



**Hermiston Agricultural
Research & Extension Center**



**1909 – 2009
Centennial**

100th ANNIVERSARY

A copy of six articles submitted to and printed in
The Agri-Times Northwest of Pendleton, Oregon

Six short narratives concerning the work history
of the Umatilla Reclamation Project Experiment
Farm in 1909, to the Oregon State University
Hermiston Agricultural Research and Extension
Center in 2009.

- 1902** – Umatilla Project founded by General Reclamation Act
- 1909** – Umatilla Experiment Farm set aside on a forty acre tract. Land was prepared and evaluations of fruit trees, berries, vegetables and field crops were started. Studies of forage and pasture crops, feeding of sheep, cattle and swine commenced.
- 1920** – Various publications concerning agricultural production became plentiful. The station location was proving unsuitable for experimentation. Mr. S.C. Scofield and J.T. Jardine were credited with a decision to move to a different site, The Umatilla Field Station.
- 1930** – The present site was selected and in 1931 Congress provided \$35,000 in the Second Deficiency Act on March 4, 1931 to establish the station on the new site.
- 1940** – Umatilla Branch Experiment Station, to this decade considerable research concerning turkey grazing, foods and production were reported.
- 1960** – Feedlots and buildings were constructed for conduction research for feeding cattle and sheep. A swine studies building donated by the Oregon Wheat Commission was erected.
- 1970** – Newer and larger tracts of the more sandy soils were being reclaimed for agricultural production. Studies of sprinkler irrigation by side roll and hand lines for cereals, forage and vegetables were implemented. Cereal and potato breeding studies for irrigation were intensified. The station was administratively combined with the centers at Moro and Adams to become the Columbia Basin Research Center, Hermiston. Later Extension offices moved from downtown Hermiston to the Center.
- 1980** – During the 1980's the Morrow and Umatilla counties regional strategy high value added research program was established due to local interest in potato, onion, sweet corn, mint, asparagus and flour production at Hermiston Agricultural Research and Extension Center. Center pivots came to the center and potato research facilities were built.
- 1990** - Soil and water relationships along with conservation of the same become more intense. Pathology lab greenhouses were constructed.
- 2000** – More intense studies about interactions of insect-disease, nematodes, water use, crops, and soil nutrition continue.

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Umatilla Experiment Farm Grows

Article 1

Pre-editorial revision: First of a series concerning the centennial celebration for the Hermiston Agricultural Research and Extension Center, June 30, 2009. Submitted to the Agri-Times by Mathias F. Kolding, Emeritus Faculty with minor editing by Sandy DeBano, OSU.

100TH ANNIVERSARY FOR HERMISTON AGRICULTURAL RESEARCH AND EXTENSION CENTER (HAREC) STARTED AS THE UMATILLA EXPERIMENT FARM

About 100 years ago an irrigation system was nearly ready for settlers to work this dry, dusty region of northwestern Umatilla County. The land was surveyed, ditches prepared, legal services were ready, railroads and roads were in place. Towns were mapped. Some businesses were already up and running.

Amidst all this was the Umatilla Experiment Farm, a forty acre piece of land ready with buildings to house people prepared to advise, teach and demonstrate how to extract a living from this scattered brush and native forbs protected sand.

As part of the State Agricultural College, the Umatilla Experiment Farm had three prime objectives of education, research, and extension.

1. Education: to pass knowledge and reveal knowledge sources to youth, to the food production system, and to consumers.
2. Research: to study and search for the better use of the biological, soil, and water interactions.
3. Extension, to gather, transcribe, demonstrate, and teach research results.

The Hermiston Agricultural Research and Extension Center (HAREC) was first established in 1909 as the Umatilla Experiment Farm on the Umatilla Government Reclamation Project after about two years of project preparation. Mr. Ralph W. Allen, Agronomist, served as its first Superintendent. It was located on forty acres of land two miles northwesterly from the town of Hermiston (roughly four miles north of its present locations). Land had been divided into reasonable plot sizes, ditching



completed for water, surveying, descriptions concerning geology, soil structure, weather, buildings started, equipment acquired, workers hired and plans laid about how to serve the proposed 20,000 acres for reclamation, though at the time water was only available for 11,000 acres.

Irrigation development in the western United States may have its roots traced to a scheme of Dr. Wozencraft and his associates in 1859 when they had proposed that the USA give California some 3,000,000 acres of Salton Valley land; however, it laid as a barren waste land until irrigation water became available in 1902. During that time and until the present the adjudication of water rights and costs are consistent challenges.

Rural communities have irrigated crops for several thousands of years. During that interim they learned that desert soils are fragile and highly variable. Therefore, surface topography, texture and depth of soil, movement of water at roots, characteristics of water, permeability of soil and water logging were studied and hopefully addressed prior to the initiation of new reclamation projects; however, as society has traveled through time these topics still distress the public and agriculturalists.

Though soil and water studies did involve a prime concern, what also transpired were interactions with climate, irrigation rights, growers, sustained productivity, crop systems, animal and poultry production, and the economics of irrigation farming.

A few comments from the 1923 publication "A Survey of Reclamation" are as follows:

"There is no room for a middleman between the water and the farmer."

"Most farmers here are satisfied with ordinary crop yields. They overlook the fact that high production is necessary if they are to clear their obligations."

"A fatal error is embodied in the reclamation system: charging the farmer no interest on the construction cost, which removes all incentive to pay when he has money available."

"Some years ago much land here in the Northwest was sold to clerks who thought they needed only to tickle the soil to become rich. When they found that they had to work two or three years they gave up." Into the tides of the above stepped the fledgling Umatilla Experiment Station charged with research, education, and extension. In 1909 little or no research was conducted and effort was spent towards reclamation of the land.

By 1914 the irrigated lands had expanded beyond early estimates to about 57,000 acres and were projected to further expand to 160,000 acres. To respond to the challenges associated with this huge increase in acreage the staff engaged in an amazingly diverse set of research activities for its small size. There were 47 apple, 14 pear, 4 quince, 22 plum, 25 cherry, 17 nectarines and apricots, 50 peaches, 5 cane fruits, 75 strawberry, and 28 grape varieties established!



Garden and truck crops were also addressed. In 1912 the following were under test: asparagus 2, rhubarb 5, watermelons 8, cantaloupes 3, and eggplant 2. Varieties of the legumes sweet clover, red clover, alfalfa, sainfoin, hairy vetch, and cowpeas were also studied. Thirty four varieties of 20 hardy shrubs were also established. In 1912 a machine shed and small workshop was added.

Mr. Ralph W. Allen, Superintendent, did write in a December 16, 1914 report about the soil deficiencies of nitrogen and organic matter. He also noted that frosts will require attention due to the possibility of late frost damage to orchards, though not being severe enough to damage field crops.

Soil alkali, establishing crops, crop rotations, prevention of soil movement, coupled with economical water required research. Much energy and time was also spent on educational work both at the station and among farmers.

Investigations by 1914 had extended to truck crops of cantaloupes, potatoes, beans and other garden crops. Strawberry plots, 18 one-tenth acre fertilizer plots were established. Irrigation trials were conducted on alfalfa, forest tress, ornamental plants, cane fruits, grapes, fruit trees, apples, pears, apricots, cherries, quinces, and soil treatments. From this work and other Columbia Basin research some 40 to 50 pamphlets were made available through the Extension Service.

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1909 August 05, USDA Bureau of Plant Industry, Washington D.C. Hints to Settlers on the Umatilla Project Oregon.

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Challenges for HAREC Many in Early Going

Article 2

100 YEARS OF SERVICE, THE SECOND ARTICLE IN A CONTINUING SERIES ABOUT OREGON STATE UNIVERSITY'S HERMISTON AGRICULTURAL RESEARCH AND EXTENSION STATION (THE UMATILLA EXPERIMENT FARM)

Mathias F. Kolding and Sandy DeBano

Oregon State University's Umatilla Experiment Farm, Hermiston, Oregon established in 1909 on a 40 acre field yielded a multitude of effective and useful information. It soon became apparent that the site could not answer with full confidence the mission of soil improvement, water use efficiency and comparative crop values.

If it could not study those three properly, how then? Could it continue to fulfill its responsibility to American agriculture's three foundations of Research, Extension and Education?

Hopefully this article tells a portion of the Farm's short history from 1909 to the late 1920's. A period where products, industries, businesses, transportation, nature, and people's complexities and interactions were revealed.

The following excerpt from: (Separate 690, from USDA Yearbook 1916, Scofield, C. S. and F. D. Farrell. 'Farming Under Irrigation'.) may describe the essence what influenced the Station's future transitions.



"The development of agriculture under irrigations involves conditions that are essentially different from those of ordinary farming. In general, the labor cost of crop production is somewhat greater, the necessary investment of capital is larger, and their requirements of social organization are more complex. These conditions require that irrigation farming shall yield larger returns than ordinary farming if it is to be successful. Of the three conditions mentioned the essential complexity of the social organization is the least understood by those who have to take part in it.

The development of an irrigation enterprise necessitates a period of pioneer existence. This period, unlike most of the pioneering with which many people are familiar, involves community problems which must be dealt with from the very beginning. On Government reclamation projects these problems are more conspicuous than elsewhere, chiefly because the colonists who occupy them have come together suddenly from widely different conditions of life and usually with previous experience to guide them.

The underlying purpose that has influenced legislative and administrative policies regarding Government reclamation has been to establish homes on the land rather than to provide the most efficient means for increased agricultural production. But successful home making is dependent upon a reasonable degree of material prosperity. Thus, the economic problems and possibilities of irrigation farming must be understood and realized if this great experiment in the reclamation of arid lands is to be made a success.”



The struggle to harness nature’s resistance to man’s taming of the lighter soils for food production is thousands of years old. For the historical peoples the easier to work sandy soils were tempting, but the heavier soils closer to the rivers were often the most productive. The soils and problems of soil reclamation along the Columbia river was probably similar to what occurred to populations along the Tadzhen, Tigris, or the Nile rivers limited to

the heavier soils bordered by sandy soils.

The following comment was written by R. W. Allen in a 1917 report; “The Work of the Umatilla Reclamation Project Experiment Farm”.

“The sand soil of the Umatilla Reclamation Project has been difficult to bring into profitable production because it has been deficient in organic matter, easily eroded by the wind and by irrigation streams, and very porous, so the irrigation water percolates rapidly.”

Researchers devoted much attention to the challenges of conserving, watering, and adding the organic matter necessary to maintain a viable production system within this fragile near chaparral/desert area.

To address those challenges they had established three primary research goals; 1. Soil improvement. 2. Efficiency of irrigation water. And 3. Comparative value of fruit and field crops.

Soil improvement. Various fertilizers and combinations of nitrate of soda, muriate of soda, acid phosphate, land plaster, tankage, blood meal, and barnyard manure were studied. Green manures of vetch, alfalfa, and rye were compared. At the time the effort was to increase the organic matter so the use of commercial fertilizers was not encouraged.

Water use efficiency. The spreading of water (flooding) over a long slope was determined a wasteful practice. Water applied to the upper part of the field would percolate to greater depths than useful as the water eventually flowed to a field's lower part. Border irrigation systems were designed with permanent stable ditches at an upper level which could feed a series of rills (ridges between shallow furrows). The rill length served by the ditch was determined by the slope and infiltration rates of the field.

Frequency and rate of water application is also related to soil type, plant species, evaporation, and crop maturity. The ratios of sand, clay, organic matter and previous traffic on the soil can impede or alleviate water infiltration. A field of wheat seedlings does not use as much water nor require the depth of useable solid water as a mature fruit tree, but the timing of water application to each is quite different. To the grower it not only means caring for the ditches to serve his fields, but maintaining them so water would keep flowing further to his neighbor. Then imagine this area of very diverse plants served by a complicated ditch network which has its special requirements and personnel to maintain its quality and quantity of water. The system evolves to one of acquiring reliable information, experience, and developing an art concerning application and supply.

Comparative value. The value of fruit crops versus field crops was probably a very frustrating exercise not just a "apples versus oranges" comparison. When one, who is not familiar with the Umatilla county topography, travels across this area the influence of soil type, slope, annual rainfall, and elevation are noticed. The interactions, however, between the physical environment and plants are decisive. So when settlers came to



wrest a living within this area they soon had to learn that what works for the western Umatilla County project fields may not for eastern Umatilla County. It may even happen that; What works for my neighbor may not work for me.

Profit and income were, of course, the means to build homes, care for families, and pay for land and improvements. The 'Forward' of O'Donnell I. D., 'Hints From A Practical Farmer' Washington Government Printing Press. 1918 was titled 'Better Business On the Farm'.

The first paragraph is "The advancement of the interests of the farmers in any country depends upon the adoption and the application of the principles of the formulae—better business, better farming, and better living." Later "... to realize the benefits of better farming and better living we must be religious in our efforts to instill in the minds of the American famers the necessity for and the means of acquiring and applying the principles of better agriculture."

"Before the advent of our excellent transportation facilities each farming community could control its markets and general business." In contrast now "... no agricultural community in this country is independent of any other section of the country or of the world in general."

Then there were also sheep, cattle, horses, and hogs interspersed with water, soils, crops, and farmsteads. Life became more and more complicated. When reading reports concerning extension, research, and education one could become suspicious that the three were drifting apart; however they are so intertwined in the American agricultural system one cannot pull them apart. It is just that as the agricultural system reveals such dynamic interactions in local systems it is a small but integral part of a larger system of food production and distribution. The food system evolved so that researchers, extension agents, and educators became more specialized since chemistry, physics, atmospheric science, soils, diseases, insects, nutrition, markets, consumption, transportation and so on revealed their diversity.

Extension agents (once called 'better farming agents') conducted farmer information meetings. Homemaker clubs, 4-H clubs for youth, Ag business courses in schools, winter short courses in colleges, crops and soils courses, and even high schools designed to specialize in agriculture were formed and established.

The order of the day might be summarized as quantity, but the quality-quality-quality must hold its place in the markets.

When reviewing the reports at hand there is a lot of information about weather and its hots and colds, dries and wets, calms and winds. Much is written about yields of apples, peaches, berries, apricots, alfalfa, cereals, corn, and potatoes. Then there are the highs and lows of costs and incomes. The world war one, the flu, the economic collapse after WWI, the giddiness of the 1920's. Some mention of labor shortages and their costs.

What is it then? About the reports? It appears that it is about challenge, about feeding people, about community, about doing a good job, about just keep on trying. After all, think of all those who tried before from whom we learned.

Authors note. Article number one and this article number two submitted by Mathias F. Kolding and Sandy DeBano to the Agri-Times tell of transitions during the years of 1909 to 1929.

New Plans Laid in 1930 For Ag Center

Article 3

A continuing story: This article is a review of what occurred from the late 1920's to ~1950. It is the third of a series leading to the centennial celebration for the Oregon State University's Hermiston Agricultural Research and Extension Center (HAREC) June 30, 2009. By Mathias F. Kolding, Emeritus Faculty and Dr. Sandy DeBano, OSU.

JUNE 30, 2009 - 100th ANNIVERSARY FOR OREGON STATE UNIVERSITY'S (HAREC) HERMISTON AGRICULTURAL RESEARCH AND EXTENSION CENTER INITIATED AS THE UMATILLA EXPERIMENT FARM

These short articles about the evolution of Oregon State University's HAREC nearly represent a microcosm of American agriculture development. They describe an agricultural system served by a land grant institution's prime objectives of education-research-extension each linked, each multi-functional—a system built to provide safe adequate affordable foods for its citizens.

This article is an attempt to draw you into the transition from the 1930's to the 1950's when the present HAREC location site was developed and the original location was left behind.

By 1930 new plans were laid. The area was surveyed. Rules for settlement were made. People came. Buildings were built. Families worked and produced food where a semi-desert community had once held its sway. That desert community was not surrendering easily for it had many allies. Allies like the winds, blowing sand, and frosts. Weeds, insects, bacteria and viruses came to the desert community's aid to feed on the new rich pasture of plants and domestic animals.



The harvest brought forth more than what was locally consumed. Agricultural advice and research gave rise to value added produce such as pigs, cattle, sheep, bees, turkeys, geese, and chickens.

A review of the paper "History of the Development of the Umatilla Field Station, March 04 1931-December 31, 1932." reports the following:

It took only 11 years to decide that the 40 acre Experiment Farm north of Hermiston did not have the soil structure or acreage to answer production questions about local irrigated sandy soils. During a 1920 conference between Mr. C. S. Scofield, Principal Agriculturist in Charge, Western Irrigation Agriculture and Director J. T. Jardine, Oregon Agriculture Experiment Station, they decided to initiate a search for a more suitable site.

A tract of about 180 acres two miles south of Hermiston was selected as a site to investigate for the new 'Umatilla Project Experiment Farm' pending construction of the McKay Creek Reservoir and enlargement of the Umatilla Project.

Ownership was determined. Six test pits were dug to determine drainage and soil profiles. A well for domestic use was drilled to 275 feet with a yield of 1200 gallons per minute. On March 4, 1931 Congress provided \$35,000 to establish the station. Water rights and costs were determined. Then the plans for developing the land were laid and building sites selected.

The early rotations were sweet clover 2 years pastured, early potatoes 1 year, sweet clover 2 years pastured, and corn 1 year, and then repeated.

During 1931 about 90 acres were cleared and seeded to a rye cover crop. Fall winds did some significant damage to the young rye so a portion was reseeded. During the following spring 41 of the cleared acres were leveled, bordered, ditched, and seeded to sweet clover and alfalfa.

The number and results of research programs expanded considerably; therefore only one example is given here to give the reader just a little flavor. Poultry men requested a complete poultry unit since they explained that most previous research was on livestock. They wanted proposals to be specific, but added that housing, diets, and egg delivery to markets were priority concerns.



Poultry researchers responded to the industry's request. Station Circular No. 429, "Fifteen years of Turkey Investigations at the Umatilla Branch Experiment Station" by D. H. Sherwood, Research Experiment Station, (presently HAREC) Hermiston, Oregon gave a comprehensive and detailed report about turkey research investigations.

In that report they listed 8 conclusions. Several are listed as follows: 1. Use of a growing pasture reduces feed costs of growing turkeys. 2. A 20% protein ration during finishing results in heavier birds. 3. \$2.00 extra per ton for pellets versus mash is a minor feed cost. 4. More scratch grains are consumed when a mash of 30% protein is fed instead of a 20% protein feed. 5. War-time emergency rations containing soybean oil meal were adequate. 6. No benefits were derived from feeding supplements of barley and alfalfa meal soaked in milk. 7. Artificial lights used after January 1 increased egg production. 8. It is not economical to keep turkeys a second breeding season. By 1950 the research activities had increased to include turkey breeder experiments, cull potatoes for turkeys, and shade for turkeys.

Additional research topics ranged from sunflower trials to hogs in pasture. Dairy feeding trials were conducted. 60 apple, 4 pear, 10 apricot, 19 peach, 38 prune/plume, 9 cherry, 14 black, Chinese and English walnuts, 22 grape, and 11 berry varieties were established.

Potatoes, beets, squash, sweet corn, field corn, alfalfa, soybeans were evaluated in yield comparison trials.

The programs became more and more intensive as insects, diseases, and weeds found “happy homes” in this new lush diverse food source provided by agriculture. Extensions’s role expanded as food source and safe food consumption became more complex since people also found “happy homes” in this new diversity. The areas viability then required additional demonstration and teaching about how to effectively use research information. Extension centers were added in the late 1930’s in Milton-Freewater and Hermiston.

The critical value of both the research and extension systems were exemplified during the 1939-46 wartime period due to their organizational structure. Topics especially relevant to World War II such as Selective Service regulations, victory gardens, machinery priorities, milk and butterfat programs, salvage of tin cans, paper, and clothing, appeals for truck gasoline, slaughter permits, local canning, and livestock health all added to foster a viable community participation in the war effort.

Irrigation and the fruits of irrigation must share a goodly portion of its credit to the irrigation districts personnel. Those who maintained and monitored the supply and flow of irrigation water played such a vital part in any irrigation success. In 1948 the Columbia River flood caused extensive damage. There was also a break in the Westland Canal south of Hermiston. That break caused a ¼ mile deep ditch which was 30 feet deep at its mouth. (Source: Leroy E. Fuller, OSC Extension Service Report, Umatilla County 1948, pp 4-D.)

The next report will cover the next two decades from 1950 to the 1970’s which saw further expansion of irrigated sands and the arrival of a still larger expansion in the next decades. mfk.

Article Continues HAREC'S Story

Article 4

JUNE 30, 2009, 100 YEARS OF SERVICE, THE FOURTH ARTICLE IN A CONTINUING SERIES ABOUT OREGON STATE UNIVERSITY'S (OSU) HERMISTON AGRICULTURAL RESEARCH AND EXTENSION STATION (HAREC)

Mathias F. Kolding and Sandy DeBano

This is the fourth article tracing Oregon State University's Hermiston Agricultural Research and Extension Center's transition from 1909 to the present. The first and second article told of a well planned, but maybe rather naïve notion that a little 40 acre plot could really serve the area. It took only one decade to discover the folly of its location in spite of the broad range of fruits, vegetables, berries, and crops established. The third article presented the transition to the present location, and some remarks about research and extension. This article, hopefully, continues the story to the 1970's.

Measuring Water Use. Prior to the clearing of the Umatilla Project lands one might have assumed there were few soil composition and structural differences. An example of concern by soil/water researchers, however, was about how applied water affects soil alkaline and salt accumulations due to poor sub-soil drainage. To study those accumulations eight lysimeters were built to measure evaporation, percolation rates, percolate composition, and alfalfa water use. Each lysimeter was a concrete box like structure 3.3 feet square and six feet deep placed in the ground over a pit to facilitate percolate collection. Access to the pit was by a stairway which exposed one side of the lysimeter. The lysimeters were filled with either virgin soil, and/or soils ranging from fine sandy loam to the more coarse sands. Variable water rates studied during the growing season were mainly 3, 4, and 6 inches per week. A total of 2,500 weekly measurements were recorded over a 17 year period ending in 1942. Later, water use and soil infiltration studies were spread out away from the station as more portable systems were devised.

One such system used a favored tool known as the "King Tube" to collect soil moisture samples. Thousands of holes were left as it was laboriously punched and hammered into the ground to extract soil samples. These samples were then placed into sealed containers and returned to the lab to determine water content.



More precise information, however, was needed by growers if they were to effectively balance water use and supply for their expanding crop numbers and crop values. Therefore, two systems were combined to calculate water use coefficients for plant growth stages to determine the daily and growing season water required for each crop:

1. The U.S. Weather Bureau standardized a Class “A” evaporation pan for daily water evaporation, air temperature, and wind miles per day.
2. Soil tensiometers and gypsum blocks measured water infiltration, retention, and plant use.

Mechanizing Water Distribution. During the decades leading up to the 1970’s it became more obvious that something was needed for more efficient water distribution than rill/flood irrigation. Overhead sprinklers were the answer. Water was pumped through feeder lines and connected to movable hand lines or mechanical side rolls. Various water pressures, nozzle hole sizes, sprinkler configurations, sprinkler heights, and lengths of water application times were studied. Eventually the “choa, choa, choa” of water being mechanically spread became a song through much of the irrigated area. Experience had taught that dams and canals were not always a reliable water source. True as it is, fruit trees, bushes, and perennial crops can survive delayed spring, or depleted fall water supplies. Potential annual high value crops such as potatoes, onions, carrots, and leafy vegetables require a more certain water supply since markets for these types of produce are not conducive to quality fluctuations from production areas.



Since sprinkler water applications implied a more controlled water application, it became imperative to record and study the effects of water distributed through sprinklers. Therefore, as a start, from the original desert environment a 10 acre tract of sage brush land west of the Station buildings was cleared in the early 1950’s to study sprinkler irrigation.

Though water was supplied to the Experiment Station from the Cold Springs Reservoir via the Feed Canal early in the spring and later pumped from the “A” Canal, an additional water source was established by a well drilled near the east border of the sprinkler irrigated tract.

Water and soil use were being blended, however nature did not leave a complete and adequate food deposit for these new plants. Soil and plant researchers studied an

array of major and minor elements necessary for not only health plant growth, but to provide a supply of essential elements and nutrients in peoples' food.

The rivalry. There were rivals constructing homes and communities. Not humans, but foxes, coyotes, badgers, gophers, rabbits, and worms constructing enough miles of underground homes and tunnels to make a hobbit's lifetime adventure. These rivals came to feast on the new yummy food abundance produced on those Umatilla-Morrow County sandy soils. Also, much to the growers' frustration, birds, insects, fungi, bacteria, and viruses came as though they were invited guests.

A warfare against the unwelcome guests emerged. Chemists and agronomists worked with new chemical formulations such as organic phosphates and chlorinated hydrocarbons to control insects. The results were, at times, spectacular. Some of the formulations, however, also held dangers to birds and mammals. Other chemicals hung around longer than desired while others decomposed rapidly. Formulations were changed. Exposure times were defined. Several, like DDT, were withdrawn from use. Even the old time popular mercury, arsenic, and formaldehyde compounds fell into disfavor.

The same was also true with the unwanted invasive plants. With the advent of irrigation both broad leaf and grassy weeds seemed to sense a new "happy home".

Screens were set in front of pumps to catch weeds invading via the canal water.

Experiments were conducted to determine the proper screen dimensions and hole openings until a system was devised to just keep out items which may plug the pumps and sprinkler orifices. Russian thistle, kochia, tumbling mustard carried by winds, however, just bounced across the fields to leave their many seeds. Others were brought by mammals, birds, machines tires, feet, and contaminated seed.

To counter act the many complications with invasive plants and their controls caused in the food production system, the Land Grant Colleges developed new agricultural courses to teach pesticide specialists who were to serve as public and private professionals.

From Crops and Soils to Animals. A different set of challenges emerged on the station as feed sources and numbers of domestic animals and birds increased. A sheep shed, a hog feeding facility, and cattle yard were added to facilitate investigations of feed sources and animal growth patterns as well as comparative heritable animal breeding characteristics.



A Shift in Assignments. Station and campus researchers were being confronted with an ever expanding sophisticated plant and animal food production system. Extension Services more or less operated out of their separate offices. Research Centers were given specific assignments. Hood River worked with fruits. Astoria had a dairy. Union expanded into forest rangelands. Ontario did flood irrigation. Burns researched limited rainfall rangelands and so on for each Station.

Oregon's diverse environment which allows for the profitable production of most livestock, birds and over 100 different crops put a financial strain on limited research resources. With that in mind a more manageable system was needed.

In the early 1970's a comprehensive study was made concerning priorities for the Oregon Experiment Station system. As a result, the Hermiston location station was administratively combined with the Stations near Adams and Moro and became part of the Columbia Basin Agricultural Research Center headquartered at Adams.

Local Support Vital to HAREC Changes

Article 5

100 Years of Service, 1970's-1990's: The Fifth Article in a Continuing Series about Oregon State University's (OSU) Hermiston Agricultural Research and Extension Center (HAREC)

Submitted to the Agri-Times by Mathias F. Kolding, Emeritus Faculty, and Dr. Sandy DeBano, OSU.

As noted in the previous article, a comprehensive study was made in the early 1970's concerning the Oregon Experiment Station system. As a result, the Hermiston location was administratively combined with the Stations near Adam and Moro to become part of the Columbia Basin Agricultural Research Center (CBARC) headquartered near Adams, Oregon.



Shifting Back to Crops and Soils from Animals:

The sheep, swine, and dairy portions were closed, and several years later during the 1980's the Station's beef progeny and feeding studies were assigned to other stations.

A fairly large acreage to the west and south of the Umatilla Munitions Depot was the next area prepared for irrigation. Some of this land was in limited production. The soils to the west and

south of the Depot presented a complex challenge. When tracing those soils from the Columbia River south, they generally range from a deeper sandier Winchester than found at the Hermiston Station. Further south they have a finer texture with a higher clay percentage until they change to a shallow Ritzville type, which has a slower water infiltration rate. Generally these soils are found where there is less than 12 inches of annual rainfall.

The preparation of those rolling, newer areas for irrigation was probably due to the improvement of the center pivot irrigation machines, additional water rights, and the growing market for high value vegetable crops. The pivots require land leveling, but not as severe as for rill or flood irrigation. This process resulted in the opening of 80 to 120 acre tracts for each pivot. Often, there were still larger areas cleared to accommodate a number of center pivot systems. As usual, wind storms did not occur on any set schedule so sand and dust storms were a problem.

In June 1971 the USDA and the Soil Conservation Service of Oregon issued a paper "Why Let Your Soil Blow Away?" In it were some former oft repeated axioms and reminders about caring for these desert soils with headings such as: Irrigation Water Management, Cover Crops, Crop Residue Management, Use Mulching, Pasture and Hay Land, and Grain Strips. In one sense it seems as though about every two decades a concerted effort is required to remind growers about basic soil issues.

A soils/crop specialist was also appointed during this period to research, demonstrate, and report best management of sandy soil conservation, cropping, and fertilizers methods under center pivot systems.

Revamping the Station: Though the personnel serving the Umatilla Experiment Station had more experience in Crop Science and Horticulture, they were serving rather extensive animal research projects. Therefore, since there were stations serving the animal industry near Burns, Union and Corvallis, the animal research projects were concluded at Hermiston.

The swine facility was rebuilt to serve a cereal breeding project. The feed blending shed, plus an addition of smaller building served an expanding potato breeding project. The calf shed was modified into a laboratory for the Horticulturist. The horse/storage shed was modified and connected to a new greenhouse to serve as the entomology laboratory. The dairy barn was rebuilt into a conference room and a pathology laboratory, which serves both growers and researchers.

It became apparent that research and extension could better serve the public if both entities were housed on the Station. So, an addition to the office building was built to provide office space for extension personnel, which made the station a better, more effective funnel for information distribution.

Community Integration: During January 1984 an Advisory Committee for the Hermiston Experiment Station was formed to identify and help solve contemporary food production and processing needs. The Committee consists of growers, representatives from the business community, food processors, and OSU staff. The Committee members and associate members bring forth and evaluate potential losses due to biological crop threats, contribute financially to solve problems, inform budgetary processes, and present feedback as problems are resolved.





Sophistication in food production systems often alleviates nagging problems, but as a system develops it also has external influences. The irrigated food production systems that developed in the western Umatilla and eastern Morrow counties are not large monocultures. Potatoes, carrots, mint, asparagus, grapes, alfalfa, and cereals, though in separate fields, are intermingled across the terrain. This intermingling and the various methods of controlling weed,

bacterial, viral, and insect pests interferes with sophistication. Whether it is a cultivation tool doing its work and raising dust clouds, or an aerial chemical application, bits, drops and vapors can find their way to sensitive neighboring crops. Chemical applications, in particular, are often the most quickly observed invader, whether detected by an odor or a damaged crop. As a result, rules and regulations concerning chemical applications are devised, but need monitoring and arbitration; therefore a pesticides investigator and advisory officer was assigned to the Station.

Another way in which the Hermiston Station connected with the community in this period was by devising and supporting an annual fall “Hermiston Farm Fair”, an event that continues to this day and helps to bind the community within the food production system. People are given the opportunity to meet and greet. Researchers tell about their research. Pesticide applicators are updated about chemical use. All can celebrate agriculture. These fairs are also held to provide companies an opportunity to display their products and meet customers. Later in the week an evening is set aside for dinner and entertainment.

Though the fall farm fair is a successful integration effort with the general public, other opportunities were devised during this period for “on-the-spot” explanations and presentations offered to the public through annual “Field Days”. Field days continue to this day; for example, in 2009 there is a grass seed day, a cereal variety day, a potato day, a corn production day, and on June 30, the 100th anniversary celebration. Station staff also participate in various county field tours held during each summer.

Space-age Irrigation: The amount of water to apply on various irrigated crops varies considerably with temperature, wind, soil type, humidity, crop, and crop growth stage. Experienced irrigators of this period had a reasonable knowledge about the amount of water to apply by probing and observing soil moisture, listening to weather forecasts, being familiar with their crops, and understanding growth stages. The tendency, however, was to overwater due to a reasonable fear of weather changes that may cause a shortage of available water.

Most crops can tolerate overwatering better than having a shortage in the soil. In addition, if a field is water depleted the risk of bringing soil moisture back to acceptable levels may come at a critical plant development stage. Furthermore, one had to learn the balance of rate of application and soil type since infiltration rates vary radically in the irrigated soils of the area.

An article by Gary Prothero, Extension Specialist, and Fred Ziari, Irrigation Specialist, in the Station's 1985 Research Report, Special Report 793, reported a system that was projected to improve scheduling information delivery and could decrease irrigation water use by as much as 40%. In this report it was noted that growers were reluctant to use climatic information because irrigation scheduling information was not timely. According to the report: "...A cooperative project with Umatilla Electric Cooperative significantly improved communications between the farms and the scheduling information. Climatic information (wind, solar radiation, temperature, rainfall, relative humidity) is collected by an automated weather station installed by BPA in Boardman and beamed to Boise by satellite. Then the information is sent to Umatilla Electric via telephone modem. The information is integrated into a Computerized Irrigation Scheduling Model and the results are made available to the local growers via a computer bulletin board or telephone answering machine..."



It was estimated that some 50,000 acres were scheduled to use the information. At that time, some 140,000 acres were sprinkler irrigated. So if the system became tried and tested, it could result in substantial water and dollar savings.

Upon reflection, it is quite apparent that during the period from the early 1970's until the late 1980's the community once again desired that the Station switch emphasis to better serve an ever increasingly sophisticated food supply system. Those switches were not achievable without local support and feedback about what information the system needed to function more effectively. This winter scene of the grape trial is nearly the last remnant, except for a couple of raspberry rows, of a very concerted and effective horticultural research effort by very capable researchers. The Station's focus, however, changes with the wants and needs of local food producers (MFK).

100 Years of Service, 1990's to Present

Article 6

The Final Article in a Six-Part Series about Oregon State University's (OSU) Hermiston Agricultural Research and Extension Center

The fifth article in this series reported that the Station's emphasis changed to one of research and extension with some education responsibilities. Livestock, poultry, berries, and fruit shifted to potato, forage, corn, and cereal breeding and development. Soil and water management became more intense. Then, with formation and positive support from the Hermiston Station's advisory committee, the station became the Hermiston Agricultural Research and Extension Center (HAREC). A much needed horticulturist was added as well as a research position aimed at dealing with problems arising for growers related to natural resource issues. In addition, the extension office was moved to the station, so the staff became a more balanced and effective group.



The First Impression. The gate entrance, the driveway, the lawn, and the buildings, when well kept and in order, give their share of credibility to the Center. Nonetheless, that credibility must continue when one enters the front office, whether through the door or the telephone. The Center has had and continues to have office staff who deal with finicky researchers, and help provide answers expected from growers, gardeners, and homemakers. They adjust to the anomaly of campus requirements and keep

track of a multitude of complicated accounts and external grants. Invited guests, 4-H leaders, and a confused public seek informed answers. They organize schedules, direct participants to meeting areas and to the appropriate extension agent or researcher. They keep books, order materials, do payroll, and even make coffee for thirsty folks. Still, they will more than likely maintain an unruffled welcome to all.

The Practical. The Hermiston Agricultural Research and Extension Center, by any other name, is still a farm. It is dependent on those who can repair, build, maintain, schedule, and operate machinery. It requires diligent and responsible helpers who carry out irrigation schedules. They are to apply the correct and right amounts of fertilizers. They are deeply involved with pesticide applications. Data concerning

experiments are often collected and recorded by them. Their work, assistance, and advice give a much added credibility to research results.

Potatoes. The role of potato variety development has grown in the last two decades. As the potato became a major produce crop in this desert area, so did the requirement for uniform tuber size and quality become demanding issues. These issues required strict watering schedules and amounts. Soil nutrition and tilth needed constant attention. Even what was once considered minor damage by insects, nematodes, and diseases could result in whole fields being rejected with considerable economic losses. As a result the potato industry supported a more regional potato development program in which the Station potato researcher played a vital role in variety selection and quality evaluations.



Since potatoes are offered to the public as tubers, it is not enough to have quantity, but the tubers must have acceptance by the consumer. Sometimes it is eye appeal. Some want large tubers, others smaller ones. Color plays a role. Does the store customer want to bake, boil, fry, or make salads; or is the sale price the deciding factor? The professional may ask about variety. Where was it grown? Several tubers may be sliced open. “Any evidence of worm holes? Is it knobby? Does it store well? How does it fry? How many thousand tons?” That person is often thinking about mass produced chips, French fries, pre-baked, pre-cooked, or other packaged products.

Most recently, a plant biochemist has joined the team at HAREC. His mission? To make an already healthy tuber even more healthy. Increasing the nutritional value of crops is particularly important in this day and age of health consciousness. The potato is already an excellent source of potassium, dietary fiber, and vitamin C, and the biochemistry program is working on making it a better source of other nutrients like vitamin B1 and folate. Using cutting-edge molecular approaches, the content of these vitamins in potato can be increased. In the end, this increases potato industry sales and the value of potato, and will decrease the incidence of human nutritional deficiencies.

Potato production is a complex business, and to address the multitude of needs and questions in the region involves a whole series of diverse professionals. HAREC researchers and extension personnel search for, examine, identify, study, and report about nematode controls, insect invasions and controls, soil and air borne diseases, proper pesticide applications, soil fertility and structure, water use and crop planting.

Onions, Melons, Sweet Corn, Carrots, Tomatoes, and Other Crops. Each of these crops, as with other fresh vegetables, find their way to the table as raw, cooked, or packaged products. Each of these crops is also exposed to variable crop managers, buyers, food processors, market fluctuations, and users. Each has, at one time or another, been brought to or researched at HAREC, whether it required attention from the horticulturalist, pathologist, agronomist, entomologist, or pesticide regulator.

Forages. Though forages are the number one crop in Oregon, forage producers are only organized to a modest extent, but it is possible that forage producers may tend to strike for the middle when it comes to quality, marketing, and production. At a risk of our being subjective, the forage market is very volatile. The consumer, animals in this instance, is highly variable. The forage market must serve cattle, sheep, and horses. Cattle are fed both for beef and dairy production. Each class requires (as do all domestic animals) different diets from birth to maturation. Sheep may have the ability to consume lower value forages. Horses are in larger numbers now than when they were replaced by tractors. Their diet requirements can vary from the very sophisticated to the ordinary. Corn, alfalfa, cereals, and miscellaneous forages have received recent attention by the Center even though the animal portion was deleted from the Center's function.



Newer Crops: Canola, Semolina, Grass Seed. Canola has drawn interest as an oil seed crop and its use in rotations as a pest suppressant. Semolina is an oil seed crop grown and used for several thousand years. Interestingly it must go through a long approval series before it receives its stamp of approval. Grass seed production for lawns and golf courses has the potential as a high profit crop. It also offers a potential perennial soil building crop. Once again production challenges are similar to the older crops, except that growers and others need to learn just what environmental hazards will diminish the value of the newer crops.

The Agricultural/Natural Resources Interface. Growers are not only faced with the myriad challenges associated with producing attractive and healthy food, but there is increasing pressure to do it in a way that maximizes the benefits we receive from other natural resources. Controversies caused by conflicts at the agricultural and natural resource interface are well known in the Pacific Northwest, and represent significant challenges to growers. One only needs think of the Klamath Basin controversy over the conflicting needs of water for irrigation and fish as a reminder. Growers' needs for science-based information regarding this interface led to the creation of a stream/riparian ecology research program at HAREC in 2001, one of the first of its kind

at an agricultural research station. Research is aimed at providing the science needed to help growers and the public find solutions to problems that “crop up” in this area.

Looking Back – Looking Forward – the Authors’ Perspectives

Just how one would tell the story of Oregon State University’s interaction with the public through its off campus research sites can be one of nostalgia. That said, however it is a contemporary struggle to fill OSU’s role in the battle to produce enough edible food for an ever expanding humanity, that humanity, reportedly, annually adds a number equal to Egypt’s population. An earthly population wherein a more and more variable creature survives.

As that variability expands in larger and larger numbers so do food preferences and health issues put pressures on the food system to produce more and more. The system, nonetheless, requires better quality and safer foods. That production and consumption system has also caused high mineral deposition shifts because grains, vegetables, fruits, and meats contain essential minerals such as potash, phosphorus, copper, zinc, selenium, and so on. These minerals are often carried to centralized locations where people live, consume and expel nutrients. Now there is pressure to deplete organic matter in the conversion to crops destined for energy production sites after which it is distributed to energy consumers. The residual energy is available to feed lots. Residue from the feed lots is distributed as food or hauled back to energy production fields.

Contemporaneously, a lush food production system acts as a magnet for other earthly creatures. It is as though viruses, bacteria, fungi, rodents, insects, and wild animals have a broadcast system announcing these great new dinner tables.

Soils and sometimes local weather conditions change as humans attempt long term practices to wrestle food away from the competition. Often as an attempt to maintain quality, larger and larger, more powerful machines are utilized which demand highly skilled operators.

Over the last 100 years that small station near Hermiston, Oregon has stood with the community on the three legs supporting the United States’ successful food production system based on Research, Extension, and Education.



On June 30, 2009, the Hermiston Agricultural Research and Extension Center, as one of the partners of the Oregon State University's off campus branch stations, we join with the public to celebrate its 100th birthday as a way to say thanks for the opportunity to serve, and to help provide people with a more reliable and sustainable food supply.

Mathias F. Kolding

It's been a pleasure to work with Mathias Kolding on these articles about the history of OSU's HAREC. Often, we forget the value of knowing where we came from and of understanding our predecessors' contribution to where we are today. Through my work with Mathias, I learned that our current practice at HAREC of working together to address tough issues faced by the agricultural community and the public is nothing new. And although we often think of our current times as being marked by change and special challenges, a historical perspective shows us that our time is not unique: change, and the challenges it brings with it, are truly the story of the human experience. It's my hope that, in 2109, our successors will be able to look back with the same satisfaction and pride at how we served our stakeholders with research, extension, and education over the next 100 years as we all face the challenges that come with change together.

Sandra DeBano

Funding to support the day to day operation of the Hermiston Agricultural Research and Extension Center (HAREC) comes primarily from state sources through Oregon State University. However, over the last several decades, the local agricultural community, including farms, agricultural businesses, and other community businesses have contributed well over \$1 million in cash or in-kind support to ensure this station is a modern facility. Literally a one- of- a- kind facility, able to provide research based information to support the local agricultural community as needed.

In addition, grant funding received by the faculty over the years has also been a significant source of funds, not only to support research projects, but to help in the modernization of the facilities. Special grant dollars from the College of Agricultural Sciences and other sources within Oregon State University have also been a significant source of funds. We certainly want to thank all of those who have and continue to provide support for the research and extension programs at HAREC.

Phil Hamm

Superintendents

R.W. Allen, Agronomist & Superintendent	1909-1919
H.K. Dean, Agronomist & Superintendent	1919-1945
Carl A. Larson, Soils Specialist & Superintendent	1945-1957
Tom Davidson, Horticulturist & Superintendent	1957-1975
Steve Lund, Plant Geneticist & Superintendent	1975-1985
Gary Reed, Entomologist & Superintendent	1985-2005
Philip B. Hamm, Plant Pathologist & Superintendent	2005-Current

In addition to those listed above, the station has had the occasional direct services and cooperation of many of the technical staff of the USDA (including representatives of the Bureau of Plant Industry, Bureau of Reclamation, Division of Engineering and Division of Entomology) and of several departments of Oregon State University at Corvallis. Chief among these departments are Farm Crops, Soils, Botany and Plant Pathology, Entomology, Horticulture, Agricultural Chemistry, Animal Science and Statistics.

Letter of Acknowledgement

Our attempt to present a narrative about the Hermiston Agricultural Research and Extension Center is only a fragment of the printed and written material available at the Center. It is an attempt, however, to present the human struggle with nature. A story of people working to wrest a stable healthy food supply from this planet's surface. It is sort of a wrestling match with heat, wind and cold. Also, it is the struggle with the demons of viruses, bacteria, fungi, insects, birds, animals and other entitles which seemingly look to the new foods for their table. All, none the less, dependent on more effective water use.

We are thankful to the Agri-Times Northwest, Pendleton, Oregon and staff for contributing the primary printed space for public view.

It is part of the story of community and services to provide sustenance for people.

Thank you,
The Authors.

Current Staff at HAREC 2009



Top to Bottom (right to left): Phil Hamm, Casey Royer, Lyle Maslen, Silvia Rondon, Phil Rogers, George Clough, Mat Kolding, Dan Hane, Don Horneck, Sandy DeBano, Tim Weinke, Brad Hollis, Jess Holcomb, Javier Almaguer, Aymeric Goyer, Jordan Eggers, Patrick Christensen, Annette Teraberry, Peggy Carr, Karly Carlson, Sarah Adams, Bethany Rice, Amanda Smith, Kortney Sweek, Jesika Holcomb, Alicia Arey, Chiho Kimoto, Jon Barber. (Date: June 26, 2009)