaching load was full-time in and of itself. This enabled her to secure her most recent accomplishment which was the introduction of a new Horses: Ground Level course to be offered as part of the Animal Science curriculum.

Dr. Tracy K. Brewer, 2004-2008

Dr. Tracy K. Brewer served as assistant research professor of range science from 2004 to 2008. Her research emphasized livestock grazing interactions with elk and mule deer, habitat management of elk and bighorn sheep, and integrated management strategies to suppress spotted knapweed. Dr. Brewer also co-taught a graduate course entitled *Grazing Behavior of Livestock and Wildlife*. Dr. Brewer received the Outstanding Young Range Professional Award from the Society for Range Management (SRM), and she served as President of the International Mountain Section of SRM.

Dr. Greg Johnson, 2005 – present

Dr. Greg Johnson joined the Department in 2005 as a Professor of Veterinary Entomology with research, teaching and extension responsibilities. His research focused on the ecology and management of insects and other arthropods that attack and harm livestock and wildlife. Specifically, he developed and refined management tactics to control the horn fly on cattle – a ubiquitous pest of cattle in Montana. His work resulted in federal registration of compounds that suppressed blood feeding by biting midges and mosquitoes on sheep, thus protecting livestock from disease transmission by these vectors. Greg's on-campus teaching included an upper level course, Veterinary Entomology; off-campus he conducted educational programs on topics of medical/veterinary importance to a diverse audience of stakeholders.

Dr. Johnson received recognition for an Outstanding Extension Program by the Pacific Branch of the Entomological Society of America.

Dr. Rachel L. Endecott, 2006-present

Dr. Rachel Endecott has been Extension Beef Cattle Specialist in the Department of Animal and Range Sciences since November 2006. She spent 5.5 years based off-campus in Miles City and moved her program to Bozeman in July 2012. Rachel's Extension programs include beef cattle nutrition, reproduction, genetics, and management for ranchers, youth, and other allied

industry stakeholders. She wrote the MSU Extension handbook, 4-H Livestock Quality Assurance for Youth Producers, and administered the statewide Steer of Merit beef carcass contest from 2008-2015 before passing it to Dr. Megan Van Emon. Rachel has served as the Extension Agriculture and Natural Resources Program Leader since May 2014.

Rachel co-taught or taught Beef Cattle Management from 2012-2016 and advises both the Collegiate Stockgrowers club and Academic Quadrathlon team. She received the Extension award from the Western Section, American Society of Animal Science in 2012, the Anne Wiprud Memorial Award for outstanding achievement in Extension programming in 2014, and the National Association of County Agricultural Agents Achievement Award in 2015.

Dr. Michael R. Frisina, 2007-present

Dr. Michael R. Frisina is a Wildlife Ecologist who has served as an Adjunct Professor in the Animal and Range Science Department since 2007. He teaches courses in Wildlife Habitat Management and Wildlife Habitat Ecology. His research focuses on the ecology and habitat use of wild sheep and goats on a world-wide basis, the ecology and wildlife use of shrub-steppe communities, conservation of endangered species, development of new approaches to assessing the influence of browsing by large ungulates on woody plants, and coordinated approaches to managing wildlife and livestock on shared ranges. In addition to teaching he has served on numerous graduate student committees since 1989.

During his career Dr. Frisina has received several awards, among them the Chief of the U.S. Forest Service National Range Management Award, Honorary Doctor of Agriculture Degree by Montana State University Bozeman, and Most Distinguished Mongolian Conservationist from the Mongolian Government.

Mr. Thomas M. Bass, 2007-present

Mr. Bass has served as an Associate Extension Specialist in the area of livestock sustainability, agricultural emergency management, agricultural and food residuals composting, and local food systems since 2007. His broad interests intersect in the concept of systems approaches to supporting diverse agricultural enterprises across the landscape. He is currently working on doctoral research focusing on sustainability and resilience of Montana's local beef supply chain.

Mr. Bass has been a successful grant writer, obtaining over a million dollars to promote Extension programs and demonstrate research. He has been honored by the Soil and Water Conservation Society for leadership in the Society, and he and collaborative teams have also received awards for Extension programming, products, and team performance by the eXtension Initiative, the American Society of Agronomy, and Colorado State University.

Dr. Shannon John J. Moreaux, 2008 – present

Dr. Shannon John J. Moreaux is an Associate Professor of Equine Science in the Department of Animal and Range Sciences and is also the Montana Extension Equine Specialist. Dr. Moreaux

is a Doctor of Veterinary Medicine and practiced equine medicine in the Gallatin valley for 15 years before accepting a tenure track position in 2008.

Dr. Moreaux teaches several courses in the Animal and Range Sciences department and services the equine industry, veterinary industry and horse owners of Montana through continuing education opportunities and outreach efforts. He is currently the instructor of record for seven undergraduate courses and has developed and taught many others. Dr. Moreaux has been faculty advisor to the Horsemen's Club, Stock Horse Team, Polo Team, and Intercollegiate Horse Show Association Team. He is the director of the annual MSU Extension Youth Horsemanship School and semi-annual Equine Conference.

Dr. Moreaux's participates in multidiscipline research that is broad reaching and directly impacts horse health and welfare and the equine industry. Research by graduate and undergraduate students under Dr. Moreaux's tutelage has garnered several awards at regional, national and international equine and animal science research conferences. His areas of research have included behavior, nutrition, metabolism, metabolic diseases and infectious diseases of horses.

Dr. Cecil I. Tharp, 2008 – present

Dr. Cecil I. Tharp has served as the Pesticide Education Specialist since 2008. He has served as the coordinator of the Montana Private Applicator Program and is a resource for the general public and commercial sector regarding pesticide use. He coordinates the certification and training of 5,500 private applicators by offering private applicator programs, setting competency standards with MDA, creating applicator exams, approving and reviewing program credit requests, offering over-distance trainings as well as serving as an invited speaker at 30 – 40 programs per year.

In efforts to reduce pesticide poisonings and reduce non-target impacts from pesticides he routinely publishes MSU Extension factsheets/guides; while directly training local pesticide trainers across the state. He is the founder of the Montana Pesticide Bulletin which now is a collaborative effort between many Montana State University Integrated Pest Management faculty and reaches ag leaders across the state. He developed and continually offers multiple train the trainer pesticide programs for new and veteran pesticide educators annually.

Dr. Glenn Duff, 2010-2015

Dr. Glenn Duff was hired as Professor and Department Head for Animal and Range Sciences in August 2010. He served as Department Head from July 2010 to August 2013 when he was named Interim Dean of the College of Agriculture and Director of the Agricultural Experiment Station. He returned as Department Head in December 2014 until he accepted the position as Department Head for New Mexico State University in July 2015.

During Dr. Duff's tenure as Department as Department Head, the department moved into its new facility, three tenure-track faculty members were hired, enrollment increased to an all-time high, new funding came from the legislature to create the Wildlife Habitat Ecology position and the Nancy Cameron Endowed Chair in Beef Physiology was created. Dr. Duff started a tour of the state with faculty to increase the Department's visibility and the department hosted a successful Western Section American Society of Animal Science meeting during the summer of 2013.

Dr. Craig A. Carr, 2012 – present

Dr. Craig A. Carr joined the Department of Animal and Range Sciences in 2012 and serves as Rangeland Plant Ecologist. His research program is focused on the application of ecological concepts and theories to the sustainable management of arid and semiarid rangelands and includes topics in rangeland ecohydrology, post-European settlement conifer expansion, rangeland weed invasion, rangeland management impacts on wildlife and wildlife habitat, fire and disturbance ecology, and wild horse habitat use and resource impacts.

Dr. Carr teaches classes in range and wildland plant identification, range and wildland biomes, range and pasture monitoring, and a graduate class in the application of rangeland ecological theory. Dr. Carr is also an advisor to the range club and coaches the MSU plant identification team which competes at the annual meeting of the Society for Range Management.

Dr. Jennifer M. Thomson, 2012-present

Dr. Jennifer M. Thomson has served as Animal Geneticist from 2012 until the present. She specializes in studying the genetic, molecular, and physiological basis of economically important traits in livestock. She is an expert in molecular genetics and molecular biology. She is interested in animal reproductive and feed efficiency particularly. More recently Jennifer has been working on applying genetic tools developed in livestock to improve management recommendations in wildlife. She has been applying the domestic sheep genotyping arrays to study Rocky Mountain Bighorn Sheep.

Dr. Thomson teaches courses in animal genetics and breeding and in the graduate program. She has recently adapted her undergraduate course to be taught in the TEAL (technology enhanced active learning) classrooms that have recently been added to the MSU campus as well as developing an online animal genetic and breeding course.

Dr. Carl J. Yeoman, 2012-Present

Dr. Carl J. Yeoman has served as a Microbiologist/Microbial Ecologist from 2012 until present. He specializes in the molecular analysis of microbial communities that live ecto- and endo-symbiotically associated with various animal species. His research is focused on identifying key microbes involved in nutrition, immunological development, and host health, and identifying the processes that distort these ecosystems. His research to date has led to 50 published peer-reviewed papers in highly reputed international journals and more than 1000 citations.

Dr. Yeoman teaches an undergraduate course on Host-associated Microbial Ecosystems, and graduate courses in Ruminant Nutrition and Research Methods.

Dr. Megan Van Emon, 2014 to present

Dr. Megan Van Emon is Extension Beef Cattle Specialist in the Department of Animal and Range Sciences located at USDA-ARS Fort Keogh in Miles City, MT. She began her career at

MSU in August of 2014. Her research interests include supplementation strategies during gestation, bull development strategies, feedlot nutrition, and mineral supplementation in grazing cattle. Currently, Megan is determining the impacts of shredded sugar beets on beef cattle performance during backgrounding and sheep nutrient metabolism. Additionally she is collaborating with Drs. Richard Waterman and Tom Geary at Fort Keogh on trace mineral supplementation strategies for bull reproductive development.

Megan's extension interests include beef cattle nutrition, reproduction, and management strategies. She works closely with extension agents and Fort Keogh for program development and to provide information.

Hannah DelCurto, 2014-present

Hannah DelCurto started as an instructor in the Animal Range Sciences Department in 2014. Her primarily role includes teaching introductory animal science classes. She has taught undergraduate courses in Introduction to Animal Science, Livestock Evaluation, Beef and Sheep Practicum, and Calving Management. Recently, she developed a course designed to enhance student involvement in the Steer-a-Year Program. Hannah manages the Steer-a-Year Program, coaches the livestock judging team, and facilitates departmental internship opportunities for undergraduate students.

Dr. Lance B. McNew, 2014-present

Dr. Lance B. McNew is an Assistant Professor and Director of the Wildlife Habitat Ecology Lab in the Department of Animal and Range Sciences. Dr. McNew and his students conduct research to address questions regarding space use and demography of wildlife in response to habitat alteration/management and human land use, wildlife-livestock interactions, and rangeland ecosystem restoration. A focus of his work is to provide science-based research, instruction, and extension that supports ecologically and economically sustainable wildlife conservation and management in working landscapes. In addition to his research responsibilities, Dr. McNew teaches classes in Range & Wildlife Policy and Rangeland Wildlife Ecology.

Dr. McNew serves as officer in two professional associations: The Wildlife Society and the Society for Range Management. Dr. McNew's research has been recognized both nationally and internationally; and he has twice received the Outstanding Publication in Wildlife Ecology and Management Award (2014, 2016) from The Wildlife Society.

Dr. Emily Glunk, 2014- present

Dr. Emily Glunk is the Extension Forage Specialist and Assistant Professor in the Animal and Range Sciences Department. Dr. Glunk's program is focused on developing and improving forage best management practices, as well as evaluating forage-livestock-soil interactions. With her background in animal science, many of her projects evaluate forage performance as well as animal performance when consuming forages. She has been and is currently a part of several

grazing projects, as well as projects evaluating best management practices of conserved forage.

Dr. Glunk travels throughout the state of Montana, and the surrounding region, providing educational workshops to farmers and ranchers, as well as learning what issues are most important to them. She is also a part of several projects developed by producers and extension agents, providing advice and consulting on data analysis. Dr. Glunk is also responsible for teaching an on-campus undergraduate course, Forage Production. She was able to add a lab component to the course in 2015, providing undergraduates with a more extensive, and hands-on classroom experience.

Dr. Thomas W. Murphy, 2016-present

Dr. Thomas W. Murphy began his sheep research and teaching position in August of 2016. He was trained as a quantitative geneticist at the University of Nebraska-Lincoln and the University of Wisconsin-Madison but will maintain a cross-disciplinary research program with the overall goal of increasing the profitability of domestic sheep production while improving the quality of American lamb and wool. His future research goals include: to determine the prevalence of clinical and sub-clinical mastitis in range ewes and how to effectively manage its occurrence, to design breeding objectives specific to Western sheep producers, to evaluate the impact of maternal nutrition throughout gestation on lifetime performance of future progeny, and to incorporate common Montana byproducts into lamb and ewe rations. Tom will be responsible for teaching the undergraduate courses of Sheep Production and Livestock in Sustainable Systems.

Dr. Timothy DelCurto, 2016-present

Dr. Timothy DelCurto fills the Nancy Cameron Endowed Chair in Range Beef Cattle Production in the Animal and Range Sciences Department. Dr. DelCurto was previously director and program head at Eastern Oregon Agricultural Research Center at Oregon State University. He will investigate and develop answers to the largest challenges facing the livestock industry through advanced research, highly qualified faculty and an integrated network of private producers across the state.

Dr. DelCurto’s position is the department's first endowed chair, meant to develop a rich research profile and program in range beef cattle nutrition and management that will serve Montana and the region's beef industry.

APPENDIX F

PAST MAJOR PROGRAMS IN ANIMAL AND RANGE SCIENCES

Dairy

Robert S. Shaw offered the first instruction in dairy in 1898. His courses covered milk-testing, butter and cheese making, breeds of dairy animals and feeding and management. In 1902 a dairy building was constructed on campus and Holstein and Jersey herds were housed in it.

In 1905, the Dairy Department and Animal Industry Department were made separate units from the crop units of the Experiment Station. W. J. Elliot was appointed as the first dairyman and remained in that position until 1909.

J. A. Nelson took charge of the dairy work in 1922 and remained at the university in different capacities as instructor, researcher and Department head until his retirement in 1960. During his 38 years John A. Nelson prepared a degree curriculum for Dairy Industry which started in 1923. He was head of the department from 1929-1956. Nelson also devoted much time to extension activities by promoting the annual Dairy Industry Week and other dairy association activities. (1)

During World War II, the Dairy Industry Department responded to the government calling for more milk production by introducing a program to obtain more milk per cow through better feeding and management and by substituting a dry meal containing skim milk powder for calf feeding. This was more economical than milk for calf feeding and provided more milk for the "defense" effort. (38)

In the 1940's the Dairy Industry researchers were studying cottage cheese flavor as influenced by manufacturing methods and the effect of strong flavored feeds such as wild mustard seeds and grain screenings, resulting in off-flavored milk. They continued looking at factors effecting milk production including management procedures, milking techniques, calving care, nutrition and genetics. (39)

A new Dairy Center, costing $1.8 million, was built 1 mile west of campus (today's BART Farm) in 1959. (1) The old facility, built in 1903, no longer offered the research and teaching facilities needed to do the job. The new Dairy Center had 17 buildings, 2 bunker silos, and yards covering 3 acres. It could handle a milking herd of 100 cows plus dry stock, heifers and bulls. The new facility had a light-controlled, soundproof observation room so visitors could observe without disturbing the cows. Cows were milked 3 at a time in about 5 minutes. (52)

Research and student emphasis in dairy declined in the late 1960's and 1970's. The industry in Montana no longer represented a large portion of Montana agriculture income. Bozeman was becoming more populated and the waste, odors and overall appearance associated with a dairy operation was becoming a concern.

An external review of the Department of Animal and Range Sciences in 1978 began to point out some of the concerns that eventually led to the dairy program becoming a lower priority in Montana. The review team noted, "Income derived from the cattle industry and rangeland grazing, equals nearly half of the total state agricultural income. Dairy and poultry science have combined income of only a total of 5% of state agricultural income." (54)

J. M. Bryant remained as Extension Dairy Specialist from 1978-1990 but the dairy closed in the late 1970's and the herd was transferred to the dairy at the State Prison in Deer Lodge. Some dairy classes were offered in the early 1980's but by 1990, there were no longer dairy classes listed in the catalogue.

Poultry

The poultry program was a significant program in both the Experiment Station and in the College from the beginning until the mid-1920's. William F. Schoppe was the first faculty member who specialized in Poultry Husbandry and under his leadership from 1908-1923, the program prospered. After Schoppe's departure in 1923, G.P. Goodearl took over but when he resigned in 1925, the poultry program declined until in the 1928-29 Annual Catalogue, there was no longer a Poultry Program or poultry classes listed. (18)

In 1930 the Poultry Husbandry Department was disbanded due to lack of funds resulting from fund shortages during the Depression. In 1944 there were 4 poultry classes offered as electives and these courses were taught by Animal Industry faculty.

The Department of Poultry Industry was reinstated in 1945 after a lapse of almost 20 years. (39)

In 1946, Everett R. Halbrook was hired and he rejuvenated the program and for the first time turkey production was added as a class. (20)

The department was studying factors to expand the gross income from poultry in Montana from the $12.5 million in 1952. They were investigating the economy and efficiency of feeds as well as other growth factors, market qualities, livability, egg production, and hatchability.

Harriet E. Cushman served as Extension Poultry Specialist from 1921 to 1947.

In 1952 Poultry Industry became available as a major in the College of Agriculture. (22) This remained until 1962 when the Departments of Animal Industry and Range Management, Dairy Industry and Poultry Industry combined to form the **Department of Animal Science and Range Management**.

Through the 1970's and 80's fewer poultry classes were offered until by 1994 there were no poultry classes listed in the catalogue.

Swine

Swine was a major component of the animal science effort at Montana State from the opening of the college and throughout the 20th century. Luther Foster wrote Pig Feeding as his first Experiment Station Bulletin in 1893. The Piggery, built in 1905, was a major building priority early in the history of the College. It had a main building with 2 wings. (10) One-quarter of the Experiment Station Bulletins related to livestock in the first 20 years of the Experiment Station were about swine. In 1927, half of the livestock Experiment Station projects were related to swine production. (33)

In the 1940's a new breed of hog, the "Hamprace", had been developed by Experiment Station researchers in cooperation with the US Range Livestock Experiment Station. It was claimed to be prolific and efficient in converting feed into pork.

Throughout the years some improvements were made to buildings and grounds facilitate teaching and research needs. In 1959 the swine production unit was able to market 1000 pigs annually. Cleaning could be done by tractor and an auger system completely mechanized the feeding. (53)

In the late 1960's the C.H. Perry Swine Center was built in on approximately 5 acres west of campus. It was a farrow to finish combined confinement and open lot facility.

The facility was described in a report as follows: "The facility consists of an environmentally regulated confinement barn constructed in mid-1960, a naturally ventilated confinement finisher barn constructed in 1971, an open front naturally ventilated boar test building constructed in 1980, 6 individual farrowing units constructed in the mid 1980's and 22 dirt lot pens for housing the breeding herd and overflow finisher hogs. There is also an office area, small classroom, feed storage areas, and bulk grain and feed storage bins. Farrowing room is a 30'X 35" space in the main barn housing 15 farrowing crates (5' X 8') with slotted floors over collection pits. Six farrowing units with a 6'x' hutch and 8'x8' outside pens. Nursery room is 30'x35' in main barn housing 120 head in 12 pens with slotted floors and collection pits. Grower-finishing room is 15'x105' in the main barn housing 80 head in 20 pens. Having 75% slotted floors and collection pits. Finisher barn is 4 pens for 48 head with slotted floor constructed in 1971 by Montana Pork Producers. Boar test building is an open front with 12 pens and constructed in 1980." (43)

The Swine Center was a swine test station from 1971 until 1993 when the program was discontinued.

Dr. Walt Neman conducted research in swine feeding and nutrition from 1964 until his retirement in 1996. In 1965 he accepted management of the swine program. He was involved in designing the new swine facility and nutrition laboratory. His research was concentrated on swine feeds common to Montana, particularly barley, which led to projects with other US and foreign researchers.

Dr. Wayne F. Gipp served as Extension Swine Specialist from 1980-2009. He developed and managed the Swine Symbol of Excellence program and promoted the use of ultrasonic evaluation as means to utilize carcass data to supplement visual appraisal in swine selection programs. Dr. Gipp was manager of the C.H. Perry Swine Test Station from 1984 -1994 which served producers throughout the Northwestern U.S. Dr Gipp's research focused on the nutritional value of alternative grains. He taught classes in Swine Production until his retirement in 2009.

The Swine Center was closed in 1995 due to budget constraints and was not reopened because of environmental concerns. (44)

The Farmers Institutes

The Montana Legislature passed a bill creating the Montana Farmers Institute Board on July 28, 1984. Although the board itself did not get organized until 1901, these extension-type meetings were known as Farmers Institutes and provided a very efficient way to educate farmers and

ranchers. The Farmers' Institute offered a number of short courses to producers, ranging anywhere from two hours to two days, on a variety of topics of interest to producers at the time, such as hog and cattle production.

In 1901-02, 17 Farmers' Institutes were held. The meetings usually lasted 2 days and panelists discussed a subject. Along with a specialist from the College, other panelists might be farmers or ranchers or others with experience with the issue being discussed. At the 1901-02 Farmers Institute subjects covered included Stock and Stock Feeding with Robert Shaw and Poultry with H.C. Gardiner. In 1903 the state appropriation increased by 25% and in 1907 a full-time director was hired to manage the Farmers' Institutes. By 1908 the appropriation doubled and 52 meetings were held.

The Farmers Institutes continued to grow and were joined by another popular outreach activity, the "demonstration trains". In 1908, the first train, furnished by Northern Pacific railroad was organized by Experiment Station personnel in a major effort to extend information to Montanans. This first train was concerned with "Dairying" and included nearly all Experiment Station personnel as well as several dairy cows. The Northern Pacific ran a 9-car train from Wibaux to Plains in 1912 which allowed 18 instructors to talk to 28,000 visitors! A similar Great Northern Railroad 12-car train and a Milwaukee Road joined the effort in 1913 allowing 272 sessions of various types to be held.

In 1917 the Farmers Institute merged with the Extension Service.