From Citrus to Centennial

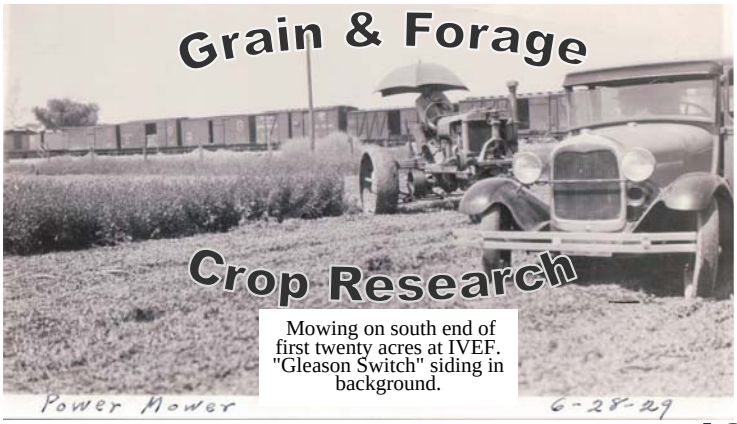
Celebrating one hundred years of Desert Agricultural Research at the University of California Division of Agriculture and Natural Resources Desert Research & Extension Center

Alan W. Robertson


1912 Entrance Sign
"IMPERIAL VALLEY
EXPERIMENT FARM
UNIVERSITY of CALIFORNIA"


2012 Entrance Sign
UNIVERSITY of CALIFORNIA
Division of Agriculture and Natural Resources
DESERT RESEARCH AND EXTENSION CENTER

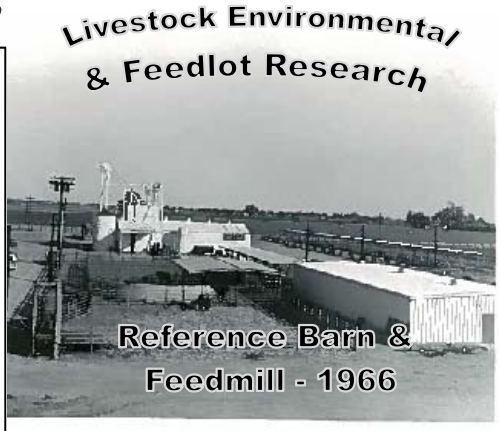
THE UC DREC : WHAT IS PERFORMED HERE



Mowing on south end of first twenty acres at IVEF. "Gleason Switch" siding in background.

Educational Outreach

UNIVERSITY OF CALIFORNIA
FARM SMART
1912 · 100 YEARS · 2012
DREC



Could GPS do much better than that mule?

As President of the Imperial County Farm Bureau it is with great pleasure that I write the foreward for *From Citrus to Centennial, Celebrating One-Hundred Years of Desert Agricultural Research in Imperial Valley at the University of California Desert Research & Extension Center.* Recognizing the need to organize the agricultural community, Imperial County Farm Bureau was founded in 1918 by Walter E. Packard who at the same time served as the Desert Research Center's first director.

The deep-rooted relationship between Imperial County Farm Bureau and the Desert Research Center is indispensible. Imperial Valley farmers and ranchers have benefitted greatly from the station's research in water and soil science, agronomy, fruit and vegetable crop science, pest control and animal science just to name a few.

Throughout history, methods in agricultural practices have improved through trial, error, and research and the staff at the Desert Research Center have been an instrumental piece of this advancement. Two particular developments were the introduction of sprinkler irrigation techniques and date of planting vegetable crop research leading to precision harvesting. Results from both of these important studies produce consistently higher yields in commercial production.

Environmental studies in the 1940s proved significant in showing ranchers how to cope with the desert heat in their cattle operations. Nutrition research continues and the Feedlot operation at the Desert Research Center is the largest feedlot in the United States as it pertains to nutrition study replication.

Farmers and Ranchers of Imperial County feed the world with the food, fiber and feed produced on our bountiful desert. Without the research and development of the Desert Research Center, the oldest, continuously operating research facility in the University of California system, our production would not be possible.

After reading this book you will begin to understand the relationship we have enjoyed together for this last century. I sincerely hope you enjoy this walk through the history of Imperial Valley agricultural and the Desert Research Center.

Mark McBroom
President
Imperial County Farm Bureau

INTRODUCTION

The centennial celebration of the University of California Desert Research and Extension Center is an exciting time. The name has changed more than once but those employed here have remained unchanged in their mission of research and outreach. Moving into the next century a commitment remains as well: to serve the public as a dedicated steward of the land in an attempt to ensure that local agricultural needs are recognized, research projects initiated, completed, documented and disseminated. The dedication of personnel here is easily overlooked, perhaps unknown, by many people. Indeed, the UC DREC Farm is not like "The Mall" or some other popular tourist attraction. Many local residents and neighbors have grown up and lived within the footprint of the UC DREC never knowing what occurs here. Nevertheless, dedication to research and extension continues in full force as employees here work at providing some measure of benefit to the Imperial Valley. At one hundred years of age, the UC DREC assumes a unique place in the history of the University of California; that of being the oldest continuously operating research farm in the UC System. This is a major accomplishment, considering that, excluding the original "Central Station" at Berkeley, the first seven research stations all closed within the first decade or so of their creation.

The author has come to proudly know the DREC since October 2001, serving as a volunteer for his wife, Nancy Caywood-Robertson, when she began her employment as an educational outreach coordinator. Her term was to have been for three years and has lasted now for over ten years. This Center has become a very special place and it is with great pleasure to present this document of historical research.

Additional information about the Desert Research and Extension enter can be obtained at the address listed below.

THE UNIVERSITY OF CALIFORNIA

DIVISION OF AGRICULTURE & NATURAL RESOURCES

DESERT RESEARCH AND EXTENSION CENTER

1004 EAST HOLTON ROAD

EL CENTRO, CALIFORNIA 92243

PHONE (760) 356-3060

URL: ucanr.org/sites/desertresearch

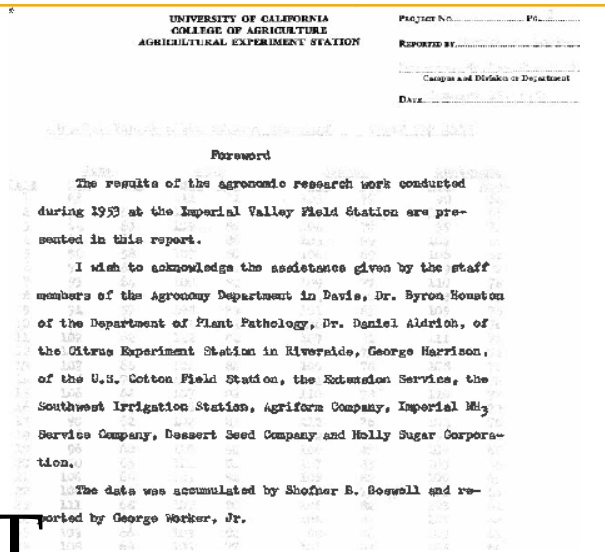
A project such as this is never complete without acknowledgement of the many people who have assisted. First and foremost, thanks to Dr. Richard Zinn, interim director, who initiated this project. Thanks, also to the entire team at DREC who have enthusiastically answered my questions. Historical photos were received from Dr. Richard Zinn, Staff Research Associate Francisco Maciel, Cooperative Extension Office Supervisor Cecilia Olea and Cathy Denton. Her father, George Worker, was the Farm Director from 1953 through 1985, and Cathy lived on the farm from birth through college. Debra Driskill, Silvia Quintanna and Annette Tietz really came through with their never-ending technological help. They are without equal. Allison Gunderson has also provided much needed publication assistance. Allison's husband Jeff is the newest employee at the DREC and their newborn son Max is the official centennial baby with a birthday of January 6, 2012. Carl Adam, Doyle Freeman, Larry Gibbs, Kay Hamilton, Fernando "Fernie" Miramontes, Richard Tamayo and Dr. Richard Zinn have provided great historical recollections dating back to 1964. Combined, their service approaches 230 years. Thanks also, to *all* who have served here. Your efforts are why we are still in existence. A very thorough attempt has been made to document the names of anyone and everyone who has been employed at the DREC including Cooperative Extension Personnel since they located here in 1989. Mr. George Worker was the Superintendent from 1953 through 1985 and stayed on until 1987. He journalized each year of activity with unsurpassed attention to detail. We are so fortunate to have his documents in our DREC Library. George's daughter, Cathy Denton and her husband Charles, reside in El Centro and we are also very grateful for their historical perspective, assistance and photos. The Honorable Bill Lehman and his wife Shannon, son and daughter-in-law of Dr. William Lehman, are neighbors to the UC DREC Farm and provided additional historical perspective. Roselynn Smith from the Yuma office, U.S. Bureau of Reclamation, provided maps and video information on the waterways and irrigation systems in the Yuma area. Mike and Laura Fox were tour guides for a trip to Algodones, Mexico to view the original locations of the Imperial Canal. From the Imperial Irrigation District, Steve Birch, Sharon Sparks and Bob Schettler provided a copy of the I.I.D. Centennial publication, "A Century Of Service". Candace Nelson at Imperial County Farm Bureau has also provided wonderful archived pictures, encouragement and references. Bob Douthitt, a fellow pilot friend, provided aerial services using his Piper Cub, model J-3 on October 21, 2011 and May 31, 2012, when this author took aerial photos of the DREC with a digital camera loaned to us by Paula Miramontes. To UC Davis Librarian, Axel Borg, thanks for tips on annotated bibliography. To UC Davis Librarian, John Skarstad and his staff in Special Collections, thank you for the information on Professor Ben Madson. UC Berkeley, Bancroft Librarian, Steve Knaff and all your staff were very gracious and professional assisting us with our wonderful discovery of the Walter Packard Papers and photos. Special thanks for encouragement and assistance from Mrs. Ann Foley Scheuring, author of a wonderful reference book entitled "Science & Service, A History of the Land-Grant University and Agriculture in California". Thanks to retired Agronomy Professor Dr. Jim Lyons and Dr. "Bill" Rains, Professor Emeritus, VII, UC Davis Agronomy, for his records and notes on research stations. Thanks to Pamela Kan-Rice and Cynthia Kintigh at UC ANR Communication Services. The Imperial County Offices of the Recorder, Assessor, and Department of Public Works provided assistance in locating all the land title and deed of sale information regarding the UC DREC. Thanks, also, to the Holtville Chamber of Commerce personnel, Dana Hawk, Mary Helen Dollente, and Kathi Larios for their historical assistance and for advertising our centennial celebration on the Chamber's electronic marquis sign. Finally, it is probably most important to recognize the good fortune of us all here now for the decision of Irving Gleason and his wife, Fannie, to sell his grapefruit farmland to the University Of California Board of Regents on November 11, 1911.

So, thank you for joining in this centennial celebration. We hope this copy of the University of California Desert Research and Extension Center's Centennial illustrates our dedication to research and educational extension in this wonderful community so aptly named "The Nations' Salad Bowl".

Sincerely,

Al Robertson January 2012

SPECIAL ACKNOWLEDGEMENT
REGARDING MR. GEORGE F. WORKER, Jr.



UNIVERSITY OF CALIFORNIA
COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATION

Project No. ..... Pd. .....

Reported by .....

Campus and Division or Department

Date .....

Foreword

The results of the agronomic research work conducted during 1953 at the Imperial Valley Field Station are presented in this report.

I wish to acknowledge the assistance given by the staff members of the Agronomy Department in Davis, Dr. Byron Houston of the Department of Plant Pathology, Dr. Daniel Aldrich, of the Citrus Experiment Station in Riverside, George Harrison, of the U.S. Cotton Field Station, the Extension Service, the Southwest Irrigation Station, Agriform Company, Imperial Mi[illegible] Service Company, Dessert Seed Company and Holly Sugar Corporation.

The data was accumulated by Shofner B. Boswell and reported by George Worker, Jr.

The above excerpt is a reprint from the first of thirty one annual reports produced by George F. Worker, Jr., Imperial Valley Field Station (I.V.F.S.) Superintendent from December 22, 1953 to March 1, 1985 (except for a one year sabbatical from Aug. 1969-Sep. 1970). Mr. Worker kept meticulous records which have become the body of the source data presented herein. Special recognition is in also in order at this point of Mrs. JoAnn Taylor. Mrs. Taylor was employed here from 1966 through 1991 and she typed all of Mr. Worker's annual reports in addition to the myriad of assignments associated with her job position. Her legacy is very special.

Mr. Worker's reporting of experimental agriculture projects was extensive. He documented research projects, gave updates on their progress and compiled bibliographical information referred to as Technical Reports. Mr. Worker also documented Non-Technical Reports prepared by researchers stationed here. Such reports were also valuable although not necessarily the result of formal research projects. Rather, they were reports of a more general nature describing supplementary information and activity regarding the research farm. In his final annual report presented for 1983-1984, Mr. Worker indicated that during the 1957-1985 period the total number of people who visited the farm was 81,965. That included field days, meetings and research facility tours. Those visitors were categorized by In State, Out of State and Foreign Country. Mr. Worker also documented agricultural

Mr. George Worker pollinating Sorghum (milo maize) at Imperial Valley Agricultural Center, early 1980's. Photo courtesy Cathy Worker Denton.

field days, presentations on and off the farm, news articles, improvements to the farm and the results of committee meetings for the operation of the farm via the Farm Advisory Committee (later called the Industrial Advisory Committee) and the Research Advisory Committee. He also reported the inventory of the equipment used here and other operational information and expense data. He even reported irrigation usage. Interestingly, in 1959, irrigation water cost $2.07 per acre foot. In 1984, it was $8.73 per acre foot. Today irrigation cost is about $22.00 per acre foot. Mr. Worker also maintained an annual listing of personnel employed here. He even recorded climactic data readings taken twice daily by station personnel for every day of the year during his entire time here. Mr. Worker also indicated that research results at the Imperial Valley Field Station were published in newspapers, magazines, technical and non-technical journals, presentations at meetings, field days, service clubs and church groups. During Mr. Worker's tenure here, the staff at I.V.F.S. made 1,749 presentations, had 557 news and magazine articles written about research at the farm, published 449 technical and 490 non-technical papers. We who follow in Mr. Worker's path owe him a tremendous amount of gratitude for his superb documentation of our heritage here at DREC. We can only strive to emulate his level of accomplishment.

CENTER DIRECTORS - UC DREC *

FROM 1912 TO PRESENT

NAME	DATE FROM	DATE TO
Packard, Walter E.	1912	1917
Wilkinson, Walter	1917	1919
Goar, L.G.	1919	August 1920
Galloway, H.O. (Interim)	August 1920	May 1921
Goar, L.G.	May 1921	July 1924
Beatty, L.	August 1924	July 1926
Maghetti, Vince	August 1926	November 1926
Goar, L.G.	November 1926	August 1929
Goar, C.B.	September 1929	August 1930
Weeth, Waldo	July 1930	July 1934
Scott, Allen	August 1934	August 1936
Goar, L.G.	September 1936	December 1953
Ittner, N.R.	March 1949	December 1953
Worker, George F., Jr.	December 1953	August 1969
Lofgreen, G.P. (Interim)	August 1969	September 1970
Worker, George F., Jr.	September 1970	March 1985
Dunn, Charles	April 1985	1993
Zinn, Richard A. PhD.	1993	1994
Sebesta, Paul, PhD.	1994	2004
Desoto, Jose (Interim)	2004	October 2005
Bottoms, Richard, PhD.	October 2005	July 2006
Desoto, Jose (Interim)	2006	April 2009
Zinn, Richard A., PhD. (Interim)	2009	June 30, 2012
Bali, Khaled, PhD. (Interim)	July 1, 2012	Present

* ORGANIZATIONAL NOTE

Originally, the title of Director was assigned to the Chairman of the Agronomy Department at UC Davis and the title of Superintendent was assigned to the person living here in charge of daily operations. From 1912-1948, general administration, financing and budgetary issues for experiment stations were under control of various departments at Davis. For example, Imperial Valley was run by the Agronomy Department, Professor Ben Madson - Chairman. Tule Lake was run by the Truck Crops Department and so on. In 1948, at the suggestion of Professor Madson, Claude B. Hutchison, the Dean of the UC College of Agriculture, reorganized field station administration under one director for all stations. Professor Madson served in that capacity until his retirement in 1954 (Source: Oral History of Ben Madson, UC Davis Oral History Program, Special Collections Library).

In 1952, the Division of Agricultural Sciences (now Division of Agriculture and Natural Resources) was created which assumed responsibility for all agricultural activities within the University including administrative control of experiment farms (Science & Service, Ann Foley Scheuring).

While the University of California is the land-grant college as created by the Morrill Act of 1862, the UC Division of Agriculture and Natural Resources (ANR) is the land-grant arm of the University and is headed by UC Vice President, Dr. Barbara Allen-Diaz. Reporting directly to Vice President Allen-Diaz is Dr. Bill Frost, UC ANR Director of the Research and Extension Center System and Associate Director of Cooperative Extension and the Agricultural Experiment Station. In August 2012, Ms. Lisa Fisher was selected as Associate Director of the Research and Extension Center (REC) System. Reporting directly to Dr. Bill Frost are the Research and Extension Center Directors. The title of Center Director came into use around 1987 and is still in use today.

UNIVERSITY OF CALIFORNIA

Division of Agriculture and Natural Resources

RESEARCH AND EXTENSION CENTERS (REC) LOCATOR MAP

UC VICE PRESIDENT

DIVISION OF AGRICULTURE

AND NATURAL RESOURCES

DR. BARBARA ALLEN-DIAZ

1111 FRANKLIN STREET

OAKLAND, CA 10201

UC ANR REC

ADMINISTRATION OFFICE

AG FIELD STATION BUILDING

UC DAVIS CAMPUS

DR. BILL FROST

DIRECTOR OF THE REC SYSYTEM

ASSOCIATE DIRECTOR OF THE REC SYSTEM

LISA FISCHER

UNIVERSITY of CALIFORNIA

Division of Agriculture and Natural Resources

DESERT RESEARCH & EXTENSION CENTER

Personnel Photo Gallery - October 2012

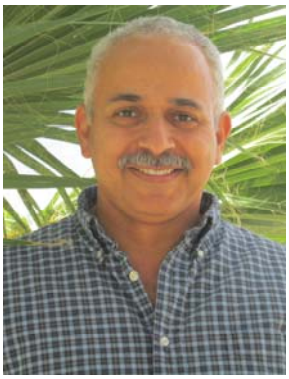
Right:

Khaled M. Bali, Ph.D.

Interim Director, DREC. July 1, 2012 - Present.

UCCE County Director, Imperial County.

1992-20 years



Right:

Richard A. Zinn, Ph.D.
Professor / Nutritionist Animal Science Dept.
UC Davis - 1981
(31 years)

Above:

Fernando Miramontes, Jr.
DREC Superintendent of Operations
1980-32 years

PHYSICAL PLANT OPERATIONS

"Fernie" Gildardo "G.G." Guzman
Farm Maintenance Worker
1980 1993-June 2012(ret.)

David Preciado, Physical Plant Mechanic - 2005

RESEARCH CENTER OFFICE STAFF

Above:
Debra Driskill
Business Officer
1991 (21 Years)

Above:
Silvia Quintana
Administrative Assistant - 1996

BUILDING AND GROUNDS MAINTENANCE

EDUCATIONAL OUTREACH - FARM SMART PROGRAM

Program Representatives

Stephanie Collins 2010

Alan and Nancy Robertson 2001

Farm Smart Winter Visitor Volunteers
(From left to right)

Lyle & M'Lee McClay | Ken & Jackie Early | Larry & Shirley Durrans | Kathy & Allan Sweet

All photos by Al Robertson except for Driskill & Quintanna: taken by Nancy Robertson

UNIVERSITY of CALIFORNIA

Division of Agriculture and Natural Resources

DESERT RESEARCH & EXTENSION CENTER

Personnel Photo Gallery - October 2012

Research & Extension Center Agriculture Operations

Kay Hamilton, Jr. Principal Agriculture Technician - 1974. *Kay's 38 years of service is more than any other active employee* in the one hundred year history of this Center. A proud accomplishment.

Francisco Maciel. Staff Research Associate - 2001

Fernando Ayala, Jr.
Agriculture Technician - 2011

Jeff Gunderson, Staff Research Associate - 2011

Gilberto Magallon, Agriculture Technician - 2006

Top: (left to right) Juan Biscaino, Fernando Ayala, Sr., Gustavo Nuñez, Vidal Casteneda. These general assistance workers keep our farm looking well manicured, throughout. Their work is the best! Thanks so much.

Bottom: (left to right)

Jorge Alonso and Juan Biscaino lighting up the carport for the DREC Centennial.

Cattle Feedlot for Nutrition & Environmental Research

Left: Armando Silva, Farm Maintenance Mechanic - 2011

Near Right: Sergio Martinez
Animal Technician - 2006

Far Right: David Zinn
General Assistance - 2011

All photos by Al Robertson

UNIVERSITY of CALIFORNIA

DESERT RESEARCH AND EXTENSION CENTER

CURRENT PERSONNEL ROSTER

NAME	TITLE	EMPLOYMENT DATES
Adam, Carl	Staff Research Associate	1982-Present
Adams, Willy	Senior Building Maint. Worker	October 2012- Present
Arredondo, Victor	Senior Custodian	October 2012-Present
Ayala, Fernando	Agriculture Technician	2010-Present
Bali, Khaled, Ph.D.	Interim Center Director	July 1, 2012-Present
Caywood-Robertson, Nancy	Education Outreach Coordinator	October 27, 2001
Collins, Stephanie	Program Representative	2010-Present
Driskill, Debra	Business Officer	1991-Present
Gunderson, Jeff	Staff Research Associate	2011-Present
Guzman, Gildardo	Farm Maintenance Worker	1993-2012 (Retired)
Hamilton, Jr. Kay	Principal Agriculture Technician	1974-Present
Machado, Max	Senior Custodian	2003-2012 (Retired)
Magallon, Gilberto	Agriculture Technician	2006-Present
Martinez, Sergio	Animal Technician	2006-Present
Miramontes, Jr. Fernando	Superintendent of DREC	1980-Present
Preciado, David	Physical Plant Mechanic	2004-Present
Presley, Jonathan	Agriculture Technician	2006-Present
Quintana, Silvia	Administrative Assistant	1996-Present
Robertson, Alan	Administrative Assistant	2011-Present
Salazaar, Sam	Building Maintenance Worker	2009-Present
Silva, Armando	Farm Maintenance Worker	2011-Present
Zinn, Richard A. Ph.D.	Professor, Animal Science, UC Davis	1981-Present

ACADEMIC DEPARTMENT PERSONNEL ASSIGNED TO UC DREC

ALL YEARS

AGRONOMY DEPARTMENT	DATES
Boswell Shafner B.	Jul. 1949 - Mar. 1953
Worker, George F. Jr.	Sep. 1953 - June 30, 1987 (retired)
Lehman, William F.	Aug. 1956 - 1989 (Deceased)
Chen, Yi Wu	1980 - 1981
ANIMAL SCIENCE	
Ittner, Nicholas R.	Mar. 1946 - Feb. 1958 (Deceased)
Garrett, William N.	Feb. 1958 - Aug. 1963 (Trf. to Davis)
Mendel, Vernon C.	Oct. 1963 - Aug. 1967 (Trf. to Davis)
Lofgreen, Glen P.	Jan. 1968 - Sep. 1977
Prokop, Michael J.	Oct. 1977 - 1981
Zinn, Richard A.	Oct. 1981 - Present
BIOLOGY	
Hauser, William J.	Nov.1973 - Jun. 1977
AGRICULTURAL ENGINEERING	
Speck, Eugene	Jul. 1950 - Mar. 1952
IRRIGATION	
Robinson, Frank E.	Aug 15, 1964 - 1995 (retired 1992)
VEGETABLE CROP	
Hoffmaster, Keith	Jun. 1947 - Jun. 1948
Zink, Frank W.	Sep. 1948 - Feb.1952
Baughn, C. Grant	Mar. 1952 - Jan.1956
McCoy, Orval D.	Feb. 1956 - Jun. 1973
VETERINARY SCIENCE	
Taylor, Walter J. (UC Berkeley)	1913-1915

UNIVERSITY of CALIFORNIA

Division of Agriculture and Natural Resources

IMPERIAL COUNTY

COOPERATIVE EXTENSION

Personnel Photo Gallery - October 2012

IMPERIAL COUNTY COOPERATIVE EXTENSION RESEARCH

Left

Khaled Bali, Ph.D.

Interim Director, DREC
July 1, 2012- Present

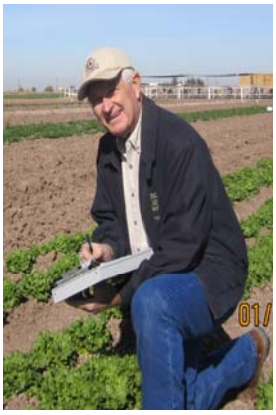
Director, Imperial County Cooperative Extension

Farm Advisor, Irrigation & Water Management - 1992 - 20 Years

Right

Brent Boutwell, Staff Research Associate

Specialty Crop Research - IR-4 Project
1993



Right
Eric Natwick
Farm Advisor, Entomology
1981 - 31 Years

COOPERATIVE EXTENSION OUTREACH

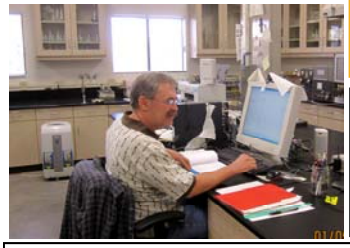
Left: Mary W. Bezemek-2009
Right: Martha Lopez-1998 Program Representatives - Nutrition

Matthew Smith - 2011 Program Representative 4-H Youth Development

Milton McShan - 2009
Program Representative 4-H Military Youth Development

RESEARCH AND EXTENSION CENTER LABORATORY

Animal Science



Left:

Carl Adam, Staff Research Associate - 1982 (30 Years)

Right: Jesus Hernandez, Laboratory Assistant - 2010

Far Right: Daniel Buenrostro, Laboratory Assistant - 2006

Soils & Water

Plant Pathology and Entomology

From Left to Right:

Rafael Lara
Laboratory Assistant - 2006

Efrain Sambrano
Laboratory Helper - 1997

(continuing)

Martin Lopez, Ph.D.
Staff Research Associate
1999

Jorge Celis
Laboratory Assistant - 2006

IMPERIAL COUNTY

COOPERATIVE EXTENSION

CURRENT PERSONNEL ROSTER

NAME	TITLE	EMPLOYMENT
Bali, Khaled, Ph.D.	DREC Director (Interim since July 1, 2012) County Director UCCE Imperial County. Farm Advisor, Irrigation & Water	1992-Present
Boutwell, Brent	Staff Research Associate - IR 4	1993-Present
Buenrostro, Daniel	Laboratory Assistant	2006-Present
Celis, Jorge	Laboratory Assistant	2006-Present
Escobosa, Isabel	Laboratory Assistant	2002-Present
Estrada, Andrea	Office Assistant	2007-Present
Garcia, Jenifer	Office Technician	1999-Present
Hernandez, Jesus	Laboratory Assistant	2010-Present
Lara, Rafael	Laboratory Assistant	2006-Present
Lopez, Martha	Program Representative	1998-Present
Lopez, Martin	Staff Research Associate	1999-Present
McShan, Milton	Program Representative	2009-Present
Natwick, Eric	Farm Advisor - Entomology	1981-Present
Olea, Cecilia	Office Supervisor	1984-Present
Smith, Matthew	Program Representative	2011-Present
Sambrano, Efrain	Laboratory Helper	1997-Present
Tietz, Annette	Office Technician	2004-Present
Welch-Bezemek, Mary	Program Representative	2009-Present

I. C. COOPERATIVE EXTENSION OFFICE STAFF

(From left to right)
Annette Tietz, Office Technician -2004;
Jennifer Garcia, Office Technician- 1999;
Cecilia Olea, Office Supervisor-1984;
Andrea Estrada, Office Assistant -2007

ROSTER OF FULLTIME PERSONNEL PREVIOUSLY ASSIGNED TO UC DREC

ALL YEARS

NAME	TITLE	DATES
Adams, Craig	unknown	mid 80s-mid 90s
Algots, John	Agronomy field Assistant	1958-1959
Alvarado, Fuesto	General Assistance	1985
Armstrong, Albert	Agricultural Technician	1985
Ash, F. J.	Cultivationist/laborer	pre 1954-1956
Beasley, Alna C.	Custodian	1961-1968
Beason, Warren	Lab. Helper/Animal Husbandry-UC Davis	1963-1964
Bentley, John	Cultivationist	1959-1970 (Deceased)
Berry, Bilie G.	Farm Maintenance Worker	1985-????
Bonneau, Gerald D.	Farm Machinery Mechanic	1982-1984
Bornt, Robert K.	Assistant Farm Machinery Mechanic	1977
Boswell, Shafner B.	Agronomy Assistant	1949-1954
Brenan, Donald	Lab. Tech./Animal Husbandry-UC Davis	1965-1966
Bright, Bruce	Ag. Tech./Farm Maintenance Worker	1972-1977
Brogan, Richard	Laboratory Helper	1964-1965
Cardona, Jose	Laboratory Helper	1977-1979
Castro, Juan	Principal Agricultural Technician	1961-????
Chastain, Tilmon G.	Agronomy Field assistant	1955-1960
Clayton, John R.	Cultivationist	pre1954-1964 (Retired)
Cobb, Bob	Superintendent, Physical Plant	1990-2004 (Retired)
Combe, Robert	Superintendent, Grounds & Buildings	1950-1954 (Retired)
Corfman, Orval E.	Cultivationist	1964-1965 (trf. to Davis)
Cuevas, Salvador	General Assistance	1985-????
DeLoach, Bruce	Agricultural Technician	1974-1977
Demmer, Dave	Laboratory Technician	1966-1967
Denton, Horace D.	Senior Superintendent , Cultivations	pre 1954-1963 (Retired)
Domingos, Frank	Senior Superintendent, Cultivations	1963-1964
Dunn, John	Farm Laborer	1958-1959
Espinosza, Lawrence	Lab. Tech/Animal Husbandry-Davis	1966-1967
Estep, Joe	Cultivationist	1968-1972
Finley, Jack W.	General Assistance	1975-1976
Flock, Elsie	Lab. Tech/ Staff research Associate	1967-???? (Retired)
Forrester, William	Agronomy Field Assistant	1959-1961 (Deceased)
Fourong, Richard F.	Laboratory Helper	1974-1976

ROSTER OF FULLTIME PERSONNEL PREVIOUSLY ASSIGNED TO UC DREC

ALL YEARS

NAME	TITLE	DATES
Fowlkes, Andrew	Laboratory Helper	1977-1984???
Fowlkes, Clinton	Laboratory Helper	1974-1978
Fowlkes, James F.	Farm Maint. Supervisor/ Lead Physical Plant Mechanic	1964-1990 ?) (Ret)
Fox, Laura	Farm Smart Program Representative	2008-2010
Freeman, Carolyn	General Assistance	1968
Freeman, Doyle	Senior Agricultural Technician	1964-1999 (Retired)
Freeman, Larry	Farm Maintenance Worker	1977-2000 (es.)
Fusi, Ernie	Farm Maintenance Worker	1995-2010
Gaskin, Delbert	Herdsman/Farm Maintenance Man	pre 1954-1971
Gibbs, Karen	Clerk	1980-????
Gibbs, Larry	Staff Research Associate	1965-2005 (Retired)
Golden, Frederick A.	Cultivationist/Sr. Supt. Agriculture	pre 1954-1979 (Retired)
Golden, Ronald W.	Laboratory Helper	1969-1970
Golden, Tommie R.	Laboratory Helper/Agronomy	1973-1975
Gomez, Raul	Physical Plant Mechanic	2004-2006??
Gutierrez, Jose L.	Senior Agricultural Technician	1963-1985??
Harrison, Charles C.	Agronomy Assistant	pre 1954-1958
Haubrich, Robert W.	Cultivationist/Lab. Tech./S.R.A.	1967-1973
Henthorn, Karen	Secretary	1977
Hernandez, Carlos	Staff Research Associate/Extension Svc.	1975-1979
Hernandez, Nick	Agronomy Field Assistant	1960-1964
Hilfiker, David S.	Laboratory Helper/ Animal Science	1969-1971
Hobson, James	Farm Laborer	1957-1959
Hurley, Vernon	Cultivationist	1962
Jacobs, Haskell V.	Cultivationist/Lab. Tech.	1966-1967
Johnston, James E.	Lab. Helper/	1974-1976
Johnston, James E.	Animal Resources Supervisor	1979-1981
Kessinger, Wayne	Senior Maintenance Man	1958-1961
Lamitie Jr., Leo	Cultivationist/Ag. Field Asst.	1957-1972 (Retired)
Lehman, Barbara H.	Secretary	1978-1979
Lehman, Louis C.	Cultivationist/Lab. Tech.	1961-1962
Lehman, William D.	Laboratory Helper	1978-1979
Leigruber, Walter	Agricultural Technician	1994-2004

ROSTER OF FULLTIME PERSONNEL PREVIOUSLY ASSIGNED TO UC DREC

ALL YEARS

NAME	TITLE	DATES
Lofgreen, Denise	Typist/Clerk	1973
Lofgreen, Lani	Lab Helper	1977
Lopez, Tom	Unclassified, Dept. Animal Science	1985-1986??
Louvin, Corwin E.	Laboratory Helper	1974
Maring, William	Sr. Maintenance Man/ Sr. Farm Machinery Mechanic	1961-1982 (Retired)
Maze, Ray	Farm Laborer	1958
McCoy, James D.	Lab Helper	1970
McCoy, Richard	Laboratory Helper	1973-1976
McIlroy, Dean L.	Laboratory Technician, Animal Science	1967
Mejia, Oscar F.	Laboratory Helper	1977-1979
Mendez, Gilberto	Assistant Herdsman/ Sr. Animal Technician	1970-1994 (est.)
Merten, John	Laboratory Helper, Animal Science	1979-1980
Monzon, Augustin	Agricultural Technician	1965-1985??
Moreno, John	Laboratory Helper, Water Sciences	1975-1976
Mota, Dora I.	Laboratory Helper, Animal Science	1979
Munger, Jeffrey	General Assistance	1976
Necochea, Justo	Cultivationist	1970
Nelson, Christopher	Laboratory Helper, Animal Science	1979-1980
Obeso, Lupe	Laboratory Assistant, Entomology	1971-1974
Odermatt, Josephine	Matron/ Janitor	pre1954-1961 (Retired)
Odermatt, Rosanna, H.	Senior Typist/ Secretary	pre1954-1967 (Retired)
Padgett, Wayne B.	Staff Research Associate, Water Science	1976
Palomera, Jesus	General Assistance	1985-???
Pal-Puri, Yesh	Laboratory Technician	1962-1965 (Tulelake)
Parrish Jr., Lloyd	Farm Maintenance Man	pre 1954-1974 (Retired)
Pate, Teri D.	Laboratory Helper, Animal Science	1977-1979
Peebles, William J.	General Assistance	1967-1968
Pentoney, Marcus	Cultivationist/ Sr. Ag. Technician	1961-1984??(Retired)
Pescho, G.R.	Sr. Lab. Technician, Entomology	pre1954-1959
Pigg, Jack	Agronomy Field Assistant	pre1954-1965
Platt, Spencer	Laboratory Helper, Biological Control	1975-1976
Poore, Robert	Cultivationist/Agricultural Technician	1972-1974
Preece, Raymond	Farm Equipment Operator	pre1954-1961

ROSTER OF FULLTIME PERSONNEL PREVIOUSLY ASSIGNED TO UC DREC

ALL YEARS

NAME	TITLE	DATES
Riley, Weldon	Cultivationist	1964-1967
Robinson, Robert A.	Laboratory Helper, Agronomy	1975-1977
Rosebraugh, Cindy	Laboratory Helper, Agronomy	1977-1979
Roselas, Joel	Unclassified, Dept. Animal Science	1985-????
Rubin, Bonnie	Clerk	1969-1970
Segura, Martha	Laboratory Helper, Agronomy	1977-1984
Scherer, Daniel	S.R.A. Dept. Land, Air &Water, UC Davis	1980-1984
Schnegl, Rudy	S.R.A. Dept. Water Science & Engineering	1974-1975
Singh, Kirpal	S.R.A. Dept. Land, Air & Water, UC Davis	1979-1981
Stoppel, Gordon	Laboratory Technician	1964-1967(Shafter)
Strong, David	Farm Laborer	1976
Tamayo, Manuel S.	Lab. Helper, Agronomy/ Sr. Animal Tech.	1978-1990 (estimated)
Tamayo, Richard	Cultivationist/S.R.A./Principal Supt. Ag.	1964-2001(Retired)
Taylor, JoAnn	Stenographer/Sec./Administrative Asst.	1966-1991(Retired)
Taylor, Michael	Laboratory Helper, Agronomy	1977-1984
Trask, Phillip R.	Herdsman/ Principal Animal Technician	1949-1979(Retired)
Valenzuela, Angel G.	General Assistance	1985-????
Vandiner, Joseph	General Assistance	1985-????
Vick, Jay M.	General Assistance	1976
Visueta, Esquiel	Cultivationist	1963
Volkart, Lawrence A.	Laboratory Helper	unknown
Wasson, Ronald L.	General Assistance	1976
Wheatley, Matthew	Staff Research Associate, Water Science	1977-1979
Worker, Cathy	Laboratory Assistant, Animal Science	1981
Worker, George F. Jr.	Farm Superintendent, Specialist in Agronomy	1953-1987(Retired)
Wong, Mark L.	Farm Laborer	1976-1977
Zinn, Milton	Laboratory Assistant, Animal Science	1981-1984????

ROSTER OF PART TIME PERSONNEL PREVIOUSLY ASSIGNED TO UC DREC

ALL YEARS

NAME	TITLE	DATES
Armstrong, William	Painter (P/T)	1966
Freeman, Gilbert	Cultivationist (P/T)	1964
Griffin, James	Painter (P/T)	1964-1965
Gibbs, Eugene	Painter (P/T)	1962-1963
Humphreys, Chuck	Painter (P/T)	1965
McNay Myrl	Laboratory Helper (P/T)	1967-1968
Parker, Claude	Carpenter (P/T)	1962
Robertson, Alan	Program Representative/ Carpenter (P/T)	2010

ROSTER OF SUMMER STUDENT PERSONNEL PREVIOUSLY ASSIGNED TO UC DREC

ALL YEARS

NAME	TITLE	DATES
Freeman, Flint	Summer Student	1964,1965
Gaskin, Kenneth	Summer Student	1964,1965
Glud, Donald P.	Summer Student	1961,1962,1963
Hale, Peter R.	Summer Student	1966
Johnson, Jim	Summer Student	1959
Lendt, Louis H.	Summer Student	1966
Meinville, Joseph P.	Summer Student	1961
Mendel, Frank	Summer Student	1965, 1966
Minetti, Earnest	Summer Student	1963
Pate, Robert	Summer Student	1962
Peng, Chin Long	Laboratory Technician/ Summer Student	1966,1967
Peterson, David	Summer Student	1959
Rose, David	Summer Student	1960
Zinn, Richard A.	Summer Student/Laboratory Helper	1970

IMPERIAL COUNTY

COOPERATIVE EXTENSION CENTER

PREVIOUSLY ASSIGNED PERSONNEL ROSTER

(AFTER 1990 LOCATION AT UC DREC)

NAME	TITLE	DATES
Alvarez, Maria	4-H Sumer Office Assistant	1990-2003
Ambrozia - Turini, Marilene	Office Assistant	2001-2006
Armstrong, Ivy	Ag. Extension Assistant	1993-1995
Bainbridge, Joseph	Laboratory Assistant	1994-1995
Bartels, Charles	Ag. Extension Assistant	1990
Bell, Carl	Farm Advisor, Weed Science	1990-2000
Bell, Nicholas	Laboratory Helper	1995
Bolin, Brent	Ag. Extension Assistant	1994
Bottoms, Rick	Farm Advisor, Vegetable Crops	2004-2006
Britschgi, Jared	Ag. Extension Assistant	1997
Brown, Jason	Ag. Extension Assistant	1993
Campos, Rudy	Extra help	2003
Cardenas, Tami	Office Assistant	1997-2000
Cardoza, Ronald	Staff Research Associate	2003-2006
Carey, Mike	Ag. Extension Assistant	1991
Carpio-Obeso, Maria	Post Graduate Researcher	1999-2001
Casteneda, Daniel	Youth Extension Service Assistant	1998
Castro, Liliana	Youth Extension Service Assistant	1990
Chan, Alan	Ag. Extension Assistant	1990-1991
Chavez, Cynthia	Youth Extension Service Assistant	1997
Claverie, Anita	Laboratory Assistant	2009-2010
Claverie, Melissa	Laboratory Assistant	1994-1996
Dale, Claire	Office Supervisor	1990-2001
De La Cerda, Alex	Ag. Extension Assistant	2001
Din, John	Ag. Extension Assistant	1990
Dunn, Chris	Ag. Extension Assistant	1990
Emery, Elizabeth	Ag. Extension Assistant	1993
Fitch, Paula L.	Farm Advisor, Nutrition	1993-2003 (Deceased)
Flemate, Lourdes	Ag. Extension Assistant	1999-2003

IMPERIAL COUNTY

COOPERATIVE EXTENSION CENTER

PREVIOUSLY ASSIGNED PERSONNEL ROSTER

(AFTER 1990 LOCATION AT UC DREC)

NAME	TITLE	DATES
Garcia, George	Ag. Extension Assistant	1993
Garcia, Jesus	Ag. Extension Assistant	1990
Gonzalez, Daniel	Ag. Extension Assistant	1993
Gonzalez, Refugio	County Director, ICCE	unk -2001
Grass, Luther	Ag. Extension Assistant	1993
Guerrero, Alfredo	Ag. Extension Assistant	1995
Guerrero, Juan	Farm Ad visor, Animal Science	unk-2009
Gutierrez, Daniel	Ag. Extension Assistant	1993-2002
Harmon, Mary	Farm Advisor, 4 - H	2006-2011
Henderson, Donna	Farm Advisor, Plant Pathology	2009-2011
Hernandez, Carlos	Staff Research Associate, Livestock	1990-1998
Hernandez, Richard	Ag. Extension Assistant	1993
Holmes, Gerald	Farm Advisor, Plant Pathology	1994-1996
Hughes, Matthew	Ag. Extension Assistant	1994
Hurtado, Reuben	Student Assistant	2003-2005
Ibarra, Sergio	Ag. Extension Assistant	1990-1995
Jimenez, Jose Marcos	Laboratory Assistant	1994-1997
Johnson, Edward	Ag. Extension Assistant	1990
Johnston, Kim	Typist	1990
Kizziah, Tara	Office Assistant	1990-1991
Korinetz, John	Ag. Extension Assistant	1994-1995
Kubler, Michael	Program Representative	1997-1999
Laemmlen Franklin F.	Farm Advisor, Plant Pathology	????-1993
Limegruber, Walter	Ag. Extension Assistant	1990-1994
Lerno, Skylar	County Extra Help	1999-2002
Lizzaraga, Norma	Office Assistant	1990-1994

IMPERIAL COUNTY

COOPERATIVE EXTENSION CENTER

PREVIOUSLY ASSIGNED PERSONNEL ROSTER

(AFTER 1990 LOCATION AT UC DREC)

NAME	TITLE	DATES
Mayberry, Deborah	Office Assistant	1993-2003
Mayberry, Keith	Farm Advisor, Vegetable Crops	1984-2002
Martin, Patricia	Office Assistant	1990-1999
McShan, Milt	Program Representative	1999-2010
McDonald, Chris	Farm Advisor, Desert Natural Resources	2000-2012
Meister, Herman	Farm Advisor, Field Crops	2001-2005
Mejia, Clemente	Laboratory Helper	1995
Mendoza, Edward	Ag. Extension Assistant	1990-1991
Moffett, Miranda	Laboratory Assistant	1994-1996
Montiel, Andrez	Farm Advisor, 4-H	1973-2006
Moreno, David	Ag. Extension Assistant	1991
Moreno, Jose	Ag. Assistant/Lab. Assistant	1997-1999
Morris, Kathie	Office Assistant	2002-2004
Muller, Johnny	Ag. Extension Assistant	1994-1995
Ochoa, Mario	Ag. Extension Assistant	2007-2011
Pavao, Anthony	Ag. Extension Assistant	1991
Price, Dennis	Ag. Extension Assistant	1994
Quiroz, Jose	Staff Research Associate	2005-2006
Ramos, Ruben	Laboratory Assistant	1993-1997
Reyes, Juan	Laboratory Assistant	1991
Rivers, Dan	Laboratory Assistant	1997
Roacho, Mario	Ag. Extension Assistant	1990-1997
Rodriquez, Devon	Ag. Assistant	2003-2006
Ruiz, Ericela	Ag. Extension Assistant	1991-1999
Santos, Alecsandro	Student Assistant	2001-2003
Salgado, Jesus	4-H Summer Program Coordinator	1990-2002
Shaner, Christina	Ag. Extension Assistant	1993
Shaner, Linda	Office Assistant	1993-2003
Silva, Leticia	Regional Occupational Program	1998
Silvas, Robert	Ag. Extension Assistant	1994

IMPERIAL COUNTY

COOPERATIVE EXTENSION CENTER

PREVIOUSLY ASSIGNED PERSONNEL ROSTER

(AFTER 1990 LOCATION AT UC DREC)

NAME	TITLE	DATES
Soto, Mark	Laboratory Assistant	1994-1997
Steffen, Joshua	Ag. Extension Agent	1997
Stordahl, Debra	Laboratory Helper	1995-1998
Stutes, Mark	Laboratory Assistant	1997-2007
Tamayo, Ricky	Ag. Extension Assistant	1990-1994
Thornburg, Josh	Ag. Extension Assistant	1994-1996
Trent, Mark	Farm Advisor, Plant Pathology	2008-2010
Trujillo, Olivia	Program Representative	1995-1997
Tubach, Roger	Ag. Extension Assistant	1994
Vallejo, Johnny	Laboratory Helper	1998
Vandiver, Joseph	Laboratory Assistant	1991-1995
Vandiver, Justin	Ag. Extension Assistant	1991
Vasquez, Vonifasio	Ag. Extension Assistant	1990-1996
Velasquez, Arturo	Ag. Extension Assistant	1991
Wickware, Rose	Office Assistant	1990-2002
Zeywar, Nadim	Laboratory Assistant	1997-1999

IMPERIAL COUNTY

COOPERATIVE EXTENSION CENTER

PREVIOUSLY ASSIGNED PERSONNEL ROSTER

(AFTER 1989 LOCATION AT UC DREC)

VOLUNTEER PERSONNEL

1994-1995	1996-1997	1997-1998	1998-1999
Cuervas, Leticia	Castillo, Pedro	Lomax, Stacey	Ruiz, Salvador
Damuso, Martha	Moreno, Jose	Ocequeda, Alfredo	
Padilla, Ann	Ocequeda, Alfredo	Phillips, Leland	
		Vallejo, Johnny	

1999-2000	2000-2001	2001-2002
Maciel, Francisco	Ambrozio, Marilene	Perez, Adolfo
Ruiz, Salvador		

YOUTH EXTENSION SERVICE ASSISTANTS

1990	1991	1992	1993
Castro, Liliana	Gamboa, Julio	none	Aria, Irma
Ozuna, Maria	Rendon, Eduardo		Gonzalez, Benjamin
Ruiz, Patricia			Moreles, Jose
			Siguieros, Ruben

1994	1995	1996	1997
Lopez, Griselda	Gonzales, Rocio	Gonzales, Rocio	Chavez, Cynthia
Osante, Manuel			Gonzalez, Rocio
Rosales, Cynthia			Justin, George
Valdez, Diana			Meza, Sandra

1998	1994 I.C.C.E. STUDENT FIELD ASSISTANT VOLUNTEERS	1994 I.C.C.E. STUDENT INTERNS
Casteneda, Daniel	Garcia, George	Grandos., Elda
Fimbres, Cynthia	Mayberry, Jamie	Meza, Julio
Garcia, Lucia	Martinez, Jaime	Roberson, Veronica
Tapia, Brandee	Olesh, Adam	Gutierrez, Martin
	Vasquez, Voni, Jr	

VISITING SCHOLARS

Escobosa, Fernando 2001-2003, Escobosa, Isabel 2001-2003,Gao, 2003-2004
Ruiz, Salvador 2001-2003, Santos, Alecsandro 2001-2003, Suleiman, Ayman 2007-2008

VOLUNTEER ROSTER

FARM SMART PROGRAM

WINTER VISITOR PROGRAM - FULLTIME ASSISTANCE

Bertrand, Adrian & Elva	2003 - 2007	Knack, Mary Lou	2007 - 2008
Best, Donna & Bob Pester	2008 - Present	McClay, Lyle & M'Lee	2012
Brown, Gerry & Cheri	2008	Ohler, Frank & Susannah Loomis	2004
DeCelles, Roger & Esther	2002 - 2006	Peabody, Roger	2008
Durrans, Larry & Shirley	2010 - Present	Remick, Joe & Shelia	2007 - 2009
Gagos, Roger & Gretchen	2007 - 2008	Ritchie, Steve & Pam	2005
Hall, Jim & Midori	2008 - 2011	Robertson, Alan	2001 - Present
Hearth, Larry & Chris	2009	Staib, David & Paula	2003 - 2010
Johnson, Ross & Barbara Smith	2004	Sweet, Allan & Cathy	2011 - Present
King, Gordy & Mae	2003 - 2011	Watkins, Arlene	2008 - 2009
Kjack, Kent & Jeannie	2009 - 2011		

WINTER VISITOR PROGRAM - MUSICIAN VOLUNTEERS

Bristol, Jim	Knack, Mary Lou	Robertson, Al
Brown, Cheri	Long, Norm	Schoenenberg, Paul
Driskill, Alex	Long, Mickey	Shaw, Ann
English, Hank	Moore, Doug	Shaw, Fred
Elschlager, Sue	McNeil, Jim	Shrum, Don
Farnsworth, Leon	Nadolson, Mike	Shrum, Rosemary
Gagos, Roger	Nible, Bob	Szatkowski, Carolyn
Gagos, Gretchen	Peabody, Roger	Van Dusen, Ian
Hartwell, Marie	Pester, Bob	Wade, Fred
Hartwell, Steve	Potherin, Mike	Watkins, Arlene

PART TIME VOLUNTEERS

Birch, Steve	DeSoto, Sebastian	Machado, Nubia	Shropshire, Bo
Britschgi, Walt	Evans, John	Miramontes, Mary	Szatkowski, Carolyn
Britschgi, Linda	Grizzle, Kim	Nelson, Donna	Szatkowski, Joe
Caywood, Tommy	Gunderson, Allison	Pauley, Steve	Trent, Tererei
Caywood Patty	Gunderson, Jeff	Pauley, Kathy	Yahni, Barb
Caywood, Sammie	Hartman, Mandy	Potherin, Janet	
Croak, Linn	Hartman, Travis	Sanchez, Linda	
DeSoto, Marie Isabel	Kittisk, Hugh	Schoenenberg, Paulette	

AREA IDENTIFIER MAP

THE "MELOLAND STATION"

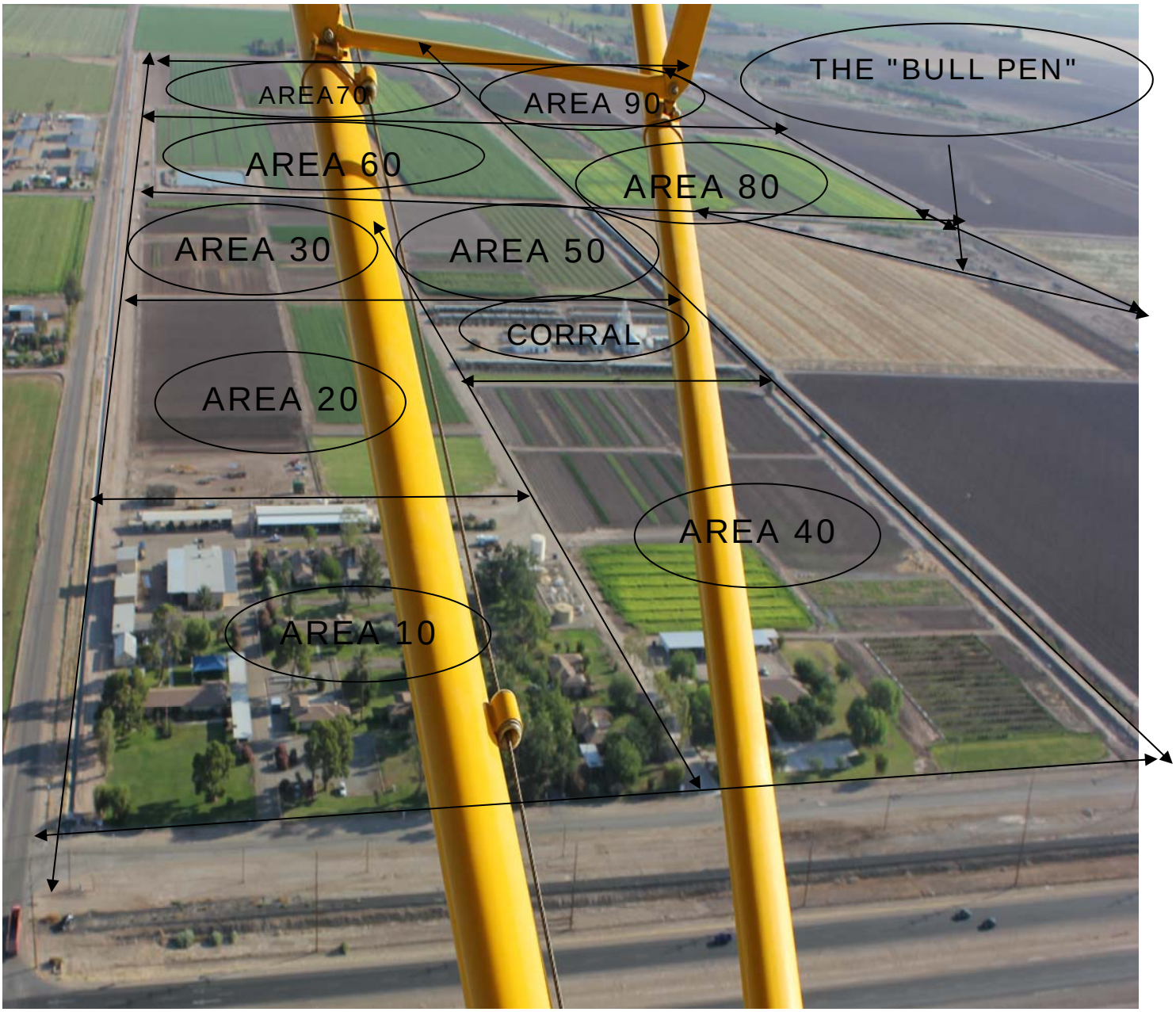
ALSO KNOWN AS:

DESERT RESEARCH AND EXTENSION CENTER (1990-PRESENT)

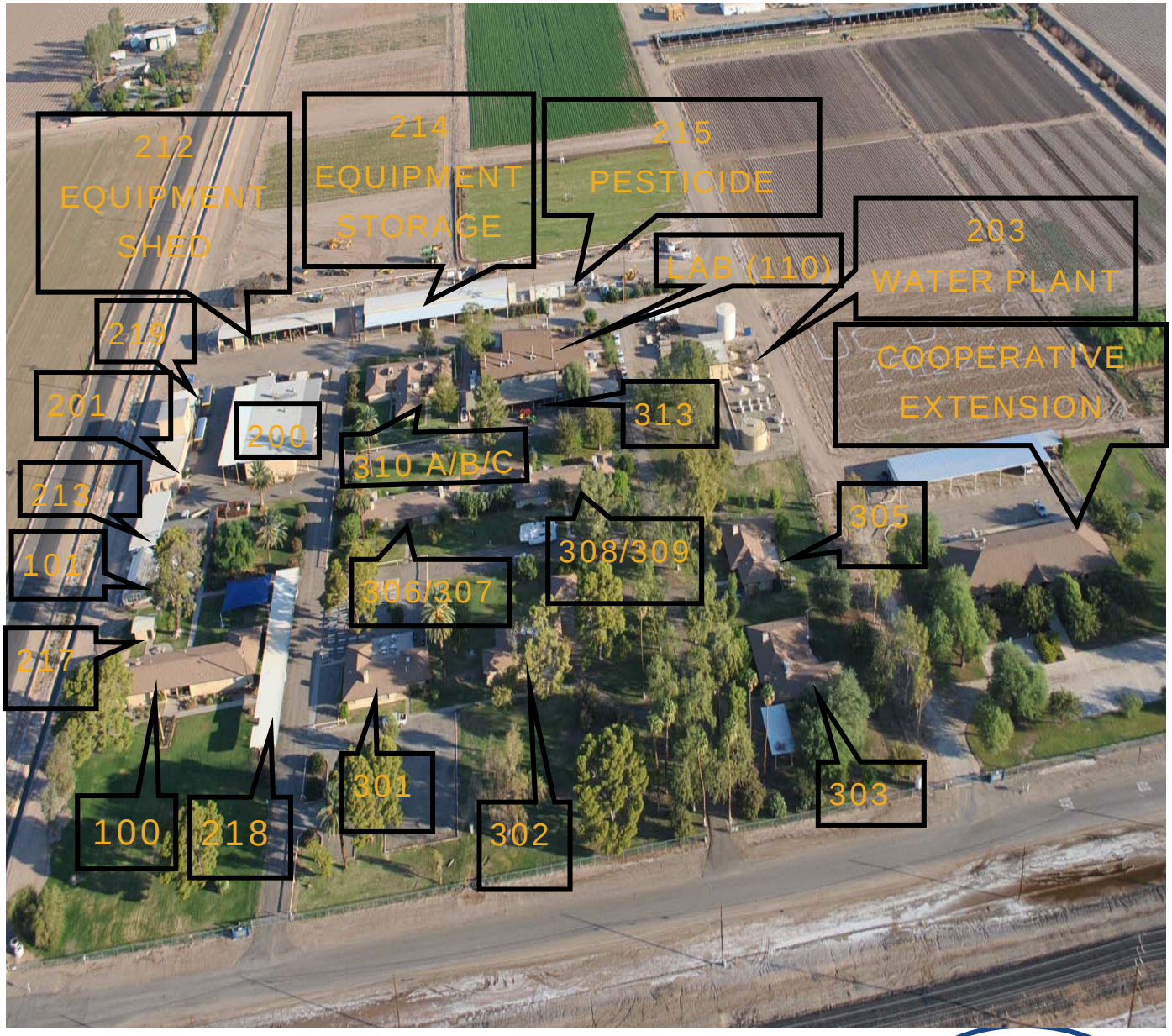
IMPERIAL VALLEY AGRICULTURAL CENTER (1984-1990)

IMPERIAL VALLEY FIELD STATION (1948-1984)

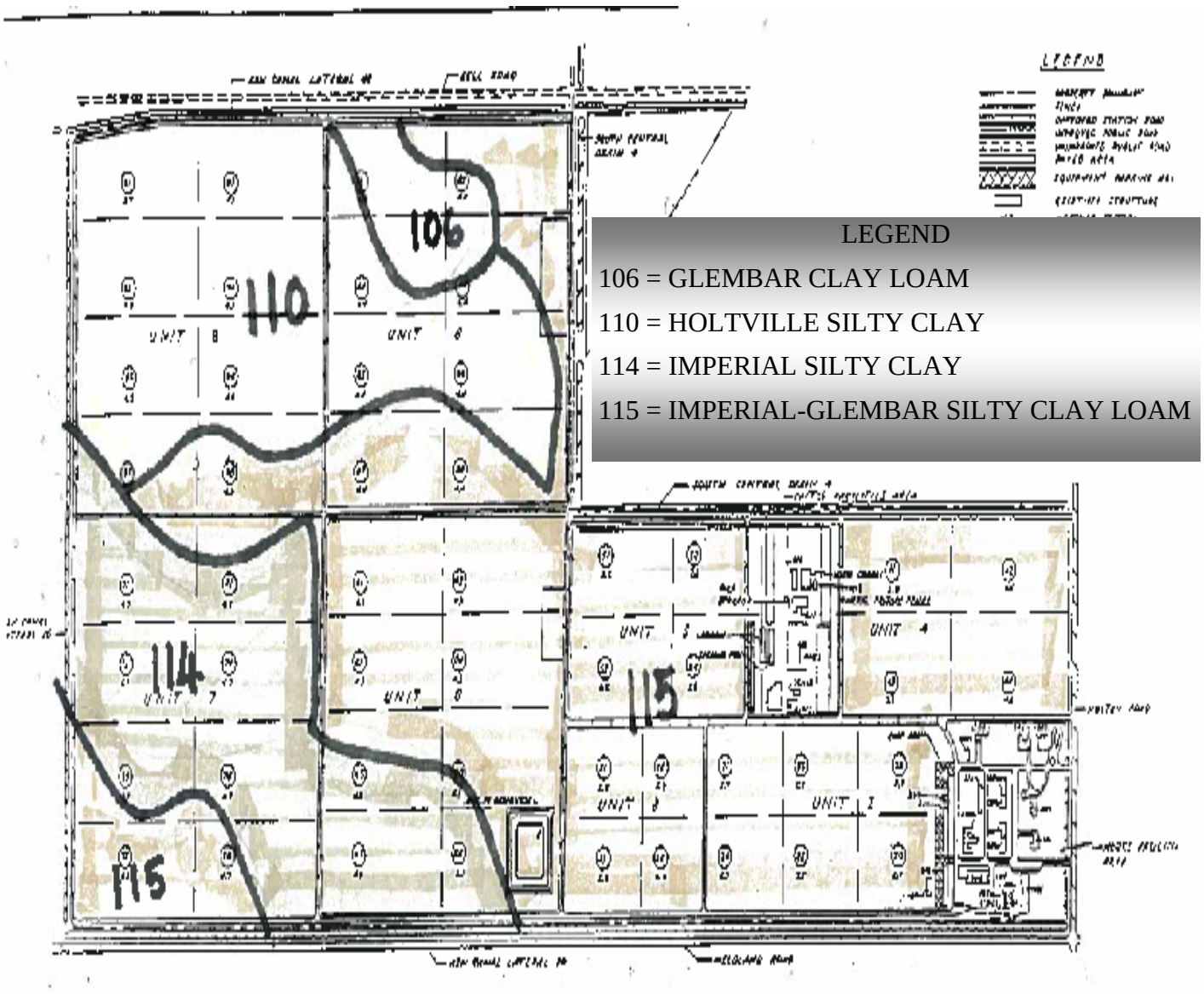
IMPERIAL VALLEY EXPERIMENT FARM (1912-1948)



LEGEND FOR STRUCTURES AT DREC



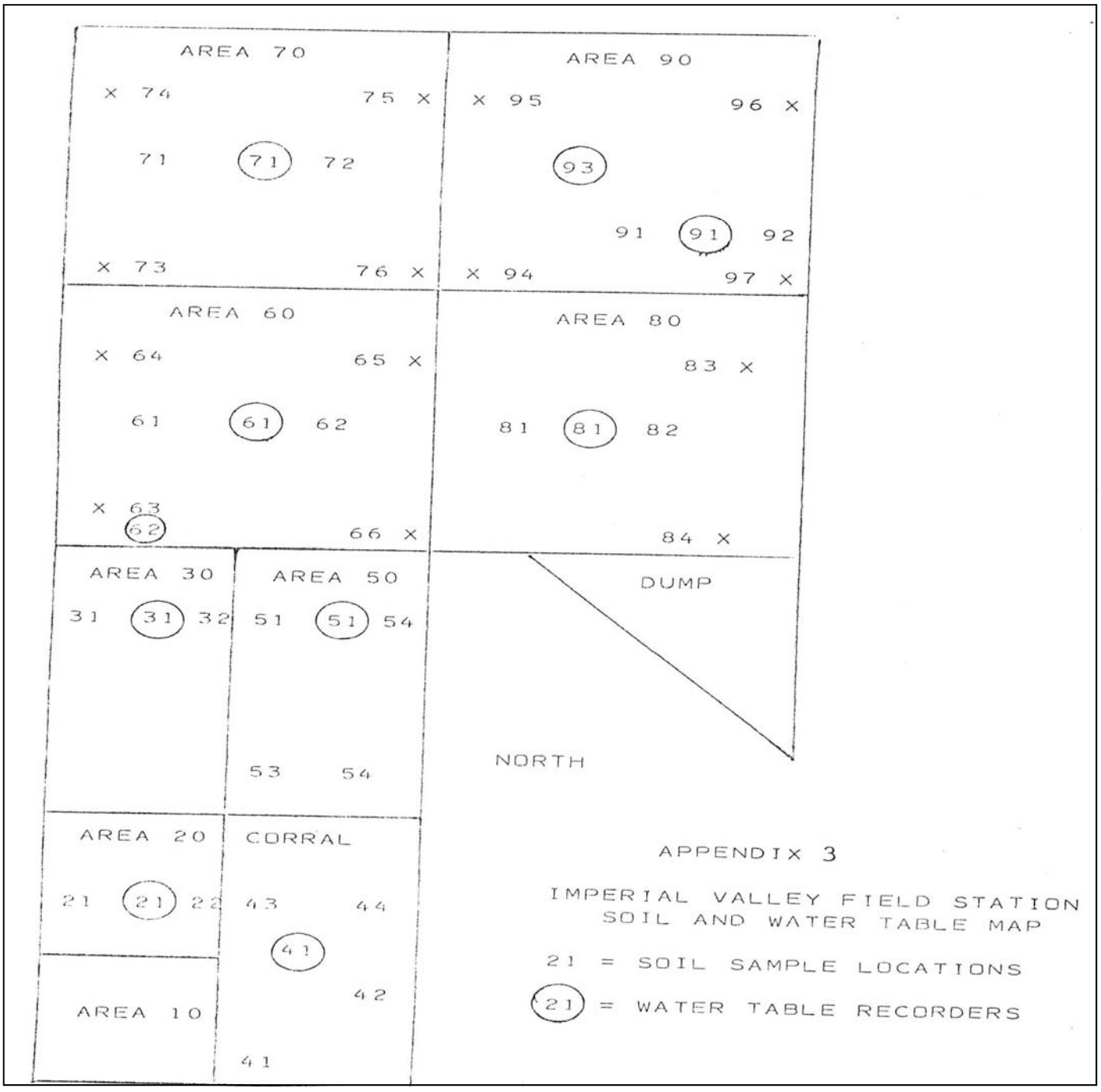
SOIL TYPES AT DREC



Source: Agricultural Field Stations, University of California, Davis

IMPERIAL VALLEY FIELD STATION

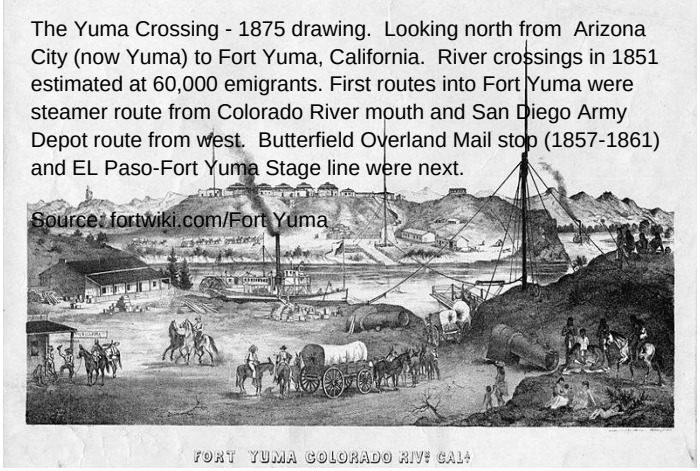
SOIL AND WATER TABLE MAP



A network of water table data recorders was first installed around the 1956-1957 season. In the 1963-64 season, a "Leaching Trial" was conducted by UC Davis specialists J.N. Luthin, R. Worstell, Frank Robinson and P. Puri. Salinity was measured at three depths in the water Table Recorders. As a result of the "Leaching Trial", the Department of Irrigation at UC Davis created a staff position at the IVFS in 1964 and Dr. Frank E. Robinson was appointed to that position. The chart above first appeared in the 1964-1965 IVFS Annual Report and continued until the 1983-84 Annual Report. Data continued to be recorded until they were removed sometime before 2000. Soil sampling was conducted using a hand auger at locations indicated.

THE BEGINNING - WHY A DESERT RESEARCH FARM?

How did the University of California Desert Research and Extension Center (UC DREC) come into existence? *Why* did the UC DREC come into existence? *Why* would anyone want to develop a research farm let alone live here in the harsh, desert environment of the Imperial Valley? At the turn of the Twentieth century, there wasn't even a farming population to speak of, living conditions were primitively unbearable and air conditioning probably wasn't in Americans' vocabulary. Fort Yuma, (initially located in California) was little more than a supply depot for the for U.S. military presence in Arizona following the Mexican-American War.



The Yuma Crossing - 1875 drawing. Looking north from Arizona City (now Yuma) to Fort Yuma, California. River crossings in 1851 estimated at 60,000 emigrants. First routes into Fort Yuma were steamer route from Colorado River mouth and San Diego Army Depot route from west. Butterfield Overland Mail stop (1857-1861) and EL Paso-Fort Yuma Stage line were next.

Source: fortwiki.com/Fort Yuma

However, as the California Gold Rush created dreams of untold wealth for adventuresome pioneers, Yuma became part of a southern route across America that provided a jumping-off point into California allowing people to avoid the life-threatening hardships of crossing the Sierra Madre Mountain Range. The American southwest was becoming part of America's last frontier and the only reason people explored this region in the 1850s was to find a way west in order to *get* the gold and strike it rich *(fortwiki.com/Fort_Yuma)!* In the 1850s, explorers and surveyors discovered that the region of what is now the Imperial and Coachella Valleys was actually below sea level. However, the soil quality proved a pleasant surprise in spite of the arid desert conditions and soon dreams began of ways to establish agriculture in the region of southwest Arizona and southeastern California. Now, the fact that southeastern California was below sea level but Arizona wasn't doesn't seem relevant at first but the dreamers who saw a future for agriculture in California realized that geography was on their side.

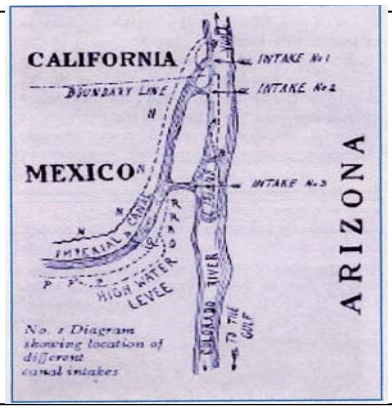
While Yuma's elevation was about 130 feet above sea level, a prehistoric alluvial flood plain was discovered by 19th century surveyors that wound its way southwesterly from Yuma, around what is now Pilot Knob, west towards what is now Calexico, then northerly towards what is now the Salton Sea. As the Colorado River revealed her mighty history to American discoverers, it became apparent that she did not always flow uninterrupted into "El Golfo" or the Gulf of California. What is constant about the Colorado is that there have always been large quantities of silt traveling in the river. Over the course of prehistoric time, it has been discovered that the Gulf of California extended much farther to the northwest than the end of its current location. As the Colorado flowed south towards the Gulf of California, large quantities of silt would build up creating a natural dam in the vicinity of present day Yuma. The river flow was diverted into what has been called the Salton Trough which ran northwesterly to a depth of about 230 feet below sea level. Eventually, the Colorado River flow resumed its original course to the Gulf of California leaving nothing more than a huge lake of standing water in the Salton Trough. That huge lake's final evaporation cycle created the Salton Sink at the north end of the Salton Trough leaving large salt deposits there while recurring strong wind storms carried sandy deposits to the east and northeast creating the sand dune mountains of today (*britannica.com/Colorado River).* The remaining soil deposits were eventually discovered to be very suitable for agriculture in the area now known as the Imperial and Coachella Valley.

So, at the turn of the 20th Century, with gravity on their side, engineers of the California Development Company changed their plan of developing irrigation in Arizona to instead focus on developing an irrigation network in southeastern California. The California Development Company had its origins in 1891 as The Arizona and Sonora Land and Irrigation Company. In 1893, the company became renamed The Colorado River Irrigation Company and promptly went bankrupt as a result of a stock market panic. In 1896 the California Development Company was formed and it signed a contract with Mexico in 1900 which allowed the construction of a canal into Mexico. It was to proceed from Intake #1 across from Yuma near Pilot Knob, south for a ways into an ancient overflow channel of the Colorado River named the Alamo Canal then west for forty miles to Sharp's Heading, east of Calexico, where the canal was turned north: basically following the prehistoric flow pattern previously indicated. As the irrigation network was created for Imperial Valley, The Imperial Land Company was created as part of the California Development Company in order to sell land and develop towns.

With the addition of rail service into the valley, farmers and towns began to emerge and crops were grown. The success was short lived, however, and by the winter of 1903-04, silt had built up at Intake #1 to a level that prevented water from flowing into the canal. A small bypass around Intake #1 had been constructed and used in 1902, 1903 and 1904 during periods of low water but additional remedies became essential since farmers were threatening lawsuits for inadequate water delivery. A plan was devised to dynamite the bottom of the dam at Intake #1 in order for the river to rush through and clear the silt. However, the chief engineer for the project considered that too dangerous and prevailed with an alternative plan. He installed Intake #3 four miles below the Mexican border in order to bypass the heavily silted area around Intake #1. Due to the contractual agreement with Mexico, the cut in the river was constructed but flood control structures could not be built until approved by the Mexican Government. As Intake #3 was installed in the fall of 1904, plans for the flood control structures were submitted to the Mexican Government and minor safeguards were installed while awaiting approval. An open cut was made against the chief engineer's professional judgment, but his fears about flooding were somewhat alleviated after he studied thirty years worth of river flow data for the Colorado and the Gila rivers and discovered that there had been only three minor floods in the previous twenty seven years. His worst fears were more than realized, however, when the first of seven major floods occurred between February, 1905 through December, 1906. As history shows, the damage from those floods severely jeopardized agriculture in Imperial Valley as the floodwaters eroded huge sections of land on its flow northward creating the Salton Sea.

The battle to control the flood waters was epic but by February, 1907, the floods were finally stopped and the flow of the Colorado River was restored to its normal course towards the Gulf of California. The final battle involved a seven month campaign from August, 1906 until February, 1907, whereby the Southern Pacific Railroad dumped trainloads of boulders across the breach in the Colorado River at Intake #3 *(The Journal of San Diego History, Winter 1975. Volume 21, Number 1, "When the Imperial Valley Fought For Its Life," Robert L. Sperry).* So, the railroad company proved to be the victor in the battle to restore irrigation water to Imperial Valley.

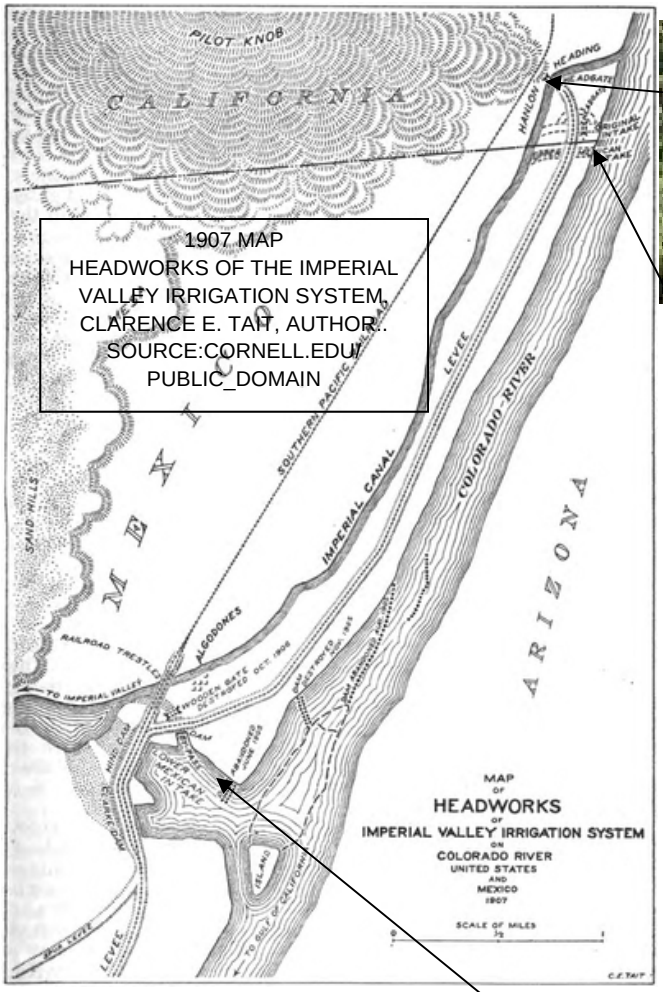
This illustration is from a document entitled "Colorado River History Used by Harold Bell Wright" by Gerry Chudleigh. Remnants of Intake #1 are visible today on the road to the Border crossing at Algodones, Mexico. (Algodones exit off Interstate 8 is just a few miles west of Yuma, Arizona). Additional historical information is presented there on a marker near the old wood and metal structure. Intake #2 was never very useful but was installed to satisfy a provision in the contract with Mexico. Today, it appears that the Morelos Dam is at the location of Intake #2. At four miles below the U.S. Border, Intake #3 was more or less "Ground Zero" for the epic floods that created the Salton Sea and nearly wiped out Imperial Valley farming. Today,



remnants of the cut at Intake #3 are not visible but there are some concrete flood control and diversion structures in that location. At the location of the diversion structure, there appears to be the remnants of the prehistoric Alamo River Chanel flowing towards the original Imperial Canal.

Additional images of this area have been included on the next page.

ADDITIONAL IMAGES: THEN AND NOW



1907 MAP
HEADWORKS OF THE IMPERIAL VALLEY IRRIGATION SYSTEM,
CLARENCE E. TAIT, AUTHOR.
SOURCE:CORNELL.EDU/
PUBLIC_DOMAIN

LEFT: THE HANLON HEADING. BUILT AS BYPASS FOR INTAKE #1 VISIBLE TODAY ALONG ALGODONES ROAD JUST BEFORE THE BORDER CROSSING.
NOTICE DASHED LINES ON MAP SITE OF INTAKE#1 KNOWN AS THE CHAFFEE GATE
SOURCE:
COMONS.WIKIPEDIA.ORG

AUTHOR'S NOTE: MORELOS DAM IS THE FINAL DIVERSION OF THE COLORADO RIVER. ALTHOUGH WATER IS VISIBLE BELOW THE DAM IT IS MERELY STANDING WATER. THERE IS RARELY ANY FURTHER FLOW OF THE COLORADO TO THE GULF OF CALIFORNIA. IT'S LIKE A WATERSHED WITHOUT *A RIVER. "COMO UNA CUENCA SIN RIO"*

ABOVE: MORELOS DAM -2012. LOOKING NORTH AT COLORADO RIVER. (FORMER INTAKE #2)
PHOTO BY LAURA FOX

ABOVE: MORELOS DAM-2012. LOOKING WEST AT DIVERSION STRUCTURE
PHOT0 BY LAURA FOX

ABOVE: 2012-IMPERIAL CANAL LOOKING WEST FROM MORELOS. PHOTO BY AL ROBERTSON

A CREW ERECTING A DIKE VICINITY THIRD HEADING OF FLOODED IMPERIAL CANAL, CIRCA 1905 PHOTO-JOSEPH LIPPINCOTT
SOURCE ONLINE ARCHIVE OF CALIFORNIA

ABOVE AND LOWER RIGHT VICINITY OF 1904 INTAKE #3.
ABOVE: 2012 - DIVERSION STRUCTURE ALONG IMPERIAL CANAL. LOOKING WEST.

RIGHT: 2012 - VIEW OF THE OLD ALAMO CHANNEL FROM DIVERSION STRUCTURE. LOOKING WEST
PHOTOS BY AL ROBERTSON

The struggle had caused the California Development Company to go bankrupt while pushing the resources of the Southern Pacific Railroad Company to its limit *(When Imperial Valley Fought for its Life, Robert L. Sperry).*

Beginning in February, 1907 the Imperial Valley was finally realizing a more reliable source of irrigation water. It marked a time when the Colorado River was more or less under control. It has been said, however, that the Colorado never gave up until its flow was stabilized with the completion of the Hoover Dam in 1935. Then, In 1942, with the completion of the All-American canal, water delivery to Imperial Valley became much more streamlined. In 1907, however, a more or less stable delivery of irrigation water to Imperial Valley allowed for more stable growth to the valley. Imperial County became incorporated in 1907, having been part of San Diego county prior to that time. Deriving its name from the Imperial Land Company, the Imperial Valley became Imperial County and by 1910, agriculture was thriving and developing rapidly with alfalfa becoming a most important cash crop *(Wikepedia.org/Imperial Valley).* So, now we have a partial answer to the opening questions regarding the establishment of the University of California Desert Research and Extension Center. Simply put, the area became suitable for growing crops.

Before proceeding further, however, the author would like to make a special acknowledgement of a book by Ann Foley Scheuring entitled "Science and Service, A History of the Land Grant University and Agriculture in California". It is a wonderful book and readers are encouraged to obtain a copy. The book is an extremely thorough presentation of the University of California's history and illustrates many factors influencing philosophical and organizational change from its earliest origins until the book's publication in 1995.

We will now explore how the University of California became involved in establishing a research farm in Imperial Valley. The University of California, located in Berkeley, is the Land Grant University for the state of California created under the Morrill Act of 1862. Vermont Representative Justin S. Morrill first introduced his bill in 1857 but it wasn't successfully passed until 1862 and was also known as the Agricultural College Land Grant Act *(Scheuring p. xi, a preface by Loy L. Sammet, Professor Emeritus, Agriculture and Resource Economics, University of California, Berkeley).* Just as the Morrill Act of 1862 (and again in 1890) enabled the national creation of land grant universities for teaching agriculture, the Hatch Act of 1887 (and again in 1955) allowed for the creation of agriculture experiment stations *(Scheuring, p.40, p.76).* Although not the first dean of Agriculture at the University of California, Eugene Hilgard has been regarded as the real founder of the UC College of Agriculture and the University of California's first Experiment Station located on the Berkeley Campus. Arriving in 1875, Dean Hilgard began soil research projects in earnest before the Hatch Act was passed; allowing him the claim of operating the first true land grant college experiment station in the United States. His tenure from 1875 -1905 left a profound effect at the university. He is best remembered for his work in soils, wine-making, crop research, entomology, pest control and plant disease. As part of his legacy in soils, Dean Hilgard developed a collection of soil survey maps for the entire state beginning in 1879. Soil mapping continued to develop as well as his insistence that California's land needed scientific understanding and management. He proved how soil composition and climate interacted, how plants endure drought, how they seek moisture and how, even in arid and alkali environments, organic matter and microorganisms contributed to soil fertility. His irrigation, tillage and percolation experiments were also valuable in the field of irrigation science in later years *(Scheuring p. 25-47).*

After the passage of the Hatch Act in 1887, Dean Hilgard established three additional experiment stations by 1890. His caveat for their creation was threefold: 1) stations should represent conditions in each geographic area, 2) stations should be able to provide answers to questions on appropriate crops and agricultural methods, 3) stations should have the support of local citizens. Additionally, Hilgard dictated that the land for each station be lent to the university with reversionary clauses to the sellers in the case of station abandonment *(Scheuring p. 40).* In 1893 three more experiment stations were established and then one more in 1904. As noble an idea as it was to create these facilities, they all suffered a relatively short life span, closing before 1909.

The three most notable factors leading to their closure were; 1) they were too expensive to maintain, 2) there was a shortage and or lack of scientifically competent supervision, 3) inadequately small budgets which brought about a level of poverty that caused reductions in projects and reduced stations to little more than "care-taker" status *(Scheuring, p. 41).*

In addition to the enabling legislation of the Hatch Act of 1887, the University of California was able to obtain funding for a citrus experiment station and plant pathology laboratory in 1905. The state citrus experiment station bill was spearheaded by a group of orange growers, sponsored by California State Assemblyman Miguel Estudillo and carried an appropriation for $30,000.00. Thus marks the beginning of what would ultimately become UC Riverside with an official founding date of February 14, 1907 *(Scheuring p.72).* As part of the citrus bill, a three member commission was created to select a location. That commission being comprised of California Governor George Pardee, UC President Benjamin Wheeler and acting Dean of Agriculture, Edward Wickson *(Scheuring, p. 71).*

The UC Meloland Station was the next experiment station to be created in 1912. According to Mr. George Worker's 1984 Annual Report, the need for agricultural research became recognized in 1908 (see inset below and left) and the wheels were set in motion for the creation of the University of California, Imperial Valley Experiment Farm. A portion of Mr. Worker's report is reprinted below.

Parker is a typographical error.. Packard is correct.

In 1908, the California State Legislature passed law appropriating $6,000.00 directing UC to establish Agricultural Experiment station (no cost to state) in El Centro. A public hearing in El Centro in September, 1909, determined that the money would be used for hiring someone to do the site selection and conditions survey. In December, 1909, Walter Packard was chosen by UC because he was employed as an irrigation field agent doing irrigation studies in the upper San Joaquin Valley while in the process of completing his M.S. Degree. The two year study resulted in his publication in 1911 entitled "The Imperial Valley Settlers' Crop Manual". UC Berkeley Press. Truly, the first publication associated with the I.V.E.F.

Cooperative experiments, a general survey of conditions of the need for experimental work was done in 1908 by Walter E. Parker and published in 1911. The original Act authorized an experiment station provided the necessary land could be obtained without cost to the state. This was done through the cooperation of the Imperial County Board of Supervisors and interested citizens. The station was established at Meloland in 1912 with deeding of 20 acres to the University of California. The Board of Supervisors purchased 10 acres for $900, and the other 10 acres was purchased and given to the University of California by the people of Meloland and vicinity. The two largest gifts came from W. F. Holt (founder of Holtville) and Harold Bell Wright (author of "The Winning of Barbara Worth"). Additional acreage was deeded by the Imperial County Board of Supervisors to the Regents of the University of California, 10 acres in 1912, 10 acres in 1913, and 40 acres in 1941, with the condition that the land be used as a state experiment farm. Then, in 1947, the Regents of the University of California purchased 170 acres from Hugh L. Keating for the sum of $10.00, bringing the station total to 255 acres. Of these, 192 acres can be used for experimental plots (Appendix B).

The station was administered by the Agronomy Division of the College of Agriculture, University of California, Davis, from 1912 to 1948. In 1948 all field stations including Tulelake (1947-48), Hopland (1951), Deciduous Fruit (1925), and Antelope Valley (now closed) were placed under one Director of Field Stations administration. Professor B. A. Madson became the first director until his retirement in 1954. Previously he was the station administrator as head of the Agronomy Division and assisted in 1910 and 1911 in the selection of the site for the station.

As a result of Packard's report (inset above left), the Meloland Station was established when he demonstrated the need for research due to the climactic and soil conditions of the Imperial Valley that were, and still are, unique in American Agriculture.

Walter Packard was the first superintendent of the farm and along with Professor Ben Madson, was involved with site evaluation and selection.

The Agronomy Division had shifted to from Berkeley to Davis as decentralizing forces served a growing trend to provide more hands-on agricultural training. The theoretical, scientific training at Berkeley was visionary in order for more stable, long term agricultural development but Davis was reaching out to a growing population.

In summary, then, we have shown that the UC DREC was not established suddenly as if on a mere whim. Irrigation and population had to occur first and prove to be reliable, successful and capable of sustaining growth. The Citrus Belt of Riverside and Orange County are earlier examples, especially with regard to the 1907 Riverside Experiment Station.

At this point, mention should be made of engineering pioneer, George Chaffey. He had achieved success as a land and community developer in the Inland Empire with his development of the Cucamonga Plain, later to become Rancho Cucamonga and the Etiwanda Water company. This is only significant because it was George Chaffey who joined the California Development Company in its early years and was responsible for the construction of Intake #1 on the Colorado River , known as the Chaffey Gate; the first part of Imperial Valley's irrigation network *(A Brief History of Irrigation in the Imperial Valley. Desert USA.com, 2011).*

Why people came to settle here is astounding. Maybe the draw was stronger than gold. Maybe they were driven to prove agriculture was worth the sacrifices necessary to succeed. After all, rural life throughout America in its early years was bonded by common factors of family and community strength. It has persevered here in the Imperial Valley and today a strong sense of community seems a very important part of why people choose to live here.

In fact, with regard to Dean Hilgard's caveat in 1888, the 1911 establishment of the Meloland Station received support from local citizens. The station also represented conditions typical of the geographic area with its Meloland Soil, a fine silty loam and would help provide answers to questions on appropriate crops and agricultural methods due to the advances in soil science. With Hilgard's vision of establishing a scientific understanding of agriculture, the way was paved for the arrival of Agronomist Walter Packard and the establishment of the Imperial Valley Experiment Farm with administrative direction from UC Agronomist Ben Madson.

In the next chapter we will present the acquisition and development of the UC DREC but at this point it is appropriate to include the following reprint from Mr. George Worker's 1974 annual report for the Imperial Valley Field Station regarding Professor Ben Madson.

The eulogy for Professor Ben Madson is included to indicate the importance of our first administrator.

Professor Madson was very instrumental in keeping the experiment farms functioning in spite of the many variables working against them such as World War I, the Great depression, the great drought of 1934 and even World War II. The UC Davis Special Collections Library has an Oral History of Professor Madson's tenure at UC Davis. He provided excellent insight regarding the administrative organization of the experiment stations.

An interesting trivia point is that Professor Madson and Walter Packard were classmates at Iowa State University, both graduating in 1907. Then to arrive at UC Berkeley in 1910, both via different career paths, seems no small coincidence. This fact seems very crucial in the history of agricultural research especially for Imperial Valley.

Article reprinted from IVAC (UC DREC) Annual report, 1974. George F. Worker, Jr.

B. A. Madson

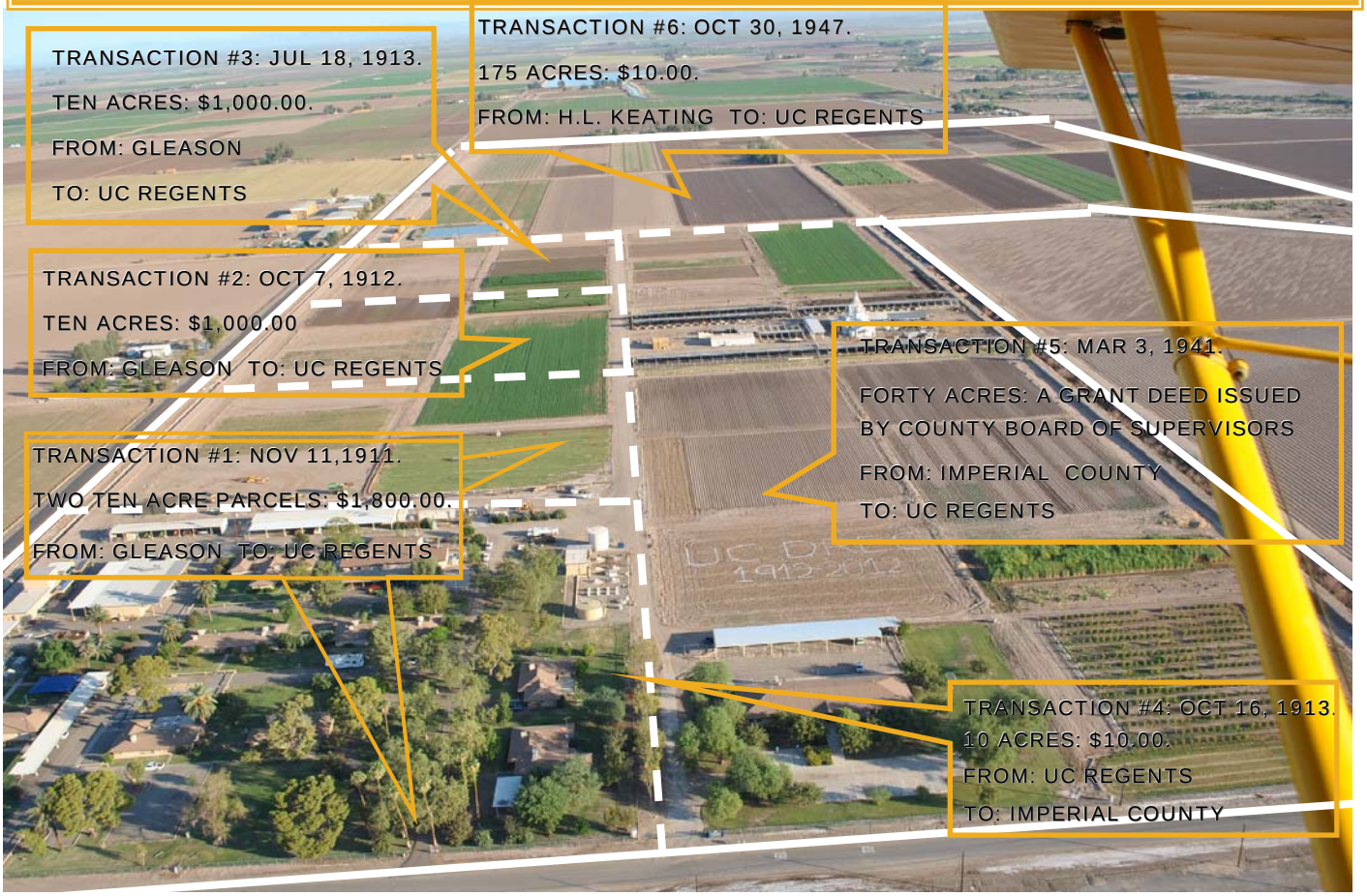
March 19, 1887 - January 12, 1974 1/

Ben, affectionately known to thousands of students as "Prof" Madson, to co-workers as "Chief" and to his thousands of city, county, state and nation-wide friends under various names, (Professor, Mayor, Citizen of the Year, but mostly just plain "Ben").

Ben A. Madson was born on March 19, 1887 in Jewel Junction Iowa. He graduated from Iowa State College in June 1907 with a major in chemistry. He worked for a time as an Assistant Chemist at Iowa State College and as Chief Chemist for the Iowa Sugar Company before coming to the University of California, Berkeley in August 1910 as an Assistant in Agronomy. The Division of Agronomy was just six years old at that time. Ben remained with the Agronomy Department from 1910 to 1948 progressing through the ranks to Professor of Agronomy and Agronomist in the Agricultural Experiment Station in 1934. He was made Chairman of the Division of Agronomy on July 1, 1927 which position he held until June 30, 1948. On July 1, 1948 Professor Madson was made Director of Agricultural Field Stations, a new position charged with the responsibility of administering the outlying research areas of the University of California to more effectively service the state. Ben held this position until his retirement in 1954 when he became Emeritus Director of Agricultural Field Stations, Emeritus Professor of Agronomy and Emeritus Agronomist in the Agricultural Experiment Station.

1/ Eulogy to Dr. Ben A. Madson by James L. Myler, Director, UC Agric. Field Sta. AGRONOMY NOTES

ACQUISITION AND GROWTH



Aerial Services: Bob Douthitt Photo Taken: October 21, 2011 Aerial Photography: Al Robertson

The above aerial photo has been included in order to provide a graphic reference for the acquisition and growth of the UC DREC. In the above display, the white solid line indicates the perimeter boundary of the farm. The dashed lines within the boundary of the farm indicate the division of the parcels of land as they were acquired by the University of California. The graphic boxes with arrows indicate six transactions of deed activity that occurred between 1911 and 1947 (Imperial County Recorder's Office, El Centro, California). Following from lower left, the transactions are numbered in chronological sequence. The total acreage has expanded from twenty (20) acres to two hundred fifty five (255) acres with about 190 acres used for experimental plots.

A Wikipedia search indicated that before this area was known as Meloland, it was called the Gleason Switch. There was a train siding here where sugar beets were loaded. During the author's title search, information from the county assessor's office and the county surveyor's office indicated that this land belonged to Mr. & Mrs. Irving Gleason and was used as a grapefruit and citrus orchard. The train siding was named after grapefruit farmers so the UC DREC owes its beginnings to grapefruit farmers! In fact, the first three transactions involved the Gleasons: 1) November 11,1911, twenty acres 2) October 7,1912, ten acres 3) July 18,1913, ten acres. An interesting side note to the first two transactions is that they were completed in *gold coin!* That was definitely a different time.

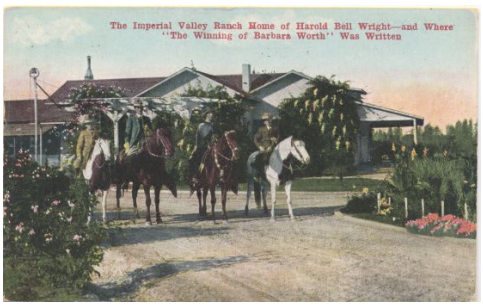
The 1915 photo above is the earliest picture found in the archives at the UC DREC. At the end of the entrance driveway, four were structures were built: Main residence, hired hand residence, office building and a barn. Notice the water behind main residence. Entrance sign reads:

IMPERIAL VALLEY
EXPERIMENT FARM
UNIVERSITY OF CALIFORNIA

Even more interesting than the discovery of the gold coin purchase, was that funding for the purchase came from the Imperial County Board of Supervisors and sixteen local, interested citizens. According to Farm Superintendent George Worker's 1983-84 IVAC Annual report, the Imperial County Board of Supervisors funded $900.00 for ten acres and sixteen local area citizens funded $900.00 for the second ten acre parcel. Of significance is that 25% ($225.00) was funded by Mr. W. E. Holt, founder of Holtville, and 14% ($126.00) was funded by Mr. Harold Bell Wright noted painter and author ("The Winning of the Barbara Worth").

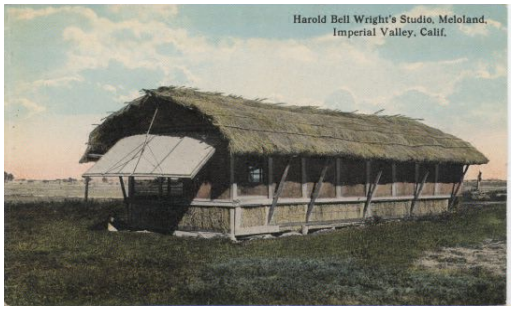
According to local residents, William D. Lehman, and Charles Denton, the property where Mr. Harold Bell Wright lived was about one mile east of the current location of the UC DREC and on the south side of the road. The remnants of the turn-off to that former property are still visible from the Evan Hewes Highway a short distance east of Barbara Worth Road.

William D. Lehman also indicated that Mr. Wright, while observing site selection studies for an experiment farm, reportedly commented that this area was a very "mellow" place to live and farm. Hence the name of Meloland.



Images of Harold Bell Wright's Tecolote Ranch located very close to the I.V.E.F.

From a collection by Gerry Chudleigh



According to a Wikipedia article, Meloland (formerly, Gleason Switch) was an unincorporated community from 1908 to 1911 and was 4 miles west of Holtville at the intersection of Meloland Road and U. S. Highway 80. There was a school house and a post office there but the post office burned in 1911. The schoolhouse still stands and is a personal residence with the old bell tower still visible from Meloland Road. The word Meloland also defines a soil type. It's a very fine sandy loam which existed throughout the area and it's likely that the Meloland soil type came about after the name of this "Mellow Place" as coined by Mr. Harold Bell Wright. According to a 1918 soil survey published by the U.S.D.A., Bureau of Soils, there were four primary soil types in the section of land that was to ultimately become the 255 acres of UC DREC. They were: 1) Holtville silty clay loam (Hs) at the south end of the farm 2) Imperial silty clay loam (Lm) in the next sector north 3) Imperial silty clay (Ls) in the third sector: 4) Meloland fine sandy loam (Mi) in the northeast sector. While the soil texture and composition has remained the same, for some reason it has been referred to as mostly Imperial-Glembar Silty Clay Loam. Whatever the name, the common factor is the wide variety of soil texture existing throughout the UC DREC. Recollections from local residents are that the DREC site was originally chosen because the soil was a very representative and desirable soil type located throughout the area.

As previously indicated, the area was known as the Gleason Switch because of a railroad siding in front of Gleasons' farm. That siding was part of The Holton Interurban Railroad line which originated in Holtville, ran along Holton Road and U.S. Highway 80 (now the Evan Hewes Highway) and into El Centro. The Holton Interurban Railroad primarily carried produce from packing sheds and pallets from a manufacturing plant before stopping at the Gleason Switch where sugar beets were loaded. In El Centro, the line then went north to Niland, California, where it connected with the main line to Los Angeles.

There was a time when the siding became unused but the train line remained in use until the 1990s. The track was finally removed from its bed around 2006 by a historic train group from Yuma, Az. But there are times even still, when phantom diesel locomotive whistles can be heard outside the UC DREC. It's as if the old Holton Interurban Line was still in operation. What a wonderful time travel it is hearing such a sound.....but then employees will all wave at Mr. Walt Britschgi as he drives by in his farm truck equipped with his diesel locomotive whistle.

Holton was the original name for the community of what is now Holtville and that is how the train line was named . However, the name Holton created confusion for the U. S. Post Office because there was also a town named Colton in the Inland Empire near San Bernardino. So, to avoid confusion, and to satisfy the U.S. Post Office, Holton became Holtville.

The first three land tractions involved the purchase land from Irving and Fannie Gleason. The third land transaction was not for additional land but rather involved a transfer of title. The southwestern most ten acre parcel of the farm was transferred back to the County of Imperial and to this day, is still titled in the name of Imperial County. The title indicated that the land was for use by the University of California as long as it was used as an agricultural experiment farm. This transaction probably occurred in order to insert a "reversionary clause" into the title since the original had no such clause. Reversionary clauses date back to Dean Eugene Hilgard's requirement that land used for experiment farms should revert back to the original owner in the case of abandonment.

The consideration as listed in the title was for ten dollars ($10.00) and some capital stock of the Imperial Water Company Number One which was one of the many, small independent water companies assimilated into the emerging Imperial Irrigation District.

It is curious. What was the significance of granting capital shares in the Imperial Water Company? Did that ensure water rights for irrigation to the farm? That answer has not yet been found.

The next transaction, number five on the graphic aerial photo, involves the acquisition of forty acres on March 3, 1941; nine months before the United States became involved in World War II. That parcel is now the area where the Imperial County Cooperative Extension is located and runs north for one half mile to an east-west division road and includes the cattle nutrition feedlot. At the time of the transaction, the land was known as Hill Ranch and on May 6,1940, the Imperial County Board of Directors passed its original resolution to "execute and deliver a deed from the County of Imperial to the Regents of California for the Hill Ranch as an addition to the Meloland Experiment Station". That resolution was amended on March 3,1941, delivered to UC Regents on March 31,1941, and recorded in the Imperial County Book of Deeds on April 9,1941.

The sixth and last transaction for the Imperial Valley Experiment Farm was in October 30,1947. The University of California purchased approximately 175 acres from Hugh and Mabel Keating for Ten Dollars ($10.00). The purchase also included a small ten and 10/100 acre triangular parcel now known as the "Bull Pen". In the title, the land was referred to as "that triangular portion cut off from the Irving W. Gleason Grapefruit Subdivision by a diagonal canal". The Gleasons still owned land here in 1947 and were still farming grapefruit.

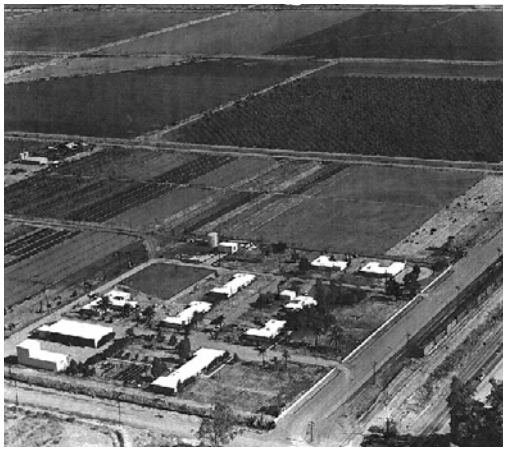


Photo above from the UC DREC Collection is estimated to be from early 50s. This is the earliest known photo after the 1946 -1951 construction project was completed. According to a Wikipedia article, $300,000.00 was obtained by Senator Ben Hulse in 1946 and the buildings constructed were, a main office with laboratory, three staff members' houses, four laborers' cottages (two duplex units), a maintenance shed, a granary, and a pump house, plus all the necessary facilities. All of the old buildings were removed from the farm except for the Superintendent's house (now the "Break Room"). It had been built around 1940 and was deemed to be in excellent condition. In the summer of 1949, the station received another $45,000.00 appropriation for additional construction. Construction was from October, 1950 through February, 1951. Buildings constructed were; another duplex unit with a four man dormitory attached, three additional garages attached to the machine shed, a 50,000 gallon water storage tank (for emergencies such as fires or breaks in the canal) , and feed storage for livestock at the corrals("Progress Report on the University of California Imperial Valley Field Station,1949 and 1950". Nicholas R. Ittner, Superintendent).

There are still citrus orchards to the east of the station attesting to that successful crop. However, it wasn't too long after that time that citrus ceased to grow well due to the buildup of salinity in the soils throughout the Imperial Valley. In 1964, soil conditions began to improve with advances in water science techniques, especially sprinkler irrigation and drainage systems, largely due to the leadership of Dr. Frank E. Robinson of the Imperial Valley Field Station.

The "Gleason Switch" is the siding along the Holton Interurban Railroad in front of the Station. This area was known as the Gleason Switch before it was known as Meloland. Irving and Fannie Gleason were the landowners before selling to the University of California. Meloland became incorporated in 1908. Holton was the original name of Holtville but became Holtville at the request of the U.S. Postal Service in order to reduce confusion with the town of Colton to the north in the inland empire.

DEVELOPMENT - A CHRONOLOGICAL TIMELINE

This chapter will highlight some of the more significant changes and developments of the farm through its history. Before proceeding further it is important to indicate the different names of the farm. One longstanding title has been the unofficial name "The Meloland Field Station". When our employees explain where they work to local residents, they'll say that they work for the University of California Desert Research Farm. The puzzled look on the listener's face usually disappears into a knowing sigh when told "you know, the Meloland Station".

Below is the listing of the four official names to "The Meloland Station".

1) 1912-1948 - Imperial Valley Experiment Farm: name on the original farm entrance

2) 1948-1984 - Imperial Valley Field Station: coincides with reorganization establishing "Director of Field Stations Administration"

3) 1984-1990 - Imperial Valley Agricultural Center coincides with renaming from Division of Agricultural Sciences to Division of Agriculture and Natural Resources.

4) 1990-Pres. - Desert Research and Extension Center (DREC).*

* For a brief time in 1990 the "Imperial Valley Research and Extension Center" name was used based on a submitted recommendation by the Research Advisory Committee in about 1989. The recommendation was the result of the Imperial County Cooperative Extension Service being located on the Imperial Valley Agricultural Center. The co-location was necessitated as a result of a 1979 earthquake that destroyed the Extension Service building in El Centro. Before formal approval of the "IVREC" name, UC Vice President - A.N.R. Kenneth Farrell, indicated his approval of the name "Desert Research and Extension Center" (source is a June, 1990 publication, Imperial Valley Agricultural Center Review, Allyn Smith, Director, ANR Programs , Southern Region).

1908*

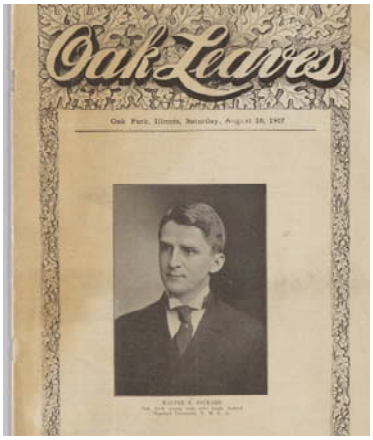
California State Law passed appropriating $6,000.00 for the "*investigation of agricultural and horticultural problems and conditions in Imperial Valley and providing for the establishment in said county of a branch agricultural experiment station for the purpose of prosecuting said work."*

UC Regents tasked with carrying out provisions of the act.

1909*

W.E. Packard given assignment to perform field studies in Imperial Valley. This is a story of being in the right place at the right time. After graduating from Iowa State College in 1907, Packard took a job at Stanford as a Secretary at the YMCA. He soon decided to enroll at the University of California in 1909. Simultaneously, he became employed at the Department of Agriculture, Berkeley serving as an irrigation field agent assigned to Upper San Joaquin Valley. Packard received an M.S. degree in Plant Nutrition with thesis on Irrigation in King and Tulare County. (Source John Skaarstad, UC Davis Library, Special Collections)

General populace meeting in El Centro, in Sep. 1909, requested UC to assign someone to the Imperial Valley. Packard received assignment in December.



A 1907 photo of W.E. Packard prior to arriving at Stanford

Photo courtesy of The Bancroft Library. University of

1910*

Packard moves to El Centro with new bride Emma. First ten days stayed in Oregon Hotel and studied area on horse and buggy (only two cars in Imperial Valley then). Begins two year project as directed by UC Berkeley to ..."determine if agricultural conditions in that newly irrigated desert area, were different enough to warrant establishing a special experiment station in the Valley." First daughter Clara born in Pasadena. Salary: $100.00 per month for next two years.

1911*

Packard's completed study becomes first publication associated with the Imperial Valley Experiment Farm. Publication entitled "Imperial Valley Settlers' Crop Manual" (also referred to as "Agriculture in the Imperial Valley"). Solutions to silt and alkali issues were presented in great detail.

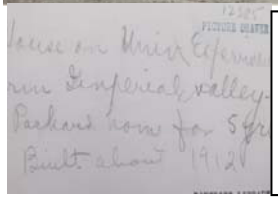
UC decides to acquire land. First twenty acres purchased November 11, 1911. Packard chose site known as the Gleason Switch along railroad line from El Centro to Holtville. Land was primarily a citrus farm sold by Irving and Fanny Gleason. The stratified nature of soil log samples taken were indicative of soil throughout Imperial Valley.

1912*

Packard built first buildings for IVEF: house, barn, office building and small residence for hired hand.

May 25,1912: first open house celebrating Imperial Valley Experiment Farm. October 7, 1912, a third ten acre parcel was purchased from the Gleasons.

Photo of 1912 house where the Packards lived. Birthplace of second daughter, Emma Lou, 4/14/1914. First baby born on farm. Hired hand residence in rear with water tower? Courtesy of the Bancroft Library, UCB.



Inscription on left: from back of photo above: "House on Univ. Experiment Farm, Imperial Valley-Packard home for 5 yrs."

1913*

July 18, 1913; UC obtains ten more acres from Gleasons. Total acreage: 40.

October 16, 1913; UC deeds ten acres back to Imperial County (the southwestern most ten acre parcel where buildings are located). Reversionary clause to title means UC can use land as long as research is performed. Otherwise, land reverts back to Imperial County.

1914*

Continued crop planting research for various UC departments...grapes, apricots, oranges, lemons, cotton, alfalfa and dates.

The Packard's second child, Emma Lou, was born, April 15,1914, in the Experiment Station Home. Emma becomes the first baby born at the Experiment Farm. (January 7, 2012, Max Gunderson becomes Centennial Baby...S.R.A. Jeff & Allison are proud parents)

* NOTE REGARDING DATA FROM 1908-1914: Material was obtained courtesy of The Bancroft Library, UC Berkeley. Collection: Banc MSS 67/81c carton #11.

1915

Photo above is from UC DREC collection dated 1915. Notice residence home on right. Office on left? Barn in center behind residence? Hired hand residence also behind and to right.. Water tower in view behind residence. Driveway is same as current UC DREC entrance?

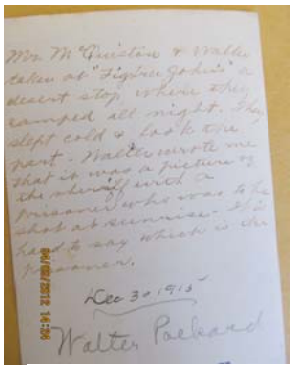
1915 (continued)

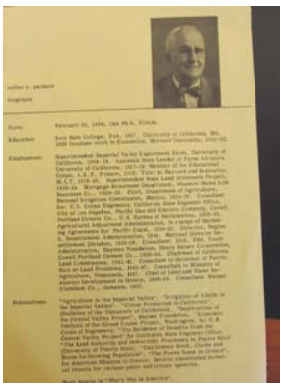
Above: 1915 photo of Packard after camping at "Fig Tree Johns., a desert stop.

Below Left: Inscription from back of above photo indicates traveling companion was Mr. M. Quistan.

Below Right: Retirement Photo of Walter E. Packard, Founder and First Superintendent of Imperial Valley Experiment Farm

Courtesy of The Bancroft Library UC, Berkeley.





Sometime around 1915,Walter Packard also established the Imperial Valley Farm Bureau and organized many of the meetings held for farmers.

1917

Mr. Packard's last year as superintendent of I.V.E.F. He published two more bulletins: "Growing Cotton in Imperial Valley" and "Irrigation of Alfalfa in Imperial Valley". UC Berkeley Press.

Alfalfa Bulletin had extensive presentation regarding soil preparation, seeding, wilting point variances for soil types, root development and irrigation methods for different soil types; e.g. smaller head of water for compact soils, larger head of water for more porous soils. Due to the unique nature of the growing conditions in Imperial Valley, Packard's bulletins were invaluable.

Salary during term: $1200-$2750: Annual!

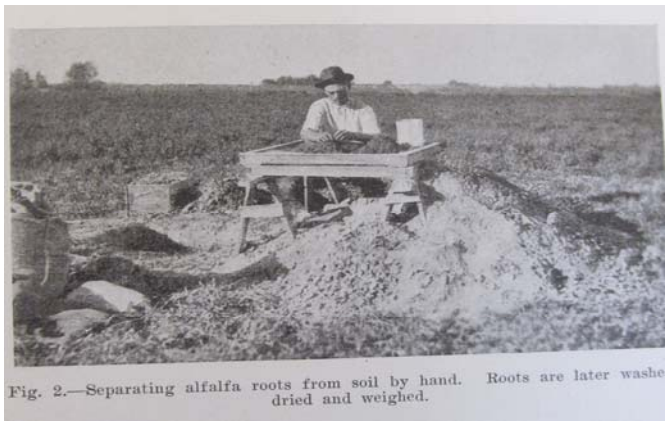


Fig. 2.—Separating alfalfa roots from soil by hand. Roots are later washe dried and weighed.

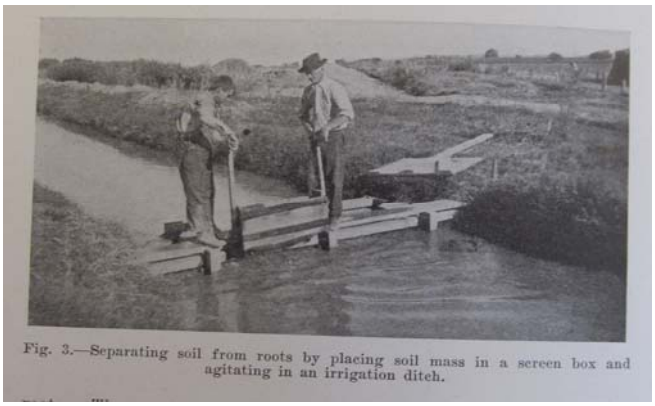


Fig. 3.—Separating soil from roots by placing soil mass in a screen box and agitating in an irrigation ditch.

Above: root separating techniques 1917 era.

"Irrigation of Alfalfa in Imperial Valley" Walter E. Packard. September, 1917. University of California Press. Courtesy of the Bancroft Library, University of California, Berkeley

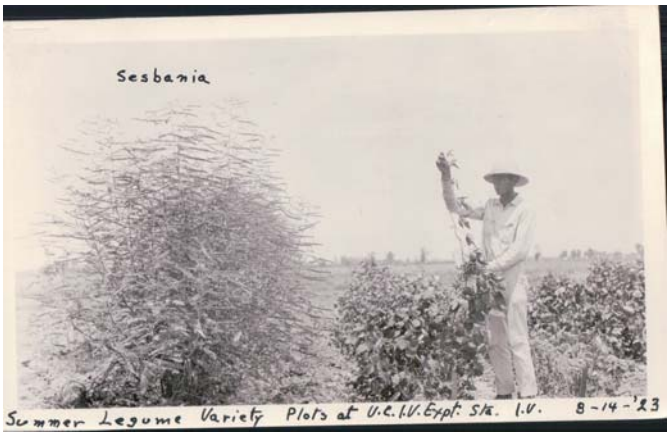
IMAGES FROM THE 1920S

The following pages of photos from the 1920s attempt to provide some sense of the evolution of agricultural practices in the Imperial Valley; unique to anywhere else in the country

Above : making onion beds for seeding, Imperial Valley location unknown. October, 1921. This is quite a photo illustrating excellent teamwork between man and mule. Those furrows are very straight considering no GPS technology.

Below: Planting Onions with two row planter. October 1921

Photos: Courtesy Imperial County Cooperative Extension collection, Cecilia Olea, Annette Tietz

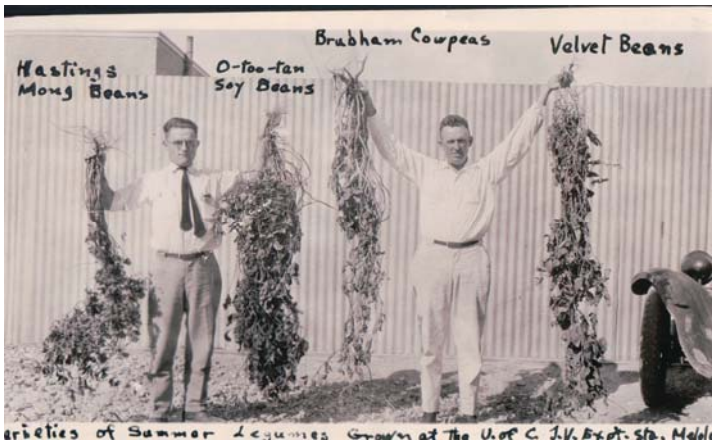


Photos of IVEF Agronomy trials 1923. Person in photos is presumed to be Superintendent L.G. Goar (May '21-July, '24)

Photos courtesy of Imperial County Cooperative Extension collection. Cecilia Olea, Annette Tietz

Below: 1923 cover crop trial at IVEF. Note water tower in background. Photo Courtesy of ICCE Collection. Cecilia Olea, Annette Tietz.

IMAGES FROM THE 1920S



Above: October 1924 photo of summer legumes trial.

IVEF Superintendent was Mr. L. Beatty (Aug'24-Jul"26), (Assumed to be man on the left).

Above and below: 1929 power mowing operation at Imperial Valley Experiment Farm. Train in background is Holton Interurban R.R. parked on the "Gleason Switch".

Photos: Collection of Francisco Maciel, UC DREC Staff Research Associate

Three photos showing lettuce farming techniques from 1925.

1: "Floating" or leveling the field

2: Using a "Lister" to make lettuce beds

3: Bed shaper and seed drill for planting lettuce. There was a proliferation of "homemade" planters in the pictorial archives but this one seemed most representative.

Courtesy ICCE Collection: Cecilia Olea, Annette Tietz.

Interview notes from Monday, May 14, 2012

Al Robertson , Jack McConnell, Bill Dubois, Sr.

The author enjoyed a very informative meeting with Mr. Dubois and Mr. McConnell at 10:00 a.m. at Imperial County Farm Bureau Board Meeting Room. Obtained clearance for room use from Candace Nelson on previous week.

Presented Mr. McConnell & Mr. Dubois with the centennial flyer and informed them of my assignment as historian for publishing book about DREC Centennial.

Gave them brief description of layout and topics for presentation.

Told them of book's title being "From Citrus to Centennial" as a result of DREC property originally being a grapefruit farm.

They both entered into discussion that the whole area had a lot of citrus but that there became a time, probably in the late 40s, when citrus just quit growing because of the salt build up in the soil as a result of no drainage system. This was also reported by Al Kalin on a separate occasion.

Told Bill and Jack about W.E. Packard as the first superintendent of farm and his efforts to organize I. V. Farm Bureau, They were unaware about him although when I showed Bill the pamphlets Packard wrote, he recognized the one entitled "Irrigation of Alfalfa in Imperial Valley."

Entered into discussion of travel in pre WWII years. Bill drove hogs to L.A. and occasionally became isolated on road to Indio (Hwy. 86 now). As a youth he drove with his dad to LA and told of numerous wash flooding problems between Indio and Banning and how they would pull other cars through the washes utilizing towing lines made of rope. The road from El Centro to Beaumont was dirt the entire way. Paved roads to L.A. started at Beaumont.

Bill and Jack knew most of names on 1955 Meloland farm Advisory committee. J. E. Brock was Bill Dubois' scout leader. Recalled scout trip to Grand Canyon and swimming in canal near downtown Phoenix on the way

Story from Bill about drought of '34; The year that the Colorado ran dry. The river didn't really run dry but the drought was so severe that there were penalties for using water for non agricultural uses. The water to Imperial still ran through Mexico and there wasn't enough left over by the time the water arrived back in the U.S.. Bill was able to form a small enterprise whereby they were able to reclaim unused, standing irrigation water from below the siphon turnouts throughout the valley. They were able to then haul it into town for residential uses without penalty. He had some legal help in that regard.

The '34 drought was a pretty big reason that the All-American Canal was built.

Spotted aphid outbreak of '54. Big increase in use of pesticides. WW II actually provided chemical technology breakthroughs. Use of D.D.T. worked to kill off harmful aphids but it also killed off Lady Beetle predators. Use of integrated pest management techniques evolved as a result of Spotted Aphid outbreak.

Jack said he knew of story regarding Harold Bell wright's coinage of the word Meloland as a fine location to farm.

Meeting ended at 11:30 in time for the Board of Directors' Meeting, Imperial County Farm Bureau.

This was an extraordinary interview. Thanks to both men.

1912-1946

- A report by Professor Ben Madson, April 23, 1953 to members of The Agricultural Advisory Council at The Davis Campus indicated that from 1912 to 1946 the I.V.F.S. was a one man station staffed by an agronomist, who acted as superintendent. Research was performed on field and vegetable crops utilizing hired labor as necessary to carry out various projects. Most notable projects involved cereals, sorghums, flax, sugar beets, cover crops, forage crops cantaloupes, and lettuce. Many studies also performed regarding cultural practices such as fertilization, irrigation and drainage.
- For a number of years, there was growing pressure from valley farmers needing expanded research in vegetable crops and livestock production. The University added a livestock specialist in February, 1946 and a vegetable crop specialist in July, 1946. Livestock management, particularly beef animals, needed special attention because the high summer heat conditions created problems encountered nowhere else.
- This increased commitment by the University resulted in the decision to buy the last 175 acre parcel in order to provide additional pasture and feed development research. The California State Legislature passed a special appropriation for the purchase and improvement of $75,000 in the spring. On October, 1947, the UC Regents purchased the land from Hugh L. and Mabel T. Keating for the sum of ten dollars ($10.00).

1946

- Senator Ben Hulse obtained $300,000.00 financing for building and facility construction.

1948

- July 1, 1948, all field stations (five at the time) were divorced from control by the various departments and placed under the administration of a Director of Field Stations with a separated operating budget for each station. As interdepartmental activity increased at each station it became more difficult for departmental chairmen to adequately supervise administrative and financial issues of their respective station activities in addition to departmental operations.

1949-1950

- February, 1949. N. R. Ittner is new superintendent of Imperial Valley Experiment Station.
- The $300,000.00 building program completed: three staff members' houses, two duplex units known as laborers' cottages, and office and laboratory building, machine shed, granary, pump house and associated utilities.
- Old buildings were moved off site except for a ten year old superintendent's house (Bldg. 301).
- California Legislature passes a $45,000 appropriation for additional buildings: another duplex unit with an attached dormitory accommodating four men, three additional garages attached to machine shed, a 50,000 gallon water storage tank and a livestock feed storage building.
- All but 80 acres of the farm's 250 acres was in production at beginning of the year. By the fall, the remaining 80 acres had drainage tiles installed and was in production as well.
- Successful land reclamation occurred with planting of a sesbania cover crop followed by barley. Yield showed a significant increase.
- Thirteen employees now working: 4 UC assigned staff, 5 field assistants, Superintendent of Buildings and Grounds, secretary, beef herdsman, night irrigator.
- Incorporated use of field days to keep people posted of work on the farm: Livestock one year then Truck Crops and Agronomy the next year.

1951

- Second building program completed (see above).
- Added two bulk grain storage bins at feed storage shed.
- Replaced 600 feet of old concrete pipeline.
- Mr. Robert Combe, Superintendent of Buildings and Grounds, collaborated with engineers from U.C.L.A. to install a fire protection system for the station.

1951 (continued)

- Staff personnel at station also referred to as project leaders. Visits from department members at Davis on the increase.
- Professor Madson visits every six to eight weeks throughout the year.
- 1,563 visitors came to farm. Foreign visitors on the increase, notably Egypt and India.
- Livestock work in pasture and feedlot includes feeding trials, environmental studies (shade and cooled drinking water) breeding for beef and dairy cattle.
- Livestock work in pasture and feedlot includes feeding trials, environmental studies (shade and cooled drinking water) breeding trials for beef cattle (Braford cows to Charollais bull). Dairy cattle studies included Herefords, Brafords, Shorthorn-Hereford crosses and Brown Swiss.
- Livestock program also involved swine environmental studies (Imperial County at one time produced more hogs than any other California County) and sheep feeding research.
- First Agronomy report issued by Shafner Boswell indicating five basic projects.

1) Comparison of wet, medium and dry irrigation procedures on sugar beets,

2) Date of planting test with five cereal varieties,

3) Yield trials for several crops: Alfalfa (six varieties), Oats (four varieties), Barley (nine varieties), Wheat (seven varieties), Grain Sorghum (eleven varieties), Sudangrass (six varieties), Hybrid Field Corn (twelve varieties), Cotton (four varieties), Flax (forty varieties with Imperial and Punjab showing best yields). Safflower (Date of Planting, Row Spacing, Rates of Seeding and Variety).

4) Weed control test on Safflower using I.P.C.

5) Foundation seed increase for release to Certified seed growers: Barley (California Mariout), Wheat (Ramona 44 and Imperial), Flax (Punjab), Imperial Kafir, Alta Fescue, L.G. Goar's selection.

1952

Agronomy work in Alfalfa, Sugar Beets, Cotton, Cereals, Flax, Trefoils (legume alternative), Hybrid Field Corn, Safflower, Flax, Castor Beans, Fescue variety trials, seed increase for California Mariout Barley, Ramona 44 Wheat, Alta Fescue (Goar's Selection) and other lesser varieties.

1953

- The station sold some agronomic crops for revenue and they were; 1) 16,275 pounds of foundation Mariout Barley at 1/2 cent per pound ($81.37); 2) 1,440 pounds mill flax seed; 3) 815 pounds cotton lint and 709 pounds cotton seed.
- Recording of daily temperatures was started in 1953 (high and low).

Agronomy

- George Worker and Shafner Boswell were the station agronomists. Other researchers who were mentioned but not stationed here include Berkeley soil scientist Daniel Aldrich (he became UC Dean of Agriculture in 1958, then UC Irvine Chancellor in 1963), C.W. Schaller, D.S. Mikkelson, E.H. Stanford, Paul F. Knowles, B.E. Comstock and David Ririe.
- Twelve agronomic crops were trialed throughout the calendar year:

1) Alfalfa - Africa, India, Hairy Peruvian, Calif. Common, Caliverde, Buffalo. Five replications.

2) Barley - Ten varieties, five replications.

3) Cereals - California Mariout, Arivat, Ramona 44, White Federation 38. Five replications.

4) Corn - Variety trial ten varieties of hybrid corn.

1953-1954 (continued)

5) Cotton - One yield trial for stub cotton (Alcala 44), a variety trial: six varieties, five replications.

6) Fertilizer Test - Phosphate effect on Alfalfa.

7) Flax - Thirteen varieties, six replications.

8) Green Forage Trial - Alfalfa clipping test.

9) Krillium Barley - Germination Trial. Two varieties, five replications.

10) Sugar Beets - Fertilization trial.

11) Wheat - Variety Trial. Four varieties, four replications.

12) Soil Amendment (Nitrogen) Barley trial. One variety, three replications.

Vegetable Crops

- First report for Vegetable Crops issued. C. Grant Baughn had been the vegetable crop specialist since 1949 and summarized a progress report for a number of trials. Other researchers involved (but not stationed here) were, J.E. Knott, J.F. Harrington and C.M. Rick.
- Trials were for the following:

Vegetable Breeding, Broccoli Spacing Test, Cantaloupe Irrigation Study, Carrot Pronging Study, Cauliflower Spacing Test, Celery Variety Trial, Corn Irrigation Study, Phthalamic Acid Study (Fifteen crops)Lettuce Coated Seed Test, Variety trials Lettuce, onion and tomato.

1954-1955

- Visitors to the I.V.F. S.: 1,355 people came to the farm for tours, meetings, field days and visits.
- The Meloland Advisory Council was mentioned for the first time. There were 26 members and the purpose was to promote the exchange of ideas between local farmers and farm personnel.
- There were three members of academic staff from UC Davis assigned to the farm: 1) George Worker, Jr., Farm Superintendent and Agronomy Specialist, 2) N.R. Ittner, Animal Science Specialist and 3) C. Grant Baughn , vegetable crop specialist. Also, Robert Combe was the Superintendent of Grounds and Buildings (today's title is Superintendent of Physical Plant).
- Progress reports presented to annual meeting at Farm Bureau Building in El Centro. They are summarized below to provide an insight about the level of research activity here.

Agronomy (George Worker)

- Emphasis was place on sorghum research in 1954 to determine reasons for seed set failures in certain varieties but not in others. It seems that aside from large amounts of bird damage to sorghum plants, Imperial Kafir produced the highest yield while Double Dwarf 38 produced the lowest. 20 varieties were grown in the nursery then four varieties were planted with six different planting dates. It seems the first results indicated that although the pollen was fertile and the stigmas were receptive the anthers were failing to open up to discharge their pollen (dehisce).

Vegetable Crops (C. Grant Baughn)

Baughn indicated that emphasis on Vegetable crop research involved breeding, plant selection, variety testing, and various cultural methods. Earlier maturity dates and increased quality were of interest as well as insect and disease resistance. Trials necessary due to increasing severity of Fusarium wilt in tomatoes. Variety testing also included optimum planting dates for onions, lettuce, sweet corn, garlic, snap beans, potatoes, tomatoes and watermelons. Cultural methods trialed included "plant spacing, effects of summer cover crops, soil fumigation, dates of planting, weed control, soil insecticide residue, fungicides, germination, pre-planting, seed treatment, coated seed, irrigation and fertility" (Grant Baughn, 1954)

1954 (continued)

Animal Husbandry (N.R. Ittner)

- Since inception, environmental research for livestock involved efforts to improve comfort during summer heat. Four areas studied; 1) methods to provide cool drinking water (cooling water from 90 degrees to 65 degrees resulted in daily weight gains of .18 pound), 2) Improve shade material for livestock (best insulating material for shade was hay placed on shade structures at about 10-12 feet above livestock), 3) Improve digestion with change from a roughage diet to a roughage concentrate ration (results showed a 1/2 pound per day increase), 4) Corral construction: wire pens versus wooden pens (effective difference was 5 1/2 to 6 degrees cooler).

- Green chopping alfalfa for feed produced an increase in beef production compared to rotational grazing but improved pasture management techniques were being evaluated also. Studies also underway to determine relation of soil fertility palatability and nutritive value of alfalfa.

1955

- 15 employees on payroll.

- 2,804 visitors. 37 were from foreign countries: Philippines, Canada, Israel, Sweden, India, Jordan, Canary Islands, Egypt, Guam, Spain, France, Turkey, Chile, Korea, Brazil, Australia and Mexico.

- Annual Field Day held on April 29,1955. 200 present. Three topics, Agronomy, Animal Husbandry and Vegetable Crops. Lunch served by Meloland Advisory Committee furnished by Board of Trade. Talk by Raymond G. Bressler, Professor of Ag. Economics, UC. entitled "The Agriculture Outlook".

- Farm Advisor classes - weekly series commenced in October. Held in cooperation with Research specialists and staff researchers. Subjects were: Swine, Feeding and feeds, Stilbestrol, Alfalfa, Flax, Weed control, Weed Identification, Flax & Sugar Beet Pests, Pest Control for melons & vegetables, Cantaloupe culture, fertilizer sources and proper placement, phosphates on vegetables & beets.

- First listing of *Meloland Farm Advisory Committee*: Roy Bellwood, Brawley, J.E. Brock El Centro, Nelson Correll, Calipatria, Claude Finnell, El Centro, Bernard Galleano, Calipatria, Paul Glud, Calexico, Joe Guidotti, Heber, Fred Gunterman, Sr., Calexico, C.D. Hansen, El Centro, B. A. Harrigan, El Centro, Harold Hunt, El Centro, John Kubler, Calexico, Rudolph Miller, El Centro, Fred Sterzing, El Centro, W.H. Thornberg, Jr., Holtville, Clarence Walker, Westmoreland, B. R. Olson, Blythe, Robert Bowlin, Indio, Ray Rummonds, Thermal, Bruce Kratka, Ripley. Meetings were twice a year with UC Staff from Ag. College, Southwest Irrigation Field Station and Farm Advisors. 65 people were present.

- Also listed for the first time were the members of the *Imperial Valley Research Advisory Committee*. Two meetings held to review research projects being conducted. Members were: J. L. Myler (Davis, Asst. Agronomy), George F. Worker, Jr., M. L. Peterson, H. H. Cole, O. A. Lorenz (Veg. Crops-Riverside), Roy Bainer (Ag. Engineering-Davis), L.D. Anderson Entomology -Riverside), J. B. Kendrick (Pathology-Riverside), J. P. Martin (Soils-Riverside), R.S. Ayers, N. L. McFarlane (Ag. Ext. Service-Riverside).

Farm Improvements

1) New high pressure water line for fire protection. 2) Replaced old cement irrigation line in center of station 3) Construction of eighteen (18) livestock pens: three steers to a pen, cable wire construction used for heat reduction. Data collection was tripled.

Agronomy (Worker)

- There were thirty different projects conducted in 1955 including alfalfa, cotton, flax,, ryegrass, foundation seed increase (flax & barley), hybrid corn (ensilage and grain yields), small grains, sudan grass sugar beets, sorghum, soybeans, sunflowers.

- Notable trials: Use of P_2O_5 as it pertained to improved yields in alfalfa. A 100# annual application was determined to produce greatest yield in alfalfa compared to one time or annual applications or differing quantities.

1955 (continued)

- Sugar beets: Test to better understand relationship of interval between date of last irrigation and time of harvest. Initial results indicated little advantage gained in letting beets suffer from lack of moisture before harvest. The small gain in sugar percentage was offset by a loss in root yield.

Hybrid Field Corn (Worker)

- Test begun to determine profitability of field corn for ensilage and grain in desert conditions. Target of profitability for ensilage was set to be at 20 tons; Mexican June best yield at 30.8 Tons per acre. Target of profitability for grain was set to be at 5,000 pounds per acre; best yield from four varieties was around 4,000 pounds per acre. More tests necessary.

Sorghum Research (Worker)

- Station testing of Sorghum increased greatly as a result of the rapid drop off in 1951 of seed production of Double Dwarf 38, the best variety in Imperial Valley. First approach was to determine effect of adverse weather at time of pollination relating to seed set and plant performance. Second approach was to evaluate new varieties or improve DD38 seed.

- Non -Technical Publications (Worker):

1) Effect of interval between the last irrigation and the time of harvest on sugar beet production. George F. Worker, Jr., David Birie, Robert S. Ayers.

2) Meloland Field Station. George F. Worker, Jr.

3) Hybrid Field Corn, 1955. George F. Worker.

4) Grain and Forage Sorghum, 1955. George F. Worker, Jr. and Dale G. Smeltzer.

5) Field Crops Report, Imperial Valley Field Station. George F. Worker, Jr.

Animal Husbandry (Ittner)

- Cooling fans added to efforts reducing thermal stress on livestock

- Since 1952, studies of Brown Swiss versus Holsteins indicated that Brown Swiss hold up in milk production better than Holsteins. More summer milking seasons needed for better analysis.

- Sheep studies begun on evaluating pelleting versus chopped hay. Also inclusion of antibiotics at low levels in rations.

- First study noted regarding utilization of alfalfa by beef steers.

- First results of breeding study were presented.

Entomology (G.R. Pesho)

- Large scale experiments begun at Riverside Citrus Experiment Station and Imperial Valley Experiment Station to study effects of pesticides in the soil on growth, flavor and yield of various crops and upon residues in soil. L.D. Anderson, project leader.

Vegetable Crop (Baughn)

- Studies in following crops: cantaloupe, carrot, garlic, lettuce, onion, potato, tomato, watermelon. Other specialists doing research were; L.K. Mann (garlic), Glen Davis (potato), O.A. Lorenz (phosphate fertility studies), C.M. Rick and Paul G. Smith (tomatoes).

- At this point in the history of the Station in 1955, researchers started to indicate when their research projects were published. Referred to as Technical Publications in The I.V.F.S. Annual Reports, they were presented in annotated bibliographical format. Also, Mr. Worker documented Non-Technical Publications and research progress reports presented by researchers. Combined, they present a good picture of research efforts at the Meloland Station until the 1985-1986 Annual Report. They will be presented in the timeline highlights for each fiscal year (July through June).

1955 (continued)

- The bibliography below has been excerpted from the 1955 Imperial Valley Field Station Annual Report . Dr. N. R. Ittner indicated that his bibliography included published data from previous projects dating back several years: assumed to be from Dr. Ittner's date of hire, 1946.
- Technical Publications (Ittner):

1) Ittner, N.R. and C.F. Kelly. "Artificial shades for livestock". California Agriculture, Vol.2, No.5, P.5, P. 10. May 1948.

2) Kelly, C.F. and N.R. Ittner. Artificial shades for livestock in hot climates". Agriculture Engineering, Vol. 29, No.6, PP. 239-242. June 1948.

3)Kelly, C.F., T.E. Bond and N.R. Ittner. "Thermal design of livestock shades". Agric. Engineering, Vol. 31, No. 12, PP. 601-606. December 1950.

4) Ittner, N.R., and C.F. Kelly. "Cattle shades". Jour. Anim. Sci., Vol. 10, No. 1, PP. 184-194. February 1951.

5) Ittner, N.R. , C.F. Kelly and H.R. Guilbert. "Water consumption of Hereford and Brahman cattle and the effect of cooled drinking water in a hot climate". Jour. of Anim. Science, Vol. 10, No.3, PP.743-751. 1951.

6) Ittner, N.R. "Summer weight gain. Brafords, Herefords, compared for seasonal gains in Imperial Valley." Calif. Agric., Vol.5, No.5, P.13. 1951.

7) Ittner, N.R., H.R. Guilbert, and F.D. Carroll. "Rate and efficiency of gain, carcass value and climactic adapta- bility of Herefords, Brahman, Hereford x Brahman and Hereford x Shorthorn crossbred cattle". Pro- ceedings annual meeting, Western Section American Society of Animal Production, PP. VI, 1952, PP. 1-10.

8) Ittner, N.R., V.V. Rendig, R.S. Ayers, and W.C. Weir. "Phosphated alfalfa for feed value". Calif. Agric., Vol. 7, No.8, P.4, August 1953.

9) Kelly, C.F., T.E. Bond and N.R. Ittner. "Engineering design of a livestock physical plant". Agric. Engineering, Vol. 34, No. 9, PP. 601-609, September 1953.

10) Ittner, N.H. and W.C. Weir. "Imperial Valley lamb feeding". Calif. Agric., Vol. 8, No. 5, P. 5, January 1954.

11) Ittner, N.R..,G.P. Lofgreen, and J.H. Meyer. "A study of pasturing and soiling alfalfa with beef steers" Jour. Anim. Sci., Vol.13, No. 1, Febrary1954.

12) Meyer, J.H., G.P. Lofgreen and N.R. Ittner. "Further studies of the utilization of alfalfa by beef steers". Jour. Anim. Sci., (In press).

13) Bond, T.E., C.F. Kelly, and N.R. Ittner. "Radiation studies of painted shade materials". Agric. Engineering, Vol. 34, No. 6, PP. 389-392. June 1954.

14) Kelly, C.F., T.E. Bond and N.R. Ittner. "Design of livestock shades. Construction and location of shades contribute to animal comfort and maintenance of feed intake". Calif. Agric., P. 3-4. August 1954.

15) Ittner, N.R., H.R. Guilbert, and F.D. Carroll. "Adaptation of beef and dairy cattle to the irrigated desert". Calif. Agric. Exp. Station Bulletin 745, PP. 1-36, September 1954.

16) Ittner, N.R., T.E. Bond and C.F. Kelly. "Increasing summer gains of livestock with cool water, concentrate roughage, wire corrals and adequate shades". Jour. Anim. Sci., Vol. 13, No. 4, PP. 867-877. November 1954.

17) Carroll, F.D., W.C. Rollins, and N.R. Ittner. "Brahman-Hereford crossbreds and Herefords— gains, carcass yields, and carcass differences". Jour. Anim. Sci. Vol. 14, No. 1, PP. 218-223, February 1955.

18)Kelly, C.F., T.E. Bond and N.R. Ittner. "Water cooling for livestock in hot climates". Agric. Engineering, Vol. 36, No. 3, PP. 173-180. March 1955.

1955 (continued)

19)Meyer, J.H., W.C. Weir, N.R. Ittner and J.D. Smith. "The influence of high sodium chloride intakes by fattening sheep and cattle". Jour. Anim. Sci., Vol. 14, No. 2, PP. 412-417, May 1955.

20) Ittner, N.R., T.E. Bond and C.F. Kelly. "Environment comparisons and cattle gains in wood and wire corrals". Jour. of Anim. Sci., Vol. 14, No. 3, PP.812-824. August 1955.

1955-1956

- Eighteen employees plus a U.S.D.A. Entomologist now stationed at I.V.F.S.
- W.F. Lehman, Jr. is new agronomy specialist at .I.V.F.S.
- Orval D. McCoy is new vegetable crop specialist.
- Station Improvements:

1) 2,538 foot Centrifugal Spun Reinforced concrete irrigation pipeline (12" diameter) replaced old concrete pipeline in center of area 40 and 50. 300 foot pipeline installed to connect to east side irrigation supply.

2) New plastic greenhouse structure installed for alfalfa research.

- Farm Advisor's meetings continued utilizing station's "auditorium" (conference room). 26 weekly meetings held starting in September. Instructors were mostly from the Extension Service but Station Staff specialists also participated.
- Total visitors to station: 1,889.
- Three meetings of Meloland Advisory Committee; two meetings of Research Advisory committee.
- Annual Field Day, April 18, 1956. Presentations from 17 specialists throughout UC system. Three main areas were Agronomy, Vegetable Crops and Animal Husbandry.
- Vegetable Field Day, March 14, 1956
- 4-H Field Day, May 5, 1956.

Agronomy (Worker)

- 35 projects underway. Similar crops as previous year but expanded subjects.
- Project participants : George Worker, Jr., Earnest Sanford, Roy Vanoni, Duane Mikkelsen, Dr. Albert Ulrich, William F. Lehman, Donald C. Erwin, Horton Laude, Paul Knowles, Charles Schaller, Dale Smeltzer, Robert Loomis, Robert Pearl, Dr. John Turner. Dr. William Sappenfield.
- Foundation Seed production, grown for release to area farmers. California Mariout-21,000 pounds; Punjab 47-6,800 pounds, Imperial Kafir-7,900 pounds.

Animal Husbandry (Ittner)

- Studies were a continuation of previous year with the additional help from C.F. Kelly, Ag. Engineering, Davis and T.E. Bond U.S.D.A., Davis, W.C. Weir, J.H. Meyer, G. P. Lofgreen (IVFS Staffer from 1968 to 1977), Wade C. Rollins, L.G. Jones, and R.C. Laben, Animal Husbandry, Davis, V.V. Rending, Soils Department, Davis, Food Technology and Home Economics Department, Davis.

Entomology

- L.D. Anderson study on effects of pesticide in soil: after three years, chemical residues in soil appeared to be accumulating at significant rates.

Vegetable Crops (McCoy)

- In addition to O.D. McCoy, other specialists were; C. Harvey Campbell, Jr., C.A. Shadbolt, F.H. Takatori, O.A. Lorenz, L.K. Mann, C.G. Baughn, D.E. Hunt, Robert Kortsen, Arthur Spurr, Paul Smith and G.N. Davis.

1956-1957

- Station Improvements:

1) Ground survey project initiated of drainage, irrigation ditches, roads, fences, etc.. The need to reduce the water table was evident and $30,000.00 was made available in July, 1957.

2) Seven 3 ton air conditioning units were installed in same place as desert coolers with water towers. Cost: $13,252.33.

3) Initiated project to replace cast iron domestic water supply pipeline.

4) Plastic greenhouse was added onto with a 16 foot extension (new dimension is 16' x 40').

5) Cal. State Highway Dept. placed two road signs on Highway 80 to indicate location of Imperial Valley Field Station.

6) Wooden sign in front of station replaced with porcelain enamel painted sign with gold letter on a blue background

7) Installed ten water level recorders throughout the station

- Organizations using I.V.F.S.: Davis Departments; Agronomy, Animal Husbandry, Agricultural Engineering, Plant Pathology, Vegetable Crops. Riverside departments; Entomology, Plant Pathology, Vegetable Crops. Imperial County Farm Advisors, Soil and Plant Nutrition from UC Berkeley. U.S.D.A. Davis Ag. Engineering, U.S.D.A. Southwestern Irrigation Field Station, Cotton and Flax Dept. Brawley (typical for most years).
- Two meetings held with research Advisory committee.
- Farm Advisors meetings still conducted only more of a monthly basis.
- Annual Field Day, April 5, 1957. Veg crop field day, January 4, 1957.
- 1,799 visitors to station,

Agronomy (Worker and Lehman)

- William D. Lehman was very busy giving numerous presentations regarding improvements in spotted aphid resistant alfalfa. E. H. Stanford, Davis Agronomy also on project. A very thorough discussion of the devastating spotted aphid epidemic is found in the book "Garden In The West", Chapter Two - The Little Stranger. Wells, George: Dodd, Mead & Company, 1969.
- There were thirty other agronomy projects conducted. Team members were: Paul F. Knowles, Charles Schaller, Dale G. Smeltzer, Duane S. Mikkelsen, William A. Williams, Robert S. Loomis, Dan W. Ragsdale, Peter Van Schaik, Leroy H. Zimmerman, William George, Frank Parsons, Donald C. Erwin.
- Non-Technical Publications (Worker):

1) Hybrid Field Corn, 1956. Field Crop Report No. 3, February 1957.George F. Worker, Jr. and Dale G. Smeltzer.

2) Grain and Forage Sorghum, 1956. Field Crop Report No. 4. February 1957. George F. Worker and Dale G. Smeltzer.

Animal Husbandry (Ittner)

- Farm began study of feeding silage compared to pelletized feed in response to revived interest in California and since there had been little research in that area. High yielding sorghums, alfalfa hay and alfalfa pellets were tried. The pelleted feeds were fast becoming desired as a means to reduce labor costs of feeding and for livestock to realize greater daily weight gains due to their ease of consumption.
- Technical Publications:

1) T.E. Bond, C.F. Kelly and N.R. Ittner. "Cooling beef cattle with fans". Agriculture Engineering, Vol. 38, No. 5, PP.308-309. May 1957.

1956-1957 (continued)

2) C.F. Kelly, T.E. Bond and N.R. Ittner. "Sky temperature in the Imperial Valley of California". Transactions American Geophysical Union, Vol.38, No. 3, PP.308-313, 1957.

3) N.R. Ittner, C.F. Kelly and T.E. Bond. "Cooling cattle by mechanically increasing air movement. Journal of American Science, Vol. 16, No.3, PP.732-738. August 1957.

4) T.E. Bond, C.F. Kelly and N.R. Ittner. "White paint for farm buildings. California Agriculture, Vol.11, No. 9, PP. 13-14. September 1957.

5) C.F. Kelly, T.E. Bond and N.R. Ittner. "Cold spot in the sky helps cool livestock." Agriculture Engineering, Vol. 38, No. 10, PP.726-729. October 1957.

Vegetable Crops (O.D. McCoy)

- 21 projects involving broccoli, cantaloupes, lettuce, onions, beets, cabbage, carrots tomatoes, watermelons, potatoes.
- Non-Technical Publications:

1) Cantaloupes and Watermelon Heat Control with Alnap 3. Imperial Valley Press, El Centro, Ca. Orval D. McCoy and G. Harvey Campbell.

2) Progress Report of Vegetables at Imperial Valley Field Station 1955-1956, 45 pages. Orval D. McCoy and others.

- Technical Publications:

1) The National Onion breeding program, 1956. Twelfth Annual Report to Cooperators. Orval D. McCoy, July 1957, Pages 11-12.

1958-1959

- Since 1951, station has provided its own fire protection. Fire hydrants and nozzles inspected as needed. Hoses inspected every six months. Stored air pressure water extinguisher inspected and operated every six months.
- Domestic water tested monthly by Imperial County Health Dept.
- Four Farm Advisor meetings were held in 1958.
- Annual Field Day, April 13, 1958

Animal Husbandry Research
(Ittner and Garrett)

- After providing twelve years of service to I.V.F.S., Nicholas Ittner passed away in February, 1958.
- William N. Garrett assumed duties in Animal Husbandry research.
- Four wire feeding pens with shades were constructed south of livestock corrals for summer environment testing.
- Technical Publications (Ittner):

1) N.R. Ittner, T.E. Bond, and C.F. Kelly: "Methods of increasing beef production in hot climates". California Agricultural Experiment Station, Bulletin 761, April 1958.

2) N.R. Ittner, J.H. Meyer, and G.P. Lofgreen: "Pelleted alfalfa hay". California Agriculture, Vol. 12, April 1958.

Agronomy (G.F. Worker, Jr.)

- Twenty six projects underway including castor beans, cotton, flax, safflower, barley, oats wheat, sorghum, soybeans, sugar beets. Foundation seed produced at IVFS: New River Flax-8,675 pounds; California Mariout Barley-16,145 pounds; Imperial Kafir Sorghum-9,000 pounds.
- Non-Technical Publications:

1) "Grain and Forage Sorghum, 1957," Field Crop Report #5, March 1958. George F. Worker, Jr. and Dale G. Smeltzer.

2) "Double Cropping" Sorghum in Imperial Valley, Agronomy Notes, January 21, 1958, George F. Worker, Jr.

Above: A 1958 photo of the Picket Fence along front of I.V.F.S. UC DREC Collection: Francisco Maciel

Above: 1958 photo in plastic and wood greenhouse. Leo Lamitie (left) making hand pollinations and John Bentley (right) is making cuttings

Photo courtesy Francisco Maciel collection, UC DREC Staff Research Associate

1958-1959 (continued)

Alfalfa Research (William F. Lehman)

- Large scale research continued into developing Spotted Aphid resistant lines of alfalfa. E.H. Stanford, Davis, Agronomy, Frank Lieberman and George Pesho, Entomology Branch, USDA, also participating.

Vegetable Crop Research (McCoy)

- Six projects underway with several trials within each project: cabbage, cantaloupe, corn, lettuce, phosphate studies.
- Technical Publications (McCoy):

1) Orval D. McCoy et al: Progress Report 1956-1957 Vegetable Crops Imperial Valley Field Station, Mimeo. 57 pages.

2) Orval McCoy: National Onion Breeding Program 1957. 13th Annual report to cooperators.

1959-1960

- Farm Improvements:

1) Drain lines for irrigation begin to get installed. Area 90 (northeast corner) was completely retiled with 4", 6",8" and 10" lines.

- Additional drain lines and irrigation laterals installed in area 90 and area 40.
- 1,438 visitors to farm.
- 38 reports or presentations made by staff of Worker, Garret, Lehman and McCoy.

Agronomy (Worker)

- Twenty projects underway including a small silo study over a two month period to determine change in composition for different silo construction types.
- Technical Publications:

1) P.F. Knowles, W.H. Isom and G.F. Worker, Jr.. "Flax production in the Imperial Valley". University of California, Circular 480, July 1959.

2) D.C. Erwin, W.F. Lehman, W.F. Kennedy and G.F. Worker, Jr., "Summer flooding of alfalfa". California Agriculture 13(10): 7 & 12, October 1959.

3) R.S. Loomis, J.H. Bricky, F.E. Broodbert and G.F. Worker, Jr.. "Comparison of nitrogen source materials for midseason. Fertilization of sugar beets". Agronomy Journal, Volume 52, 97-101, 1960.

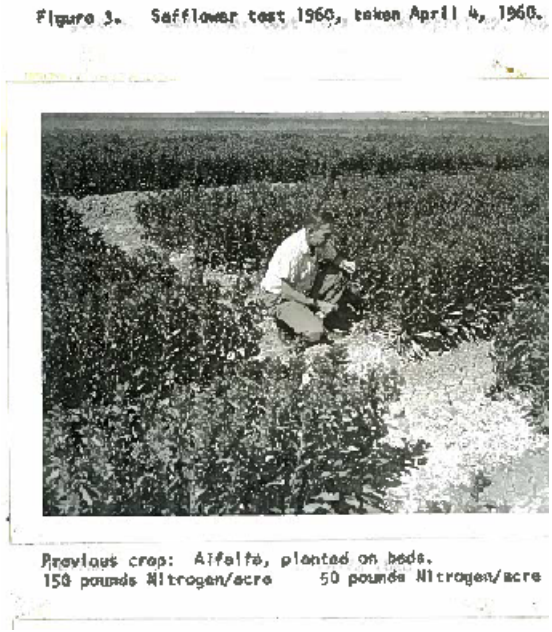


Photo courtesy George F. Worker, Jr.
I.V.F.S. library 1959-1960

1959-1960 (continued)

- The photo from previous page dates to April 4, 1960. George Worker, Jr. performed a Safflower - Nitrogen rates study utilizing four rates of nitrogen application, two planting methods (flat and on beds), and on plots with three previous cropping histories (alfalfa, fallow, bermuda grass). Highest yield (3,909 lbs. per acre) was obtained from 150 lbs. nitrogen following alfalfa and planted flat. Yields were only slightly lower (3,443 - 3,536 lbs.) with 50-150 lbs. nitrogen applied on fallow plot and flat planting. I.V. F. S. was attempting to find a crop to fill the need for a crop after cotton but be out of the field in time for fall planting.

Alfalfa (Lehman)

- Technical Publications (Lehman):

1) D.C. Erwin, B.W. Kennedy and W.F. Lehman. "Xylem necrosis and root rot of alfalfa associated with excessive irrigation and high temperature". Phytopathology 49(9): 572-578, September 1959.

2) D.C. Erwin, W.F. Lehman, W.F. Kennedy and G.F. Worker, Jr. "Summer flooding of alfalfa". California Agriculture 13(10): 7 & 12, October 1959.

3) G.R. Pesho, F.V. Lieberman and W.F. Lehman. "A biotype of the spotted alfalfa aphid on alfalfa". Journal of Economic Entomology 53(1): 146-150, February 1960.

4) W. F. Lehman and J.W. Lambert. "Effects of spacing on soybean plants between and within rows on yield and its components". Agronomy Journal 52(2): 84-86, February 1960.

Animal Husbandry (Garrett)

- Technical Publications (Garrett):

W.N. Garrett, T.E. Bond and C.F Kelly. "Effects of air velocity on gains and physiological adjustments of hereford steers in a high temperature environment". Journal of Animal Science 1960, February 1960.

Vegetable Crops (McCoy)

- Technical Publications (McCoy):

1) Mike Zahara, John M. MacGillivray and Orval D. McCoy. "Labor requirement for lettuce harvest in Imperial Valley". Vegetable Crops Series 98, 1960.

2) O.A. Lorenz, O.D. McCoy and K.B. Tyler. "Rates and Sources of Phosphorous. Experiment-lettuce 1959-60 season". Miscellaneous Vegetable mimeograph, June 1960.

3) Orval D. McCoy, et.al. "Progress report of Vegetable Crops Research". University of California, Imperial Valley Field Station, mimeograph Report. 52 pages.

1960-1961

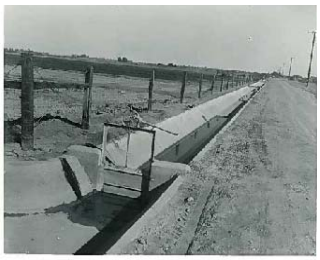
- Station Improvements

1) Fall 1960 - equipment storage building: 24' wide x 128' long. This replaces original equipment shed. Original shed on the west side was divided into five sections each and made into rooms for departmental working and storage.

2) Replacement of galvanized domestic water line with copper line.

3) Galvanized pipeline to corrals replaced with plastic pipeline.

4) Concrete ditch lining project completed for basically the north half of the station. Irrigation and waste ditches installed as a result of bermuda grass in ditches.



Irrigation System Concrete Lining Project

Before on the left, after on the right

Photo courtesy George Worker Collection,

I.V.F.S. Library 1960-1961

1960-1961 (continued)

- Irrigation water applied: 1,724.6 acre feet.
- Cost of water applied: $3,491.85.
- Cost per acre foot: $2.02.
- Annual field day held on March 16, 1961. Afterwards, a joint meeting was held of Meloland Farm Advisory Committee and Research Advisory Committee.

Agronomy (Worker)

- Twenty one progress reports submitted.
- Non Technical Publications:

1) Grain and Forage sorghum, 1960. Field Crop Report No.8, February 1961. George F. Worker, Jr.

2) Barley-Flax Yield Summary. I.V.F.S. mimeo. #1, April 1961. George F. Worker, Jr.

Alfalfa research (Lehman)

- Nine progress reports submitted.
- Non Technical Publications:

1) Improvement of Nondormant Alfalfa. California Agriculture, Vol.15, No. 16, February 1961. W.F. Lehman.

2) Aphid Resistant Moapa Alfalfa best for valley hay growers. Imperial Valley Press Desert Valley Farm News. February 7, 1961. W.F. Lehman.

Animal Husbandry (Garrett)

- Six progress reports submitted.
- Non-technical reports:

1) Shade in valley's feed lots. C.F. Kelly, T.E. Bond and William N Garrett. Post Press Desert Valley Farm News. December 6, 1960.

2) Animal Husbandry Research at the Imperial Valley Field Station. Imperial Valley Farm Advisor Briefs. March 6 1961.

3) Animal Husbandry Research at the Imperial Valley Research Station. Roundup of Livestock Facts. Agricultural Extension Service, University of California, Davis. March 1961.

4) Animal Husbandry Field Day Mimeograph. Imperial Valley Field Station. March 1961 (portions or entire articles originally written by W. N. Garrett for this mimeograph have appeared in the Western Livestock Journal, Farm Journal and Post Press Newspaper.

- Technical Publications (Garrett):

1) J.H. Meyer, G.P. Lofgreen and W.F. Garrett. "A proposed method for removing sources of error in beef cattle feeding experiments". J. Animal Science no. 19, No. 4:1123, November 1960.

2) C.F. Kelly, T.E. Bond and W.F. Garrett. "Shade area requirements for beef feed lots in the "Imperial Valley". California Agriculture. 14, No. 9, p.11, September 1960.

3) W.N. Garrett, W.C. Weir, J.H. Meyer and G.P. Lofgreen. "Effects of various energy supplements on grains, yields and carcass grade of lambs grazing alfalfa pasture". J. Animal Science, Vol. 19, No. 3, p. 773, August 1960.

4) W. N. Garrett, T.E. Bond and C.F. Kelly. "Environmental comparisons of swine performance as affected by shaded and unshaded wallows". J. Animal Science, Vol. 19, No. 3, p. 921, August 1960.

5) W.N. Garrett, G.P. Lofgreen and J.H. Meyer. "Addition of minerals to a beef cattle ration". California Agriculture 14, No. 7, P.8, July 1960.

1960-1961 (continued)

Vegetable Crop Research (McCoy)

- Ten research progress reports submitted.
- Non Technical Publications:

1) The Use of Continuous Plastic Tunnel Covers for Forcing Cantaloupe and Other Vegetables: "Polyethylene Boon to Growers". California Farmer, August 20, 1960. Orval D. McCoy.

- Technical Publications (McCoy):

2) C.A. Shadbolt and O.D. McCoy. "Temperature and plant response to paper and plastic protectors on cantaloupes". Hilgardia, Vol. 30, No.9, November 1960.

3) O.D. McCoy. Eleventh Annual Vegetable progress Report 1959-60. Department of Vegetable Crops, Imperial Valley Field Station, University of California, 57 pages.

4) O.A. Lorenz, K.B. Tyler and O.D. McCoy. "Rate and source of phosphorous experiment with lettuce at Imperial Valley Field Station". Vegetable Crops Series 116, May 1961.

1961-1962

- Station Improvements:

1) Original livestock and feed storage building was raised four feet, additional room added for sampling, office shop and laboratory.

2) Additional funding obtained for improving drainage tiles in Area 60, 20 and 30.

- Annual Field Day on April 19, 1962 followed by a joint meeting of Meloland Farm Advisory and Research Advisory Committees..
- Total visitors to the station: 1,726.

Agronomy (Worker)

- Twenty five progress reports made.
- Non-Technical Publications:

1) Phosphorous Experiment IX-5 at the Imperial Valley Field Station 1959-60. George F. Worker, Jr. and Robert S. Loomis. I.V.F.S. Mimeo #2, June 1961, 3 pages.

2) Safflower Yield Trials 1957-1960. George F. Worker, Jr. and Robert S. Loomis. I.V.F.S. mimeo. #2, June 1961, 3 pages.

3) Comparison of Flax Varieties Grown in Yield Tests in the Imperial Valley, California in 1960-1962. Benjamin H. Beard, George F. Worker, Jr. & Robert LeMert. February 1962.

4) Grain and Forage Sorghum Tests, 1961. George F. Worker, Jr. and Dale G. Smeltzer. Field Crop Report No.9, February 1962, pages 1-9.

5) Summary of Performance of Barley, Oats and Wheat Tests conducted at the Imperial Valley, Field Station from 1937-1961. George F. Worker, Jr. and Charles W. Schaller. Field Crop Report No. 10, March 1962, pages 1-10.

6) Sugar Beet Irrigation Cut-Off Trial, Imperial Valley. George F. Worker, Jr. and Robert S. Loomis. Sugar Beet Notes, April 27, 1962, pages 5-7.

- Technical Publications (Worker):

Colt A. Suneson, Milton D. Miller and George F. Worker, Jr. "Barley variety Blanco Mariout". California Agriculture, Vol. 15, No. 6, pages 7, 8, June 1961.

Alfalfa Research (Lehman)

- Eleven progress reports submitted.
- Became involved in planning for 1962 construction of new, metal greenhouse.

1961-1962 (continued)

Animal Husbandry (Garrett)

- Eight progress reports submitted.
- Non-Technical reports:

1) Net energy evaluation of feeds with special reference to the feeding value of molasses. William N. Garrett. Proceedings of the eighth annual Nevada Feed Conference. January 22, 1962, Reno, Nevada.

2) A comparison of rolled or ground barley and milo in the feedlot ration. William N. Garrett. First Annual California Feeder's Day Report, July 12, 1962, Davis, California.

- Technical publications:

1) T.E. Bond, C.F. Kelly, W.N. Garrett and L. Hahn. "Evaluation of materials for livestock shades". California Agriculture, Vol.15, No.7,P.7, July 1961.

2) W.N. Garrett, J.H. Meyer, G.P. Lofgreen and J.B. Doble. "Effect of pellet size and composition on feedlot performance, carcass characteristics and rumen parakeratosis of fattening steers". Journal Animal Science, Vol.20, No.4, p.833, November 1961.

Vegetable Crop Research (McCoy)

- Twelve progress reports submitted.
- Technical Publications:

1) O.D. McCoy et.al. Twelfth Annual Vegetable Progress report 1960-61. Department of Vegetable Crops, Imperial Valley Field Station, University of California, 31 pages.

2) C.A. Shadbolt, T.M. Little and O.D. McCoy. "Soil temperatures as influenced by bed direction". American Society Horticultural Science, Vol. 78, Pages 488-495, December 1961.

3) C.A. Shadbolt, F.L. Whiting and O.D. McCoy. "The microclimate of plastic shelters used for vegetable production". Hilgardia, Vol.32, No.4, Pages 251-266. March 1962.

4) O.D. McCoy and G.N. Davis. "Notice of release of onion breeding line M-100", March 1, 1962.

5) O.D. McCoy, J.H. MacGillivray and W.L. Sims. "Determinate maturity of lettuce and mechanical harvesting". Vegetable Crop Series 123, May 1962.

6) O. D. McCoy. "1961 Fall date of planting study summary-cantaloupe". Miscellaneous Mimeograph, Page 1-7. May 1962.

1962-1963

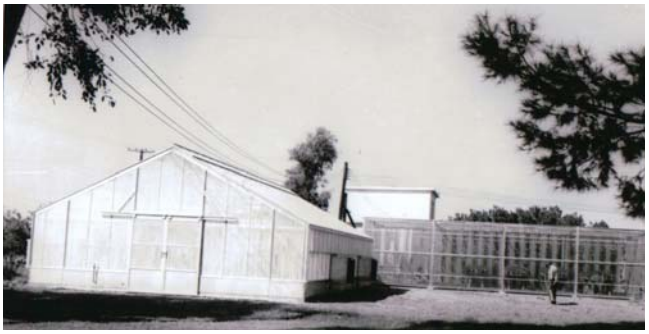
- Total visitors to I.V.F.S.: 2,197.
- Station Improvements:

1) Glasshouse, lath house and potting shed. 25' x 41' greenhouse, 20' x 40' lath house and a 12' x 20' potting shed were completed in September 1962.

Above: Plastic Greenhouse in use from 1956-1962. Notice the Granary in background.

Below. 1962 photo of newly completed glasshouse and lath house.

Photos courtesy of Francisco Maciel, UC DREC



1962-1963 (continued)

- Station Improvements

2) More improvements made to drainage system at station: surface drainage in areas 20, 30, 40 and 50; tile drainage in area 60, 70 and 80.

3) Office and laboratory constructed in south room of feed barn.

4) Major alterations approved for dry lab in main office building: benches and cabinetry, fume hood, necessary health and safety devices, electrical and plumbing changes, additional laboratory equipment.

- Annual Field day held on February 13, 1963 followed by a meeting of the Imperial Valley Field Station Research Committee. It was at the end of a five year cycle of annual field days and a new five year cycle was to be prepared.

Data recording at I.V.F.S.

- Not only has the I.V.F.S. kept records about research projects, soil and climatic data has been recorded as well. In the early years, merely the maximum and minimum temperature was recorded. In 1958, a weather station was installed in the west end of the feedlot area. It recorded: 1) Air Temperature (continuous maximum and minimum both at 80" above ground and 35' above ground), 2) Black bulb temperature, max. and min., 3) Relative humidity, max. and min., 4) soil temperature 6" below ground (max. and min.), 5) Wind velocity: 0600 -1800 average, and 1800-0600 average, 6) Wind direction: 0600 -1800, average and 1800-0600, average.

- Water table data was also recorded from ten recorders throughout the station.

- Salt analysis was performed at about 24 different locations throughout the station.

- In 1989, the weather data station was relocated to area 20 and was integrated into an automated collection system named the California Irrigation Management and Information System (CIMIS).

Agronomy (Worker)

Seventeen research progress reports submitted.

Non-Technical publications:

1) Sorghum Acreage Rises in Imperial Valley. George F. Worker, Jr.. Local newspapers, Arizona Ranchman, California Farmer, etc., March 8, 1963.

2) Grain and Forage Sorghum 1962. George F. Worker, Jr. and Dale Smeltzer. Field Crop Report No. 11, February 1963.

3) Low Soil Moisture and Sugar Beet Quality. Robert S. Loomis and George F. Worker, Jr. The California Sugar Beet, 1962.

Technical Publications:

1) Benjamin H. Beard, George F. Worker, Jr. and George H. Able. "Cooperative yield tests of flax varieties in the Imperial Valley, 1961-1962".

2) George F. Worker, Jr. and M.L. Peterson. "Nitrogen effects on Coastal Bermuda grass". California Agriculture, Vol.16, No.11, November 1962.

Animal Husbandry (Garrett)

Non-Technical Publications:

1) Total and shaded Space Allotments for Beef Feedlots. W.N. Garrett. Second Annual California Feeders' Day Report. October 6, 1962, Davis, California.

2) Cooperative Feeding Values of Sorghum, W.N. Garrett. Second Annual California Feeders' Day Report. October 6, 1962, Davis, California.

3) Effects of High Temperatures on Feed Utilization. W.N. Garrett. Second Annual California Feeders' Day Report. October 6, 1962.

4) Effects of Experimental Environments on Fattening Swine in a hot climate. W.N. Garrett. Second Annual Animal Husbandry Swine Day. January 25, 1963, Davis, California.

1962-1963 (continued)

Technical Publications (Garrett):

1) W.N. Garrett, C.F. Kelly and T.E. Bond. "Total and shaded space allotments for beef cattle as affected by ration in a high temperature environment". Journal of Animal Science, Vol.21, No.4, Page 794, November 1962.

2) W.N. Garrett, GP. Lofgreen and J.H. Meyer. "Energy gain in relation to weight gain of feedlot cattle". Journal of American Science, Vol.21, No.4, Page 996, November 1962.

3) W.N. Garrett. "Environmental research with beef cattle". Proc. 41st Annual Meeting of Pacific Coast Section, American Society of Agricultural Engineers PC 63-11, 1963, San Francisco, California.

4) C.F. Kelly, T.E. Bond and W.N. Garrett . "Heat transfer from a swine to a cold slab". American Society for Agricultural Engineers, Paper No. 63-406, 1963, Miami, Florida.

Alfalfa Research (Lehman)

- On going research project report entitled "Breeding Non-dormant types of alfalfa adapted to the southwestern United States. Sonora was a new variety released in January 1963 and testing began cooperatively throughout the region to gather more information about this variety as well as varieties already under evaluation.
- Technical Publications (Lehman):

1) W.M. Clement, Jr. and W.F. Lehman. "Fertility and cytological studies of a dihaploid plant of alfalfa, (Medicago sativa L)" Crop Science, Vol. 2, Pages 451-453, November - December 1962.

2) W.F. Lehman. "Sonora alfalfa-a new variety for the Southwest." Mimeo. pamphlet, 4 pages.

Vegetable Crop research (McCoy)

- There were twelve progress reports submitted.
- Non-Technical Publications:

1) Fall Cantaloupe Trials. Orval d. McCoy. Western Grower and Shipper, July 1962, pages 18-19.

2) Single Harvest for Vegetables. Orval D. McCoy. California Farmer, August 18, 1962.

- Technical Publications:

1) O.D. McCoy. Thirteenth Annual Vegetable Crops Progress Report 1961-62. Department of Vegetable Crops, Imperial Valley Field Station, University of California, 49 pages plus an insert.

2) O.D. McCoy. "Three year results - rate and source of phosphorous experiment with lettuce at Imperial Valley Field Station, 1959-1962."

- Two vegetable crop variety releases:

1) Lettuce - "Calmar"

2) Tomato - "Imperial"

1963-1964

- Visitors to station: 3,221.
- Capital Improvements:

1) Old wooden cattle pens removed and replaced with six holding pens, six feeding pens, a large holding pen and a loading chute.

2) Roofing material was replaced on buildings at station.

- Research Advisory Committee reports that sugar cane could be established as a commercial crop. The Extension Service published a bulletin "Sugar Cane, a new crop for Imperial County" and Holly Sugar company conducted a feasibility study to incorporate sugar cane processing into their sugar beet processing and was to conduct variety testing pending legislation passage.

1963-1964 (continued)

Annual Field Day

- Held on March 25, 1964. 163 attendees. These annual field days were important. There were nine speakers in a three hour presentation comprised of the following: James Myler, Head of Field Stations, UC Davis; J.H. Myer, Dean of Agriculture, UC Davis; M.L. Peterson, Statewide Dean of Agriculture, UC Berkeley; R.G. Curley, Agricultural Engineering, UC Davis; L. Jones, Agronomy, UC Davis; Wm. F. Lehman, UC Davis Asst. Agronomist, I.V.F.S.; Verne E. Mendel, UC Davis Assistant Animal Husbandman, I.V.F.S.; J. Burgess, Agricultural Extension Service, El Centro, CA.; J. Fielder, Dixon Dryer Company, Dixon, CA.
- The topic for that particular field day was "Alfalfa Production and Utilization". There were five year plans that enumerated topics in advance for upcoming annual field days.
- On the day before the Annual Field Day, there were meetings of the Research Advisory committee and the Meloland Farm Advisory Committee (later known as the Industrial Advisory Committee). These committees discussed important issues regarding station operations and research projects, on-going and up-coming. For example, the Irrigation Department announced that they had a staff position available and candidates were being interviewed. Also, publicity was apparently always at the forefront. Local press, radio and TV was important. Mr. Worker always documented talks, newspaper articles, public presentations and guided tours given by staff researchers.

- Station personnel numbered at thirty six (36).

Agronomy (Worker)

- Thirteen projects underway with progress reports issued.

- Non-Technical Publications (Worker):

1) Imperial Valley Field Station History. George F. Worker, Jr. mimeographed report, November 1963.

2) Sudangrass and Sudan Hybrid Trials. George F. Worker, Jr. Field Crop Report No. 12, January 1964.

3)Grain Sorghum 1963. George F. Worker, Jr. and Dale G. Smeltzer. Field Crop Report No. 13, February 1964.

- Technical Publications:

1) G.F. Worker, Jr. and V.L. Marble "Influences of stages-of-cutting on the yield and chemical composition of forage sorghum, sudan grass and sorghum sudan hybrids". Agronomy Abstracts, Page 113, 1963.

2) J.D. Prato, V.L. Marble, D.G. Smeltzer and G.F. Worker, Jr., "Sorghum forage for silage". California Agriculture, Vol. 17, No. 10, Pages 10-11, 1963.

3) R.S. Loomis and G.F. Worker, Jr. "Responses of sugar beet to low soil moisture at two levels of nitrogen nutrition". Agronomy Journal, Vol. 55, No.6, Pages 509-515, 1963.

4) G.H. Able, G.F. Worker, Jr., D. Browell and B.H. Beard. "Cooperative yield test of flax varieties in the Imperial Valley, 1962-1963". USDA Annual Report.

Alfalfa (Lehman)

- Breeding trials were ongoing for insect and disease resistance. Clonal nurseries for 645 entries were being developed and tested. Yield trials were replicated and pollen studies were conducted as well.

- Technical Publications:

1) W.F. Lehman, E.H. Stanford, V.L. Marble and W.H. Isom. "Sonora". California Agriculture, Vol.17, No.6, Pages 8-9, June 1963.

1963-1964 (continued)

2) W.F. Lehman, E.H. Stanford, V.L. Marble and W.H. Isom. "Sonora Alfalfa". California Agricultural Experiment Station Leaflet 164, September 1964.

3) W.F. Lehman and Y.P. Puri. "Factors affecting germination and tube growth of hand-collected and bee-collected pollen of alfalfa (Medicago sativa L.) on agar media". Agronomy Abstracts, Page 99, 1963.

4) W.F. Lehman and Y.P. Puri. "Factors affecting germination and tube growth of hand-collected and bee-collected pollen of alfalfa on agar media". Crop Science, Vol.4, No. 2, Pages 213-217, March-April 1964.

Animal Husbandry (Mendel)

- In September 1963, W.N. Garrett transferred to UC Davis and Verne E. Mendel assumed duties as Animal Husbandry Assistant at I.V.F.S. Livestock environmental studies continued as well as sheep weaning and breeding studies.

Irrigation Drainage

- Drainage and salinity experiment conducted to improve methods of leaching salts out of soils. Field conditions were so extreme that more development was needed on automated recording equipment. Cooperators in this "Leaching trial" were J.N. Luthin, R. Worstell, Frank Robinson* and P. Puri.

*Frank Robinson would join I.V.F.S. Staff the following year.

Vegetable Crops (McCoy)

- Disease and insect resistance, improvements in quality, yield and inheritance of characters continued to be studied with additional cultural studies including reactions to chemicals and mineral nutrition.

- There were about twenty one different research - ers involved in vegetable crop projects.

- April 13,14, 1964 - the Carrot Breeders' Conference was held at I.V.F.S. This was a biennial event with researchers from across the U.S. participating and U.S.D.A. coordinating. As a result of this meeting, it appears to have been decided that the U.S.D.A. would continue cooperative selection work at I.V.F.S.

- Since that time, the U.S.D.A. at the University of Wisconsin, Madison, Wisconsin, has been at the Meloland Station conducting an annual carrot field day.

- Technical Publications (O.D. McCoy):

1) O.D. McCoy, O.A. Lorenz, and K.B. Tyler. "Three years' results - rate and source of phosphorus experiment with lettuce at Imperial Val ley Field Station, 1959-1962". Misc. Mimeo. Imperial Valley Field Station, Department of Vegetable Crops, 23 pages, April16,1963.

2) O.D. McCoy and M. Zahara. "Four methods of lettuce harvest." Vegetable Crops Series 130, 14 pages, October 1963.

3) O.D. McCoy, W.L. Sims and J.H. MacGillivray. "Comparison of single and multiple harvests of cabbage and lettuce". Vegetable Crops Series 131, 12 pages, January 1964.

4) O.D. McCoy, J.H. MacGillivray, R.W. Scheuerman, A.G. Gentile, C.B. Atlee and R.H. Sciaroni. "Labor output as affected by yield". Vegetable Crops Series 132, 6 pages, February 1964.

5) O.D. McCoy. Fourteenth Annual Vegetable Crops Progress Report 1962-63, 79 pages, April 1964.

6) O.D. McCoy, G.C. Hanna, A.G. Gentile, P.G. Smith, L.F. Lippert and G.N. Davis. "Recently developed vegetable varieties - aid mechanization and climatic adaptability". California Agriculture 18 (3): 8-10, March 1964.

1964-1965

"Extension and Teaching".

- This section was included every year in Mr. Worker's annual reports and he documented efforts of researchers to reach out to the community and spread the results of their applied research. That was as important as generating published reports.

- The following summary is indicative of the annual outreach efforts every year at the Station.:
  *Field days: 5
  *Group tours and discussions: 15 (e.g. Holtville Cub Scouts, Utah University, foreign visitors).
  *Farm Advisor meetings/field days: 5.
  *Seminars of various groups: 20 (e.g. soil conservation service, Meadows union farm bureau, etc.)
  *Research committee meetings: 4
  *Total visitors to station: 2,379 (includes 15 foreign countries and 9 states outside of California).
  *Talks, presentations, field days, individual tours and publications by the five staff personnel of Worker, Lehman, McCoy, Mendel, Robinson: 55 (Frank Robinson even taught an irrigation class at Imperial Valley College).

- Station Improvements:

1) Repaired asphalt roads around main office area.

2 Surface drainage pipe installed area 20, 30, 40, 50.

3) Installed 1,000 gallon gasoline tank under ground and connected to pumps. Two old tanks (500 and 800 gallon) were filled with sand.

Alfalfa (Lehman)

- Non-Technical Publications:

1) Alfalfa varieties. W.F. Lehman, J. Davidson and D.W. Cudney. Imperial Agricultural Briefs, Page 5-6, September 1965.

- Technical Publications:

1) W.F. Lehman, M.V. Schonhorst, "Sonora alfalfa" Crop Science 4: p.665, 1964.

2) W.F. Lehman and Y.P. Puri. "Germination of alfalfa (Medicago sativa L.) pollen samples influenced by pollen aggregations and sucrose levels". Crop Science Abstracts, Western Society of Crop Science, Page 11, 1965.

3) W.F. Lehman and Y.P. Puri. "Germination and tube growth rates of stored and fresh alfalfa (Medicago sativa L.) pollen on agar media". Agronomy Abstracts, Page 28, 1965.

4) Y.P. Puri and W.F. Lehman. "Effect of pollen aggregations and sucrose levels on germination of fresh and stored alfalfa (Medicago sativa L.) pollen. Crop Science 5: pp. 465-468, 1965.

Vegetable Crops (McCoy)

- Non-Technical Publications:

1) Use of overhead irrigation to remove salt - save seed labor and water. Orval D. McCoy and Frank E. Robinson.

2) Studies on seeding rate and overhead and furrow irrigation of lettuce with saline water. Orval D. McCoy and Frank E. Robinson. Mimeograph report for Salinas row Crop Mechanization Conference, February 1965.

3) A study of population and bed width in relation to soil salinity and growth of carrots under sprinkler and furrow irrigation. Orval D, McCoy and Frank E. Robinson. Mimeograph Report, January 1965.

4) Lettuce seeding rates with furrow vs. sprinkler irrigation in Imperial Valley. Frank E. Robinson and Orval D. McCoy. Progress Report. April 1965.

5) Granular and liquid herbicides at three rates, incorporated and non-incorporated furrow and sprinkler irrigation on seeded weeds and lettuce. James M. Lyons, Orval D. McCoy, Frank E. Robinson and Fred L. Whiting. Progress Report, April, 1965.

1964-1965 (continued)

- Technical Publications (McCoy):

1) O.A. Lorenz, K.B. Tyler and O.D. McCoy. "Phosphate sources and rates for winter lettuce on calcareous soil". Journal of American Society of Horticultural Science, Vol. 84, Page 348-355, June 1964.

2) F.E. Robinson and O.D. McCoy. "The effect of sprinkler irrigation with saline water and rates of seeding on germination and growth of lettuce". Journal of American Society of Horticultural Science, Vol. 87, December 1965.

Animal Husbandry (Mendel)

- Six progress reports were submitted.

- Non-Technical Publications:

1) Sloping floors for beef cattle feed lots. S.R. Morrison, W.N. Garrett, C.F. Kelly, T.E. Bond and V.E. Mendel, California Agriculture 18(9): Page 14-15, 1964.

2) The effect of fat on the concentrate to roughage ratio selected by feedlot animals. W.N. Garrett and V.E. Mendel. 4th Annual California Feeders' Day, Page 45-47, 1964.

Water Science and Engineering (Robinson)

- Frank E. Robinson was assigned to the I.V.F.S. in August 1964 as an Assistant Water Scientist, Water Science and Engineering Department, Davis. His career was most distinguished, he was well liked by all and his contributions to Imperial Valley Agriculture are very valuable. He retired officially in 1992 but stayed on until 1995 to help finish a project he had started. It appears he arrived at an opportune time because irrigation drainage was becoming increasingly important as the Valley had to deal with increasing soil salinity issues. Shallow drain tile installation was a new exploratory concept. There was an increased cooperation with the Vegetable Crops Department to improve precision planting and mechanical harvesting techniques. In Agronomy, sugar cane and sugar beets were faced with issues that were ultimately mitigated with implementation of intermittent furrow irrigation and sprinkler irrigation which improved soil aeration. Sprinkler irrigation was probably Dr. Robinson's most significant contribution.

- Non-Technical Publications:

1) Use of overhead irrigation to remove salt-save seed labor and water. Orval D. McCoy and Frank E. Robinson. Mimeograph Report, December 1964.

2) Studies on seeding rate and overhead and furrow irrigation of lettuce with saline water. Orval D. McCoy and Frank E. Robinson. Mimeograph Report for Salinas Row Crop Mechanization Conference, February 1965.

3) A study of population and bed width in relation to soil salinity and growth of carrots under sprinkler and furrow irrigation. Orval D. McCoy and Frank E. Robinson. Mimeograph Report, January 1965.

4) Lettuce seeding rates with furrow vs. sprinkler irrigation in Imperial Valley. Frank E. Robinson and Orval D. McCoy. Progress Report, April 1965.

5) The effect of irrigation regime light colored seed row covers and slanted beds upon germination of pelleted sugar beet seed. Frank E. Robinson and George F. Worker, Jr., Progress Report, September 1965.

6) Granular and liquid herbicides at three rates, incorporated and non-incorporated furrow and sprinkler irrigation on seeded weeds and lettuce. James M. Lyons, Orval D. McCoy, Frank E. Robinson and Fred L. Whiting. Progress Report, April 1965.

- Technical Publications:

1) F.E. Robinson. "Required percent air space for normal growth of sugar cane". Soil Science 98 (3): Pages 206-207, September 1964.

1964-1965 (continued)

2) F.E. Robinson and G.F. Worker, Jr.. "Growth of sugar cane in areas irrigated with Colorado River Water". California Agriculture 19(8): Pages 2-3, August 1965.

3) F.E. Robinson and O.D. McCoy. "The effect of sprinkler irrigation with saline water and rates of seeding on germination and growth of lettuce". Journal of American Society of Horticultural Science 87, December 1965.

4) F.E. Robinson and L.D. Baver. "The use of the neutron soil moisture probe to study soil moisture movement in sugar cane soils in Hawaii". Transactions of 8th International Congress of Soil Science. Bucharest, Romania, December 1965.

Agronomy (Worker)

- Ten progress reports were submitted.

"Meloland grain Sorghum was approved for certification and 6,000 pounds of foundation seed was released in the spring." (George F. Worker, Jr. I.V.F.S. annual report. 1964-1965).

- Non-Technical Publications:

1) Sudangrass and sudan hybrid trials 1964. George F. Worker, Jr.. Field Crop Report No. 15, February 1965.

2) Grain sorghum 1964. George F. Worker, Jr. and Dale G. Smeltzer. Field Crop Report No. 14, February 1965.

3) Select forage sorghum on use basis. George F. Worker, Jr.. Crops and Soil, Vol. 16, March 1964.

4) Grain sorghum studies. George F. Worker, Jr. IVFS Mimeograph No. 5, October 1964.

- Technical Publications:

1) D.M. Yermanos and G.F. Worker, Jr.. "Cyclic production of capsules in flax". California Agriculture 18(5): Pages 13-14, May 1964.

2) G.F. Worker, Jr.. "Study of combine losses and seed size of four grain sorghum at the Imperial Valley Field Station". Sorghum Newsletter 18 (5): Page 16, 1965.

3) R.S. Loomis and G.F. Worker, Jr.. "Restitution of growth in nitrogen deficient sugar beet plants". Journal of Sugar Beet Technology 12(8): pp.657-665, January 1964.

1965-1966

- Total visitors to Station: 2,195 (287 visitors from 23 countries, 34 visitors from 18 states outside California)

- Station Improvements:

1) Completed air-conditioned cattle reference barn, First cattle in - August 1966.

2) Livestock Feed Mill remodeled and expanded (W.E. Douthitt, steel, Checkers Construction, Sheffield Electrical).

December 1965

Above and Below: Livestock Feed Mill, Handling Area and Reference Barn, December 1965 and December 1966.

Photo courtesy of George Worker I.V.F.S. 1965-1966 Annual Report

December 1966

1965-1966 (continued)

- Station Improvements (continued):

3) Completed installation of 4 concrete cistern tanks for domestic water storage : 3,500 gallon capacity.

4) Imperial Irrigation District concrete lined irrigation delivery canals on west, north and east side of Station.

5) Granary Building modification: converted second floor for use as a laboratory. Removed two large steel tanks, framed two doors, installed an exterior stairwell, enclosed interior stairwell, finished interior, installed a walk-in refrigerator. Started work in July 1966.

6) Septic tank, disposal field, water closet, with shower, installed at Building #211(feedmill); seepage field and connecting lines installed at Building #103.

7) Overhead 440 volt distribution system installed in cattle facility.

8) Truck weighing scale (20') installed in cattle area.

9) Additional sub-surface drainage, Area 80.

Research Advisory Committee:

1) Reorganized to include five subcommittees: Field Crops, Forage Crops, Livestock, Vegetable Crops, Water Management.

2) Sheep pasture study delayed.

3) Budget unchanged, funds and personnel to newer stations.

4) Dr. Pal Puri transferred to Tulelake Station as Superintendent.

Agronomy (Worker)

- Foundation Seed: Meloland Grain Sorghum: 4,210 lbs. New River Flax: 5,120 lbs.
- Ten progress reports issued.
- Non-Technical Publications:

1) Grain sorghum and sudan research. G.F. Worker, Jr., Imperial Agricultural Briefs, Page 1, March 1965.

2) The effect of irrigation regime, light colored seed row covers and slanted beds upon germination of pelleted sugar beet seed. F.E. Robinson and G.F. Worker, Jr., Mimeograph report, PP.1-4 September 15, 1965.

3) Safflower trials - IVFS 1957 thru 1964. G.F. Worker, Jr., J.P. Jones and P.F. Knowles. Field Crop Report No. 16, November 1965.

4) Small grain research and testing program at the Imperial Valley Field Station. G.F. Worker, Jr., Imperial Agricultural Briefs, December 1965

5) Grain sorghum test. G.F. Worker, Jr. and Dale G. Smeltzer. Field Crop Report No. 17, February 1966.

6) Adaption of sprinkler irrigation in the Imperial Valley. F.E. Robinson, O.D. McCoy and G.F. Worker, Jr., Mimeograph report 1965.

7) Controlled plant population. R.S. Loomis and G.F. Worker, Jr. The California Sugar Beet, PP. 34-35, 1965.

- Technical Publications:

1) W. N. Garrett and G.F. Worker, Jr. "Comparative feeding value of silage made from wheat and dual purpose varieties of sorghum". Journal of Animal Science, Vol. 24, No. 3, PP. 782-785, August 1965.

2) F.E. Robinson and G.F. Worker, Jr.. "Growth of sugar cane in areas irrigated with Colorado River water". California Agriculture, Vol. 10, No. 8, PP. 2-3, August 1965.

3) B.H. Beard, G.F. Worker, Jr. and G.H. Abel. "Dunes Flax". California Leaflet 185, September 1965.

1965-1966 (continued)

- Technical Publications (Worker):

4) G.F. Worker, Jr. and Y.P. Puri. "Genotypic response of grain sorghum to nitrogen rates and date-of-planting under four irrigation levels". Crop Science Abstract, Western Society of Crop Science P.20, June 1965.

5) G.F. Worker, Jr. and P.H. Van Schaik "Planting date effects of cotton in Imperial Valley". California Agriculture, Vol. 20, No.3, PP. 4-5, March 1966.

Alfalfa (Lehman)

- Project title: "Breeding Nondormant Types of Alfalfa Adapted to Southwestern United States. Cooperating with UC Davis, Agronomy Dept.; UC Riverside, Plant Pathology Dept.; Entomology Research Division , University of Arizona.

- Non-Technical Publications:

1) Lehman, W.F., Questionnaire Pertaining to Alfalfa Research in Western United States. Mimeograph pamphlet.

2) Lehman, W.F., Report From Western Alfalfa Improvement Conference. Report of the Twentieth Alfalfa Improvement Conference. July 6-8, 1966.

- Technical Publications:

1) W.F. Lehman and Y.P. Puri. "Germination of alfalfa (Medicago sativa L.) pollen samples influenced by pollen aggregations and sucrose levels". Crop Science Abstracts, Western Society of Crop Science, P. 11, 1965.

2) W.F. Lehman, J. Davidson and D.W. Cudney. "Alfalfa varieties". Imperial Agricultural Briefs, PP. 5-6, September 1965.

3) W.F. Lehman and Y.P. Puri. "Germination and tube growth rates of stored and fresh alfalfa (Medicago sativa L.) pollen on agar media". Agronomy Abstracts, P. 28, 1965.

4) Y.P. Puri and W.F. Lehman. "Effect of pollen aggregations and sucrose levels on germination of fresh and stored alfalfa (Medicago sativa L.) pollen". Crop Science, Vol. 5, PP. 465-468, 1965

Animal Science (Mendel)

- Unexplained condition named "canary grass staggers" in cattle being investigated. A cooperative survey conducted with local Farm Advisor, practicing veterinarians, and the Extension Veterinary Dept. They could not prove that canary grass was the cause.

- Environmental studies were of increasing importance as more and more cattle were being fed in pens, nationwide. Areas of importance include, engineering aspects such as flow rate characteristics from manure pits, aerobic digesters, space requirements for optimum performance in restricted conditions such as over slat - covered manure pits or environmentally controlled buildings.

- The refrigerated reference barn is now referred to as the *Ittner Building.*

- Non-Technical Publications:

1) Seasonal influence on the protein-energy ratio of fattening rations. V.E. Mendel and W.N. Garrett. Fifth Annual California Feeder's Day, PP. 3-8, 1966.

2) Sloping and slatted floors for cattle feedlots. S.R. Morrison, V.E. Mendel and T.E. Bond. Fifth Annual California Feeder's Day. PP. 74-77, 1966.

3) Some methods for reducing heat stress in fattening cattle. V.E. Mendel and W.N. Garrett. Annual Report of Cooperative Regional Project W-46, 1965.

- Technical Publications:

1) V.E. Mendel and G.V. Raghaven. "Thermal response of intravascular and rectal tissue to temperature changes and chemical conditions in the rumen of sheep". Journal of Physiology 182, No. 1, PP. 34-41, 1966.

1965-1966 (continued)

- Technical Publications (Mendel):

2) S.R. Morrison, V.E. Mendel and T.E. Bond. "Sloping floors for beef cattle feedlots". Proc. Nat'l. Symp. on Animal Waste Management. ASAE Pub. No. SP-0366, pp. 41-43, 1966.

Vegetable Crops (McCoy)

- Eleven progress reports were submitted including trials on asparagus, melons, lettuce, tomatoes.

- Non-Technical Publications:

1) Precision planting. O.D. McCoy Imperial County Farm Bureau Monthly, Vol. 40, No. 5, PP.3-4, May 1966.

2) An old-timer gets new ideas for vegetable farming. Imperial County Farm Bureau Monthly, Vol. 40, N0. 6, June 1966.

- Technical Publications:

1) F.E. Robinson and O.D. McCoy. "The effect of sprinkler irrigation with saline water and rates of seeding on germination and growth of lettuce." Proceedings of American Society of Horticultural Science, Vol. 87, PP. 318-323, December 1965.

Water Science and Engineering (Robinson)

- Continuation of research into improvement of irrigation management and salinity control.

- Non-Technical Publications:

1) Sprinkler and furrow irrigation of sugar beets. Frank E. Robinson and George F. Worker, Jr., Mimeograph., 1965.

2) Comparative advantages of sprinkler and furrow irrigations on lettuce. Frank E. Robinson and Orval D. McCoy, Mimeograph, 1965

3) Adaption of sprinkler irrigation in the Imperial Valley of California. Frank E. Robinson, Orval D. McCoy and George F. Worker, Jr., Mimeograph, 1965

4) Cross currents in Water Science and Engineering. Frank E. Robinson, Mimeograph, 1965

- Technical Publications:

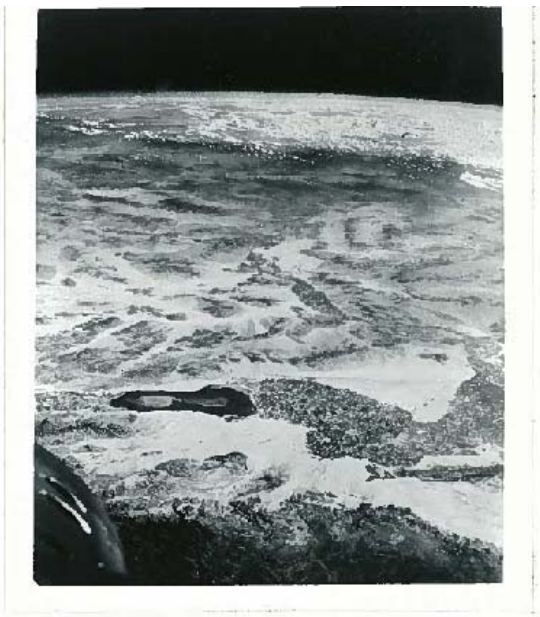
1) F.E. Robinson " Required percent air space for normal growth of sugar cane". Soil Science, Vol. 98, No. 3, pp. 206-207, September 1964.

2) F.E. Robinson and G.F. Worker, Jr.. "Growth of sugar cane in areas irrigated with Colorado River Water". California Agriculture, Vol. 19, No.8, pp. 2-3, August 1965.

3) F.E. Robinson and O.D. McCoy. "The effect of sprinkler irrigation with saline water and rates of seeding on germination and growth of lettuce". Proceedings of American Society of Horticultural Science, Vol. 87, pp. 318-323, December 1965.

- Miscellaneous trials underway for residual effects of herbicides in soil and pre-emergent weed control herbicides.

1966-1967



This photo was taken by the Gemini 5 crew during their eight-day flight in space August 21-29, 1965. Area in the foregound is the Laguna Mountain range, west of Imperial Valley. Salton Sea along the Coachella, Imperial, and Mexicali Valleys is located horizontally in the lower third of the photo. The Palo Verde Valley is approximately at the center of the photo. Farther up-stream Lake Havasu behind Parker Dam is visible. The top of the picture shows the curvature of the earth.

Courtesy NASA and George F. Worker IVFS Annual Report 1966-1967.

1966-1967

- Total visitors to Station: 2,698.
- Station Improvements:

1) Bldg. 201 remodeling complete. Upstairs is soils lab. Downstairs is seed storage, samplings, etc. (Wilson & Wilson Contractors)

2) Improvements to domestic water: pressure controls for proper air-water ratio.

3) Equipment Storage shed: 24' x 160' with 14' eaves (Duggins Construction).

Donations to Station by 15 seed companies valued at $871.00 (a typical year's worth of assistance from business community).

Agronomy (Worker)

- Ten research progress reports submitted.
- Non-Technical Publications:

1) Grain Sorghum Studies. G.F. Worker, Jr. Mimeograph report, 1966.

2) Response of grain Sorghum to Dates-of - Planting under Four Irrigation Levels. G.F. Worker, Jr. Imperial Agric. Briefs, July, 1966.

3) Protein percent of Grain Sorghum Grown at the Imperial Valley Field Station. G.F. Worker, Jr. Agronomy notes, November 1966.

4) Protein Percent of Grain Sorghum Grown at the Imperial Valley Field Station. G.F. Worker, Jr. Imperial Agric. Briefs, November 1966

5) Grain Sorghum 196. G.F. Worker, Jr. and D.G. Smeltzer. Field Crops Report No. 18, February 1967.

6) Grain Sorghum Variety Testing and Date-of-Planting in the Imperial Valley. G.F. Worker, Jr. I.V.F.S. Mimeograph N0. 6, March 1967.

- Technical Publications:

1) G.F. Worker, Jr. "Meloland Grain Sorghum,: Calif. Leaflet, No. 192: 1-4, October 1966.

2) J.R. Goodin, R.M. Hoover and G.F. Worker, Jr. "High temperature effects on sugar beet germination," Calif. Agric. Vol. 20, No. 8: 14-15, August 1966.

3) F.E. Robinson and G.F. Worker, Jr. "Factors affecting the emergence of sugar beets in an irrigated desert environment," Agron. J. Vol. 58: pp.433-435, 1966.

4) F.E. Robinson, O.D. McCoy and G.F. Worker, Jr. "Sprinkler irrigation in Imperial Valley," Calif. Agric. Vol.21, No.2: pp.6-8, February 1967.

5) G.F. Worker, Jr. and Y.P Puri. "Genotypic response of grain sorghum to nitrogen rates and date-of-planting under four irrigation levels," Agron. Abstracts, pp. 21-26, August 1966. Stillwater, Oklahoma.

Alfalfa (Lehman)

- Non-Technical Publications:

1) Alfalfa Varieties for the Low Desert Valley of California 1967. W.F. Lehman. Mimeograph pamphlet.

- Technical Publications:

1) W.F. Lehman and Y.P. Puri. "Rates of germination and tube growth of stored and fresh alfalfa (Medicago sativa L.) pollen on agar medium, " Crop Science 7: p.272-273, 1967.

2) W.F. Lehman, D.C. Erwin and E.H. Stanford. "Root rot tolerance in new alfalfa strains to plant breeders, " Calif. Agric. 21: p.6, 1967.

3) W.F. Lehman. "Alfalfa seed chaicid (Bruchophagus roddi Guss.) infestation cycles and sampling for resistance in Southern California," Agron. J. 59: pp. 403-406, 1967.

1966-1967 (continued)

4) F.E. Robinson, O.D. McCoy, G.F. Worker and W.F. Lehman. "Comparison of sprinkler and surface irrigation of vegetable crops of a desert environment," Agron. Abstracts, p. 111, 1967.

5) W.F. Lehman, S.J. Richards, D.C. Erwin and A.W. Marsh. "Effects of irrigation treatments on alfalfa (Medicago sativa L.) production, persistence and soil salinity in Southern California," Hilgardia. In press, 1967.

Animal Husbandry (Mendel)

- Non-Technical Publications:

1) Economics of Energy Utilization in Fattening Cattle. V.E. Mendel. Proc. of seminar. September 1966.

2) Seasonal influence of the Protein Energy Ratio of Fattening Rations. V.E. Mendel, W.N. Garrett. U.S.D.A. Cooperative Regional Project, W-46. 1967

- Technical Publications:

1) V.E. Mendel and W.N. Garrett. "Nutritive value of alfalfa hay fed as cubes or as bales," 6th Annual Calif. Cattle Feeders' Day Report. 1967.

2) V.E. Mendel and W.N. Garrett. "Nutritive value of alfalfa hay fed as cubes or as bales," J. Anim. Sci. 26: 936. 1967.

Vegetable Crops (McCoy)

- Non-Technical Publications:

1) Cutting and Packing Lettuce. O.D. McCoy. Imperial County Farm Bureau Monthly, Vol. xxxx (12): 12, December 1966.

2) Sprinkler irrigation in the Imperial Valley. F.E. Robinson and O.D. McCoy. I.V.F.S. Mimeograph report, 7 pages, January 1967.

3) An Evaluation of Sprinkler Irrigation for Imperial Valley. F.E. Robinson, O.D. McCoy, G.F. Worker Jr., Calif. Agric. Vol. 21(2): pp 6-8, February 1967.

4) Plant Response with Sprinkler Irrigation. O.D. McCoy, F.E. Robinson, H.V. Jacobs. I.V.F.S. miscellaneous Mimeograph, 6 pages, March 2, 1967.

5) Sprinkler Irrigation in Imperial Valley Research. F.E. Robinson, O.D. McCoy. Imperial County Agric. Briefs, March 3, 1967.

6) Lettuce Precision Planting with Planet Jr. O.D. McCoy, H.V. Jacobs. I.V.F.S. Miscellaneous Mimeograph, 5 pages, April 5, 1967.

7) Sprinklers show advantages. F.E. Robinson, O.D. McCoy, G.F. Worker, Jr., W.F. Lehman. Vegetable Crop Management Vol. 3(6): pp. 10-11, June 1967.

8) New Cultural Research Tool. O.D. McCoy. Imperial County Farm Bureau Monthly, Vol. XLI (8): pp. 2-5, July 1967.

- Technical Publications:

1) Robinson, F.E. and Orval D. McCoy. "Population growth rate and maturity of vegetable crops in relation to soil salinity and texture under sprinkler and furrow irrigation. Agron. Jour. 59: pp. 178-181, 1967.

Water Science (Robinson)

Removal of soil salinity much greater with sprinkler vs. flood irrigation. Increase in yield is 50% with 82" sprinkler irrigated beds vs. 42" furrow irrigated beds.

- Non-Technical Publications:

1) Sprinkler Irrigation. F.E. Robinson Imperial Agric. Briefs, PP. 2-3, January 27, 1967.

2) Sprinkler Irrigation in Imperial Valley- Research and Application. F.E. Robinson, O.D. McCoy. Imperial Agric. Briefs, p. 14, March 31, 1967.

3) The effects of Sprinkler Irrigation with Saline Water and the Rates of Seeding on Germination and growth of Lettuce. F.E. Robinson, O.D. McCoy. Imperial Agric. Briefs, p. 13, March 31, 1967.

1967-1968 (continued)

Animal Science (Mendel & Lofgreen)

Six annual progress reports submitted.

First year of using Animal Science name instead of Animal Husbandry.

Technical Publications:

1) G.P. Lofgreen, W.F. Garrett. "A System for Expressing Net Energy Requirements and Feed Values for Growing and Finishing Beef Cattle." Jour, of Anim. Sci. 27: p. 793. 1968.

Vegetable Crops (McCoy)

Seven Progress reports submitted.

Non-Technical Publications:

1) Preliminary Results, Asparagus Variety Trial at Meloland. O.D. McCoy. Imperial County Farm Bureau Monthly, pp. 2-3, August 1967.

2) Preliminary results of asparagus crown spacing at Meloland. O.D. McCoy. Imperial County Farm Bureau Monthly, pp. 7-10, September 1967.

3) New Cultural Research Tool. O.D. McCoy Imperial County Farm Bureau Monthly, p. 11, July 1967.

4) Hand and Mechanized Lettuce Harvesting Compared. O.D. McCoy, F.E. Robinson and R. Garrett. Transactions, of the ASAE, pp. 76-77, June 1968.

Technical Publications:

1) H. Agamallan, A. Lange, J. Lyons, H. Stillwell, H. Ford, H. Kempen, F.E. Robinson, O. D. McCoy. "Pre emergence Herbicides for weed control in Lettuce". Calif. Agric. 21: pp. 8-9. 1967.

2) O. Lorenz, J. Lingle, O. McCoy. "Two Year Lettuce-Source and Rate of Phosphorous Experiment at Imperial Valley Field Station." U.C., I.V.F.S. , Dept. Veg. Res. Mimeo. #25, 10 pp. May 1968.

Water Science (Robinson)

It was being proven that sprinkler irrigation was able to effectively conserve water, reduce soil salinity, maintain good soil which ultimately resulted in greater seedling emergence rates.

Non-Technical Publications:

1) Sprinklers show advantages. F.E. Robinson. Vegetable Crop Management, pp.10-11, June 1967.

2) From Desert to Oasis. F.E. Robinson. Big Farmer, pp. W6-W7, Spring 1968.

3) Manage your herbicide and stay out of trouble. F.E. Robinson. Irrigation Age, pp. 14-15, February 1968.

Technical Publications:

1) F.E. Robinson and L.D. Baver. "The use of neutron probe to study moisture movement and moisture extraction by sugarcane in Hawaii." Trans. 8th Int. Congr. Soil Sci., Bucharest, Romania. Vol. 2, pp. 433-443. August 1964.

2) H. Agamallan, A. Lange, J. Lyons, E. Stillwell, H. Ford, H. Kempen, O.D. McCoy and F.E. Robinson. "Pre-emergence herbicides for weed control in lettuce." Calif. Agric. 21: pp. 8-9. October 1967.

3) F.E. Robinson. "Irrigation Research Under Arid Conditions." 21st Annual Nevada Water Conference, Carson City, Nevada. Vol. 21, pp. 33-37. September 1967.

4) F.E. Robinson, O.D. McCoy, G.F. Worker, W.F. Lehman. "Comparison of sprinkler and surface irrigation of vegetable crops in a desert environment." Agron. Abstracts, p. 111, November 1967.

5) F.E. Robinson. "Sprinklers Show Advantages." Vegetable Crop Management, p.10-11. June 1967.

1966-1967 (continued)

- Technical Publications (Robinson):

1) F.E. Robinson and O.D. McCoy. "Population, growth rate and maturity of vegetable crops in relation to soil salinity and texture under sprinkler and furrow irrigation," Agron. J. 59: p. 178-181, March 1967.

2) F.E. Robinson and J.N. Luthin. "A comparison of deep and shallow tile for reduction of soil salinity in Imperial Valley," Calif. Agric. 21: p. 2-4, February 1967.

3) F.E. Robinson, O.D. McCoy and G.F. Worker, Jr. "An evaluation of sprinkler irrigation for Imperial Valley," Calif. Agric. 21: p. 6-8, February 1967.

4) F.E. Robinson and G.F. Worker, Jr. "Factors affecting the emergence of sugar bets in an irrigated desert environment," Agron. J. 58: p. 433 -435, July 1966.

1967-1968

- Visitors to Station: 2,215.

- Academic staff changes:

Dr. Verne E. Mendel transferred to Davis, September 1967 and Dr. Glen P. Lofgreen came to Station in February 1968. Glen's title was Animal Scientist, Animal Science Department, Davis.

- Station Improvements:

1) February 1968; four (4) 3,250 gallon water storage tanks installed underground and a concrete reinforced rock and sand filled water filter was added to domestic water system

2) Two horse corrals built - 28' x 56'.

3) Additional sub-surface drainage tile was installed in area 80.

4) Irrigation pump installed S. W. corner area 90.

Agronomy (Worker)

- Twelve Annual progress reports submitted.

- Non-Technical publications:

1) Grain sorghum varietal testing at the Imperial Valley Field Station. G.F. Worker, Jr. Mimeograph No. 7, October 1967.

2) Barley yields as affected by date-of-planting and seeding Rates. G.F. Worker, Jr. Imperial Agricultural Briefs, October 1967.

3) Grain sorghum, 1967. G.F. Worker, Jr. Field Crop Report No. 19, February 1968.

- Technical Publications:

1) F.E. Robinson, O.D. McCoy, G.F. Worker, Jr. and W.F. Lehman. "Comparison of sprinkler and surface irrigation of vegetable and field crops in a desert environment". Agron. Abstracts, Nov. 5 -10, 1967. Washington, D.C.

2) B.H. Beard, G.F. Worker, Jr. and G.H. Abel. "Registration of Dunes Flax." Crop Sci. 7: p. 681. 1967.

3) B.H. Beard and G.F. Worker, Jr. "Variance components for irrigated seed flax (Linum usitatissimum L.) yield trials." Crop Sci.8: p. 129-130. 1968.

Alfalfa (Lehman)

- Non-Technical Publications:

1) 1968 Supplement to Alfalfa Varieties for the Low Desert Valleys of California 1967, W.F. Lehman. Mimeograph pamphlet. April 1968.

2) Notice of release of SW44 Germplasm to Alfalfa breeders. W.F. Lehman and E.H. Stanford

- Technical Publications:

1) F.E. Robinson, O.D. McCoy, G.F. Worker, Jr. and W.F. Lehman. " Sprinkler and surface irrigation of vegetable and Field crops in an arid environment". Agron. J. 60: pp. 696-700. 1968.

1967-1968 (continued)

- Technical Publications (Robinson):

6) "From Desert to Oasis." Big Farmer, pp. W6-W7. Spring 1968.
7) F.E. Robinson. "Manage Your Herbicide and Stay Out of Trouble." Irrigation Age, p.14-15. February 1968.
8) O.D. McCoy, F.E. Robinson. "The Effect of Fur row and Sprinkler Irrigation on 3 Multiple Row Carrot Populations." Abstracts Am. Soc. Hort. Sci., College Station, Texas. P. 198. August 1967.
9) F.E. Robinson, O.D. McCoy, R.E. Garrett. "Hand and Mechanized Lettuce Harvesting Compared." Trans. Am. Sci. Agric. Eng. Vol. 11, pp. 76-77. January 1968.
10) F.E. Robinson. "Improving Soil Salt Removal With Sprinklers." Proc. 1968 Ann Tech. Conf., Sprinkler Irrigation Assn., Denver, Colorado. pp. 19-26. February 1968.

- 1967-1968 Research Advisory Committee Members:

L.D. Anderson, Entomology, Davis.
Roy Bainer, Agriculture Engineering, Davis (Chairman)
W.W., Donnan, Southwest Branch, Soil and Water Conservation Research Division, Riverside
D.C. Erwin, Plant Pathology, Riverside
H.H. Heitman, Animal Science, Davis
C.E. Houston Irrigation Extension Specialist, Davis
J.M. Lyons Vegetable Crops, Riverside
R.M. Love Agronomy and Range Science, Davis
J.P. Martin, Soils, Riverside
M.F. Phelps, Agricultural Extension Service, Riverside County
J.L. Myler, Director, Agriculture Field Stations (ex officio).
A.F. Van Maren, Agricultural Extension Service, Imperial County.
A.J. McKenzie, Southwestern Irrigation Field Station, USDA, Brawley, Ca.
G.F. Worker, Jr., Agricultural Field Sa tion, El Centro, Ca. (Secretary) (ex-officio)

1968-1969

- Total Visitors to the Station: 2,922.
- Five separate field days instead of Annual Field Day.

1) Cotton: 10/22/68
2) Lettuce: 11/12/68
3) Small Grains: 4/15/69
4) Livestock: 4/17/69
5) Alfalfa 4/24/69

- Station Improvements:

1) January 1969: Four concrete block pens for sugar beet storage (12’ x 13’)
2) Large Cattle corral in area 80 was subdivided into five smaller pens for feeding trials (15± cattle each)
3) Remodel kitchens in residential units (sinks and cabinetry)
4) Altered domestic water lines: replace 400 feet of cement pipe with 6” transite pipe.

- Irrigation water cost: $2.31 per acre foot. (1,746.6 acre feet: total cost $4,031.56)
- There was a larger number than usual Farm and Research Advisory committee meetings:

1) Research Committee met Mar ’69, a.m. Combined meeting with Farm Committee in p.m.
2) Water Management subcommittee met Mar ‘69
3) Livestock subcommittee met two times: Sep 68/ Feb. 69.
4) Field Crops subcommittee met twice: Oct. 68/ Mar. 69.
5) Forage Crops subcommittee met once: Oct. 1968.

1968-1969 (continued)

- In May 1968, a special Research Advisory Subcommittee was created and tasked with developing future research plans for the Imperial Valley Field Station. The report was ten pages in length and followed recommendations at a May 1, 1968 Symposium on Desert Agriculture.
- A new roster of Research Advisory Committee members was created on June 27, 1969.

Agronomy (Worker)

- Seven research progress reports submitted. This appears to be the first year that the hybrid triticale (wheat/rye) was compared against wheat varieties.
- Non-Technical Publications:

1) Agricultural Contrasts—With Special Reference to Cultivars of Vegetable Crops in Imperial Valley. O.D. McCoy, F.E. Robinson, H. Johnson, Jr., J. Lyons, H. Otto, A. Van Maren, R. Hageman and G.F. Worker, Jr. Vegetable Research Mimeograph 26, January 1969, and Farm Bureau Monthly, Imperial County, March 1969.

2) Barley Yields as Affected by Date of Planting and seeing rates. G.F. Worker, Jr., Field Crop Production Handbook, Arizona Extension and Field Crop Highlights, Riverside Agricultural Extension, December 2, 1968.

3) Grain Sorghum Test, 1968. G.F. Worker, Jr. Field Crops Report 20.

4) Safflower Varieties Compared Under Minimum Tillage, G.F. Worker, Jr. and Paul F. Knowles, Imperial Agricultural Briefs, December 1968.

5) Wheat Flowering as affected by Date of Planting, G.F. Worker, Jr., Imperial Agricultural Briefs, October 1968

- Technical Publications:

1) F.E. Robinson, O.D. McCoy, G.F. Worker, Jr., and W.F. Lehman. "Sprinkler and surface irrigation of vegetable and field crops in an arid environment." Agron. J. 60: pp. 696-700. 1968.

2) G.F. Worker, Jr. and V.L. Marble. "Comparison of growth stages of sorghum forages types as to yield and chemical composition." Agron. J. 60: 669-672. 1968.

3) G.F. worker, Jr. and J. Ruckman. "Varieties in protein levels in grain sorghum in the Southwest desert." Agron. J. 60: 485-488. 1968.

4) G.F. Worker, Jr. "Crude protein composition of developing heads of grain sorghum cultivars under Southwestern desert conditions." Agron. Abstracts, Nov. 10-15, 1968. New Orleans.

Alfalfa (Lehman)

- A new alfalfa mite was discovered (microscopic) and was suspected as one of the causes for declines in alfalfa stands. Newer techniques were available for developing resistant strains to the Alfalfa weevil as well. The spotted aphid was still presenting problems (See Gardens in The West, Chapter 2 The Little Stranger"). With reinvigorated efforts, it appears that Dr. Lehman had narrowed resistant strains to four and was nearing a time for release of a new strain of alfalfa.
- Non-Technical Publications:

1) Alfalfa Varieties for the low Desert Valley of California-1969, W.F. Lehman, April 1969, Mimeograph Pamphlet, pp. 1-10.

Left: A memorial stone to Dr. Bill Lehman located in front of the Cooperative Extension Building acknowledging his dedicated service. Photo courtesy, Al Robert-

Animal Science (Lofgreen)

- It appears that in January 1968, the term Animal Husbandry ceased to be used and was replaced by the term Animal Science. Also, sheep were removed from manure disposal testing and it appears that the Station began a shift to only testing cattle. As the feed lot was expanding its capabilities, the increased emphasis on cattle was seen to be in response to satisfying local needs. In fact, it appears that only steers were being studied.

1968-1969 (continued)

Animal Science

- One interesting cattle nutrition study pertained to the inclusion of clay in diets where significant weight gains were observed when adding 2% clay to a high energy ration. Maybe that explains why even today, cattle are seen to be licking the soil in their pens to increase their mineral consumption. The project was referred to as "Montmorillonite in Finishing Rations."

- There were twelve Animal Science progress reports submitted.

- Technical Publications:

1) Lofgreen, G.P. 1968. "Environment and beef cattle performance." Proc. 21st Pacific Southwest Animal Industry Conf. October 14, 1968: 112-116.

2) Lofgreen G.P., V.E. Mendel, and D.L. McIlroy. 1968. "Effects of kinds of milo, method processing and level of urea on cattle performance." 8th Feeders Day Report 1968: 28-35.

3) Lofgreen, G.P. 1969. "Nutrition and carcass composition." Feedstuffs 41: 44.

4) Garrett, W.N., G.P. Lofgreen and J.L. Hull. 1968. "Factors affecting the utilization of corn milo, barley and wheat in rations for beef cattle. Report to USDA on contract 12-14-100-7753 (44).

5) Lofgreen, G.P. 1969. "Net energy tables for use in feeding beef cattle." Animal Sci. Bul. 25 pages.

Vegetable Crops (McCoy)

- There were twelve progress reports submitted. This appears to be the first year that trials for wider seed beds for lettuce occurred.

- Non-Technical Publications:

1) Agricultural Contrasts - With Special Reference to Culture of Vegetable Crops in Imperial County. O.D. McCoy, F.E. Robinson, H. Johnson, Jr., J. Lyons, H. Otto, A. Van Maren, R. Hagemann, G.F. Worker, Jr. Imperial County Farm Bureau Monthly, March 1969.

2) Agricultural Contrasts-With Special Reference to Culture of Vegetable Crops in Imperial Valley. O.D. McCoy, F. Robinson, H. Johnson, Jr., J. Lyons, H. Otto, A. Van Maren, R. Hagemann, G. Worker, Jr., Univ. of Calif. Coll. of Agric. Exp. Sta., Imperial Valley Field Station, Vegetable Research Mimeo #26, January 1969.

3) Serious Internal Defect of Lettuce in Imperial Valley During the 1969 Season. Univ. of Calif. Coll. of Agriculture, Ag Exp. Sta., Imperial Valley Field Station, Vegetable Research Mimeo #27, February 20, 1969.

4) Effect of Kinetin on High Temperature Germination of lettuce seed, O.E. Smith, H. Johnson, Jr., O.D. McCoy, lettuce germination trial, Meloland, authors report of creative work, 1968.

5) Progress Report-1968. O.D. McCoy, et.al., Research in Vegetable Crops, University of California, Imperial Valley Field Station, Department of Vegetable Crops. 191 pages. A report assembled for the Vegetable Subcommittee meeting of the Imperial Valley Field Station, Farmers Advisory Committee, November 21, 1968.

6) Report of Vegetable Crop Research. O.D. McCoy, Prepared for the Imperial Valley Field Station Farmers Advisory Committee, 8 pages, February 9, 1969.

7) Modified: Rate of Phosphorous-Fumigation Study with Lettuce at Imperial Valley Field Station, University of California, El Centro, California. O.D. McCoy, J. Lyons, I. Thomason. Imperial County Farm Bureau Monthly, Vol. XLI, No. 12, December 1968.

- Technical Publications:

1) Robinson, F.E., O.D. McCoy, G.F. Worker, Jr., and W.F. Lehman. 1968. Sprinkler and surface irrigation of vegetable and field crops in an arid environment. Agron. J. 60: pp. 696-700.

1968-1969 (continued):

Water Science and Engineering (Robinson):

- Experiment Station Project #2382. "Improvement of Irrigation Management and Salinity control in Imperial Valley." Frank Robinson. Utilizing a solid set sprinkler system, lettuce, onions and radishes were grown in symmetrical patterns instead of conventional bed furrow technique. Highest yield was 1,000 cartons per acre. Lettuce was grown with one-half the water and one-half the nitrogen fertilizer.

- Dr. Robinson made several presentations nationwide about the use of sprinkler irrigation. Notably, in Phoenix, AZ. at the American Society of Civil Engineers, "The Place of Sprinkler Irrigation in the Modernization of Desert Agriculture." Other locations; Tucson, Pomona, Washington, D.C., Riverside, Indio, Brawley and El Centro.

- Non Technical Publications:

1) Sprinklers-Rate of Application. Imperial Agricultural Briefs. Agricultural Extension. p.4-5, November 1968.
2) Agricultural Contrasts - With Special Reference to Culture of Vegetable Crops in Imperial County, O.D. McCoy, F. Robinson, H. Johnson, Jr., J. Lyons, H. Otto, A. Van Maren, R. Hagemann, G. Worker, Jr. Farm Bureau Monthly, Imperial County, p. 4-15. March 1969.
3) Solid Set Sprinklers for Starting Vegetable Crops. A.W. Marsh, H. Johnson, Jr., L.J. Booker, N. McRae, Keith Mayberry, Phil Mowbray, D. Ririe, F.E. Robinson, Agricultural Extension Service AXT 294, June 1969.

- Technical Publications:

1) F.E. Robinson and J.N. Luthin. "Comparison of three commercial drain tiles in a heavy soil of Imperial Valley." California Agriculture 22:10-11. August 1968.
2) F.E. Robinson. "The place of sprinkler irrigation in the automation of desert agriculture." National Irrigation and Drainage Specialty Conference, Amer. Soc. Civil Engineers, Phoenix pp. 161-167. November 1968.
3) F.E. Robinson and J.N. Luthin "Slip Plowing in non-stratified clay." Calif. Agriculture 22: pp. 8-9. November 1968.
4) F.E. Robinson, O.D. McCoy, G.F. Worker, Jr., W.F. Lehman. "Sprinkler and surface irrigation of vegetables and field crops in an arid environment." Agron. J. 6: pp. 696-700. December 1968.
5) F.E. Robinson, D.W. Chudney, J.P. Jones. "Evaluation of soil amendments in Imperial Valley." Calif. Agriculture 22: pp.10-11. December 1968.
6) Luthin, J.N., P. Fernandez, B. Maslov, J. Woerner, F.E. Robinson. "Displacement front under ponded leaching." Jour. of Irrigation and Drainage Div. Am. Soc. Civil Engineers, Vol. 95, No. IRI, March 1969. pp. 117-125.
7) Luthin, J.N. and F.E. Robinson. "Depth of Drainage in irrigated areas." Trans. Am .Soc. Agric. Engineers 12: pp. 27-31. January 1969.
8) Imperial Valley Field Station. Proceedings of Tile Drainage Conference, Water Resources Center, Imperial Valley Field Station, El Centro, pp. 31-33. November 1968.
9) F.E. Robinson. "Comparisons of irrigation methods in an arid environment." Abstracts, International Conference on Arid Lands, American Association for Advancement of Science, Tucson, Arizona. p. 145. June 3-13, 1969. (manuscript in mimeograph)
10) F.E. Robinson and G.F. Worker, Jr. "Plant density and yield of sugar beets in an arid environment." Agron. J. 61: pp.441-443. June 1969.

1969-1970

- Glen P. Lofgreen was acting superintendent from August 1, 1969 to August 9, 1970. Mr. Worker went on a leave of absence to Kufra, Libya for agricultural study and research in that desert environment.
- Total Visitors to Station: 3,458.
- Six different field days: Cantaloupe, California Cattle Feeders Day (Annual), Veg. Crops, Irrigation, Cereal Grains, Cattle.
- Eight meetings of research committees and subcommittees.
- Station improvements:

1) Modified building #200
2) Built three small glass houses
3) A wood framed shed was added onto the existing potting shed.
4) Four concrete block storage bins built near potting shed.
5) Two grain storage bins built in cattle facility

- Feed produced for livestock:

1) Alfalfa hay 254.2 tons
2) Sudan hay 96.4 tons
3) Barley 88.4 tons
4) Bermuda hay 35.9 tons
5) Wheat 6.5 tons

- There were thirty four (34) total progress reports submitted for the 1969-170 season.

Agronomy and Alfalfa (combined)

- There were twelve progress reports submitted.
- Non-Technical Publications:

1) Robinson, F.E. and W.F. Lehman . 1969. June. Comparison of irrigation methods in an arid environment. Mimeograph pamphlet. 10 pp. Not previously reported.
2) Flock, R.A. and W.F. Lehman. 1969. June. A microscopic mite found on alfalfa in the Imperial Valley. Imperial County Farm Bureau Monthly. P. 19.
3) Lehman, W.F. and R.A. Flock. 1969. June. Alfalfa bud mite, Acera medicaginis, populations and damage to alfalfa in the low desert valley areas of southwestern United States. Crop Science Abstracts, 1969 Annual Meeting Western Society of Crop Science.
4) Lehman W.F., E.H. Stanford, F.V. Lieberman, W.E. Bendixon, W.H. Isom, and V.L. Marble. 1969 July. SW 44 Nondormant alfalfa with stem nematode resistance released to plant breeders. Calif. Agric. 23: 9-10
5) Worker, G.F. , W.F. Lehman. 1970. February. Grain sorghum 1969. Field Crop Report No. 21 pp.1-11.
6) Lehman, W.F. and E.H. Stanford. 1970. January. Notice of release of C937 to alfalfa breeders.

- Technical Publications:

1) Registration of Phytophthora to alfalfa Germplasm, UC 38 and UC 47. W.F. Lehman, D.C. Erwin, and E.H. Stanford. Crop Science 9: 527. 1969.
2) Effect of environment on quality characteristics of alfalfa (Medicago sativa L.) pollen. W.F. Lehman, Y.P. Puri and M.J. Garber. Crop Science 9: 560-563 1969.
3) Two microscopic mites, Aceria medicaginis and Tarsonemus setifer, found on alfalfa in the desert areas of the Southwestern United States. W.F. Lehman and R.A. Flock J. of Econ. Entomology 63: pp. 293-294. 1970.

1969-1970 (continued)

Animal Science (Lofgreen)

- Eight annual progress reports submitted.
- Made thirteen presentations from November '69 through June '70 including college lectures at Kansas State University and Oklahoma State University.
- Non-Technical Publications:

1) Lofgreen, G.P. 1970. Development and application of the net energy system as related to cattle feeding. Proc. Ann. Symp. Farr Better Foods. 1970: 2.

- Technical Publications:

1) Influence of various forms of alfalfa on its feeding value. G.P. Lofgreen. California Feeders Day Report 9: 40. 1969.

2) Comparative net energy values of rations containing wheat and other grains for beef cattle. G.P. Lofgreen. Proc. Int. Symp. On Wheat in Livestock and Poultry Feeds. In Press from Oklahoma State University, Stillwater, Oklahoma. 1970.

3) Energy requirements of beef cattle for maintenance, growth, and fattening. G.P. Lofgreen Proc. Georgia Nutr. 1970.

4) The influence of degree-hour of heat on the performance of beef cattle. V.E. Mendel, S.R. Morrison, T.E. Bond and G.P. Lofgreen. California Feeders Day Report 9: p. 28. 1969.

1969-1970 (continued)

Vegetable Crops (McCoy)

- Eight Progress reports submitted.
- Made presentations in Fresno, Ca., Davis, CA., Jefferson City, Missouri and at IVFS, El Centro.
- Non-Technical Publications:

1) Lippert, L.F., O.D. McCoy and R.E. Foster (Univ.. Of Arizona). July 15, 1969. Evaluation of cantaloupe breeding lines for mechanical harvest. Author's report of creative work.

2) McCoy, O.D. 1969. Phosphate uptake in lettuce, cabbage, and carrots. Proceedings First Annual South Desert Area subcommittee, Soil Improvement committee, California Fertilizer Association. Imperial Valley Country Club, El Centro, CA. pp.4-12.

3) McCoy, O.D. 1969. Phosphate replacement and polyphosphates. Proceedings First Annual South Desert Area Fertilizer Conference. Sponsored by the Desert Area Subcommittee, Soil Improvement Committee, California Fertilizer Association, Imperial Valley Country Club, El Centro, Ca. pp. 13-18.

4) McCoy, O.D. , H. Johnson, Jr. L.F. Lippert, and O.E. Smith. 1969. The effect of ethrel, 2- chloroethane phosphoric acid, on fruit maturation of Top Mark variety cantaloupe, grown on raised or a-typical flat beds with overhead irrigation. Vegetable Research Mimeograph 28. U.C. Imperial Valley Field Station. 10pp. Presented at Univ. Of Calif. Agric. Ext. Serv. Cantaloupe Mechanization Conference, Fresno County, Farm Advisors' Office, November 21, 1969.

5) McCoy, O.D., Betty Ransom Atwater, and Morris Garber. 1970. Field performance of lettuce seedlings showing cotyledon necrosis. 8.pp. Mimeograph. Presented June 1970, at 51st Annual Meeting of Association of Official Seed Analysts, Ramada Inn, Jefferson City, Missouri.

6) McCoy, O.D. M. Yamaguchi, and F. Howard, 1968. Levels of certain elements in the cantaloupe plant. Summaries of papers, statewide conference on toxicities and nutrient interactions, Davis, California, Div. of Ag., Sciences, Univ. of Calif. pp.36-37.

7) President's Report to the Regents, May 17, 1968. page 8 reference to research of O.D. McCoy.

- Technical Publications:

1) Precision planting of lettuce. O.D. McCoy, F.E. Robinson, H. Johnson, Jr., R.G. Curley, C. Brooks, G. Giannini, F. LeBaron. Journal of American Soc. Hort. Sci. 94: 344-345. 1969.

Water Science and Engineering (Robinson)

- Plant temperatures reached 108º in July in surface irrigated areas but were held below 92º by sprinkler irrigation during hottest hours of the day.
- During freezing temperatures, plants were coated with ice by continuous sprinkler application,: iced plants remained at 31º while surrounding area dropped to 21º.
- Two-inch thin wall plastic tile at three foot depth, 50 foot spacing improved salt removal from heavy clay soil.
- Two years after slip-plowing heavy clay soil root development was better in slip plow channels.
- Non-Technical Publications:

1) Blanket of ice keeps plants from freezing. F.E. Robinson. Calif. Agric. 24: 6-7. February, 1970.

- Technical Publications:

1) Advantages of Sprinkler Irrigation in an arid environment. F.E. Robinson. Proceedings 1969 National Conference on Water Conservation with Sprinkler Irrigation, Sprinkler Irrigation Association, Washington, D.C., pp. 65-68. February 1969.

1969-1970 (continued)

- Technical Publications (Robinson)

1) Carrot population density and yield in an arid environment. Frank E. Robinson. Agron. J. 61: 499-500. July, 1969.

2) Stands for automation achieved by sprinkling. Frank E. Roboinson. J. Irrig. and Drainage Div., ASCE, No. IR3, Proc. Paper 6774, 95: 385-389. September 1969.

3) Precision planting of lettuce. O.D. McCoy, F.E. Robinson, H. Johnson, Jr., R.G. Curley, C. Brooks, G. Gianni, F. Le Baron. Amer. Soc. Hort. Sci. 94: pp. 344-345. July 1969.

4) Microclimate of a sprinkled field in an arid area. F.E. Robinson. Proceedings 1970 Annual Technical Conference. Sprinkler Irrigation Association, Denver, Colorado, p. 62-70. February 1970.

1970 - 1971

- Twenty different organizations now utilizing the IVFS facilities, mostly various departments from Davis and Riverside.
- Total visitors to the station: 2,933.
- The specialists were busy with their extension efforts: 81 various presentations were made both on and off the Station.
- Increasing numbers of schools visited the Station, including Imperial Valley college, Cal Poly Pomona, Utah State, Holtville sixth and seventh grade, Hedrick sixth grade.
- George Worker made numerous presentations regarding his sabattical visit to Kufra, Libya. Title of presentations were "The Miracle of sand and water in Kufra, Libya".

Agronomy (Worker and Lehman)

- New wheat and alfalfa lines were released: D6293 wheat was released as "Anza" and UC52 alfalfa was released as UC Salton.
- Sixteen different progress reports were submitted.
- Non-Technical Publications:

1) Worker, G.F. and W.F. Lehman. 1970. Barley progress report 1967-1970. Mimeo pamphlet.; 6 pp. October.

2) Lehman, W.F. , C.O. Qualset and George F. Worker, Jr. 1970.Performance of wheat varieties at the University of California Imperial Valley Field Station in 1969 and 1970 Agron. Prog. Report No. 31; 10 pp.

3) Qualset, C.O., and J.D. Prato, J.H. Rupert, H.E. Vogt, W.H. Isom and W.F. Lehman. 1970. INIA 66 wheat - its characteristics and performance. Agron. Progress Report No. 32; 2 pp.

4) Qualset, C.O., J.H. Rupert, H.E. Vogt, W.F. Lehman, J.T. Feather, J.D. Prato and Y.P. Puri. 1970. Preliminary performance data on Nuri 70, Yecora 70, Sarie 70 and Potam 70 wheats in California. Agron, Prog. Report No. 31; 5 pp. December.

5) Worker, G.F. and W.F. Lehman. 1971. Grain Sorghum 1970. Field Crop Report No. 23; 14 pp. February.

6) Lehman, W.F. 1971. Alfalfa varieties and production in the low desert valley areas of California-1971. Mimeo pamphlet. 18 pp. April.

7) Worker, George F., Jr. June 17, 1969. Phosphorus and nitrogen application on sugar beets. Proceedings First Annual South Desert Area Fertilizer Conference, El Centro, California, pp. 19-30.

8) Worker, George F., Jr. and Paul F. Knowles. December, 1969. Safflower varieties compared under minimum tillage after cotton and planted on beds. Yuma County Farm Notes. 2pp.

9) Worker, George F., Jr. and W.F. Lehman. February 1970. Grain sorghums 1969. Field Crop Report No. 21. Mimeograph. 12 pages.

10) Qualset, C.O., W.M. Isom, J.D. Prato, Y.P. Puri, G.F. Worker, Jr. June 1969. Triticale... problems and progress with a new cereal crop. California Agriculture.

1970-1971 (continued)

Agronomy (continued)

11) Worker, George F., Jr. and C.D. Qualset. July 9,1969. Performance of Mexican wheat varieties at the Imperial Valley Field Station in 1969. Agronomy Progress Reports No. 28. Mimeograph. 8 pages.

- Technical Publications:

1) Lehman, W.F., M.L. Peterson, C.R. Adair, L.L. Davis and R.W. Haubrich. 1970. Rice introductions tested for use in California. Calif. Agriculture 24: pp.4-6. June.

2) Nielson, N.W., W.F. Lehman and V.L. Marble. 1970. A new severe strain for the spotted alfalfa aphid in California. J. of Econ. Ent. 63: 1489-1491. October.

3) Nielson, M.W., H. Don, M.H. Schonhorst, W.F. Lehman and V.L. Marble. 1970. Biotypes of the spotted alfalfa aphid in Western United States. J. of Econ. Ent. 63: pp. 1822-1825. December.

4) Lehman, W.F., E.H. Stanford, M.W. Nielson, F.V. Lieberman, M.H. Schonhorst, O.J. Hunt, R.N. Peaden and H.L. Carnahan. 1971. Registration of C937 parental clone of alfalfa. Crop Sci. 11: p. 142. January-February.

5) Nielson, M.W., M.H. Schonhorst, H. Don, W.F. Lehman and V.L. Marble. 1971. Resistance in alfalfa to four biotypes of the spotted alfalfa aphid. J. of Econ Ent. 64: pp. 506-510. April.

6) Robinson, F.E. and George F. Worker, Jr. 1969. Plant density and yield of sugar beets in an arid environment. Agron. Journal 61: pp. 441-443.

7) Worker, George F., Jr. 1969. Germination studies in grain sorghum. Abstracts-Western Society of Crop Science, 1969, Reno, Nevada.

Animal Science (Lofgreen)

- Dr. Lofgreen continued to receive wide attention for his livestock nutrition and environmental research. Sprinkler cooling was innovative and it was discovered that during periods of heat stress, cattle sprinkled for 60 seconds every half hour experienced more weight gain by 1/2 pound per day than those uncooled and 2/10ths lbs. more than those in a refrigerated barn.

- There were eight annual progress reports submitted.

- Non-Technical Publications:

1) Lofgreen, G.P., J.R. Dunbar and D.G. Addis. Barley, milo, triticale and wheat in high-energy finishing rations. 10th California Feeders Day Report. pp. 30-36.

2) Lofgreen, G.P. and J.R. Dunbar. 1970. The effect of popping and degree of flaking on the nutritive value of milo. 10th California Feeders Day Report. pp. 48-53.

3) Lofgreen, G.P. and R.L. Givins. 1970. Cooled water and cattle performance. 10th California Feeders Day Report. pp. 61-62.

4) Lofgreen, G.P. and S.R. Morrison. 1970. Effect of sprinklers or refrigeration on cattle performance. 10th Annual California Feeders Day Report. p. 63.

5) Lofgreen, G.P. 1970. Methionine hydroxy analogue and/or sulfur in rations containing urea. 10th California Feeders Day Report. pp. 64-65.

6) Lofgreen, G.P. and S.R. Morrison. 1970. Slotted floors versus dirt pens. 10th California Feeders Day Report. p. 66.

7) Lofgreen, G.P., 1970. Ground versus steam flaked wheat. 10th California Feeders Day Report. pp. 70-71.

1970-1971 (continued)

8) Dunbar, J.R. and G.P. Lofgreen. 1970. The value of high roughage substitutes in high barley finishing rations. 10th California Breeders Day Report. pp. 4-9

9) Morrison, S.R., G.P. Lofgreen and T.E. Bond. 1970. Feedlot manure management in a desert climate. 10th California Feeders Day Report. pp. 37-40.

Vegetable Crops (McCoy)

- *On January 15, 1971, a new lettuce variety was released to commercial growers named "Calicel."* It had originated at the Davis campus and grown under trials at the Imperial Valley Field Station since 1961-62 and at commercial fields in the Salinas-Watsonville district since 1964. It is related to a Great Lakes variety but matures sooner with a high degree of uniformity and firmer heads than the Great Lakes varieties. The name "Calicel" is a contraction of California and Cellophane relating to the ease with which the heads of lettuce could be "cello"-wrapped after harvest.

- The lettuce variety "Calmar" was also developed at the Imperial Valley Field Station.

- There were ten annual progress reports submitted.

- Non-Technical Publications:

1) McCoy, O.D. , et al. Vegetable section of 1969-70 administrative report, Imperial Valley Field Station, 13 pp. July 1970.

2) Preparation of material for ad hoc committee report. "Coordinated UC research program for vegetables in the Imperial Valley," third draft. May 1970. Revised July 7, 1970.

3) McCoy, O.D. and J. Story. Created an illustrated 3-fold, 2-sided brochure at request of World Farm Foundation Association in behalf of the planned trade fair exhibit at Birmingham, England, Sept. 30, 1970, to promote an export of perishable fresh fruit and vegetables. 2 pages. August 1970

4) McCoy, O.D. Lettuce seed deficiencies at Meloland (an exclusive story written without byline). Holtville Tribune, p. 14. Sept. 3, 1970.

5) Asparagus Advisory Board. F. H. Takatori. O.D. McCoy. Variety studies. pp. 1,2. O.D. McCoy. Spacing-crowns. p. 3 July 1970.

6) Thomason, Ivan, John Radewald, Jim Lyons, and Orval McCoy. Nematode may cause yield losses. California Farmer. p. 25D. August 5, 1970.

7) Johnson, Hunter Jr., Orval D. McCoy and David Woodruff. The effects of "Ethrel" (2-cloroethylphosphonic acid as a harvest aid on fall cantaloupes. Vegetable Briefs for California Farm Advisors. p. 3, No. 138. November 1970.

8) Quote of research data in Polyphosphates for vegetable crops. Vegetable Briefs for California Farm Advisors. p. 4 No. 140. December 10, 1970.

9) Notice of release of lettuce variety "Calicel". Vegetable Briefs for California Farm Advisors. pp. 2-3, No. 143. March 1, 1971.

10) Smith, Orrin E., Norman C. Welch, Hunter Johnson, Jr. and Orval D. McCoy. Size and density shown as keys to lettuce quality. Western Grower and Shipper. pp.23, 29. Vol. 42, No. 6. June 1971.

- Technical Publications:

1) Smith, Paul G., Archie Millett, R.W. Scheuerman, O.D. McCoy, B.J. Hall, R.C. King, D. Rivie, V.H. Schweers and A.F. Van Maren. Pakmor and Calmart- disease resistant tomatoes. California Agriculture, p. 3. June 1970.

1970-1971 (continued)

- Technical Publications (McCoy)

2) Notice of release of lettuce variety "Calicel" by the University of California, California Experiment Station, Department of Vegetable Crops and Department of Plant Pathology, Davis, California; and United States Department of Agriculture, Agricultural Research Service, Crops Research Division, Beltsville, Maryland. 3 pp. January 15, 1971. (Under program No. 2685, Davis, Vegetable Crops and Departmental Project No. 3423, J.E. Welch, F.W. Zink, and O.D. McCoy). Appendix 1.

Water Science (Robinson)

- With the initiation of Sprinkler Irrigation in 1964, virtually ***all*** of the 36,00 acres of commercial lettuce being grown utilized sprinkler irrigation. It was shown to be an effective means of increasing yields and manipulating the size of harvested plants. It was also an effective tool in heat stress in summertime and preventing frost damage in winter.

- Continued research involved further defining advantages of sprinkler irrigation in further stages of crop development such as pink bollworm control through the use of insecticide injection into sprinkler water.

- Non-Technical Publications:

1) Robinson, Frank E., Keith Mayberry (longtime I.V. Cooperative Extension Agent) and David W. Cudney. 1971. Sulfur burner tested at Meloland. Agriculture Extension "Pest-o-Gram". pp. 5-6. March.

- Technical Publications:

1) Robinson, F.E. 1970. Microclimate of a sprinkled field in an arid area. Proc. 1970 Annual Technical Conference. Sprinkler Irrigation Assn., Denver, Colorado. pp.62-70. February.

2) Robinson, F.E. 1970. Modifying an arid microclimate with sprinklers (J726). ASAE, p. 465. August.

3) Robinson, F.E. and Hunter Johnson, Jr. 1970. Seedling emergence from encapsulated and coated lettuce seed. Calif. Agric. 24(7) : 10-12 July.

4) Robinson, F.E. 1970. Population density and growth rate of head lettuce (Lactuca sativa L.) in an arid climate with sprinkler irrigation. J. American Soc. Hort. Sci. 95(6): 831-834. November.

1971-1972

- Total visitors to the Station: 3,026.

- Dr. G.P. Lofgreen named as President of the American Society of Animal Science.

- Non-Technical publications produced at the Station continued to be well received by local farmers. It's part of what is referred to as Research Extension: the release of agronomic data regarding new varieties, yields, hybrids, experimental lines, etc. Publications were progress reports, IVFS crop reports, agronomy notes and local extension service publications, as well.

- Twenty eight people stationed here.

- Each year donations to the farm occurred. This season 324 pounds of seed were donated by thirteen different companies.

- Farm Improvements:

1) In early 1971, the trailer lab was installed out by the water storage tank (plumbing & electrical added as well).

2) Building 215 built (pesticide storage)

3) Chain link fence built around water treatment facility.

4) Feed mill: ladders installed across top of bulk feed tanks

1971-1972 (continued)

5) March 1971: construction was begun for the Irrigation reservoir. Located in the southwest corner of Area 60, it was intended to be one acre in size and six feet deep containing six acre feet of water (currently it is slightly over five feet deep). Intake and discharge lines were installed. Supply pipeline was installed along west side of area 60 running north to supply water to the five checks; a pipeline was installed along the south of area 60 to area 80 then north to the pump in area 90. Also a pipeline ran east along the south boundary of area 90.

- Research Projects:

1) 12 projects completed

2) 18 projects were underway

3) 6 projects were initiated

- This was typical for most years and as a general rule, the maximum number of projects seemed to be set at fifty.

Agronomy Research (Worker and Lehman):

- Ten annual progress reports were submitted
- A new barley variety (IV 66363) named UC Holt submitted for certification.
- Major accomplishment in rice project was the release of 1,933 new sources of Germplasm in United States and the processing of 1,096 additional varieties. The project was for developing seed bank storage to preclude shortages.
- Triticale and Durum wheat research was increasing.
- Non-Technical Publications:

1) G.F. Worker, Jr. Grain Sorghum Performance 1971. Field Crops Report No.26.

2) G.F. Worker, Jr. Sudangrass Performance 1971. Field Crops Report No.25

3) G.F. Worker, Jr. & W.F. Lehman. Field Corn Performance 1969 - 1971. Field Crops Report No. 24.

4) W.F. Lehman, C.O. Qualset and G.F. Worker, Jr. Performance of wheat varieties at the University of California Imperial Valley Field Station in 1969-1971. Agronomy Progress Report. No. 35.

5) G.F. Worker, Jr. & W.F. Lehman. Barley Progress Report 1970-1971. Supplement to Field Crops Report No.22.

Non-Technical Publications (Lehman):

1) C.O. Qualset, J.D. Prato, J.A. Rupert, H.E. Vogt, M.A. Khalifa, W.F. Lehman and W.H. Isom. Anza-a new high yielding wheat variety. Agronomy Progress Report No. 34.

2) W.F. Lehman, C.O. Qualset, G.F. Worker, Jr. Performances of wheat varieties at the University of California Imperial Valley Field Station, 1969-1971. Agronomy Progress Report No. 35.

3) J.D. Prato, C.O. Qualset, J.A. Rupert, W.F. Lehman, Y.P. Puri, H.E. Vogt and W.H. Isom. Performances of new wheat varieties in California, 1970-1971. Agronomy Report No. 36.

4) C.D. Qualset, J.D. Prato, W.F. Lehman, W.H. Isom, J.A. Rupert and H.E. Vogt. Performance of Azteca 67 Wheat in California. Agronomy Progress Report No.38.

5) G.F. Worker, Jr. and W.F. Lehman. Field corn performance 1969-1971. Field Crop Report No. 24.

6) W.F. Lehman. Sunflower crop tested in Imperial Valley. Imperial Valley Press.

1971-1972 (continued)

Technical Publications (Worker and Lehman):

1) G.F. Worker, Jr., P.F. Knowles. Safflower production under minimum and maximum soil preparation in Imperial Valley. California Agriculture Vol. 26, No. 1. 1972

2) W.F. Lehman, E.H. Sanford. Egyptian alfalfa weevil-breeding resistant alfalfa. California Agriculture 25: pp. 7-8. May 1971.

3) C.O. Qualset, J.D. Prato, J.A. Rupert, H.E. Vogt, W.H. Isom, W.F. Lehman. INIA 66R-a new high yielding wheat selection. California Agriculture 25: p.9. June 1971.

4) W.F. Lehman. Breeding alfalfa for resistance to the Egyptian alfalfa weevil (Hypera brunneipennis L.). Abstracts Western Society of Crop Sci. 1971 meeting, Agric. Experiment Station, University of Nevada, T13. page 1. June 1971.

5) J.P. Gustufson, C.O. Qualset, J.D. Prato, Y.P. Puri, W.H. Isom, W.F. Lehman. Triticale in California. California Agriculture 26: 3-5. February 1972.

Animal Science (Lofgreen)

- There were four Annual Progress Reports submitted.
- Nutrition, management and health of stressed cattle was being performed in cooperation with local cattle feeders, Imperial, Riverside and Davis Agricultural Extension Service.
- Studies were performed to determine the best time to "process" calves; prior to shipment, upon arrival at the yard or 2 to 3 weeks after arrival. Delayed processing caused the poorest performance, cattle processed prior to shipment performed best in two of three tests and cattle processed upon arrival performed best in one of three tests. They all responded equally to showing protection from their vaccinations.
- Technical Publications:

1) G.P. Lofgreen. Net energy evaluation. Proceedings 32nd Minnesota Nutrition Conference, September 20-21, 1971, pp. 73-87.

2) G.P. Lofgreen. Corn Processing. California Feeders Day Report 11: 17-23. 1971.

3) G.P. Lofgreen, J.R. Dunbar, D.G. Addis, J.G. Clark. Nutrition of newly received calves. .California Feeders Day Report 11: pp. 3-11. 1971.

4) Lofgreen, J.R. Dunbar, D.G. Addis, J.G. Clark. Nutrition and management in receiving and feeding calves. Proc. 6th Annual Oklahoma Cattle Feeders Seminar. Feb. 3-4, 1972. B1-B12. 1972.

5) V.E. Mendel, S.R. Morrison, T.E. Bond, G.P. Lofgreen. Duration of heat exposure and performance of beef cattle. J. Animal Sci. 33: 850 -854.1971.

6) W.N. Garrett, G.P. Lofgreen, J.L. Hull. Influence of processing method on energy utilization of feed grains. Hilgardia 41: 123-156. 1971. (n. b. Hilgardia was a UC Berkeley publication named in tribute to College of Ag. Dean Hilgard, 1865-1905). See also page 4 regarding Dean Hilgard.

7) S.R. Morrison, G.P. Lofgreen, T.E. Bond. Feedlot manure management in a desert climate. Proc. Intl. Symp. on Livestock Wastes 1971: 60-65. 1971.

8) J.R. Dunbar, D.G. Addis, G.P. Lofgreen, J.G. Clark, G.L. Crenshaw. Effect of receiving rations on the health of newly received calves.

9) S.R. Morrison, G.P. Lofgreen. R.L. Givens. Sprinklers and refrigeration for heat stress relief. California Feeders Day Report 11: 40-45. 1971.

1971-1972 (continued)

Vegetable Crop Research (McCoy)

- Eight Annual Progress Reports submitted.
- Non-Technical Publications:

1) H. Johnson, Jr., A.W. Marsh, K.S. Mayberry, O.D. McCoy. How to get a lettuce stand in hot weather. Western Grower and Shipper 43(1): 5-6, 22-23.

2) H. Johnson, Jr., O.D. McCoy, D. Woodruff. Vegetable Briefs for California Farm Advisors. The effects of 2 chloroethylphosphonic acid as a harvest aid on fall cantaloupes.

3) O.D. McCoy. Tomato change is seed (illustrated). Monthly Desert Valley Farm News.

Water Science (Robinson)

- One Annual Progress Report was submitted: A cooperative project with Keith Mayberry and David Cudney of I.V. Agricultural Extension Office utilizing sprinkler irrigation for full season with seedless watermelon varieties. It was effective in reducing sunburn.
- Summer testing of various vegetable crops to determine temperature reduction advantage in daily sprinkling to promote germination and growth during a normally unproductive period.
- Non-Technical Publications:

1) F.E. Robinson. Precautions in the use of sprinklers for frost protection in alfalfa and lettuce. Sprinkler Irrigation Association Newsletter 1 (11). April 1972.

Other research projects

- Entomology, Biological Control, Plant Pathology. Primarily for insect and pest control research.
- An increasing number of researchers from outside the Station were performing projects; individually and in cooperation with Station Specialists. This year showed 43 additional researchers performing research at the Station; individually and cooperatively.
- Photo below: 2012 Nancy Caywood-Robertson with retired UC Davis researcher, Lee Urie, Department of Agronomy and Range Science. In '71, he worked with Dr. W.F. Lehman on a project named "Genetic and agronomic studies of oil crops in Northern California. In February, 2012, he visited our Farm Smart winter visitor program.

Photo courtesy Al Robertson

1972-1973

- Above photo shows the new reservoir in the lower right corner. Four projects for '72-'73 were to install the irrigation system, the reservoir control system, the pumping plant and line the reservoir. Contractors were Co-Val Concrete pipe company of Coachella and Pacific Lining company of Indio, California.
- Cattle handling facility, project # IV-5376A, was for more corrals, six pens for calves, including shades, water and feed bunks and modifying a working chute. Contractor was Johnson Bros. Welding and Blacksmith Shop, Holtville, California.
- Total visitors to the station: 2,835.
- Twenty seven projects: 8 were completed, 17 were in progress, 2 were initiated.
- Dr. Frank Robinson honored as Sprinkler Irrigation Association's "Man of the Year."
- Non-Technical Publications related to research projects:

1) Worker, Jr., G.F. Jan. 1973. "Grain and sorghum performance." Field crop report No. 27. 18 pages.

2) Worker, Jr., G.F. Mar. 1973. "Grouping of grain sorghum cultivars by days to flowering for Imperial Valley and similar Southwestern desert areas." Agronomy Progress Report No. 50. 3 pages.

3) Lehman, W.F. September 1972. "Performance of wheat varieties at the University of California Imperial Valley Field Station in 1970, 1971 and 1972." Agronomy Progress Report No, 47.

4) Lehman, W.F. May 1973. "Report on cereal research at El Centro de Investigaciones Agricolas del Noroeste (CIANO), Ciudad Obregon, Mexico." Cereal Field Day and discussion of presentation.

5) Lehman, W.F. and E.H. Stanford. December 1972. "Progress in the development of alfalfa varieties with resistance to the Egyptian alfalfa weevil, Hypera brunneipennis (Boh.)." Proceedings 1972 California Alfalfa Symposium. Pages 23-27.

6) Lehman, W.F. January 15, 1973. "Alfalfa roots, scald is major desert problem.." Imperial Valley Press.

7) Lehman, W.F., E.H. Stanford, D.C. Erwin, V.L. Marble, and W.H. Isom. May 1973. "UC Salton - a new variety of Alfalfa for the low desert valleys of Southern California. Agronomy Progress Report No. 51.

8) Robinson, Frank E. February 18-20,1973. "Future Agricultural Systems." Sprinkler Irrigation Association, 1973 Annual Technical Conference Proceedings. Pages 34-41.

9) Robinson, Frank E. March 1973. "Frost control tests with lettuce and alfalfa. Blanket of ice keeps plants from freezing." Reprinted from California Agriculture 24:2. February 1970 newsletter. Sprinkler Irrigation Association 2 (10): 1-3.

1972-1973 (continued)

- Non-Technical Publications (continued):

10) Worker, Jr., G.F. 1973. "Barley performance at the University of California Imperial Valley Field Station from 1967 through 1973." Agronomy Progress Report No. 56.

11) Takatori, F.H. "Asparagus research, 1972-1973." University of California Division of Agricultural Sciences and Management. pp. 13-21.

12) Hagemann, R.W. Report in November 1973 Imperial Agricultural Briefs.

13) Lofgreen, G.P., S.R. Morrison, and R.L. Givens. 1973. "Effect of sprinkling and space allotment on cattle fed on slotted floors during periods of heat stress." California Feeders Day Report12: 15-21.

14) Lofgreen, G.P. and R.A. Parsons. 1973. "Low intensity lighting and feedlot performance." California Feeders Day Report 12: 45-47.

15) Lofgreen, G.P. 1973. "Level of hominy feed in high energy ration." California Feeders Day Report 12: 38-42.

16) Lofgreen, G.P. 1973. "Effect on cattle performance of frequency of mixing high energy rations." California Feeders Day Report. 12: 35-37.

17) Lofgreen, G.P., D.G. Addis, J.R. Dunbar, J.G. Clark and G.L. Crenshaw. 1973. "Handling light calves on arrival at the feedlot." Proceedings, First Annual Texas Beef Conference. 23-32.

18) Addis, D.G., J.R. Dunbar, J. Clark, G.P. Lofgreen and G. Crenshaw. 1973. "Effect of time and location of processing feeder calves." California Feeders Day Report 12: 73-81.

19) Addis, D.J., J. Dunbar, J. Clark, G.P. Lofgreen and G. Crenshaw. 1973. "Preventive medica - tion for feedlot replacement cattle." California Feeders Day Report 12: 22-25.

20) McCoy, O. 1973. "History of lettuce improvement." University of California, Division of Agricultural Sciences, Imperial Valley Field Station. Veg. Research Mimeo. No. 35. 2 pp.

- Technical Publications:

1) Worker, Jr. G.F.1972. Registration of Meloland Grain Sorghum. Crop Sci. 12: 395.

2) Qualset, C.O., J.D. Prato, J.A. Rupert, H.E. Vogt, M.A. Khalifa, W.F. Lehman and W.H. Isom. 1973. "Anza" - a new high-yielding, short statured wheat variety. Calif. Agric. 27: 14-15. February.

3) Lehman, W.F. 1972. Phytophthora root rot, Rhi -zoctonia root canker and flooding injury of alfalfa in southwestern United States. Report of the twenty-third Alfalfa Improvement Conference. U.S. Dept. Ag. Res. Serv. P. GG1-2-72:15. Oct.

4) Lehman, W.F. 1972. Introduction of rice Germplasm into the United States. Proceedings fourteenth Rice Technical Workers Group. p. 33- 44. June 20-22.

5) Robinson, F.E. 1973. Increase in conductivity of irrigation water during sprinkling. Agron. J. 65: 130. February.

6) Robinson, F.E. 1973. Changes in seepage rate from an unlined cattle waste digestion pond. Trans. of ASAE 16: 95-96. February.

7) Robinson, F.E. and Keith S. Mayberry. 1973. Microclimate modifications by sprinklers to extend arid vegetable seasons. American Society of Agricultural Engineers. Paper No. 73-215. p.11. June.

8) Beard, B.H. 1973. Seed irradiation in varietal development. Proceedings XIII International Congress of genetics 74: 17. June.

1972-1973 (continued)

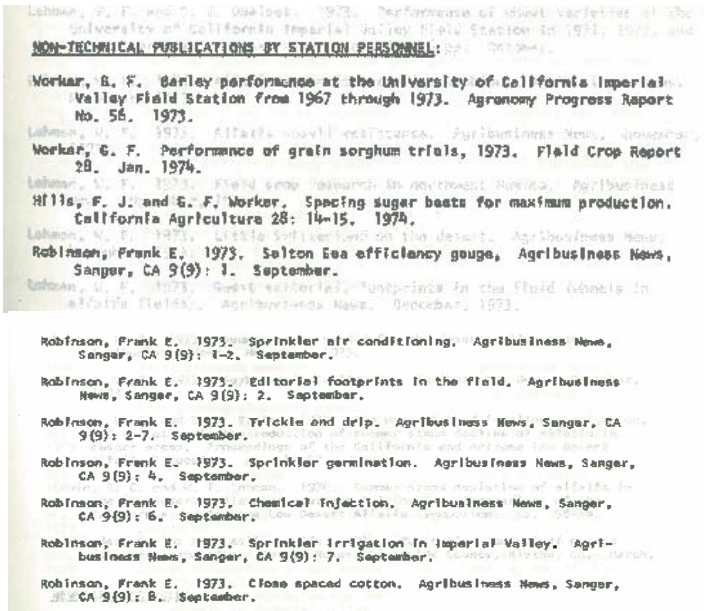
- Technical Publications (continued):

9) Sharma, R.K., A.J. Mueller, H.T. Reynolds and N.C. Toscano. Trapping pink bollworm moths. Calif. Agric. 27: 14-15.

10) Morrison, S.R., R.L. Givens and G.P. Lofgreen. 1973. Sprinkling Cattle for relief from heat stress. J. Animal Sci. 36: 428-431.

1973-1974

- Total visitors to Station: 3,232.
- 52 total talks, tours, reports, field day presentations by Station Specialists.
- The passing of Dr. Ben Madson (March 19, 1887 through January 12, 1974). See Chapter One page six.
- O.D. McCoy, Vegetable Crop Specialist is no longer assigned to the Station. No information available about his new assignment.
- William Houser is newly assigned academic staff member. He was assigned as an Assistant Research Biologist, Division of Biological Control, UC Riverside. Research on Tilapia Fish as weed control in weed infested irrigation canals.
- The following listings are Non Technical and Technical Publications of IVFS Personnel: 1973-74 IVFS Annual Report. George F. Worker, Jr.



NON-TECHNICAL PUBLICATIONS BY STATION PERSONNEL:

Worker, G. F. Barley performance at the University of California Imperial Valley Field Station from 1967 through 1973. Agronomy Progress Report No. 56. 1973.

Worker, G. F. Performance of grain sorghum trials, 1973. Field Crop Report 28. Jan. 1974.

Hills, F. J. and G. F. Worker. Spacing sugar beets for maximum production. California Agriculture 28: 14-15. 1974.

Robinson, Frank E. 1973. Salton Sea efficiency gauge, Agribusiness News, Sanger, CA 9(9): 1. September.

Robinson, Frank E. 1973. Sprinkler air conditioning. Agribusiness News, Sanger, CA 9(9): 1-2. September.

Robinson, Frank E. 1973. Editorial footprints in the field. Agribusiness News, Sanger, CA 9(9): 2. September.

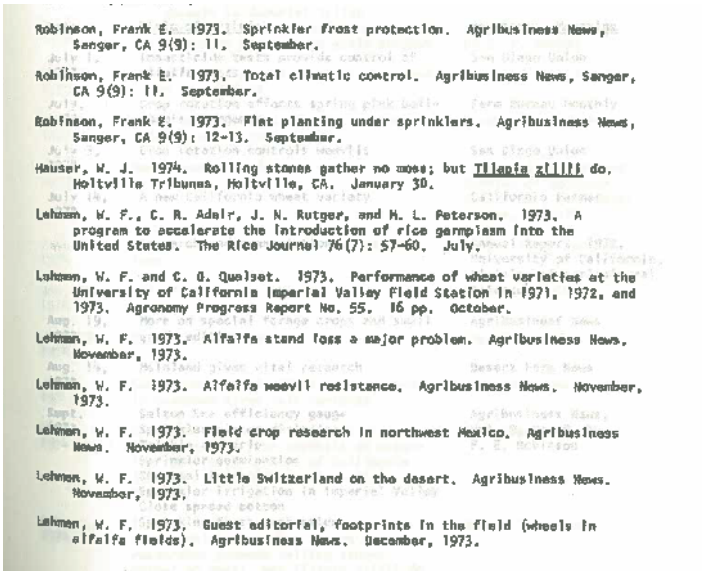
Robinson, Frank E. 1973. Trickle and drip. Agribusiness News, Sanger, CA 9(9): 2-7. September.

Robinson, Frank E. 1973. Sprinkler germination. Agribusiness News, Sanger, CA 9(9): 4. September.

Robinson, Frank E. 1973. Chemical injection. Agribusiness News, Sanger, CA 9(9): 6. September.

Robinson, Frank E. 1973. Sprinkler irrigation in Imperial Valley. Agribusiness News, Sanger, CA 9(9): 7. September.

Robinson, Frank E. 1973. Close spaced cotton. Agribusiness News, Sanger, CA 9(9): 8. September.



Robinson, Frank E. 1973. Sprinkler frost protection. Agribusiness News, Sanger, CA 9(9): 11. September.

Robinson, Frank E. 1973. Total climatic control. Agribusiness News, Sanger, CA 9(9): 11. September.

Robinson, Frank E. 1973. Flat planting under sprinklers. Agribusiness News, Sanger, CA 9(9): 12-13. September.

Houser, W. J. 1974. Rolling stones gather no moss; but Tilapia still do. Holtville Tribunes, Holtville, CA. January 30.

Lehman, W. F., C. R. Adair, J. N. Rutger, and H. L. Peterson. 1973. A program to accelerate the introduction of rice germplasm into the United States. The Rice Journal 76(7): 57-60. July.

Lehman, W. F. and C. O. Qualset. 1973. Performance of wheat varieties at the University of California Imperial Valley Field Station in 1971, 1972, and 1973. Agronomy Progress Report No. 55. 16 pp. October.

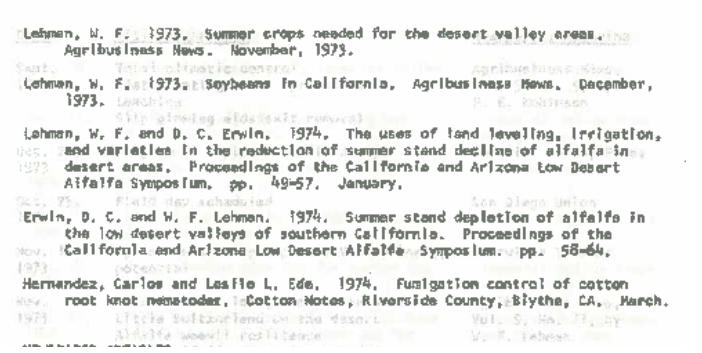
Lehman, W. F. 1973. Alfalfa stand loss a major problem. Agribusiness News, November, 1973.

Lehman, W. F. 1973. Alfalfa weevil resistance. Agribusiness News. November, 1973.

Lehman, W. F. 1973. Field crop research in northwest Mexico. Agribusiness News. November, 1973.

Lehman, W. F. 1973. Little Switzerland on the desert. Agribusiness News. November, 1973.

Lehman, W. F. 1973. Guest editorial, footprints in the field (wheels in alfalfa fields). Agribusiness News. December, 1973.



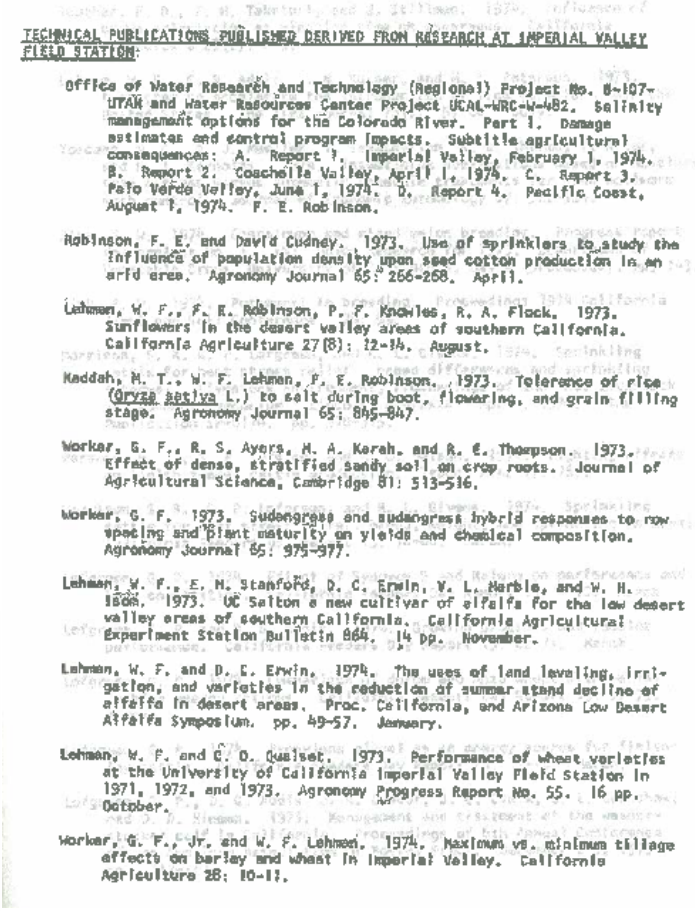
Lehman, W. F. 1973. Summer crops needed for the desert valley areas. Agribusiness News. November, 1973.

Lehman, W. F. 1973. Soybeans in California. Agribusiness News. December, 1973.

Lehman, W. F. and D. C. Erwin. 1974. The uses of land leveling, irrigation, and varieties in the reduction of summer stand decline of alfalfa in desert areas. Proceedings of the California and Arizona Low Desert Alfalfa Symposium. pp. 49-57. January.

Erwin, D. C. and W. F. Lehman. 1974. Summer stand depletion of alfalfa in the low desert valleys of southern California. Proceedings of the California and Arizona Low Desert Alfalfa Symposium. pp. 58-64.

Hernandez, Carlos and Leslie L. Ede. 1974. Fumigation control of cotton root knot nematodes. Cotton Notes, Riverside County, Blythe, CA. March.



TECHNICAL PUBLICATIONS PUBLISHED DERIVED FROM RESEARCH AT IMPERIAL VALLEY FIELD STATION:

Office of Water Research and Technology (Regional) Project No. B-107-UTAH and Water Resources Center Project UCAL-WRC-W-482. Salinity management options for the Colorado River. Part I. Damage estimates and control program impacts. Subtitle agricultural consequences: A. Report 1. Imperial Valley, February 1, 1974. B. Report 2. Coachella Valley, April 1, 1974. C. Report 3. Palo Verde Valley, June 1, 1974. D. Report 4. Pacific Coast, August 1, 1974. F. E. Robinson.

Robinson, F. E. and David Cudney. 1973. Use of sprinklers to study the influence of population density upon seed cotton production in an arid area. Agronomy Journal 65: 266-268. April.

Lehman, W. F., F. E. Robinson, P. F. Knowles, R. A. Flock. 1973. Sunflowers in the desert valley areas of southern California. California Agriculture 27(8): 12-14. August.

Maddah, M. T., W. F. Lehman, F. E. Robinson. 1973. Tolerance of rice (Oryza sativa L.) to salt during boot, flowering, and grain filling stage. Agronomy Journal 65: 845-847.

Worker, G. F., R. S. Ayers, M. A. Karah, and R. E. Thompson. 1973. Effect of dense, stratified sandy soil on crop roots. Journal of Agricultural Science, Cambridge 81: 513-516.

Worker, G. F. 1973. Sudangrass and sudangrass hybrid responses to row spacing and plant maturity on yields and chemical composition. Agronomy Journal 65: 975-977.

Lehman, W. F., E. H. Stanford, D. C. Erwin, V. L. Marble, and W. H. Isom. 1973. UC Salton a new cultivar of alfalfa for the low desert valley areas of southern California. California Agricultural Experiment Station Bulletin 864. 14 pp. November.

Lehman, W. F. and D. C. Erwin. 1974. The uses of land leveling, irrigation, and varieties in the reduction of summer stand decline of alfalfa in desert areas. Proc. California, and Arizona Low Desert Alfalfa Symposium. pp. 49-57. January.

Lehman, W. F. and C. O. Qualset. 1973. Performance of wheat varieties at the University of California Imperial Valley Field Station in 1971, 1972, and 1973. Agronomy Progress Report No. 55. 16 pp. October.

Worker, G. F., Jr. and W. F. Lehman. 1974. Maximum vs. minimum tillage effects on barley and wheat in Imperial Valley. California Agriculture 28: 10-11.

1973-1974 (continued):

- Technical Publications (continued):*

Takatori, R. H., J. Stillman, and F. Souther. 1974. Influence of planting depth on the production of green asparagus. California Agriculture 28(1): 4-5.

Souther, F. D., F. H. Takatori, and J. Stillman. 1974. Influence of crown orientation at planting time on asparagus. California Agriculture 25(2): 8-9.

Lehman, W. F., C. R. Adair, J. N. Rutger, and M. L. Peterson. 1973. A program to accelerate the introduction of rice germplasm into the United States. The Rice Journal 76(7): 57-60. July.

Toscano, N. C., A. J. Mueller, V. Sevacherian, R. K. Sharma, T. Niles, and H. T. Reynolds. 1974. Insecticide applications based on Hexalure trap catches versus automatic schedule treatments for pink bollworm moth control. Journal of Economic Entomology 67: 522-524.

Zink, F. W. 1974. Cantaloupe and mixed melon breeding. Progress report for project No. 1. IN: Melon Research for 1973. Department of Vegetable Crops, University of California, Davis (processed). pp. 1-3.

Zink, F. W. 1974. Potpourri in breeding. Proceedings 1974 California Plant and Soil Conference. 74: 59.

Morrison, S. R. G. P. Lofgreen, and R. L. Givens. 1974. Sprinkling cattle for heat stress relief: breed differences and sprinkling interval. Livestock Environment, Proceedings of the Int. Livestock Environment Symposium. Lincoln, Nebraska. April, 1974. ASAE Publication SP-0174. pp. 310-315.

Parsons, R. A., G. P. Lofgreen and A. O. Nelson. 1974. Lighting effects on finish feeder cattle production. Trans. ASAE 17: 787.

Morrison, S. R., G. P. Lofgreen, and R. L. Givens. 1974. Sprinkling cattle for heat stress relief, breed, weight, and sprinkling interval. California Feeders Day Report 13: 78-80. March.

Lofgreen, G. P. 1974. Effect of Synovex S and Ralgro on performance and body composition. California Feeders Day Report 13: 4-10. March.

Lofgreen, G. P. and D. G. Addis. 1974. Growing programs and feedlot performance. California Feeders Day Report 13: 62-71. March.

Lofgreen, G. P. 1974. Comparison of durum and Anza wheat with barley in high energy rations. California Feeders Day Report 13: 72-75. March.

Lofgreen, G. P. 1974. Propylene glycol as an energy source for finishing cattle. California Feeders Day Report 13: 11-16. March.

* Lofgreen, G. P., D. G. Addis, J. R. Dunbar, J. G. Clark, G. L. Crenshaw, and D. D. Hinman. 1973. Management and treatment of the weaner-stocker calf in California. Proceedings of 6th Annual Conference of the American Association of Bovine Pract. December 2-5, 1973. pp. 112-117.

Addis, D. G., J. G. Clark, J. R. Dunbar, G. P. Lofgreen, and D. D. Hinman. 1974. Preventive medication for feedlot replacement calves. California Feeders Day Report 13: 33-43. March.

Addis, D. G., D. D. Hinman, J. G. Clark, G. P. Lofgreen, and J. R. Dunbar. 1974. Stress study - castration, branding. California Feeders Day Report 13: 44-46. March.

Hinman, D. D., D. G. Addis, G. P. Lofgreen, and J. G. Clark. 1974. Protein levels in receiving rations. California Feeders Day Report 13: 17-21. March.

Morrison, S. R., R. L. Givens, and G. P. Lofgreen. 1973. Sprinkling cattle for relief from heat stress. California Agriculture 27: 7-9. August.

Lofgreen, G. P., R. L. Givens, S. R. Morrison, and T. E. Bond. 1973. Effect of drinking water temperature on beef cattle performance. Paper No. 73-421. 1973 Annual Meeting of American Society of Agricultural Engineers. June 17-20. 1973. pp. 1-15.

* Above entries from 1973-74 IVFS Annual Report. G.F. Worker, Jr.

1974-1975

- Total visitors to Station: 3,113.
- Imperial Valley College utilized Station facilities for conducting a college level class in Water-Drainage...once a week for 32 weeks.
- Station Improvements:

1) Funding received for sewage upgrade. Water Control Board disallowed use of chlorination and effluent discharge into station tile drains. The Station requested Holtville to allow connection to their sewage plant. No action by city council at this time (connection to Holtville sewage system never occurred. Station installed its own septic field in the "Bull Pen" area with associated pumps and lines).

- Four field days; lettuce, cereal, alfalfa, onion.
- Non-Technical Publications:*

Lehman, W. F., C. O. Quelset, and L. K. Gibbs. 1974. Performance of wheat varieties at the University of California Imperial Valley Field Station in 1972, 1973, and 1974. Agronomy Progress Report No. 61. 15 pp. September.

Lehman, W. F. 1974. Rice grown near El Centro. Agribusiness News 10: 1. November.

Lehman, W. F. 1974. Alfalfa Improvement Conference. Agribusiness News 10: 1. November.

Lehman, W. F. 1974. Guest editorial, food consumers and growers must learn to work together on food production. Agribusiness News 10: 2. November.

Lehman, W. F. 1974. A plant for a pat. Agribusiness News 10: 3. November.

Lehman, W. F. 1974. Irrigation management an alfalfa problem. Agribusiness News 10: 4. November.

Lehman, W. F. 1974. Field burning. Agribusiness News 10: 6. November.

Lehman, W. F. 1974. Durum wheat for cattle feed. Agribusiness News 10: 6. November.

Lehman, W. F. 1974. Many problems in pasturing bermuda grass and ryegrass. Agribusiness News 10: 7. November.

Lehman, W. F. 1974. The alfalfa bud mite. Agribusiness News 10: 8. November.

Lehman, W. F. 1974. Wheat performance trials. Agribusiness News 10: 1. November.

Worker, G. F. 1975. Grain sorghum studies in 1975 at the Imperial Valley Field Station. Imp. Ag. Briefs. May.

Worker, G. F. 1975. Performance of grain sorghum trials in 1974. Agr. Progress Report 62: 1975.

Robinson, F. E. 1974. Emitter tested in Coachella. Agribusiness News 10(10): 1. October.

Robinson, F. E. 1974. Colorado - salty but clean. Agribusiness News 10(10): 1. October.

Robinson, F. E. 1974. What is minimized leaching? Agribusiness News 10(10): 4. October.

Robinson, F. E. 1974. Salinity and the law. Agribusiness News 10(10): 4. October.

Robinson, F. E. 1974. Drip irrigation. Agribusiness News 10(10): 7. October.

Robinson, F. E. 1974. Treaty with Mexico. Agribusiness News 10(10): 8-10. October.

Robinson, F. E. 1974. Low energy water. Agribusiness News 10(10): 2. October.

* Above entries from 1974-75 IVFS Annual Report. G.F. Worker, Jr.

1974-1975 (Continued):

Non-Technical Publications (continued):*

Robinson, F. E. 1974. Surface irrigation. Agribusiness News 10(11): 8. November.

_____. 1974. Rolling stones gather no moss; but Tilapia zillii do. Holtville Tribune. January 30.

Hauser, W. J. 1974. Fish controls weeds in irrigation ditches. Agribusiness News 10(11): 1. November.

_____. 1974. IID is fishing for weed solution. Desert Valley Farm News. November 12.

NON-TECHNICAL PUBLICATIONS BY NON-STATION PERSONNEL

F. H. Takatori. Asparagus 1973-74. Division of Agricultural Sciences and management. Davis, California.

Hernandez, Carlos and Leslie L. Ede. 1975. Cotton production study at Palo Verde Valley 1972. Cooperative Extension, University of California, Riverside. Mimeo. 35 pp.

* Above entries from 19774-75 IVFS Annual Report. G.F. Worker, Jr.

- For the 1974-75 season there were twenty seven research projects: two completed, twenty two in progress and three new projects initiated.
- Technical Publications:*

TECHNICAL PUBLICATIONS DERIVED FROM RESEARCH AT IMPERIAL VALLEY FIELD STATION

Worker, G. F. 1975. Field crops and variety comparison between Imperial Valley, California, and Kufra Oasis, Libya. J. Agric. Sci. Camb. 84: 215-219.

Worker, G. F. 1975. Hybrid grain sorghum trials. Calif. Agric. 29(1): January.

Worker, G. F. and W. F. Lehman. 1974. Maximum vs. minimum tillage effects on barley and wheat in Imperial Valley. Calif. Agric. 28: 10-11. July.

Cudney, D. W., K. S. Mayberry, and G. F. Worker. 1974. Residual effects of lettuce herbicide on following crops. Calif. Agric. 28: 17-18. August.

Robinson, Frank E. 1974. A. Imperial Valley, California. pp. 7-31. February. IN Salinity management options for the Colorado River. Phase I. Drainage estimates and control program impacts. Subtitle. Agricultural consequences. Report to the Office of Water Research and Technology, USDI, and by the University of California, Water Resources Center, as a part of Office of Water Research and Technology Project No. B-107-UTAH and Water Resources Center

Project UCAL-WRC-W-402. 64 pp.

Robinson, F. E., K. S. Mayberry, W. F. Lehman, K. K. Tanji, and J. N. Luthin. 1975. Maximizing yields when sprinkler irrigating with saline water. Proceedings California Plant and Soil Conference, California Chapter American Society of Agronomy, Anaheim. pp. 37-38. January 29-31.

Robinson, Frank E. 1975. Sprinkler irrigation of onion seed in Imperial Valley. Sixth National Onion and Carrot Seed Production Conference and Workshop, Davis, California. (Mimeo) 8 pp. February 24-25.

Robinson, F. E., K. S. Mayberry, W. F. Lehman, K. K. Tanji and J. N. Luthin. 1975. Crop response to higher salinity in sprinkler irrigation. Presented, Annual Meeting American Society of Agricultural Engineers, June 22-25. UCD. Paper No. 75-2061. 18 pp.

Kaddah, M. T., W. F. Lehman, G. D. Meek, and F. E. Robinson. 1975. Salinity effects on rice after the boot stage. Agronomy Journal 67(3): 436-439. June.

Marsh, A. W., H. Johnson, Jr., F. E. Robinson, N. McRae, K. Mayberry, and D. Ririe. Solid set sprinklers for starting vegetable crops. Division of Agricultural Sciences, University of California. Leaflet 2265: 1-10. May.

Barnes, D. K., F. I. Frosheiser, E. L. Sorensen, J. M. Elgin, Jr., N. W. Nielson, W. F. Lehman, K. T. Leath, R. H. Ratcliffe, and R. F. Baker. 1974. Standard tests to characterize pest resistance in alfalfa varieties. ARS-NC-19. 23 pp. September.

Lofgreen, G. P. 1975. Barley, corn, milo, triticale, and wheat for finishing cattle. Beef Cattle Science Handbook 12: 504-514. Agriservices Foundation. Clovis, CA 93612. January.

Lofgreen, G. P. 1975. Beef production on Alicia grass pasture. 14th California Feeders Day Report. pp. 62-66. March.

Lofgreen, G. P. 1975. Feed acidity and cattle performance. 14th California Feeders Day Report. pp. 14-21. March.

Lofgreen, G. P. 1975. Harnessing the hormone in cattle feeding. Beef Cattle Science Handbook 12: 488-494. Agriservices Foundation. Clovis, CA 93612. January.

Lofgreen, G. P. 1975. How the calf growing program influences subsequent feedlot performance. Beef Cattle Science Handbook 12: 538-547. Agriservices Foundation. Clovis, CA 93612. January.

Lofgreen, G. P. 1975. Relgro and Synovex combinations. 14th California Feeders Day Report. pp. 72-77. March.

Lofgreen, G. P. 1975. The California net energy system after ten years of application. I. Theory. Beef Cattle Science Handbook 12: 474-483. Agriservices Foundation. Clovis, CA 93612. January.

Lofgreen, G. P. 1975. The California net energy system after 10 years of application. II. Problems in application. Beef Cattle Science Handbook 12: 484-487. Agriservices Foundation. Clovis, CA 93612. January.

Lofgreen, G. P., O. O. Hinman, D. G. Addis, and J. G. Clark, J. R. Dunbar, and G. H. Stabenfeldt. 1975. A comparison of steers with normal and short scrotum bulls in the feedlot. 14th California Feeders Day Report. pp. 4-9. March.

Lofgreen, G. P., D. G. Addis, O. O. Hinman, J. G. Clark, and J. R. Dunbar. 1975. Nutrition and management of the newly received calf. Beef Cattle Science Handbook 12: 495-503. Agriservices Foundation. Clovis, CA 93612. January.

Lofgreen, G. P., R. L. Givens, S. R. Morrison, and T. E. Bond. 1975. Effect of drinking water temperature on beef cattle performance. J. Animal Sci. 40(2): 223-229. February.

Clark, J. G., C. Adams, D. G. Addis, J. R. Dunbar, O. O. Hinman, and G. P. Lofgreen. 1974. Oxytetracycline blood serum level studies in healthy, pneumonic and recovered cattle. Vet. Med./Small Animal Clin. 1974: 1542-1546. December.

Parsons, R. A., G. P. Lofgreen, and A. G. Nelson. 1974. Lighting effects on finish feeder cattle production. Trans. ASAE 17(4): 767-768. August.

Addis, D. G., G. P. Lofgreen, J. G. Clark, J. R. Dunbar, and C. Adams. 1975. Barley vs. milo in receiving rations. 14th California Feeders Day Report. pp. 53-61. March.

Morrison, S. R., G. P. Lofgreen, and R. L. Givens. 1975. Effect of manure gases on beef cattle performance. 14th California Feeders Day Report. pp. 48-52. March.

Mayberry, Keith S. and Roy S. Raweshokold. 1975. Nitrogen uptake in midwinter lettuce. Calif. Agric. 29: 6-7. March.

Hauser, W. 1975. An unusually fast growth rate for Tilapia zillii. California Fish and Game 61(1): 54-56.

Hauser, W. J. 1975. Influence of diet on growth of juvenile Tilapia zillii. Progressive Fish-Culturist 37(1): 33-35.

Hauser, W. J. 1975. Can Tilapia replace herbicides? Proc. Sixth Annual Cal-Neva American Fisheries Society Meeting. 23-25 January 1975. Sacramento, CA. In press.

Hauser, W. J. 1975. Tilapia as biological control agents for aquatic weeds and noxious aquatic insects in California. Proc. 43rd Annual Meeting of the California Mosquito Control Association. 26-29 January 1975. Redding, CA. In press.

Hauser, W. J. Thermal requirements of Tilapia zillii. Submitted Trans. Amer. Fish. Soc. April, 1975.

Hagaman, R. W. 1975. Irrigated pasture study. Imperial County Agricultural Briefs. May.

Zink, F. W. 1975. Cantaloupe and mixed melon breeding. Melon research for 1975. Vegetable Crops Series 172: 1-4.

* Above entries from 1974-75 VFS Annual Report. G.F. Worker, Jr.

1975-1976

- 40 personnel assigned to IVFS.
- Total visitors to the Station: 5,671.
- Two new lettuce lines introduced: Calrey and Calrico. Developed jointly by UC Davis and USDA.
- Alfalfa variety CUF 101 and UC 102 were first tested. They were bred for resistance to blue alfalfa aphid. CUF 101 was ultimately to prove to be the standard for many years.
- Two new wheat varieties released; Shasta, a common wheat, and Modoc, a promising durum.
- Sprinkler application of RoNeet Herbicide was proven to be effective at controlling weeds with no harmful effect on beets. Data from IVFS helped in gaining state registration of this method of application.
- Asparagus variety UC 157 released for commercial use.
- IVFS received a visit from UC President David Saxon, Vice President James B. Kendrick, Jr., Regent William F. Smith, Chancellor Ivan Hinderaker and party. Date of visit was February 11, 1976.
- First time a desktop computer was purchased.

William Hauser, President Saxon, Chancellor Hinderaker, Frank Robinson, Adolph Van Maren, and Regent W. F. Smith.

Photo from 1975-76 IVFS Annual Report, IVFS Library courtesy G. F. Worker, Jr.

- Station Improvements:

1) Reference barn was remodeled: lab space was separated from livestock feeding area.
2) Cattle pens remodeled: additional concrete walks and floors poured; manure pond doubled in size.
3) A 12" levee with a holding pond was constructed around corrals to retain rain runoff.

- IVC expanded use of IVFS facility for college class instruction: 86 days of classes held; Fertilizer, Weed Control, Vegetable production.
- Non-Technical Publications: *

NON-TECHNICAL PUBLICATIONS BY STATION PERSONNEL

Hauser, W. J. and S. Platt. A special report on the salinity tolerance of Tilapia zillii in Salton Sea water. July 29, 1975.

Hauser, W. J. 1975. Tilapia - a new herbicide at Imperial Valley Field Station. Imperial Agricultural Briefs. pp. 6-7. August 22.

_____. 1975. Weed-eating fish. Herbicide of the future? California Farmer. October 4.

_____. 1975. African fish controlling weeds in desert-valley irrigation canals. Cooperative Extension News. University of California, Riverside. July 20.

_____. 1975. African fish newest tool in weed control. Western Hay & Grain Grower. p. 36. Nov.-Dec.

Hauser, W. J. and E. F. Legner. 1975. Annual Report. Biological control of aquatic weeds in the lower Colorado River basin. Dec. 19.

Hauser, W. J. and S. Platt. 1976. Special information report on the optimum temperature of Tilapia zillii. May 18.

Robinson, F. E., K. S. Mayberry, W. F. Lehman, K. K. Tanji, and J. N. Luthin. 1975. Maximizing yields when sprinkler irrigating with saline water. Agribusiness News 11(7): 16.

Robinson, F. E. 1975. Footprints in the field. Agribusiness News 11(10):3.

Robinson, F. E. 1975. Arizona experiments with higher efficiency irrigation. Agribusiness News 11(10): 1 and 4.

Robinson, F. E. 1975. Arizona man develops automatic gate system. Agribusiness News 11(10):12.

Robinson, F. E. 1975. Scientists work for more yield per gallon of water. Agribusiness News 11(10): 1.

Robinson, F. E. 1975. Water salinity and crop yield. Imperial Agricultural Briefs. Courthouse, El Centro, CA. November.

Lehman, W. F. 1975. Grain sorghum field trials conducted. Agribusiness News 11: 11. September.

Lehman, W. F. 1975. Sunflowers for oil, protein, and the desert. Agribusiness News 11: 13. September.

Lehman, W. F. 1975. Attractive durum wheat grabs grower interest. Agribusiness News 11: 5. September.

Lehman, W. F. 1975. Variety selection helps reduce wind shattering. Agribusiness News 11: 5. September.

Lehman, W. F. 1975. Alfalfa seed production generally lower in '75. Agribusiness News 11: 1 and 4. September.

Lehman, W. F. 1975. Footprints in the field. Agribusiness News 11: 3. September.

Lehman, W. F. 1975. Reaction of alfalfa varieties to the blue alfalfa aphid. Imperial Agricultural Briefs. p. 11. October.

Lehman, W. F. 1975. Reaction of alfalfa varieties to (Acyrthosiphon lotl) a new aphid infesting alfalfa in California. Agronomy Notes. pp. 18-19. July-August.

* Above entries from 1975-76 IVFS Annual Report, G.F. Worker, Jr.

1975-1976 (continued)

- Non-Technical Publications (continued):*

Lehman, W. F. and E. H. Stanford. 1975. Possibilities for developing alfalfa varieties for resistance to the Egyptian alfalfa weevil (Hypera brunneipennis). Fifth California Alfalfa Symposium. p. 53-59. December.

Lehman, W. F. and E. H. Stanford. 1975. Possibilities for varietal resistance to the blue alfalfa aphid (Acyrthosiphon kondoi). Fifth California Alfalfa Symposium. p. 31-34. December.

Quelset, C. O., J. D. Prato, N. E. Vogt, W. F. Lehman, W. H. Isom, and J. A. Rupert. 1975. Performance and description of three new wheat varieties for California - Portola, Tenorl 71, and Yecora Roja. Agronomy Progress Report No. 64. pp. 25. July.

Lehman, W. F., C. O. Quelset, and L. K. Gibbs. 1975. Production and performance of common and durum wheats at the University of California Imperial Valley Field Station in 1974 and 1975. Agronomy Progress Report No. 68. pp. 19. September.

Lofgreen, G. P. and N. J. Adams. 1976. Feedlot performance and carcass characteristics of cattle fed various roughage levels. Calif. Feeders Day Report 15: 4.

Lofgreen, G. P. 1976. A comparison of sodium bicarbonate with rumensin in a finishing ration. Calif. Feeders Day Report 15: 15.

Lofgreen, G. P. 1976. The influence of protein supplementation on beef production from Alicia grass pasture. California Feeders Day Report 15: 53.

Lofgreen, G. P. 1976. The net energy of propylene glycol. Calif. Feeders Day Report 15: 94.

Adams, N. J. and G. P. Lofgreen. 1976. The effects of replacing grain with by-products in a finishing ration. Calif. Feeders Day Report 15: 11.

Addis, D. G., G. P. Lofgreen, J. G. Clark, Carol Adams, E. Prigge, J. R. Dunbar, and Ben Norman. 1976. Preventive medication for feedlot replacement calves - study II. Calif. Feeders Day Report 15: 28.

Ruppanner, R., D. G. Addis, G. P. Lofgreen, J. G. Clark, Carol Adams, E. Prigge, J. R. Dunbar, and Ben Norman. 1976. Preliminary report on metabolic profile testing in stressed calves in the Imperial Valley. Calif. Feeders Day Report 15: 33.

Prigge, E. C., D. G. Addis, G. P. Lofgreen, J. G. Clark, Carol Adams, J. R. Dunbar, and Ben Norman. 1976. Castration time on feedlot performance and carcass evaluation. Calif. Feeders Day Report 15: 48.

Worker, G. F. 1975. Barley performance at the University of California Imperial Valley Field Station from 1974 through 1975. Agronomy Progress Report No. 65. August.

Worker, G. F. 1975. Grain sorghum 1975. Mimeo. 2 pages.

Worker, George F. 1975. Barley grain yields obtained after forage clipping. Imperial Agricultural Briefs. September.

Cudney, D. W. and G. F. Worker. 1975. Cotton herbicide research 1974 and 1975. Imperial Extension Mimeo.

Worker, G. F. 1976. Grain sorghum performance trials at Imperial Valley Field Station in 1975. Agronomy Progress Report No. 74. February.

Worker, G. F. 1976. Rate-of-seeding on grain sorghum yield. Imperial Agricultural Briefs. March.

Addis, D. G., J. R. Dunbar, G. P. Lofgreen, and J. G. Clark. 1971. Starting rations for stressed cattle - I. Research Reports. Univ. Calif. Cooperative Extension mimeo. 2 pages.

Dunbar, J. R., D. G. Addis, G. P. Lofgreen, and J. G. Clark. 1971. Starting rations for stressed cattle - II. Univ. Calif. Cooperative Extension Mimeo. Research Reports. 3 pages.

Addis, D. G., J. R. Dunbar, G. P. Lofgreen, J. G. Clark, and George L. Crenshaw. Receiving rations for newly arrived feedlot replacement calves. Univ. of Calif. Agricultural Extension Mimeo. 9 pages.

Dunbar, J. R., G. P. Lofgreen, D. G. Addis, and J. G. Clark. 1973. Effect of starting ration on feedlot performance. Research Reports. Univ. Calif. Cooperative Extension Mimeo. 2 pages.

Dunbar, J. R., D. G. Addis, G. P. Lofgreen, and J. G. Clark. 1972. Starting stressed calves with and without long stem hay. Research Reports. Univ. Calif. Cooperative Extension mimeo. 2 pages.

Addis, D. G., J. R. Dunbar, G. P. Lofgreen, J. G. Clark, and George L. Crenshaw. 1972. Time of processing study - I. Research Reports. Univ. Calif. Cooperative Extension mimeo. 2 pages.

Dunbar, J. R., D. G. Addis, G. P. Lofgreen, J. G. Clark, and George L. Cramshaw. 1972. Time of processing study - II. Research Reports. Univ. Calif. Cooperative Extension mimeo. 2 pages.

Addis, D. G., J. R. Dunbar, G. P. Lofgreen, J. G. Clark, and George L. Crenshaw. 1972. Time of processing study - III. Research Reports. Univ. Calif. Cooperative Extension mimeo. 2 pages.

Addis, D. G., J. R. Dunbar, G. P. Lofgreen, J. G. Clark, and George L. Crenshaw. 1972. Interesting sidelights on previously reported trials. Research Reports. Univ. Calif. Cooperative Extension mimeo. 2 pages.

Addis, D. G., J. R. Dunbar, G. P. Lofgreen, J. G. Clark, and George L. Crenshaw. 1972. Preventive medication - 21-day progress report. Research Reports. Univ. Calif. Cooperative Extension mimeo. 2 pages.

Addis, D. G., J. R. Dunbar, G. P. Lofgreen, and J. G. Clark. 1972. Preventive medication - Study I. Research Reports. Univ. Calif. Cooperative Extension mimeo. 3 pages.

Addis, D. G., D. D. Hinman, J. R. Dunbar, G. P. Lofgreen, and J. G. Clark. 1973. Stress study - castration, branding. Research Reports. Univ. Calif. Cooperative Extension mimeo. 2 pages.

Clark, J., D. Hinman, G. Addis, C. Adams, G. Lofgreen, and J. Dunbar. Antibacterial blood serum level studies. Research Reports. Univ. Calif. Cooperative Extension mimeo. 5 pages.

Lofgreen, G. P., D. G. Addis, J. R. Dunbar, and J. G. Clark. 1974. Time of processing - effect on overall feedlot performance. Research Reports. Calif. Cooperative Extension mimeo. 2 pages.

Hinman, D. D., D. G. Addis, G. P. Lofgreen, J. G. Clark, and J. R. Dunbar. Protein levels in receiving rations. Research Reports. Univ. Calif. Cooperative Extension mimeo. 4 pages.

Hinman, D. D., D. G. Addis, G. P. Lofgreen, J. G. Clark, and J. R. Dunbar. 1974. Bulls vs. Steers and buffered vs. non-buffered feeds. Research Reports. Univ. Calif. Cooperative Extension mimeo. 2 pages.

Addis, D. G., G. P. Lofgreen, D. D. Hinman, J. G. Clark, and J. R. Dunbar. 1974. Barley vs. milo in receiving rations. Research Reports. Univ. Calif. Cooperative Extension mimeo. 4 pages.

Hinman, D. D., G. P. Lofgreen, D. G. Addis, J. R. Dunbar, and J. G. Clark. 1974. Preventive medication IV. Research Reports. Univ. Calif. Cooperative Extension mimeo. 2 pages.

Addis, D. G., G. P. Lofgreen, J. G. Clark, and J. R. Dunbar. 1975. Barley vs. milo in receiving rations II. Research Reports. Univ. Calif. Cooperative Extension mimeo. 3 pages.

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* Above entries from 1975-76 IVFS Annual Report. G.F. Worker, Jr.

- Technical Publications:*

TECHNICAL PUBLICATIONS DERIVED FROM RESEARCH AT IMPERIAL VALLEY FIELD STATION

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* Above entries from 1975-76 IVFS Annual Report. G.F. Worker, Jr.

1976-1977

- Total visitors to Station: 4,154.
- Tropical Storm "Kathleen" occurred on September 10, 1976: 2.66 inches total with 1.80 inches in less than two hours. Very little damage.
- The official certification of Alfalfa variety CUF 101 was done in record time. A field station and perhaps experimental release record was set with the total time from selection in the field to availability to farmers was ***36 months!***
- Largest field planting of rice introduction lines was planted in June 1976.
- From the Canadian Province of Alberta, The Alberta Provincial Research Department from Lacomb, Alberta, is new to IVFS. A Wheat, Barley and Triticale seed increase program was started and is ongoing as of the DREC Centennial in 2012. Canadians benefit from two growing seasons per year for improved seed certification.
- Research utilizing Tilapia fish for weed control resulted in a ten-fold savings in canal weed control.
- Donations to Station from twenty sources amounted to a value of $7,608.43.
- Station Improvements:

1) August 1977: Paved areas around main office were repaired with chip seal coat.
2) Building 302: new lightweight garage door replaced old heavy wooden door.
3) June 1977: Feed mill remodeling contract let to Hall's Construction Co.: raise original grain tanks, install weigh hopper and new mixer, additional storage bins.
4) Sewage system modification: plans submitted for septic tank and leach field system. Construction completed in fall 1977.

1976-1977 (continued):

- Non-Technical Publications :

NON-TECHNICAL PUBLICATIONS BY STATION PERSONNEL

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* Above entries from 1976-77 IVFS Annual Report. G.F. Worker, Jr.

Technical Publications: *

TECHNICAL PUBLICATIONS DERIVED FROM RESEARCH AT IMPERIAL VALLEY FIELD STATION

Worker, Jr., George F. 1977. Sorghum seeding rates for best yields. California Agriculture. Vol. 31. January.

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Puri, Y. P., C. O. Qualset, K. G. Boyhorr, H. D. Vogt, W. F. Lehman, E. W. Hempleman, W. C. Shuey, and J. D. Prato. 1976. Modoc, a new durum wheat for northern California. California Agriculture 30: 8-9. November.

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Platt, S. and W. J. Hauser. The effect of size, density, and compatability on the feeding rate of Tilapia zillii. Submitted to Progressive Fish-Culturist, April 1976.

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Legner, E. F., H. S. Yu, R. A. Medved, and M. E. Badgley. 1975. Mosquito and chironomid midge control by planaria. California Agriculture. November. pp. 1-3.

Legner, E. F. and G. S. Olton. 1975. Filth fly sources in Southern California. California Agriculture 29: 10. December.

Legner, E. F., R. A. Medved, and R. D. Sjogren. 1975. Quantitative water column sampler for insects in shallow aquatic habitats. Proceedings of 43rd Annual Conf. of California Mosquito Control Association, Inc. January 26-29, 1975. pp. 110-115.

Hauser, W. J., E. F. Legner, R. A. Medved, and S. Platt. 1976. Tilapia - a management tool for biological control of aquatic weeds and insects. Fisheries 1(2): 10-16. March-April.

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* Above entries from 1976-77 IVFS Annual Report. G.F. Worker, Jr.

1977-1978

- Total visitors to the Station: 3,098.
- The second fifty year storm hit in less than a year: Tropical Storm "Doreen" caused $17,500 damage to Station and $31 million in Imperial County. Total rainfall at IVFS was 5.12 inches.
- Michael J. Prokop was new animal science staff specialist. He replaced Dr. Glen P. Lofgreen.

1977-1978 (continued)

- Station Improvements:

1) Roofing repairs: Main office, all residential roofs were repaired and covered with a white reflective covering of "snowcoat". Contractor, K. Hess.

2) Repaired and repainted cattle reference barn: ductwork, roof, exterior walls.

3) Replaced white picket fence along south of Station with 4 foot high green chain link fence: 1,200 feet

4) Feedmill alterations: added more overhead ingredient bins, improved ingredient delivery of existing bins, replaced mixer with one ton capacity. Architect, Ben Beard, city of Industry, contractor, Hall's Construction, Imperial.

5) Roof repair and elastomeric coating for buildings 200, 201, 213. Town and Country Roofing, El Centro.

6) Unleaded gasoline storage tank (1000 gallons) installed underground. Service Station Maintenance, El Centro.

7) Reservoir sidewall stabilized with hydrated lime and recompacted. Installed overpipe and inlet/ outlets were modified. Contractor, Donald Dresselhaus, Vista, CA.

8) Sewage system alteration: additional septic tank, a lift station, 21" PVC pipeline to leach field on east side of station between IID drain No. 4 and Ash Canal Lateral #46 to leach field. B & B Pipeline, Coachella.

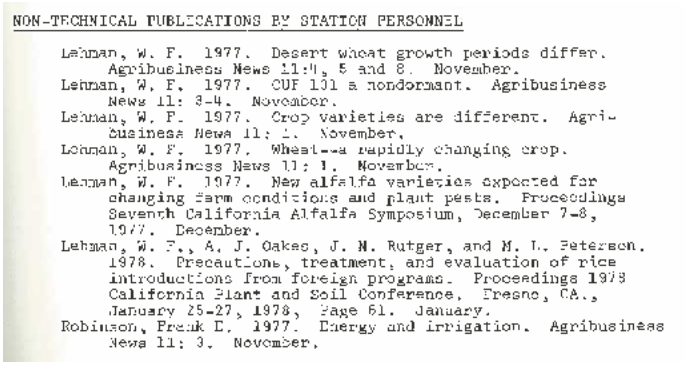
9) Painted feedmill exterior, residence interiors.

10) Physically handicapped access to main office: front door and landing, northeast landing entrance and new restrooms.

- Total donations to station valued at $5,500. 95.

- Twenty eight research projects: six completed, twenty one in progress, one initiated.

- Non-Technical Publications: *



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Lehman, W. F. 1977. Crop varieties are different. Agribusiness News 11: 2. November.
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Lehman, W. F. 1977. New alfalfa varieties expected for changing farm conditions and plant pests. Proceedings Seventh California Alfalfa Symposium, December 7-8, 1977. December.
Lehman, W. F., A. J. Oakes, J. N. Rutger, and M. L. Peterson. 1978. Precautions, treatment, and evaluation of rice introductions from foreign programs. Proceedings 1978 California Plant and Soil Conference, Fresno, CA., January 25-27, 1978, Page 61. January.
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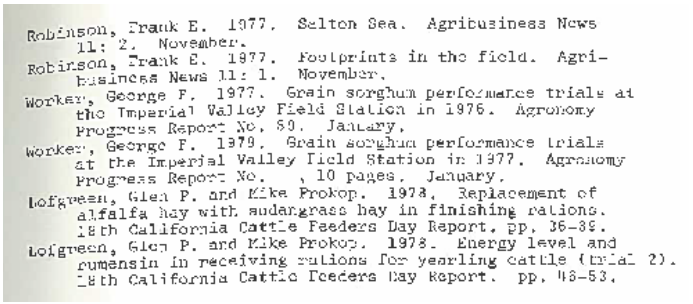

Robinson, Frank E. 1977. Salton Sea. Agribusiness News 11: 2. November.
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Worker, George F. 1979. Grain sorghum performance trials at the Imperial Valley Field Station in 1977. Agronomy Progress Report No. , 10 pages. January.
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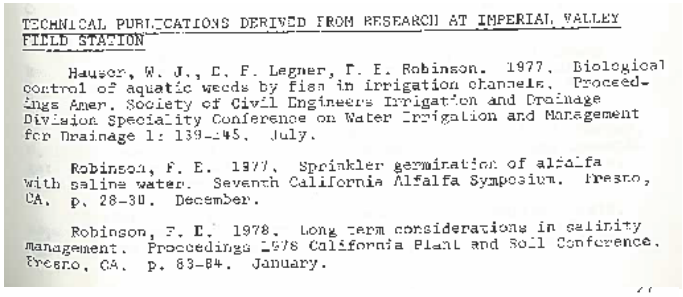
* Above entries from 1977-78 IVFS Annual Report. G.F. Worker, Jr.

Technical Publications:



TECHNICAL PUBLICATIONS DERIVED FROM RESEARCH AT IMPERIAL VALLEY FIELD STATION

Hauser, W. J., E. F. Legner, T. E. Robinson. 1977. Biological control of aquatic weeds by fish in irrigation channels. Proceedings Amer. Society of Civil Engineers Irrigation and Drainage Division Speciality Conference on Water Irrigation and Management for Drainage 1: 139-145. July.

Robinson, F. E. 1977. Sprinkler germination of alfalfa with saline water. Seventh California Alfalfa Symposium. Fresno, CA. p. 28-30. December.

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Lehman, W. F., E. H. Stanford, and D. C. Erwin. 1977. Registration of UC Salton alfalfa. Crop Science 17: 671-672. July.

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Rutger, J. N. and W. F. Lehman. 1977. Rice introduction and germplasm development. California Agriculture 31: 28-29. September.

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* Above entries from 1977-78 IVFS Annual Report. G.F. Worker, Jr.

1977-1978 (continued)

Technical Publications (continued): *

Cudney, David W. and George F. Worker, Jr. 1977. Cotton plant back study. Cotton Herbicide Research 1976-77, Imperial County Extension Circular 147. October.

Cudney, David W., James E. Hill, and George F. Worker, Jr. 1977. Sprinkler application of Roneet timing studies. Imperial County Cooperative Agricultural Extension Circular No. 150, November.

Welch, James E. 1977. Lettuce breeding. In 3rd Annual Report. Iceberg Lettuce Research Program. State of California Department of Food and Agriculture, Sacramento, CA. pp. 4-9. August.

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Takatori, F., F. Souther, D. Benson, and B. Mullen. 1978. Asparagus research. University of California, Division of Agricultural Sciences and Man., Veg. Crop Series 202, pp. 8-11.

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Ruppanner, R., B. B. Norman, C. J. Adams, D. G. Addis, G. P. Lofgreen, J. G. Clark and J. R. Dunbar. 1978. Metabolic and cellular profile testing in calves under feedlot conditions: minerals, electrolytes, and biochemical components - reference values. American Journal of Vet. Res. 39: 841-844.

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* Above entries from 1977-78 IVFS Annual Report. G. F. Worker, Jr.

1978-1979

- Total visitors to Station: 4,213
- Dr. James Welch, lettuce breeding specialist from the Davis campus since 1955, retired from the University of California. Seven new lines of lettuce were set to be released in 1980. The following page has been inserted as a tribute to Dr. Welch's lettuce research.
- Dr Hauser no longer on IVFS Staff. No information available on his relocation.
- Irrigation water costs now at about $5.73 per acre foot.
- Station Improvements:

1) Reservoir overflow pipe replace with cement drop box.
2) Air conditioning towers replaced with redwood and plastic frames
3) Cattle facility roads were covered with gravel.
4) Sewage plant lift station had a five foot high redwood fence installed.
5) Corporation Yard (The "Bull Pen") had a ten foot fence installed (included two rows of barbed wire)
6) Main office had modification to its water system by isolating lab water from rest of water in building (installed separate water heater and lines).
7) Fire detection alarms installed in nine service buildings.

NON-TECHNICAL PUBLICATIONS BY STATION PERSONNEL

Robinson, Frank E., William F. Lehman, and Keith S. Mayberry. 1978. Saltlex Irrigation. Reprint Cal. Ag. May, 1977 in Technical Feature, Irrigation News 11(11): 4, October.

Robinson, F. E. 1978. Characteristics of different sprinkler systems. Eighth California/Arizona Alfalfa Symposium. Dec. 13. Holtville, CA. December.

Robinson, F. E. 1978. Salinity constraints of water conservation in an arid area. Agronomy Abstracts 1978 Annual Meetings. Fort Collins, Colo. p. 23.

Donovan, T. J., L. E. Graham, and W. F. Lehman. 1978. Influence of water stress, season, and cultivar on alfalfa protein and dry matter production. Agronomy Abstracts. p. 178. December.

Lehman, W. F., C. O. Qualset, and L. K. Gibbs. 1978. Production and performance of common and durum wheats at the University of California Imperial Valley Field Station, El Centro, in 1975, 1977, and 1978. University of California Agronomy Progress Report No. 94. 15 pages.

Johnson, T. H., A. J. Oakes, C. N. Rutger, W. F. Lehman, W. O. McTrath, and C. N. Bollich. 1978. A survey of rice genetic resources and conservation in Africa and the Americas - United States of America (U.S.A.). Proceedings of the Workshop on the Genetic Conservation of Rice, International Rice Research Institute. Pages 18 and 19.

Lehman, W. F. 1978. Breeding alfalfa for tomorrow. Proceedings of the Eighth California/Arizona Alfalfa Symposium. pages 1-9. December.

Lehman, W. F. and F. E. Robinson. 1978. Breeding alfalfa for resistance to soil salinity. Imperial Agricultural Briefs. pages 3-4. May.

Lehman, W. F. and F. E. Robinson. 1978. Alfalfa bred for resistance to soil salinity. California-Arizona Farm Press. p. 10. June.

Morrison, S. R., M. Prokop, and G. Lofgreen. 1978. Sprinkling cattle for heat stress relief: activation temperature, duration of sprinkling and per area sprinkled. Paper presented at California Feeders Day, El Centro, California. pp. 67-69. March.

Lofgreen, Glen P. and Mike Prokop. 1978. Citrus peel liquor as an energy source in cattle growing rations. Paper presented at the 19th California Cattle Feeders Day, El Centro, California. pp. 5-11. March.

Prokop, Mike. 1978. Dried winery pomace as an energy source in cattle finishing rations. Paper presented at the 19th California Cattle Feeders Day, El Centro, California. pp. 17-22. March.

Ruppanner, R. and UC Stress Calf Study Group (Mike Prokop). 1978. Metabolic profile testing in stressed calves. Paper presented at the 19th California Cattle Feeders Day, El Centro, California. pp. 52-59. March.

Prokop, Mike. 1978. Cement kiln dust in cattle finishing rations. Paper presented at the 19th California Feeders Day, El Centro, California. pp. 73-75. March.

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PROJECT LEADER'S ANNUAL PROGRESS REPORT

IMPERIAL VALLEY FIELD STATION

1. Station Identification No.: 31	2. Expt. Sta. Proj. No.: W-VCR-3178-H
3. Experiment Station Project Title: Lettuce breeding	
4. Project Leader: James E. Welch	5. Period Covered by this Report: 7 (mo.) 78 (yr.) - 6 (mo.) 79 (yr.)

6. Progress Report: (Progress during report period toward reaching objectives of this research)

Two hundred and fifty-six lettuce breeding lines and 45 commercial varieties were included in the 1978-79 planting. The experiment involved 1.8 acres but the overall area needed for early irrigation by sprinklers and subsequent irrigation by furrows was 2.6 acres. Two hundred and fifty-one lines were saved for seed production. The seed crop in each line was produced by about 30 carefully selected plants. The plants were not caged during flowering and the seed produced in each line was massed. Unfortunately, both seed yields and seed quality were very poor. Germination tests on a large number of randomly chosen lines showed that all seed were dead. Poor cultural practices in growing, harvesting, and handling the seed crop undoubtedly were involved in the failure.

Lines that appear to have new cultivar potential, based on their performance at the station, are planted in trials in commercial fields. Three commercial varieties -- 'Calmar UC' ('Calmar 60', 'Calmar W'), 'Calrey', and 'Calrico' -- and 13 breeding lines were chosen for tests in Imperial Valley fields in the 1978-79 season. Trials were conducted at 5 locations. The most promising lines in these experiments were 620232, 640054, 640161, 730199, 740159, 760224, 770135, and 770154. Four of these entries — 640054, 640161, 740159, and 760224 -- were promising in similar tests in the previous season.

Seven lines — 620232, 640054, 690115, 730199, 740159, 760205, and 760223 — have been chosen for release as new cultivars. These lines have been tested in commercial fields in California Central districts — Salinas-Watsonville-King City, Santa Maria-Guadalupe, and Central San Joaquin Valley — and Imperial Valley for periods varying from 2 to 16 years. About half the lines are better suited to Central districts and the other half to Imperial Valley. The release notice will give the name, experimental designation, origin, adaptability, description, and outstanding characteristics of each introduction. The announcement will appear early in 1980.

7. Publications Related to Station Project During Report Period:

Welch, James E. Aug. 1978. Lettuce breeding. p. 1-8. In 4th Annual Report. Iceberg Lettuce Research Program. State of California Department of Food and Agriculture, Sacramento, California.

(This report will be duplicated as submitted for inclusion in Station Annual Report)

James E. Welch
Signature of Project Leader

The above entry is from the 1978-79 IVFS Annual Report. G.F. Worker, Jr. This progress report is typical of the documentation necessary conducting research at a University of California Research Facility. This particular one is of interest for two reasons: 1) Dr. Welch and his team developed seven new lines of lettuce but he retired just before they were released; 2) Lettuce is a major crop for Imperial Valley. Another interesting aspect of this project as reported on page 72, is the importance of varietal development in order to "stagger the harvest". Date-of-Planting Research has always been an important aspect of DREC research in order to determine when the best date of harvest would occur. Best date of harvest is important in order to coincide with packing shed schedules and shipping to market requirements.

1978-1979 (continued)

- Non-Technical Publications (continued): *

Prokop, Mike. 1979. In vitro studies on chemical treatment of crop residues. Imperial Agricultural Briefs. p. 8. February.
Prokop, Mike. 1979. California cement kiln dust doesn't make the grade. Imperial Agricultural Briefs. April. pp. 5-6.
Prokop, Mike. 1979. Cattle manure may help meet the energy shortage. Imperial Agricultural Briefs. pp. 3-4. June.
Worker, G. F. 1978. Barley performance at the University of California Imperial Valley Field Station from 1975 through 1978. Agronomy Progress Report No. 98. University of California. 4 pages. July.
Worker, George F. 1979. Research results released on barley trials. California-Arizona Farm Press. p. 7. January.
Worker, Jr., George F. 1979. Soybean variety trial at the Imperial Valley Field Station. Imperial Agricultural Briefs. pp. 9-10. February.
Worker, Jr., George F. 1979. Soybean performance trial at Imperial Valley Field Station in 1978. Agronomy Progress Report No. 97. 10 pages. February.
Worker, Jr., George F. 1979. Imperial Valley Field Station Report: Grain sorghum trials at the Imperial Valley Field Station. Imperial Agricultural Briefs. March.
Worker, G. F. 1979. Grain sorghum performance trial at the Imperial Valley Field Station in 1978. Agronomy Progress Report No. 96. 9 pages. January.

* Above entries from 1978-79 IVFS Annual Report. G. F. Worker, Jr.

- Research Projects: 46 total, 9 completed, 29 underway, 8 initiated.
- Technical Publications: *

1979-1980

TECHNICAL PUBLICATIONS DERIVED FROM RESEARCH AT IMPERIAL VALLEY FIELD STATION

Anderson, J. C., A. P. Kleinman, F. S. Brown, J. R. Cannon, R. C. d'Arge, L. Dubanks, W. C. Franklin, C. W. Howe, E. B. Jackson, K. L. Leathers, F. E. Robinson, D. Snyder, J. T. Young, R. A. Young. 1978. Salinity management options for the Colorado River, damage estimates and control program impacts. Report P-78-003. Utah Water Research Lab. Utah State Univ. Logan, Utah. June.
Robinson, Frank E. 1978. Agricultural consequences in California. Appendix 2 of salinity managment options for the Colorado River. Report P-78-003, Utah Water Research Laboratory, Utah State Univ. Logan, Utah. June.
Robinson, F. E. 1979. Higher salinity in the Colorado River and future irrigation management. Proceedings 1979 California Plant and Soil Conference, Calif. Chapter American Society of Agronomy, pp. 60-66. February.
Robinson, F. E., D. W. Cudney, and W. F. Lehman. 1979. Nitrate fertilizer timing, irrigation, protein, and yellow berry in durum wheat. Agronomy Journal 71(2): 304-308.
Morrison, S. R., Prokop, M., and G. Lofgreen. 1979. Space allotment for beef cattle on slotted floors. Paper presented at the meeting of the American Society of Agricultural Engineers, New Orleans, LA.
Waines, J. G., C. K. Lebanauskas, M. F. Handy, B. S. Gill, and W. F. Lehman. 1978. Protein and amino acid profiles of normal and yellow-berry bread wheat. Crop Science 18: 580-582. March.
Robinson, F. E., D. W. Cudney, and W. F. Lehman. 1979. Nitrate fertilizer timing, irrigation, protein, and yellow berry in durum wheat. Agronomy Journal 71: 304-308. April.

Worker, Jr., G. F. and D. W. Cudney. 1978. Cotton herbicides residual studies at the Imperial Valley Field Station. Agronomy Abstracts. July.
Worker, Jr., G. F. 1978. Tillage practices in the West. Agronomy Abstracts, 1978 annual meeting. December.

* Above entries from 1978-79 IVFS Annual Report. G. F. Worker, Jr.

- Total visitors to Station: 3,980. Special visitors included James Kendrick, VP Agriculture; Dr. Thomas Rivers, UCR Chancellor; W. Mack Dugger, Jr., Associate Director; Jerome Siebert, Director, Cooperative Extension.
- October 15, 1979: earthquake occurred. magnitude was 6.4 according to Southern California Earthquake Center and is still talked about today. The aftershocks were sufficient to cause residents to sleep outside. Extensive repairs necessary to eight buildings and structures.
- Two metal frame roof sheds were constructed: one along east side of main office and one on west side of shop building.
- Education and Extension: reports, talks and tours amounted to 119 separate events by the four staff specialists. Additionally, there were 38 news media articles published.
- Non-Technical Publications: *

NON-TECHNICAL PUBLICATIONS BY STATION PERSONNEL

Prokop, Mike. 1979. In vitro studies on chemical treatment of crop residues. Imperial Agricultural Briefs. p. 8.

Prokop, Mike. 1979. California cement kiln dust doesn't make the grade. Imperial Agricultural Briefs. pp. 5-6. April.

Prokop, Mike. 1979. Cattle manure may help meet the energy shortage. Imperial Agricultural Briefs. pp. 3-4. June.

Worker, G. F. 1979. Barley performance at the University of California Imperial Valley Field Station from 1976 through 1979. Agronomy Progress Report No. 100. 4 pages. Sept.

Worker, G. F. 1979. Soybean studies at the Imperial Valley Field Station in 1979. Mimeo. 4 pages.

Worker, G. F. 1980. Soybean performance trial at Imperial Valley Field Station. Agronomy Progress Report No. 105. 6 pages. February.

Worker, G. F. 1980. Soybean inoculation rate and depth of application study at the Imperial Valley Field Station. Agronomy Progress Report No. 106. 2 pages. February.

Worker, G. F. 1979. Fertilization of wheat after soybeans at the Imperial Valley Field Station. Imperial Agricultural Briefs. December.

Worker, G. F. 1979. Barley variety trial results at the Imperial Valley Field Station. Imperial Agricultural Briefs. December.

Worker, G. F. 1980. Grain sorghum performance trials at the Imperial Valley Field Station in 1979. Agronomy Progress Report No. 104. January.

Worker, G. F. 1980. Soybean variety trial at the Imperial Valley Field Station in 1978 and 1979. Imperial Agricultural Briefs. March.

Worker, G. F. 1980. Barley performance at the University of California Imperial Valley Field Station from 1977 through 1980. 5 pages. June.

Lehman, William and A. F. Van Maren. 1979. Wheat varieties 1979-80. Imperial Agricultural Briefs. 2 pages. September.

Lehman, W. F. 1979. UCIVEX, a new annual ryegrass. Proceedings Irrigated Pasture Meeting. 1 page. September.

Lehman, W. F. and F. E. Robinson. 1979. Progress in developing salt tolerance in alfalfa. Proceedings Ninth California Alfalfa Symposium. pp. 73-75. December.

Van Maren, A. F. 1980. Processing tomato culture. Imp. Ext. MAP 309.

* Above entries from 1979-80 IVFS Annual Report. G.F. Worker, Jr.

1979-1980 (continued)

- Research projects: 42 total; 5 completed, 29 underway, 8 new.
- Technical Publications: *

TECHNICAL PUBLICATIONS DERIVED FROM RESEARCH AT IMPERIAL VALLEY FIELD STATION:

Luthin, C. N., F. E. Robinson, K. K. Tanji. 1979. Salinity management in the Colorado River basin. Termination Report, Western Regional Research Project W-129. 12 pages. January.

Luthin, J. N., F. E. Robinson, and K. K. Tanji. Salinity management in the Colorado River Basin. 1973-78 Summary of Research for Western Regional Research Project W-129. 22 pages.

Robinson, Frank E. 1979. Plan of utilization of geothermal water East Mesa agricultural investigation. Progress Report. June 30, 1979. 28 pages.

Robinson, Frank E., Kirpal Singh, and Terry R. Thomas. 1980. Plant support capabilities of a geothermal fluid. Presentation at the ASAE Pacific Region Annual Meeting, Filo Lagoon Hotel, Hilo, Hawaii, March 18-20, 1980. 10 pages.

Robinson, Frank E. 1979. Plan of utilization of geothermal water. East Mesa agricultural investigation. Progress Report. December 31, 1979.

Robinson, Frank E. 1980. Plan of utilization of geothermal water. East Mesa agricultural investigation. Progress Report. June 30, 1980.

Robinson, Frank E. 1979. Salinity constraints of water conservation in an arid area. Agronomy Abstracts 1979 Annual Meetings. Fort Collins, Colo. p. 23.

Robinson, F. E., Kirpal Singh, Terry R. Thomas. 1980. Plant support capabilities of a geothermal fluid. Paper 80-0102. Am. Soc. Agric. Engineers. Hilo, Hawaii. March 19, 1980.

Robinson, F. E., K. Singh, Wade Berry, T. R. Thomas. 1980. Plant support capabilities of a geothermal fluid. Transactions of Geothermal Resources Council 4: 691-693.

Morrison, S. R., M. Prokop, and G. Lofgreen. 1979. Space allotment for beef cattle on slotted floors. Paper presented at the meeting of the American Society of Agricultural Engineers, New Orleans, LA.

Morrison, S. R., G. P. Lofgreen, and M. Prokop. 1979. Effect of floor space allotment and animal group size on beef cattle performance. Paper presented at American Society of Agricultural Engineers Meeting at New Orleans, LA. Paper No. 79-411. 8 pages. December.

Prokop, Mike. 1979. Use of crop residues and by-product feeds. Paper presented at American Association of Bovine Practitioners Regional Nutrition Seminar at Seattle, WA. Paper No. P-1. 11 pages.

Prokop, Mike. 1979. Metabolizable protein in beef rations. Paper presented at American Association of Bovine Practitioners Regional Nutrition Seminar at Seattle, WA. Paper No. P-12. 12 pages.

Prokop, Mike. 1979. Feeding the stressed calf. Paper presented at American Association of Bovine Practitioners Regional Nutrition Seminar at Seattle, WA. Paper No. P-27. 11 pages.

Prokop, M. J. 1979. Cement kiln dust in diets for finishing steers. J. An. Sci. 78: 399. (abstract)

Prokop, M. 1980. The response of newly received yearling cattle fed dl-malic acid. 20th California Cattle Feeders Day Report, Monterey, 20: 9.

Addis, D. and the UC Stress Calf Study Group (Mike Prokop). 1980. Barley, corn, and buffers in receiving rations. 20th California Cattle Feeders Day Report, Monterey, 20: 33.

Prokop, M. 1980. The effect of flowed limestone in cattle finishing rations. 20th California Cattle Feeders Day Report, Monterey, 20: 51.

Prokop, M. 1980. Manure fermentation residue as an energy source in cattle finishing rations. 20th California Cattle Feeders Day Report, Monterey, 20: 63.

Morrison, S. R., M. Prokop, and G. P. Lofgreen. 1980. Sprinkling cattle for heat stress relief, activation, temperature, duration of sprinkling, and pen area sprinkled. Paper presented for publication in the Trans. of Amer. Soc. of Ag. Engineers.

Isom, W. H. and G. F. Worker. 1979. Crop Management in semi-arid environments. Ecological Studies, Vol. 34, Agriculture in Semi-Arid Environments, ed. by A. E. Hall, G. H. Cannel, and H. W. Lawton.

Lehman, W. F. 1979. Alfalfa production in the low desert valley areas of California. Division of Agricultural Sciences University of California Leaflet 2197. Pages 1-22.

Nielsen, M. W. and W. F. Lehman. 1980. Breeding approaches in alfalfa. In: Breeding Plants Resistant to Insects. F. G. Maxwell and P. R. Jennings, editors. Pages 277-311.

Izzeldin, H., L. F. Lippert, and F. H. Takatori. 1980. Performance of lettuce plants originating from seedlings affected with physiological necrosis. J. Amer. Soc. Hort Sci. 105(1): 54-57.

Hills, F. J., L. Chiarappa, and S. Geng. 1980. Powdery mildew of sugarbeet: disease and crop loss assessment. Phytopathology 70: 680-682.

* Above entries are from 1979-80 IVFS Annual Report. G. F. Worker, Jr.

Regarding the release of seven new iceberg lettuce varieties, the 1979-80 IVFS Progress Report for the lettuce project indicated the following:

1) "Alamo" - best for Dec 15 - Mar 1 harvest.
2) "Anza" - best for Jan 15-Mar 10 harvest.
3) "Laguna" - best for Jan 15-Mar 10 harvest.
4) "Ramona" - best for Central Coast harvest Aug 15-Sep 30, and Imperial Valley harvest during Dec 10-Jan 15.
5) "Rita"- best for Central Coast harvest Aug 15-Sep 30 and Imperial Valley harvest Jan 1-Jan 20.
6) "Vega"- Best for Central Coast district harvests Aug 15-Sep 30, Central San Joaquin Valley harvests Oct 15 Oct 30, Imperial Valley harvests Dec 15-Feb 1.
7) "Vista"- best for Central Coast Districts Aug 15 -Sep 30 harvest, Imperial Valley harvest Dec 20-Jan 10.

- Succeeding Dr. James Welch's was Larry Rappaport, acting project leader and George Kihara, project administrator. IVFS personnel involved in project were Mr. George Worker, Jr., agronomist and Richard Tamayo, Principal Superintendent of Agriculture.
- Cooperating local growers were: 1) MagCo, El Centro; 2) John Menvielle Co., El Centro; 3) Holtville Farms, Holtville; 4) Rod Reynolds, Brawley; 5) Danny Danenberg Co. El Centro; 6) San Andrews Co. Holtville.

1980-1981

- Total visitors to Station: 3,399.
- Eight field days: Broccoli, Lettuce (2), Carrot, Alfalfa, Squash, Sudangrass, Melon.
- New Academic Staff Specialist assigned to IVFS: Yi Wu Chen, Associate in the Experiment Station, Department of Agronomy and Range Science, University of California, Davis.
- Station Research Advisory Committee members listed were:

1) R.K. Soost, Chairman 2) G.F. Worker, Jr. Secretary 3) J.L. Myler (ex-officio) 4) L.N. Lewis (administrative officer) 5) R.L. Branson 6) R.E. Garrett 7) O.A. Lorenz 8) J. Letey, Jr. 9) C.W. Schaller 10) R. Gonzalez 11) Lee Hermsmeier 12) P.H. Van Schaik 13) R.L. Baldwin.

- A private owner furnished a 20' x 20' plant growth chamber to IVFS and it was modified to include a new wall, insulation, cabinets, electrical, plumbing, HVAC. Installed in Building 200.

NON-TECHNICAL PUBLICATIONS BY STATION PERSONNEL

Worker, George F. May, 1981. Grain sorghum trials in 1980 at Imperial Valley Field Station. Imperial Agricultural Briefs.

Worker, George F. August, 1980. Barley variety trial results at the Imperial Valley Field Station. Imperial County Agricultural Briefs.

Worker, Jr., George F. November, 1980. Barley fits desert crop rotation system. California-Arizona Farm Press.

Worker, Jr., George F. January, 1981. Soybean performance trial at Imperial Valley Field Station in 1980. Agronomy Progress Report No. 113.

Worker, Jr., George F. January, 1981. Grain sorghum performance trials at the Imperial Valley Field Station in 1980. Agronomy Progress Report No. 112.

---. April, 1981. More on guar Cyamopsis tetragonaloba. California Pulses. Vol. 2, No. 1.

* Above entries from 1980-81 IVFS Annual Report. G. F. Worker, Jr.

- Non-Technical Publications: *

Johnson, Jr. Hunter. Melon Research Board Annual Report 1980-81.

Van Maren, Adolph F. Plant nutrition - wheat phosphate - 1981.

Van Maren, Adolph F. Plant Nutrition - durum wheat - 1981.

Isom, William H. 1980 results in "California Pulses," Vol. 2. No.1.

- Research Projects:

  40 total; 5 completed, 29 current, 6 new.

- Technical Publications: *

TECHNICAL PUBLICATIONS DERIVED FROM RESEARCH AT IMPERIAL VALLEY FIELD STATION:

Isom, W. H., W. L. Green, F. H. Stanford, W. F. Lehman, V. L. Marble, and L. R. Teuber. March 1980. Registration of UC-PX 1971, alfalfa germplasm. Crop Science 20: 287-289.

Robinson, F. E., K. K. Tanji, G. N. Luthin, W. F. Lehman, K. S. Mayberry, R. J. Schnagl, and W. Padgett. 1980. Irrigation management of Colorado River water with increase in salinity. Transactions, American Society of Agricultural Engineers 23(4): 859-866.

Jensen, M. E., D. S. Harrison, H. C. Korven, F. E. Robinson. 1980. The role of irrigation in food and fiber production in design and operation of farm irrigation systems. American Society of Agricultural Engineers. Monograph Number 3. St. Joseph, Mich. p. 15-47.

Robinson, Frank E. and Keith Mayberry. 1980. Efficient water and nitrate fertilizer use during stand establishment of desert lettuce. Progress Report Presented for Iceberg Lettuce Research Advisory Board, Vandenberg Inn, Santa Maria, California, November 12. 12 pages.

Robinson, Frank E. and Keith Mayberry. 1981. Efficient water and nitrate fertilizer use during stand establishment of desert lettuce. Progress Report presented for Iceberg Lettuce Research Advisory Board, Holiday Inn, Riverside, CA, March 17. 14 pages.

Robinson, F. E., K. Singh, W. Berry, and T. E. Thomas. 1980. Plant support capabilities of a geothermal fluid. Transactions of Geothermal Resources Council 4: 691-693. September.

Robinson, Frank E. 1980. Irrigation rates critical in Imperial Valley alfalfa. California Agriculture 34(10): 18. October.

Robinson, Frank E., Wade L. Berry, Terry R. Thomas, and Kirpal Singh. 1981. Plant growth with geothermal and ground water on the East Mesa. For presentation at the American Society of Agricultural Engineers Pacific Region annual meeting. Ramada Inn, Bakersfield, CA, February 9. 10 pages.

Erwin, D. C., S. A. Khan, and G. F. Worker, Jr. 1980. Control of the high temperature root disease of milo by pentachloronitrobenzene and metalaxyl. Proc. Am. Phyto-Pathological Soc. Abstr. No. 1, p. 83. August.

Simon, P. W., C. F. Peterson, and R. C. Lindsay. 1980. Genetic and environmental influences on carrot flavor. J. A.S.H.S. 105(3): 476-480.

Morrison, S. R., G. P. Lofgreen, and Michael Prokop. 1981. Effect of floor space allotment and animal group size on beef cattle performance. Trans. Am. Soc. Agr. Eng. 24(2): 480.

Morrison, S. R., Michael Prokop, and Glen P. Lofgreen. 1981. Sprinkling cattle for heat stress relief: activation temperature, duration of sprinkling and pen area sprinkled. Trans. Am. Soc. Agr. Eng. 24(5): 1295.

Beard, Benjamin H. Release of Helianthus Germplasm Pool III. US Department of Agriculture, Agricultural Research Service and the California Agricultural Experiment Station, Davis, CA.

Marble, V. L. and G. Peterson. 1981. Characteristics of alfalfa varieties and brands used in California. Proceedings, Eleventh California Alfalfa Symposium. Fresno, CA. December 9-10. pp. 78-90.

* Above entries from 1980-81 IVFS Annual Report. G. F. Worker, Jr.

1981-1982

- Total visitors to the Station; 3,753.
- Academic Staff changes:

1) Newly assigned; Dr. Richard A. Zinn, Assistant Professor, Department of Animal Science, University of California, Davis.

2) Transferred: Dr. Michael Prokop, Animal Science.

3) Transferred: Yi Wu Chen, Agronomy.

- Non-Technical Publications: *

NONTECHNICAL PUBLICATIONS

Agriculture in North Yemen. Invited paper, annual meeting, American Society of Agronomy, November 30 - December 3, 1981. G. F. Worker, Jr.

Grain sorghum trials in 1981 at Imperial Valley Field Station. Imperial County Ag. Briefs. May, 1982. G. F. Worker, Jr.

Sudangrass and sudangrass hybrids variety trial at the Imperial Valley Field Station in 1981. Agronomy Progress Report No. 117. Sept. 1981. G. F. Worker, Jr.

Barley performance at the University of California Imperial Valley Field Station from 1973 through 1981. Agronomy Progress Report No. 116. Aug. 1981. G. F. Worker, Jr.

Grain sorghum performance trials at the Imperial Valley Field Station. Agronomy Progress Report No. 120. Feb. 1982. G. F. Worker, Jr.

Barley performance at the University of California Imperial Valley Field Station from 1979 through 1982. Agronomy Progress Report No. 123. Jan. 1982. G. F. Worker, Jr.

Imperial trials evaluated, grain sorghum varieties. California-Arizona Farm Press. Apr. 1982. G. F. Worker, Jr.

Supplemental protein for stressed calves. Imperial County Ag. Briefs. Apr. 1982. D. E. Axe.

Broccoli variety trial, Imperial Valley Field Station. Imperial County Ag. Briefs. Apr. 1982. K. S. Mayberry.

Durum wheat 1981, Imperial County, summary of three plant rate studies. Imperial County Extension Map 309. A. F. Van Maren.

Melon weed control, Imperial County Ag. Briefs. May, 1982. C. E. Bell.

Lettuce seed coatings. American Vegetable Grower. June, 1982. Keith Mayberry and Frank Robinson. p. 32.

Lettuce seed coating trial. Imperial County Ag. Briefs. November, 1981. K. S. Mayberry and F. E. Robinson. pp. 6-7.

Lettuce seed coating trial II. Imperial County Ag. Briefs. Dec. 1081. F. E. Robinson and K. S. Mayberry. pp. 7-8.

Progress report, plan of utilization of geothermal water, East Mesa agricultural investigation. June, 1982. F. E. Robinson.

Concepts in ruminant protein nutrition. California Cattle Feeders Day. 1981. R. A. Zinn and F. N. Owens. pp. 3-9.

Axe, D., D. Addis, J. Dunbar, J. Clark, W. Garrett, N. Hinman, R. Zinn and R. Curley. 1982. Feeding value of cleaned and uncleaned cotton gin trash. Cattle Feeders Day, April 24, 1982. University of California, Davis, CA. pp. 23-29.

Plant nutrition - wheat. 1982. Adolph F. Van Maren and Stu Pettygrove. Mimeo.

"Cultural Practices for Desert Melon Production," in California Melon Research Board Annual Report, 1982.

Natwick, E. T. Harvester ant control with granular insecticide. MAP 301. 1982-83.

Natwick, Eric. Control of sweet potato whitefly on zucchini with yellow plastic mulch. MAP 500. 1982.

Logner, E. F. Biological control of pink bollworm. 2nd Quarterly Report. Dec. 1982.

* Above entries from 1981-82 IVFS Annual Report. G. F. Worker, Jr.

- Research Projects:

  53 total: 4 completed, 39 current, 10 new.

- Plant entomologist Eric Natwick, Cooperative Extension, begins his career in the Imperial Valley.
- Vince Rubatzky first appears as project member in carrots. He still comes to The DREC for the USDA Annual Carrot field day.
- IVFS still producing its own feed: 524.5 tons.
- Irrigation water cost now at about $8.00 per acre foot: $11,287.12/ 1,408 acres = 8.00 per acre foot.
- First reference made to the problem with Whitefly infestations.

Technical Publications: *

TECHNICAL PUBLICATIONS

Axe, D., D. Addis, J. Clark, J. Dunbar, W. Garrett, N. Hinman, and R. Zinn. 1982. Feeding value of cleaned and uncleaned cotton gin trash. Proceedings Western Section, American Society of Animal Science 33: 57-59. July 7-9, 1982.

Robinson, Frank E. 1981. Application of saline water and the effect on crop production. Conference on biosalinity - the problem of salinity in agriculture. Egypt, Israel, and the United States. Sept. pp. 38-39.

Robinson, Frank E., Terry R. Thomas, Kirpal Singh. 1981. Geothermal fluids to irrigate energy crops on Imperial East Mesa Desert, California. Transactions Geothermal Resources Council 5: 561-562.

Robinson, Frank E. 1982. Water and crop yields in a California desert. Alternative strategies for desert development and management. Agriculture. Vol. 2. United Nations Institute for Training and Research. Pergamon Press.

Lehman, W. F., D. B. Bucks, F. E. Robinson, J. N. Rutger, and L. K. Gibbs. 1982. Rice cultivar selection for water conservation in an arid environment. Rice Technical Working Group, Breeding Genetics and Cytology Section. February.

Robinson, F. E., L. D. Whittig, D. J. Scherer. 1982. Imperial Valley Repository of upstream effluents from the Colorado River. Ann. Report WR160. Phsio Chemical basis for management of salt affected soils. Presented at Las Vegas. Oct. 26, 1982.

Lehman, W. F., M. D. Rumbaugh, R. Zambrano, L. P. Spiaggi, and V. Otazu. 1981. Collecting alfalfa and other plants in Bolivia, Peru, and Equador. Proceedings Western Alfalfa Improvement Conference, June 2-3, 1981. pp. 34-40. June.

Lehman, W. F. and F. E. Robinson. 1981. Progress in developing salt tolerance in alfalfa. Proceedings Western Alfalfa Improvement Conference, June 2-3, 1981. pp. 54-56. June.

Bucks, D. A., R. L. Roth, W. F. Lehman, L. J. Eric, and O. F. French. 1982. Intermittent irrigation of rice in a desert environment. Proceedings Ninth Rice Technical Working Group. 1 pp. Feb.

Natwick, Eric T., Franklin F. Laemmlen, and Alfonso Durazo III. Squash variety trial: resistance/tolerance to Bemisia tabaci and the squash leaf curl and infectous yellows virus diseases. Plan Program. 7/1/82-6/30/83.

Release of carrot breeding line B3475. USDA and University of California. March, 1983.

Release of Helianthus Germplasm Pool I (Ha GPPI)

Release of Helianthus Germplasm Pool II (Ha GPPII)

* Above entries from 1981-82 IVFS Annual Report. G. F. Worker, Jr.

1981-1982 (continued)

- Technical Publications (continued): *

Release of Helianthus Germplasm Pool III (Ha GPPIII).

Release of Helianthus Germplasm Pool IV (Ha GPP IV).

The botanical description and diagnostic characteristics of variety Ida-Lea.

The botanical description and diagnostic characteristics of male plant M138

The botanical description and diagnostic characteristics of female plant F189.

Toscano, N. C., R. A. Van Steenwyk, K. Kido, N. F. McCalley, W. W. Barnett, and M. W. Johnson. 1982. Yield responses in lettuce plants at various density treatment levels of Lepidopterous Larvae. J. Econ. Entomol. 75: No. 5.

* Above entries from 1981-82 IVFS Annual Report. G. F. Worker, Jr.

1982-1983

Total visitors to Station: 3,750

- Station Improvements:

1) Repaired and retiled floors in Buildings 303, 306, 307, 308 and 310C.

2) Re-roof Buildings 200, 203.

3) Laser Leveled fields 31, 32, and part of 21.

4) Gravel applied on roads around northern roads of Station.

5) Divided livestock feed pens 40W divided in half. Pens increase from 8 to 16. Improves replication flexibility.

- New Director, Field Stations, visits Station (unable to archive information at time of publication)

- Research Projects at Station: 44 total. *

RESEARCH PROJECTS AT STATION

Projects Completed:

Stand establishment as related to mechanized production of vegetables. Project No. R-BPS-2894-RR. Frank H. Takatori.

Etiology, biology, and control of vegetable diseases in Southern California. Project No. R-PPA-1085. Frank Laemmlen.

Agronomic studies of small grains and field corn in California desert area. Project No. CEFS-0044. Adolph F. Van Maren.

Improving the efficiency of plant breeding methods for quantitative characters. Project No. D-ARS-3624-H. Ken Foster.

Control of insects and diseases in vegetables. Project No. CEFS-0010. Eric Natwick.

Pepper study. Project No. R-BPS-2846. Hunter Johnson, Jr.

Control of insects and mites on vegetable crop - pok choi. Project No. R-ENT-4040. Eric Natwick.

Current Projects:

Improvement of lettuce (Lactuca sativa). Project No. D-VCR-4178-H. Richard Michelmore.

Plant population and irrigation management for efficient water utilization and salinity control. Project No. D-LAW-3087-H. Frank E. Robinson.

Improving varieties and culture of sorghum, corn, and sudangrass in the low desert valleys. Project No. D-ARS-3317-H. George F. Worker, Jr.

Agronomic and genetic studies of alfalfa in southern California. Project No. D-ARS-3309-H. William F. Lehman.

Genetics and improvement of cereal crops - emphasis on wheat and triticale. Project No. D-ARS-3116-H. C. O. Qualset.

Development of improved cultivars of Hordeum species and genetic investigation of associated problems. Project No. D-ARS-2547-H. C. W. Schaller.

Soil Physical treatment to facilitate salt removal from lower Colorado River basin soil. Project No. D-LAW-3538-H. Frank E. Robinson.

Biology and control of insects and mites on vegetable crops. Project No. R-ENT-4040-H. Nick Toscano.

Factors affecting asparagus culture and production in the semi arid regions of California. Project No. R-BPS-2512. Frank H. Takatori.

Introduction, increase, and investigation of rice germplasm from foreign rice programs. Project No. D-ARS-3561-H. William F. Lehman.

Hormonal regulation of seedling growth and development. Project No. D-VCR-4148. Kent Bradford.

Improving the efficiency of plant breeding methods for quantitative characters. Project No. D-ARS-3624-H. Ken Foster.

Factors influencing vegetable crop uniformity production and harvest efficiency - melons. Project No. R-BPS-2345-H. Hunter Johnson, Jr.

Economic and environmental improvement in management of anthropod pests of cotton in southern California. Project No. R-ENT-4165. H. T. Reynolds.

Efficient use of fertilizer on vegetable crops. Project No. CEFS-0008. Keith S. Mayberry.

Stand establishment as related to mechanized production of vegetables. Project No. R-BPS-2894-RR. Frank H. Takatori.

Genetic and agronomic studies of oil crops in northern California - soybean. Project No. D-ARS-3306-H. P. F. Knowles.

Engineering and environmental aspects of livestock production. Project No. D-XXX-2965-H. Richard A. Zinn.

Environmental physiology of annual and perennial weeds and its relationship to weed control. Project No. R-BPS-3625-H. D. W. Cudney.

Utilization of cellulosic feedstuffs and by-products by ruminants. Project No. D-ASC-1569-H. Richard A. Zinn.

Nutrition, management, and health of stressed cattle. Project No. D-ASC-2710. Richard A. Zinn.

Gene resources and improvement of agronomic crops - cowpeas, guar. Project No. R-BPS-2580. W. H. Isom.

Disease and nematode control in vegetables and melons. Project No. CEFS-0026. Frank Laemmlen.

Vegetable adaptation in California - carrot. Project No. D-VCR-3381-H. V. E. Rubatzky.

* Above entries from 1982-83 IVFS Annual Report. G. F. Worker, Jr.

1982-1983 (continued)

- Research Projects (continued): *

Developing improved management methods and crops for semi arid zones. Project No. R-BPS-4095-H. A. E. Hall.

Agronomic and genetic study in southern California - alfalfa seed culture. Project No. D-ARS-3309-H. R. W. Hagemann.

Biological control of pink bollworm - parasite release. Project No. R-BIC-2548. E. F. Legner.

Zucchini squash variety trial for resistance/tolerance to insects and disease. Project No. CEFS-0010. Eric Natwick.

Distribution, efficiency, and effect of microflora of fungicide applied to soil. Project No. R-PPA-2086. Frank Laemmlen.

Pepper study. Project No. R-BPS-2846. Hunter Johnson, Jr.

Control of insects and mites of vegetable crop - pok choi. Project No. R-ENT-1441. Eric Natwick.

Renewable energy production in the low desert - eucalyptus culture. Project No. CEFS-0008. Keith S. Mayberry.

Biology and control of insects and mites on vegetable crops. Project No. R-ENT-4040. Keith S. Mayberry.

Genetic improvement of cotton yield, quality, and efficiency of production. Project No. R-BPS-4193. Rosielle.

Vegetable adaptation in California - broccoli and cauliflower. Project No. D-VCR-3381. V. E. Rubatzky.

Projects Initiated:

Renewable energy production in the low desert. Project No. CEFS-0008. Keith S. Mayberry.

Efficient use of fertilizer on vegetable crop. Project No. CEFS-0008. Keith S. Mayberry.

* Above entries from 1982-83 IVFS Annual Report. G. F. Worker, Jr.

- Nontechnical Publications: *

NONTECHNICAL PUBLICATIONS

Mayberry, Keith S. and Frank E. Robinson. 1982. Potatoes for the desert. Imperial County Ag. Briefs. October.

Lehman, W. F., L. F. Jackson, C. O. Qualset, and L. K. Gibbs. 1982. Production and performance of common and durum wheats and triticale at the University of California Imperial Valley Field Station, El Centro, in 1980, 1981, and 1982. Agronomy Progress Report No. 126. 16 pp. September.

Lehman, W. F. 1982. Wheat and triticale variety tests. Imperial Agricultural Briefs. pp. 8-9. December.

Jackson, L. F., C. O. Qualset, C. W. Schaller, W. F. Lehman, Y. P. Puri, R. L. Wenning, L. Prato, H. E. Vogt, L. K. Gibbs, C. Smalley, K. G. Baghott, W. M. Canevari, L. D. Clement, R. Coviello, M. L. Feyler, T. E. Scardaci, M. J. Sith, A. F. Van Maren, B. L. Weir, C. M. Wick, and J. F. Williams. 1982. Regional durum and common wheat and triticale performance tests in California. Agronomy Progress Report No. 128. 55 pp. December.

Worker, George F. Jr. 1982. Desert barley. Western Hay and Grain. September.

Worker, Jr., George F. 1982. Field corn performance at the Imperial Valley Field Station in 1982. Agronomy Progress Report No. 125. October.

Worker, Jr., George F. 1982. Barley variety trial results of the Imperial Valley Field Station. Imperial County Agricultural Briefs. October.

Worker, Jr., George F. 1982. Poco, an early, short barley variety. Agronomy Progress Report No. 127. November.

Worker, Jr., George F. 1983. Grain sorghum performance trials, Imperial Valley Field Station. Agronomy Progress Report No. 129. February.

Worker, Jr., George F. 1983. Sudangrass variety and hybrid trials, Imperial Valley Field Station. Agronomy Progress Report No. 130. February.

Worker, Jr., George F. 1983. Grain sorghum trials in 1982 at Imperial Valley Field Station. Imperial County Agricultural Briefs. April.

Worker, Jr., George F. 1983. Sudangrass variety and hybrid yields at Imperial Valley Field Station. Imperial County Agricultural Briefs. May.

Worker, Jr., George F. 1983. Barley and wheat forage-grain yields, Imperial Valley Field Station. Agronomy Progress Report No. 137. May.

Worker, Jr., George F. 1983. Barley performance trials, Imperial Valley Field Station. Agronomy Progress Report No. 138. June.

Worker, Jr., George F. 1983. Barley good forage-grain producer. California-Arizona Farm Press. June 25.

Michelmore, E. 1983. Annual Report, California Iceberg Lettuce Research Program.

Hagemann, Robert W. 1983. Bermudagrass. Agri. Briefs. pp. 4-5. January.

Hagemann, Robert W. 1983. Trial results of alfalfa seed cultural practices. Alfalfa Seed Production Symposium. pp. 9-13. March.

Zinn, R. A. and D. Axe. 1983. Ration conditioners and potassium supplementation for finishing steers. California Feeders Day Report. pp. 64-73. April.

Zinn, R. A. and D. Axe. 1983. Salinomycin influence on characteristics of rumen fermentation and site and extent of digestion. California Feeders Day Report. pp. 74-79. April.

Zinn, R. A. and D. Axe. 1983. Salinomycin influence on feedlot steers and heifers. California Feeders Day Report. pp. 80-86. April.

Zinn, R. A., D. Axe, J. Dunbar, and B. Norman. 1983. Pelleting influence on utilization of cottonseed meal by light weight calves. California Feeders Day Report. pp. 48-51. April.

Zinn, R. A., D. Axe, D. Addis, J. G. Clarke, J. Dunbar, and B. Norman. 1983. Potassium in receiving rations for light weight calves. California Feeders Day Report. pp. 52-57. April.

Zinn, R. A., D. Axe, D. Addis, J. G. Clarke, J. Dunbar, and B. Norman. 1983. Protein supplementation for the stressed calf. California Feeders Day Report. pp. 58-63. April.

Zinn, R. A., D. Axe, J. Dunbar, and B. Norman. 1983. Sarsaponin influence on performance and metabolism of light weight calves. California Feeders Day Report. pp. 87-92. April.

Mayberry, K. S. and V. E. Rubatzky. 1983. Fresh carrot varieties. Agr. Extn. Mimeo. 4/29/83.

Franklin, D. 1983. Cooperative carrot investigations, USDA-Meloland Station, February 28 through March 4, 1983. Mimeo. 3/17/83.

- Technical Publications: *

TECHNICAL PUBLICATIONS

Keim, R. and G. Worker. 1982. A modified drip irrigation system to apply experimental fertilizer treatments. Agronomy Abstracts. 1982 annual meeting, Anaheim, CA. Nov. 28-Dec. 3. p. 53.

Erwin, D. C., J. S. Baumer, Jr., R. A. Khan, W. F. Lehman, and V. Vaziri. 1982. Registration of A77-10R alfalfa germplasm. (Reg. No. GP 118). Crop Science 22: 1267. Nov.-Dec.

Lehman, W. F., M. W. Nielson, V. L. Marble, and E. H. Stanford. 1983. Registration of CUF 101 alfalfa (Reg. No. 119). Crop Science 23: 398. Mar.-Apr.

Lehman, W. F., D. F. Stuteville, M. W. Nielson, and V. L. Marble. 1983. Registration of UC 123 and UC 143 alfalfa germplasms (Reg. No. GP 124 and GP 125). Crop Science 23: 403. Mar.-Apr.

Robinson, Frank E. 1982. Plan of utilization of geothermal water - East Mesa. Agricultural Investigation Progress Report. June.

Robinson, Frank E., Daniel J. Scherer. 1982. Konal - Imperial Valley, California. Section 2 in Andre Lauchli and Frank E. Robinson. 1982. Development of new and improved crops for water conservation in arid lands. W157 Progress Report. Fort Collins, Colorado. October 15.

Robinson, F. E., D. J. Scherer, L. D. Whittig. 1982. III. Imperial Valley repository of upstream effluent from the Colorado River. In Physico-Chemical Basis for Managing Salt Affected Soils. Western Regional Research Project W-160. Las Vegas. October.

Robinson, F. E., W. L. Berry, D. J. Scherer, T. R. Thomas. 1982. Environmental indicators of geothermal water on Imperial East Mesa, California. Agronomy Abstracts, Anaheim, CA. p. 37.

* Above entries from 1982-83 IVFS Annual Report. G. F. Worker, Jr.

1982-1983 (continued)

- Technical Publications (continued): *

Robinson, Frank E. 1982. Wind and the culture of jojoba and guayule in deserts. Chapter 8. New Crops for Desert Agriculture, Problems and Opportunities. University of California, Cooperative Extension, Riverside, CA. p. 49-51.

Robinson, Frank E. 1982. Irrigation with saline water on the Imperial East Mesa. Chapter 12. New Crops for Desert Agriculture, Problems and Opportunities. University of California, Cooperative Extension, Riverside, CA. p. 91-93.

Robinson, Frank E., Daniel J. Scherer, Terry R. Thomas. Irrigation of the arid Imperial East Mesa dune sand area in California. U.S. Committee on Irrigation, Drainage, and Flood Control. Jackson, Miss. October 21.

Robinson, Frank E., Keith S. Mayberry, Daniel J. Scherer. 1983. Lettuce stand establishment with improved seed pellets. Transactions of American Society of Agricultural Engineers 25(1): 79-80 and 26(3): 726.

Robinson, Frank E. 1983. Plan of utilization of geothermal water - East Mesa. Agricultural Investigation Progress Report. January 31.

Warrag, M. O. A. and A. E. Hall. 1983. Reproduction responses of cowpea to heat stress: genotypic differences in tolerance to heat at flowering. Crop Science 23(6).

Chiri, A. A. and E. F. Legner. 1983. Field application of host-searching kairomones to enhance parasitization of the pink bollworm (Lepidoptera: Gelechiidae). J. Econ. Entomol. 76(2): 245-255.

* Above entries from 1982-83 IVFS Annual Report. G. F. Worker, Jr.

- Note regarding the reprints of research projects and Technical Publications:

On the previous page a reprint of research projects was presented in order to provide readers a sense the type of research projects occur at IVFS. That was followed by a reprint of Technical Publications. Those technical publications are the articles that were published in technical journals to provide documentation and dissemination (extension) in written format of the specific research project. In the interest of time and space consideration, titles of research projects have been omitted but readers can be assured that if there is a Technical Publication presented, there was a research project at IVFS on that subject.

1983-1984

- Total Visitors to Station: 3,596.
- Station has new name: Imperial Valley Agricultural Center (IVAC)
- Meetings began with the Agricultural Building Committee for new Cooperative Extension Building at IVAC
- Station Improvements:

1) Ceiling of Building 103 (The Ittner Reference Barn) was power washed, primed and painted with epoxy paint.

2) The Lath House (102) beams were replaced with galvanized beams.

3) The east bank of DREC Irrigation Reservoir was filled, shaped and a slab of concrete was installed (10' x 10' x 8").

4) The two oldest cattle feed storage tanks were wrapped with steel bars for reinforcement.

- Total Number of Research Projects: 44. 13 completed, 23 were ongoing, 8 were new.
- Nontechnical Publications: *

NONTECHNICAL PUBLICATIONS

Isom, W. H. and G. F. Worker. 1984. Final on guar. California Pulses 84: 1.

Worker, Jr., G. F. 1984. Field corn performance trials Imperial Valley Agricultural Center, 1982, 1983, and 1984. Agronomy Progress Report No. 152. 13 pp.

Worker, Jr., G. F. 1984. Barley performance trials, Imperial Valley Field Station, 1980 through 1984. Agronomy Progress Report No. 151. 4 pp.

Worker, Jr., G. F. 1984. Grain sorghum performance trials, Imperial Valley Field Station, 1983. Agronomy Progress Report No. 145.

Worker, Jr., G. F. 1983. Use of field station for generation and cultivar advancement. Agronomy Abstracts. Annual Meeting. August 14-19. Washington, D. C.

Worker, M. S. and G. F. Worker, Jr. 1983. Method of selecting soybean seedling plants for salt tolerance. Agronomy Abstracts. Annual Meeting. August 14-19. Washington, D. C.

Lehman, W. F., Les Ede, V. L. Marble, J. D. Radewald, and M. W. Nielson. 1983. UC Cibola a new variety of alfalfa. Agronomy Progress Report No. 141. 10 pp. July.

Lehman, W. F., C. O. Qualset, L. F. Jackson, L. K. Gibbs. 1983. Production and performance of common and durum wheats and triticale at the University of California Imperial Valley Field Station, El Centro, in 1981, 1982, and 1983. Agronomy Progress Report No. 142. 19 pp. Sept.

Lehman, W. F. and F. F. Laemmlen. 1983. UC Cibola - a new dormant variety of alfalfa that survives well in soils infested with root nematodes. Imperial Agricultural Briefs. p. 6.

Marble, V. L., G. Peterson, W. R. Sheesley, C. A. Frate, W. M. Canevari, M. L. Feyler, and W. F. Lehman. 1984. Summary of alfalfa variety, brand and experimental selection trials grown in the San Joaquin Valley of California. Agronomy Progress Report No. 147. 43 pp. March.

Zinn, R. A., J. Dunbar, and B. B. Norman. 1984. Influence of dietary protein level and supplemental sarsaponin on early performance of light weight calves. California Feeders Day Report. pp. 14-20. May.

Zinn, R. A. and W. N. Garrett. 1984. Net energy values for steam rolled triticale and steam flaked corn. California Feeders Day Report. pp. 34-44. May.

Zinn, R. A. 1984. Feeding value of cull cantaloupes for ruminants. California Feeders Day Report. pp. 45-48. May.

Zinn, R. A. 1984. A comparison of sodium lignosulfonate versus cane molasses in finishing diets for feedlot steers. California Feeders Day Report. pp. 49-53. May.

Zinn, R. A. 1984. Interaction of growth implants ionophores and corn processing on feedlot performance of growing-finishing steers. California Feeders Day Report. pp. 56-73. May.

Zinn, R. A. 1984. Short term effect of antibiotic feeding on site and extent of digestion of growing and finishing diets in feedlot cattle. California Feeders Day Report. pp. 74-82. May.

Zinn, R. A. 1984. Influence of method of fat supplementation on performance of finishing steers. California Feeders Day Report. pp. 83-87. May.

Zinn, R. A. and S. R. Morrison. 1984. The influence of sprinkling and ration energy density on performance response of finishing steers during period of high ambient temperature. California Feeders Day Report. pp. 88-93. May.

Zinn, R. A., J. Dunbar, and B. Norman. 1984. Influence of mebio and pasturella vaccine on health and performance of light weight calves. California Feeders Day Report. pp. 3-6. May.

* Above entries from 1983-84 IVFS Annual Report. G. F. Worker, Jr.

1983-1984 (continued)

- Nontechnical Publications (continued): *

Hagemann, Robert W. 1983. Trial results of alfalfa seed cultural practices. Alfalfa Seed Production Symposium. pp. 9-13. March.

Hagemann, Robert W. 1983. Trial results for flat planted alfalfa. Agricultural Briefs. June.

Hagemann, Robert W. 1985. Trial results of alfalfa seed cultural practices. Alfalfa Seed Production Symposium.

---. UC Carrot variety evaluation - Imperial Valley Field Station 1983-84. 19 pp. Mimeo.

Teuber, L. R., et al. 1984. Climate and dormancy data reduce need for many regional alfalfa trials. California Agriculture 38: 11-14.

Munnecke, D. E., F. F. Laemmlen, and J. Bricker. 1984. Soil fumigation controls sudden wilt of melons. California Agriculture 38: 8-9.

* Above entries from 1983-84 IVFS Annual Report. G. F. Worker, Jr.

- Technical Publications: *

Technical Publications:

Robinson, F. E. 1983. Wind and the culture of jojoba and guayule in deserts. Chapter 14. New Crops for Desert Agriculture, Problems and opportunities. University of California Cooperative Extension, pp. 87-88. August.

Robinson, F. E. 1983. Irrigation with saline water on the Imperial East Mesa. Chatper 20. New Crops for Desert Agriculture, Problems and opportunities. University of California Cooperative Extension, pp. 129-131. August.

Robinson, F. E. 1984. Irrigation of the Imperial East Mesa with saline ground water. 1984 California Plant and soil Conference, California Chapter American Society of Agronomy. West Sacramento. pp. 82-87. February.

Lehman, W. F., J. N. Rutger, F. E. Robinson, and M. Kaddah. 1984. Value of rice characteristics in selection for resistance to salinity in an arid environment. Agronomy J. 76: 366-370.

Robinson, F. E., W. L. Berry, D. J. Scherer, and T. R. Thomas. 1984. Yield potential of asparagus irrigated with geothermal and ground water on Imperial East Mesa desert, California. Hort. Science 19(3): 407-408.

Robinson, F. E., D. J. Scherer, T. R. Thomas. 1984. Irrigation of the arid Imperial East Mesa dune sand area in California. Selected by the U. S. Committee on Irrigation and Drainage as U. S. contribution on Question 39 in Transactions of the Twelfth Congress of the International Commission on Irrigation and Drainage, Fort Collins, CO. Vol.1(B): 511-520.

Hall, A. E. and P. N. Patel. 1984. Cowpea breeding for resistance to drought and heat. World Cowpea Research Conference. Nov. 4-9, 1984. IITA, Ibadan, Nigeria.

Laemmlen, Franklin F. and Keith S. Mayberry. 1984. Several available varieties are more resistant than those now grown in the Imperial Valley. California Agriculture. Nov-Dec.

Michelmore, Richard. 1984. Annual report, California Lettuce Research Program.

Munneck, D. E., F. F. Laemmlen, and J. Bricker. 1984. Soil fumigation controls wilt of melons. California Agriculture 38: 8-9.

Bradford, Kent J. 1984. Seed priming: Techniques to speed seed germination. Proc. Oregon Horticultural Society 25: 227-233.

Valdes, V. M., K. J. Bradford, K. S. Mayberry. 1984. Seed priming overcomes thermodormancy in coated lettuce seeds. Abstract. Hort. Science 19: 538.

Warrag, M. O. A. and A. E. Hall. 1984. Reproductive responses of cowpea (Vigna Unguiculata (L.) Walp.) to heat stress. I. Responses to soil and day air temperature. Field Crop Research 8: 3-16.

Warrag, M. O. A. and A. E. Hall. 1984. Reproductive response of cowpea (Vigna unguiculata (L.) Walp.) to heat stress. II. Responses to night air temperature. Field Crops Report 8: 17-33.

Warrag, M. O. A. and A. E. Hall. 1983. Reproductive response to cowpea to heat stress. genotypic difference in tolerance to heat at flowering. Crop Sci. 23: 1088-1092.

- Technical Publications: *

Leyner, E. F. and F. W. Pelam, Jr. 1983. Contemporary appraisal of the population dynamics of introduced Cichlid fish in Southern California. Conference of Calif. Mosquito and Vector Control Assn, Jan. 23-26.

Toscano, N. C., R. A. Van Steenwyk, K. Kido, N. F. McCalley, W. W. Barnett, and M. W. Johnson. 1982. Yield responses in lettuce plants at various density treatment levels of Lepidopterous larvae. J. Econ. Ent. 75(5):

Lehman, W. F., Les Ede, V. L. Marble, M. W. Nielson, and W. D. Radewald. 1983. Registration of UC Cibola alfalfa. Crop Science 22: 1216. Nov.-Dec.

Thyr, B. D., W. F. Lehman, B. J. Hartman, O. J. Hunt, T. J. McCoy, O. E. Roe and T. R. Knous. 1984. Registration of CUSN-242 CLS_4 germplasm. Crop Science 23: 398. March-April.

Teuber, L. R., V. L. Marble, W. F. Lehman, I. I. Kawaguchi, M. K. Miller, B. J. Hartman, O. J. Hunt, D. K. Barnes, B. Burrows, D. L. Landcaster and R. H. Gripp. 1984. Use of climatic and fall dormancy data to allocate varieties to regional variety trials in California. California Agriculture 38: 12-14. May-June.

Lehman, W. F., J. N. Rutger, F. E. Robinson, and M. Kaddah. 1984. Value of rice (Oryza sativa L.) characteristics in selection for resistance to salinity in an arid environment. Agron. Journal 76: 366-376. May-June.

Elgin, J. H., D. K. Barnes, R. H. Ratcliffe, F. J. Frosheiser, M. W. Nielson, K. T. Leath, E. L. Sorensen, W. F. Lehman, S. A. Ostazeski, D. L. Stuteville, W. R. Mehr, R. N. Peaden, M. D. Rumbaugh, G. R. Manglitz, J. E. McMurtery III, R. R. Hill, Jr., B. D. Thyr and B. J. Hartman. 1984. Standard tests to characterize pest resistance in alfalfa cultivars. United States Department of Agriculture, Agricultural Research Services, ARS-NC-19. 38 pp. June.

Hills, F. J. and G. F. Worker, Jr. 1983. Disease threshold and increase in fall sucrose yield related to powdery mildew of sugar beets in California. Plant Disease 67(6): 654-656.

Zinn, R. A. and F. N. Owens. 1983. Influence of feed intake level on site of digestion in steers fed a high concentrate diet. Journal of Animal Science 56: 471-475.

Zinn, R. A., F. N. Owens. 1983. Site of protein digestion in steers: predictability. Journal of Animal Science 56: 707-716.

Zinn, R. A. and W. N. Garrett. 1984. Net energy for steam rolled triticale and steam flaked corn. Proceedings, Western Section American Society of Animal Science 35: 264-267.

Axe, D., D. Addis, J. G. Clark, W. N. Garrett, N. Hinman, and R. A. Zinn. 1982. Net energy value of cleaned and uncleaned cotton gin trash. Journal of Animal Science 55(suppl. 1): 490.

Perez, A., M. Estrada, and R. A. Zinn. Influence of lactobacillus supplementation on milk production during the first 120 days of lactation. Journal of Dairy Science 67 (suppl. 1): 119.

Zinn, R. A. 1983. Influence of sarsaponin on ruminant protein nutrition. XVIIth Conference on Rumen Function. Chicago, IL.

* Above entries from 1983-84 IVFS Annual Report. G. F. Worker, Jr.

1984-1985 no report on file

1985-1986

- April 1985 - Mr. Charles Dunn is new director of the Imperial Valley Agricultural Center (IVAC). George Worker remains as Specialist in Agronomy until his retirement on June 30, 1987
- Total visitors to the Center: 2,424.
- First discussions regarding CIMIS Weather Station installation which finally occurred in 1989.

- Research Projects: 93 total: 26 completed, 44 ongoing, 23 new.
- Nontechnical Publications: *

NONTECHNICAL PUBLICATIONS

Worker, Jr., G. F., C. Shattner, and D. Hulton. 1986. Results of field corn silage hybrid at Loma Linda University farm in 1985. Agronomy Progress Report No. 171. May.

Worker, Jr., George F. 1986. Barley performance trials at Imperial Valley Agricultural Center, 1981 through 1986. Agronomy Progress Report No. 179.

Worker, Jr., George F. and Keith Mayberry. 1986. Imperial Valley Agriculture. Agronomy Progress Report No. 183.

Worker, Jr., George F. 1986. Results of oats varieties for hay and grain yield at Imperial Valley Agricultural Center. Agronomy Progress Report No. 184.

Worker, Jr., George F. 1986. Field corn performance trials at Imperial Valley Agricultural Center, 1982 through 1986. Agronomy Progress Report No. 187.

Zinn, R. A., J. R. Dunbar, and B. B. Norman. 1986. Influence of time of processing on health and performance of feedlot calves. 1986 California Cattle Feeders' Day. pp. 21-28.

Zinn, R. A. 1986. An evaluation of crude protein requirements of growing-finishing steers. 1986 California Cattle Feeders' Day. pp. 29-32.

Zinn, R. A. and S. R. Morrison. 1986. Influence of manger space on performance of feedlot steers housed on slotted floors. 1986 California Cattle Feeders' Day. pp. 33-35.

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* Above entries from 1985-86 IVFS Annual Report. G. F. Worker, Jr.

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* Above entries from 1985-86 IVFS Annual Report. G. F. Worker, Jr.

1986-1992

- Beginning with the 1986-1987 season, annual reports ceased to be written. Information regarding station improvements and operations was no longer being reported. The extension of researchers' education to the community at large ceased to be documented. The tabulated listings of professional publications, technical and nontechnical was no longer available.
- Research projects were continuing but no reports of Research Advisory Committee Meetings and associated results were found.
- Mr. Worker's position as agronomist was not replaced upon his retirement in 1987.
- In 1989, Dr. William F. Lehman sadly passed away and was not replaced by another agronomist.
- In 1992, Dr Frank E. Robinson retired and his position was not replaced at the DREC (he remained on until 1995 in order to finish a project he had started).
- No Vegetable Crop specialist had been assigned to the DREC since Orval McCoy left in 1973.
- Dr.. Richard Zinn, Animal Nutritionist, essentially became the only University of California staff specialist remaining who is assigned to the DREC.
- Based on the 1985-1986 Annual Report, DREC research continued with Station researchers, but an increasing number of additional projects were undertaken by as many as twenty one researchers not assigned to the DREC including Imperial County Cooperative Extension Agents utilizing DREC facilities including Eric Natwick, Frank Laemmlen, Alfonso Durazo, III, A.F. Van Maren, Keith Mayberry and Juan Guerrero.
- 1992: Khaled M. Bali, Ph.D. (Soil Science; Soil Physics) is assigned to Imperial County Cooperative Extension as a Farm Advisor, Irrigation & Water Management.
- The Imperial County Cooperative Extension Service moved their Office to the DREC in 1989, a ten year project since the earthquake of '79 destroyed the Extension Building in El Centro.

1993-1999

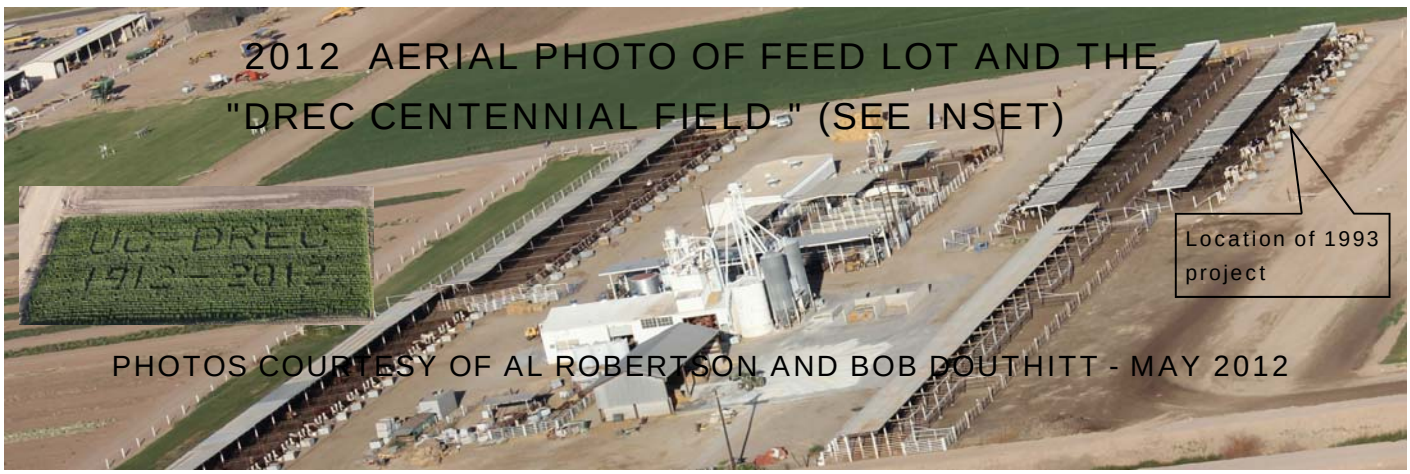
- Beginning in 1993, Research Advisory Committee meeting notes are on file at the DREC containing project requests.
- Additionally, it appears that the Industrial Farm Advisory committee had ceased to conduct any meetings.
- It appears that around 1990, Silver Leaf Whitefly infestations of many crops were becoming a very serious problem and alfalfa varieties were being developed that showed improved resistance to whitefly.
- In the 1993-1994 season a major farm improvement project involved the construction of 32 additional pens for livestock nutrition studies; all labor performed with station personnel, graduate students and family members of Dr. R.A. Zinn.

1993 Feedlot Project

Photos courtesy of R.A. Zinn

1993-1994 Feedlot Project.

Photos courtesy R.A. Zinn



2000 -2012

- Station Improvements:

1) New Science Building.

Approval was received from ANR via Facilities Planning and Management at UC Davis for the construction of a new 5,000 square feet laboratory to replace the one in the main headquarters building and an old mobile home type trailer. Ultimately completed in early 2005, it accommodates animal science, water and soils, plant pathology and entomology.

Above and Below

A 2012 photo of the Science Laboratory housing Animal Science,

Plant Pathology & Entomology, Soils and Water Science.

2) Pressurized Irrigation System.

Renovated and upgraded the DREC Irrigation system in order to conserve and better manage irrigation water. Approval was received in 2001, it was funded in 2003 and completed in 2006. An extensive project, it involved replacing exposed concrete ditches with underground PVC piping and incorporating a pressurized pump and filtration system in order to provide pressure irrigation to 190 acres of the farm. The gravity irrigation was retained and modified for appropriate projects as well. Additionally, the water supply to the five acre foot reservoir was modified to incorporate an underground PVC supply line located at the southwest corner of the DREC proceeding to the reservoir running parallel to the existing Ash Lateral Canal. Not only was the farm better able to manage pressurized irrigation needs, evaporation and silt accumulation issues were greatly mitigated. Imperial County was at a point where dissolved solids in agricultural run-off water were becoming important issues. Referred to as TMDL, or Total Maximum Daily Load, local farmers were asked to voluntarily take measures to be more aware of and control TMDL. The Underground Irrigation Project at the DREC was very significant in reducing TMDL and has drawn praise from local farmers.

Photos above:
Reservoir water can be filtered and pumped underground to any research plot on the DREC. Gravity irrigation system also utilizes underground piping. Photos courtesy Al Robertson.

Taking depth measurements prior to irrigation project. Interim Director Jose Desoto, volunteer Al Robertson and ship's mascot "Kirby the Queensland", set sail while flying the colors of the "Jolly Roger". "Aaargh Matey".

3) Domestic Water Facility Renovation: 2009-2011.

In addition to the existing water tank and water storage tanks, an additional 30,000 gallon water storage tank was installed along with a new micron filtration system.

2012 photos of Domestic water plant renovation. Al Robertson

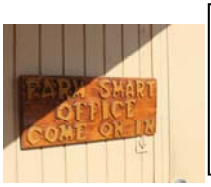
Above: 1961 Aerial Photo of "The Granary" across from shop area.
See page 38 for details of 1966 renovation project.
Photo courtesy of Francisco Maciel collection.

4) Renovation of Building #201 (2007-2009). The building had been converted in 1966 to a dry lab and storage area and was in need of structural renovation before conversion to Farm Smart use; an educational outreach program started in 2001. The renovation included earthquake reinforcement of the entire structure with engineering design provided by UC Davis Facilities and Planning Department. Interior renovation included a 160 person conference room, a small audio-visual/electrical service room, a kitchenette room with sink, cabinet storage, freezers and refrigerators, and a Farm Smart Office. The second floor was remodeled to provide office space for Staff Research Associates.

Above: Entrance to Farm Smart

Above and Below.
Farm Smart Program
Presentation area.

Above: Kitchenette Area



Left and Right:
Farm Smart Office:
Stephanie and Nancy

- Sugarcane Research Project: 1997-2004

An ongoing project since 1997, DREC Director Paul Sebesta conducted research regarding the development of sugarcane as an ethanol source for a gasoline additive which came with the elimination of MTBE as the prevailing additive for cleaner burning gasoline. Production of sugarcane and ethanol in Imperial valley was deemed highly feasible if ethanol production facilities could be located here. That reality never occurred and after about 2004 the project ended. However, there were additional benefits realized with sugarcane research. Building products that essentially replaced wallboard and "MDF" sheathing were developed by Canadian researchers. Also, a foundation was established to develop more research into Bio-energy crops.

- Farm Smart Program: 2001-Present

Created by Nancy Caywood- Robertson in October of 2001, Farm Smart is an Agricultural Literacy Program. It came into being as a result of a National Science Foundation Grant for conducting a three year Agricultural Science Educational Program for middle school students. At the same time, Nancy implemented Farm Smart Educational Field trip programs for learners of all ages and the programs proved so popular that the Imperial Irrigation District has donated $50,000.00 annually since 2003 for the continuation of Farm Smart Education. The photos on the left of this page show the current facilities enjoyed by Farm Smart. The early years of Farm Smart Programs had presentations in the conference room of the main headquarters

Farm Smart Program (continued)

The early years of Farm Smart Programs had presentations in the conference room of the main headquarters. During the first year, attendees to Farm Smart Programs numbered 6,493 including elementary school students and a small number of winter visitors. Popularity and enrollment grew rapidly to a point that larger facilities were essential. The move into the renovated "Granary" in 2009 has provided much greater programing flexibility and capacity. Annually, Farm Smart reaches out to about 7,000 students from local and regional schools and about 3,000 winter visitors. The revenue generated from all Farm Smart Programs allows it to be self-sustaining which is a great benefit for programming creativity and flexibility.

The mission of the Farm Smart Program is to educate people of all ages about natural and renewable natural resources, including agriculture, so they can be conserved, managed and available for future generations.

FARM SMART PROGRAM DESCRIPTIONS

October: "Alfalfa Is Ice Cream In The Making"

Utilizing the above phrase authored by UC Davis Agronomist Dan Putnam, this program involves students in understanding cattle nutrition and comparing it to human nutrition. A fun video entitled "From Moo to You" is presented. Students are then shown a cow's diet and actually milk a model cow named "Bessie". A hayride then takes students to see cattle up close and observe actual feedlot operations as well as observing an alfalfa field. Following the hayride students enjoy lunch on the farm before returning to school. Teachers are provided with handouts including a resource guide from "California Ag In The Classroom", activity booklets for students and a music CD with an accompanying booklet containing lyrics to songs on the CD and expansion activities for each subject. Prepared by volunteer Al Robertson, this cd is entitled "AGRI-LICIOUS FARM SMART MELODIES".

Milking Bessie on the left and enjoying ice cream on the right.
Alfalfa really is "Ice Cream In the Making".
Photos courtesy of Nancy Caywood-Robertson

November/December: "Fall Festival".

This program focuses on the fall harvest season of early America and stresses the importance of corn in the diets of our ancestors in early American history as well as our diets today. Students are shown how corn is incorporated in all farm animals diet. They learn how to harvest corn, shuck corn, and how to dry it so it can be shelled by hand and/or by machine. Students then try grinding corn into corn meal hand and by machine. After all that students enjoy delicious "Johnny Cakes" made from a delicious corn meal recipe. They are shown how communities would come together for a "Hoedown" at the end of the harvest time. Then students go on a hayride to the FARM SMART Corn Maze to explore corn plants and learn corn trivia along the trail.

Deidre DuBose photo

Nancy Caywood-Robertson photo

Above: Discovering the parts of a corn plant
Left: Having a Hoedown with Al and Nancy

Farm Smart Program (continued)

January-March:

"The Winter Visitor Program".

FARM SMART advertises to all RV Parks in the region and winter visitors then call to make reservations for a visit to the DREC for about five hours of Agricultural Education in a relaxed, fun setting. After registration, coffee and popcorn are served until the program starts. After opening remarks, a food demonstration is presented and guests enjoy samples of the food prepared. Visitors are divided in two groups. One goes for a hayride learning about projects at the DREC then harvest produce from the Farm Smart Garden. The second group goes into the "Granary" and is treated to a "Crops of the Valley" presentation. Groups reconvene for lunch where they are served a large chef salad, sodas or water and desert. Live music is performed by Nancy and Al for about 45 minutes during lunch (guest musicians even perform from time to time). After lunch groups "flip-flop" and attend the program the other group saw in the morning. At the completion of the afternoon presentations, the entire group convenes for "ice cream on the patio". Numerous door prizes are then raffled off followed by closing remarks. Door prizes are donated by local businesses, organizations and Al Robertson. Seeds for the Farm Smart Garden are donated by Golden Valley Seed Company and transplants are donated by Keithly-Williams Seed Company.

IMAGES OF THE WINTER VISITOR PROGRAM

All Photos Farm Smart Collection

Registration

Coffee & Popcorn: Breakfast of Champions

Food demonstration using California Products.

DREC Farm Tour

Bountiful Harvest!

"A broccoli for my birthday? Thank you honey."

This is how you make a siphon hose irrigate a field

Indoor Gardening display

Another door prize winner

A wonderful field trip... PLUS Ice Cream, Lunch, Produce, Coffee and Popcorn. Great Time. Great price!

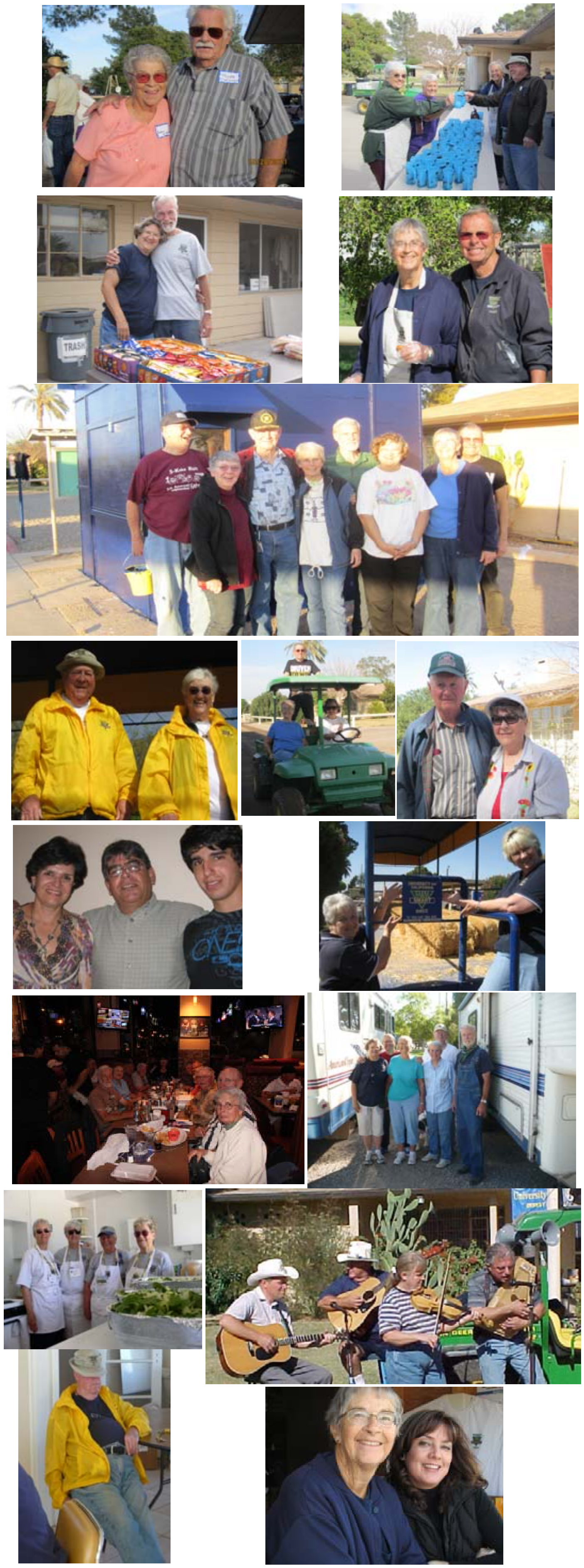
Above and right: Preparing Farm Smart Garden with transplants. The work of these General Assistance Helpers is beyond description.

The Winter Visitor Program has become very successful and popular largely due to the efforts of Winter Visitor Volunteers who actually park their RVs in the DREC parking lot. Numbering at least eight, they assist in every aspect of the program; registration, prepare and serve popcorn, coffee, lunch, package door prizes, collate and handout educational literature associated with the program, clean up after programs and just about anything else that comes up during their stay at the DREC. Some volunteers even stay after the Winter Visitor Program to assist in the spring Farm Smart Program for students.

Throughout the year volunteers contribute significantly to the overall success of Farm Smart. In the 2011-2012 season, total volunteers numbered 37 and their combined service amounted to 4,428 hours.

A random selection of Farm Smart volunteers in action.... Treasured memories.

Courtesy of Al and Nancy Robertson



Farm Smart Program (continued)

March/April: "My Agri-Licious Food Pyramid"

This program stresses the relationship between agriculture and nutrition. Students are shown that nutrition starts on the farm with a video titled "Hard Hat Harry, Down on the Farm". A Farm Smart bracelet is made by students which reinforces the essential elements of what makes plants grow. Water conservation is explained then reinforced with a song "Dudley Dew Drop". Soil types are explained. The distinction between fruits and vegetables is explained and reinforced with the "Crunch Munch" song. Nutrition concepts are demonstrated with an adaptation of the story "Stone Soup". Students are then provided with a "Shaker Salad" containing an item from each of the food groups on the food pyramid. Students crawl through a Farm Smart Tunnel to view a display of life under the soil. A hayride follows where students enjoy harvesting from a Farm Smart Garden.

AGRI-LICIOUS FOOD PYRAMID PHOTOS
Courtesy Al & Nancy Robertson and Deidre DuBose

May: "Insects, The Good, The Bad and the Buggly".

Students learn the difference between insects and bugs. The anatomy of a bug is demonstrated with a "Build-A-Bug" Snack made from vanilla wafers, raisins and pretzel sticks. The song "Buggity Bug" reinforces that bugs have a head, thorax, abdomen, six legs and get their food by the use of their proboscis. A very popular video titled "The Honey Bee Files" is shown providing an enjoyable way of learning about the importance of bees. A pheromone activity reinforces methods bees utilize to communicate and swarm. Beeswax candles are then made as a group activity. Chemical safety is introduced as it pertains to agricultural and residential needs then reinforced with the appearance of "Mr. Chemical Man". Harmful insects such as mosquitos are discussed then ecosystems are discussed to complete the understanding of the program. A "Soggy Bottom Punch", complete with a gummy worm is served as a refreshing drink before the hayride. On the hayride students harvest radishes, squash, carrots and witness plenty of bugs in the field. The "Lady Bug Beetle" is very popular.

INSECT PROGRAM PHOTOS
Al & Nancy Robertson

Farm Smart Program (continued

FARM SMART ATTENDEES

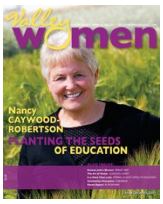
YEAR	ATTENDEES	TOTAL
2001-02	6,493	6,493
2002-03	3,514	10,007
2003-04	7,509	17,516
2004-05	6,372	23,888
2005-06	7,597	31,845
2006-07	7,838	39,323
2007-08	8,940	48,263
2008-09	9,014	57,277
2009-10	10,426	67,703
2010-11	10,862	78,565
2011-12	9,263	87,828

FARM SMART IN THE COMMUNITY

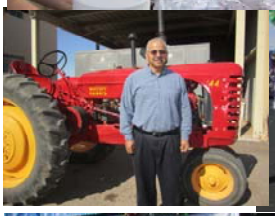
COURTESY OF THE FARM SMART PHOTO COLLECTION











More UC DREC photos

All taken in 2012 except visit from UC President Dynes

Linda Sanchez and Sammie Caywood

Nancy & Al at Yuma Crossing for Western Days

Allison Gunderson and her Centennial Baby Max

Hugh Kittisch

Rosie & Mom from Camacho's

Kay Hamilton, Jr.

Dr. Saadhi on Sabbatical from Baghdad

2005 Visit from UC President Dynes

Nancy, Al & Laura Fox, 2010

Stephanie Collins, Al & Nancy

4
CURRENT PROJECTS AT THE DREC

For the current season at the DREC there are 26 projects in various stages: 5 are new projects, 10 are in a three year review stage to determine whether or not to they will continue, 11are continuing or ongoing projects.

- New Projects

1) The Effect of Hydrogel on Water Use Efficiency: Project leader, Dr. Khaled Bali, (Interim DREC Director, County Advisor UCCE and Farm Advisor, Irrigation and Water Management
2) Wheat Fertilization Practices in Imperial Valley.
3) Castor Beans: Project Leader, Dr. Steve Kafka, UC Davis.

4) Heat Tolerant Lettuce/Spinach: Project Leader, Dr. Beiguan Mou, USDA, Fresno.
5) Eco-Agra: Project Leader, Dr. Richard A. Zinn, DREC Academic, Professor/Nutritionist, Animal Science Department, UC Davis.

- Projects Up For Three Year Review

1) Jatropha for Bio-Diesel: Project Leader, Dr. Sham Goyal, UC Davis.

2) Sweet Corn: Project Leader, Eric Natwick, UCCE Farm Advisor, Entomology.
3) Alternative Forage Crops for the Desert: Project Leader, Dr. Dan Putnam, UC Davis.
4) Insect Management in Cucurbits: Project Leader, Eric Natwick, UCCE Farm Advisor.
5) Insect Management in Alfalfa: Project Leader, Eric Natwick, UCCE Farm Advisor.
6) Carrot Germplasm: Project Leader, Joe Nuñez, UCCE Kern County and Dr. Phil Simon, USDA, University of Wisconsin.
7) Whitefly Alfalfa Resistance: Project leader: Dr. Larry Teuber, UC Davis

8) Agronomic & Genetic: Project Leader, Dr. Larry Teuber, UC Riverside.
9) IR 4 Projects: Project Leader, Eric Natwick, UCCE Farm Advisor.
10) Cysnematodes in Sugar beets: Project Leader, Dr. Becky Westerdahl, UC Davis.

- Continuing Projects

1) Cole Crops Insects: Project Leader, Eric Natwick, UCCE Farm Advisor.
2) Alfalfa Yield Trials: Project Leader, Dr, Dan Putnam, UC Davis.

3) Lettuce Insects: Project Leader, Eric Natwick, UCCE Farm Advisor.
4) Onions: Project Leader, Erick Natwick, UCCE Farm Advisor.

Continuing DREC Projects

5) Wheat Breeding for the Imperial Valley: Project Leader, Dr. Jorge Dubcovsky, UC Davis.

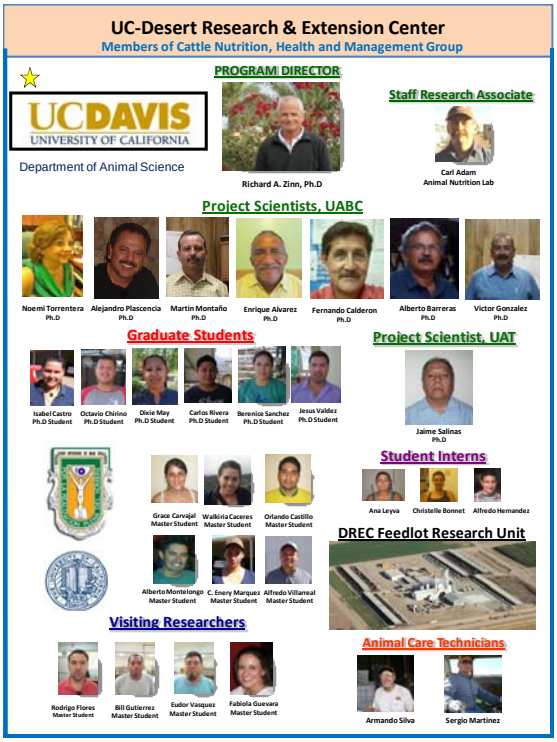
6) Farm Smart Educational Outreach Program for Students and Winter Visitors: Project Leader, Nancy Caywood-Robertson.

7) Multisite Evaluation of Sorghum and Other Energy Crops: Project Leader, Dr. David Grantz, UC Riverside.

8) USDA Melons: Project Leader, Dr. Jim McCreight, USDA, Salinas, CA.

9) Automation of Surface Irrigation Systems: Project Leader, Dr. Khaled Bali, Interim DREC Director, County Advisor-UCCE, Farm Advisor, Irrigation and Water Management.

10) Canadian Grain: Project Leader: Dr. Mike Oro, James Helm, Dave Dyson Alberta Agriculture Department, Provincial Research, Lacomb, Alberta, Canada.



Cattle Nutrition Research Team Members.

Poster created by Dr. Zinn & Nancy Caywood-Robertson. September 2012

11) Feedmill Rate Projects (10 Sub projects): Project Leader, Dr. Richard A. Zinn, DREC Academic, Professor/Nutritionist, Animal Science Department UC Davis.

5
RESEARCHERS AT DREC

The heritage of the research at the Desert Research and Extension center is unique in that the property also houses the offices of the Cooperative Extension Service for Imperial County. Since its creation, Cooperative Extension service research has always been a vital part of research conducted at the Desert Research and Extension Center. A strong earthquake in 1979 resulted in the Extension Service Offices eventually relocating to the Desert Research and Extension Center in 1989.

Before the Cooperative Extension Service moved to the Desert Research And Extension Center the center was named Imperial Valley Agricultural Center. As shown in chapter three, and on page xi of the introduction, numerous University of California Academic Staff were assigned to the Center. During the 60s, 70s and 80s, there were as many as five researchers assigned here at one time from the Departments of Agronomy, Animal Science, Irrigation and Water science, Vegetable Crop and Plant Science and Division of Biological Control.

The results of research from 1953 through 1985 have been included in chapter three and were presented as Technical Publications. Since that time the results of research projects have been archived in various technical data base collections accessible by the internet but not here at the Research and Extension Center. This chapter will focus on the technical publications of 1) UC Davis researcher currently assigned at the Desert Research and Extension Center; Richard Zinn, Animal Science Department, UC Davis 2) Cooperative Extension Farm Advisor, Khaled Bali, Irrigation and Water Management 3) Eric Natwick, Entomology.

While the information may not include every publication they've published, the intent is to portray at least a large sampling of publications resulting from their research projects at the Desert Research and Extension Center.

Additionally, the author would be remiss in not acknowledging the efforts of other researchers who, while not assigned here, have performed numerous and significant research projects here as well.

The previous chapter illustrated the current projects in process at the DREC. In addition to researchers assigned to DREC, off - farm researchers listed were:

Dr. Jorge Dubcovsky, UC Davis

Dr. Sham Goyal, UC Davis

Dr. David Grantz, UC Riverside

Dr. Steve Kafka, UC Davis

Dr. Jim McCreight, USDA, Salinas

Dr. Beiguan Mou, USDA, Fresno

Dr. Joe Nuñez, Kearney REC

Dr. Dan Putnam, UC Davis

Dr. Phil Simon, USDA, Madison , WI.

Dr. Larry Teuber, UC Davis

Dr. Becky Westerdahl, UC Davis

In addition to researchers previously listed project leaders who have conducted research at the DREC between 1985 and the present include:

Dr. Richard Bottoms, UC Davis

Carl Bell, I.C. Cooperative Extension

Juan Guerrero, I.C. Cooperative Extension

Donna Henderson, I.C. Cooperative Extension

Gerald Holmes, I.C. Cooperative Extension

Frank Laemmlen, I.C. Cooperative Extension

Keith Mayberry, I.C. Cooperative Extension

Chris McDonald, I.C. Cooperative Extension

Herman Meister, I.C. Cooperative Extension

Dr. Paul Sebesta, UC Davis

Mark Trent, I.C. Cooperative Extension

The following pages are samplings of publication titles by current researchers stationed at DREC.

KHALED M. BALI
Irrigation/Water Management Advisor
County Director, UC Cooperative Extension-Imperial County
Interim Director, UC Desert Research & Extension Center
University of California Division of Agriculture and Natural Resources
1050 E. Holton Rd. Holtville, CA 92250
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EDUCATION

Ph.D. (Soil Science; Soil Physics), University of California, Davis. 1992.
Dissertation: *Error Corrections for Gamma-attenuation Measurements of Multi-phase Flow in Porous Media.*
M.S. (Water Science; Irrigation and Drainage), University of California, Davis. 1987.
Thesis: *Water Application Under Varying Infiltration and Time.*
B.S. (Soils and Irrigation), University of Jordan, Amman. 1984.

SPECIALIZATIONS

Water Resources Management and Sustainability of Irrigated Agriculture
Water Use Efficiency and Water Quality
Irrigation Management and Fertigation Practices for Nonpoint Source Pollution Control/TMDL
Reuse of Agricultural Drainage Water and Wastewater for Irrigation
Water Conservation and Deficit Irrigation
Evapotranspiration and Crop Water Use

BACKGROUND AND EXPERIENCE IN:

Leadership and management
Outreach and extension education
Water quality, soil salinity, and soil erosion
Waste management
Irrigation and water management
Spatial variability of soil hydraulic properties
Evapotranspiration and crop coefficients
Multiphase flow in porous media and dual-energy gamma systems
Modeling of transport processes in Soils
Geographic information systems
Computer applications, Internet, and distance learning

HONORS AND AWARDS

- U.S. Fulbright Scholar 2006-2007. Reuse of Wastewater in Jordan
- Khaled Bali Xeriscape Demonstration Garden. Yuma Crossing State Historic Park. Dedicated on April 22, 2004. USBR & Yuma Crossing State Park.
- Received the 2003 Water Conservation Award. USBR- Lower Colorado Region Regional Award- Yuma Area Office October 2003.
- Received the 2003 American Society of Civil Engineers/Environmental & Water Resources Institute *Best Practice Paper Award* for our ASCE Journal of Irrigation and Drainage paper "Model for Estimating Evaporation and Transpiration from Row Crops. Journal of Irrigation and Drainage Engineering, Nov/Dec 2001".
-University of California-Office of the Vice President: 2002 Agricultural and Natural Resources Distinguished Service Award for Outstanding Teamwork (Bali, Grismer, and Snyder)
- University of California Outstanding Research Award. UC-ANR Academic Assembly Council. July 1997.
- Volunteers in Overseas Cooperative Assistance (VOCA)- Outstanding Contribution to VOCA. August, 1996.

- Outstanding Student of the College of Agriculture- Soils and Irrigation. University of Jordan. Prize awarded by the late King Hussein of Jordan. June 1984.

- Practical Training Scholarship at the University of Stuttgart, Germany. Awarded by DADD, Germany. June-September 1984.

EMPLOYMENT RECORD

1992 to date University of California - Division of Agriculture and Natural Resources.

1985 to 1991 University of California, Davis. Department of Land, Air and Water Resources.

1990 to 1991 City of Davis, CA. Public Works Department.

PROFESIONAL EXPERIENCE

Assistant, Associate, and Full Title Cooperative Extension Advisor-Irrigation/Water Management, University of California- Division of Agriculture and Natural Resources, UC Desert Research & Extension Center, Holtville, CA (1992-present). Responsible for designing, implementing, and conducting educational and applied research programs in irrigation, drainage, water management, water quality, soil sciences, salinity, waste management, and nonpoint source pollution. Duties include: Conducting a comprehensive research program to encourage the use of research-based irrigation and water management practices to improve water use efficiency, water quality, and reduce soil salinization. Taught classes at the University of California-Davis, The University of Arizona, Imperial Valley College, and the University of Jordan. Organized conferences, seminars, short courses, and field days. Participated in educational, outreach, coordination and consulting in U.S., China, Egypt, Jordan, Morocco, Mexico, and Saudi Arabia, Syria, United Arab Emirates.

County Director-UCCE- Imperial (July 2009-present): Provides leadership, direction and management oversight of 16 University and County academics and staff and two University volunteers.

U.S. Fulbright Scholar (2006-2007). Reuse of Wastewater for Irrigation- University of Jordan.

SELECTED PUBLICATIONS

Escobosa, M. I. G, **K. M. Bali**, J. Guerrero, R. S. Ortiz, L. F. Escobosa, A. Perez, V. Cardenas., M. Aviles, O.

Rodriguez, D. Araiza, C. Ruiz, and A. Lopez. 2009. The Impact of Phosphorus Management Practices on the Quality of Surface Drainage Water. Agricultura Orgánica-AGROFAZ (Mexican Journal). ISSN: 1665-8892. Volume 9, No. 1 Pages 49-56.

Gao, P., Pasternack, G. B., **K. M. Bali**, Wallender, W. W. 2008. Estimating Suspended Sediment Concentration

Using Turbidity in an Irrigation-Dominated Southeastern California Watershed. American Society of Civil Engineers, Journal of Irrig. & Drain. Engr. Volume 134, Issue 2, pp. 250-259 (March/April 2008).

Hanson, B. R., **K. M. Bali,** and B. L. Sanden. 2008. Irrigating Alfalfa in Arid Regions. IN C.G. Summers and D. H.

Putnam, eds., Irrigated Alfalfa Management in Mediterranean and Desertzones. Chapter 7 Oakland: University of California Agriculture and Natural Resources. Publication 8293. http://alfalfa.ucdavis.edu/irrigatedalfalfa/

Meyers, R.D., B. L. Sanden, and **K. M. Bali.** 2008. Lagoon Water, Manures, and Biosolids Applied to Alfalfa. IN

C.G. Summers and D. H. Putnam, eds., Irrigated Alfalfa Management in Mediterranean and Desertzones. Chapter 20. Oakland: University of California Agriculture and Natural Resources. Publication 8306. http://alfalfa.ucdavis.edu/irrigatedalfalfa

Gao, P., Pasternack, G. B., **K. M. Bali**, Wallender, W. W. 2007. Suspended sediment transport in an intensively

cultivated watershed in southeastern California. CATENA Volume 69. pp. 239-252 (Ranked by ScienceDirect number 8 out of TOP 25 Hottest Articles. October 2007).

Escobosa, M.I. G, **K. M. Bali**, Juan Guerrero, Roberto Soto Ortiz, L.F. Escoboza, M. López, A. Pérez M. S.R.

Carvajal, V.C. Salazar, M. J. Román.2007. Biosolids Application in Clay Soils and its Effect on Infiltration Rate at Imperial Valley, Ca. Agricultural production -AGROFAZ (Mexican Journal). ISSN: 1665-8892. Volume 7 No. 1, Pages 17-24.

Ventura. F, R. L. Snyder, and **K. M. Bali.** 2006. Estimating Evaporation from Bare Soil Using Soil Moisture Data. American Society of Civil Engineers, Journal of Irrig. & Drain. Engr. Volume 132, Issue 2, pp. 153-158 (March/April 2006).

Estimating Evaporation and Transpiration from Row Crops. California Water Plan Update Bulletin 160-05 Volume 4 - Reference Guide. California Department of Water Resources. 7 pp (ASCE paper published in 2001).

Fulton, A. **K. M. Bali,** Z. Mousli, and L. Jackson. 2006. Irrigation and Water Relations of Small Grains. Small

Grains Production Manual, Part 5. UC- ANR Publication-8168. 7 pages.

http://ucce.ucdavis.edu/datastore/detailreport.cfm?usernumber=632&surveynumber=323

Escobosa, M. I. G, **K. M. Bali**, Juan Guerrero, Roberto Soto Ortiz, S. R. Carvajal, V. C. Salazar, R. López, L. F.

Escobosa, G. Román, and D. A. Zúñiga. 2006. Effect of the Application of Biosolids in the Production of Alfalfa Soils of the Imperial Valley, CA. U.S.A. Agricultura Organicia-AGROFAZ (Mexican Journal). ISSN: 1665-8892. Volume 6, No. 1 Pages 1-5.

Kaffka, S. R., S. M. Lesch, **K. M. Bali, K. M**., and D. L. Corwin. 2005. Site-specific management in salt-affected

sugar beet fields using electromagnetic induction. Computers and Electronics in Agriculture 46:329-350. Published by Elsevier B.V.

Bali, K. M. 2003. Saline Water. Pages 829-831. *Encyclopedia of Water Science.* New York. Marcel Dekker, Inc.

Ventura F., B. A. Faber, **K. M. Bali**, R. L. Snyder, D. S. Duce, and K. F. Schulbach. 2001. Model

for Estimating Evaporation and Transpiration from Row Crops. American Society of Civil Engineers, Journal of Irrig. & Drain. Engr. Vol. 127, No. 6, 339-345

Bali, K. M., M. E. Grismer, M. E. and R. L. Snyder. 2001. Alfalfa Water Use Pinpointed in Saline, Shallow Water

Tables of Imperial Valley. *California Agriculture*, Vo. 55, No. 4, 38-43.

Bali, K. M., M. E. Grismer, and I. C. Tod. 2001. Reduced-Runoff Irrigation of Alfalfa in Imperial Valley,

California. American Society of Civil Engineers, Journal of Irrig. & Drain. Engr. Vol. 127, No. 3, 123-130.

Grismer M. E. and **Bali, K. M.** 2001. Reduced-Runoff Irrigation of Sudan Grass Hay, Imperial Valley, California.

American Society of Civil Engineers, Journal of Irrig. & Drain. Engr. Vol. 127, No. 5, 319-323.

Snyder R. L., **K. M. Bali,** F. Ventura, and H. Gomez-MacPherson. 2000. Estimating Evaporation

from Bare or Nearly Bare Soil. American Society of Civil Engineers, Journal of Irrig. & Drain. Engr. Vol. 126, No. 6, 399-403.

M. E. Grismer and **Bali, K. M.** 1998. Subsurface Drainage Systems Have Little Impact on Water Tables, Salinity

of Clay Soils.*California Agriculture*, Vol. 52, No. 5, 18-22.

Bali, K. M., and R. A. Gonzalez. 1997. Availability of Colorado River Water for Transfer in Southern

California. *Water: Economics, Management and Demand, Edited by Melvyn Kay, Tom Franks and Laurence Smith, E & FN Spon,* pp 59-66.

Grismer, M. E., **K. M. Bali**, F. E. Robinson and I. C. Tod. 1997. Effects of Water Management and

Conservation on Water Value Relative to Alfalfa Yield in the Low Desert of California. *Water: Economics, Management and Demand, Edited by Melvyn Kay, Tom Franks and Laurence Smith, E & FN Spon,* pp 67-74.

M. E. Grismer and **Bali, K. M.** 1997. Continuos Ponding and Shallow Aquifer Pumping Leaches Salts in

Clay Soils. *California Agriculture*, Vol. 51, No. 3, 34-37.

Grismer, M. E., **K. M. Bali** and F. E. Robinson. 1995. Field-scale neutron probe calibration and variance analysis

for clay soil. American Society of Civil Engineers, Journal of Irrig. & Drain. Engr. Vol. 121, No. 5, 354-362.

Bali, K. M., M. E. Grismer, and J. W. Hopmans. 1996. Outflow methods for Evaluating the

Functional Relationships bet-ween NAPL Pressure and Saturation in Porous Media *Volatile Organic Compounds in the Environment, ASTM STP 1261,* Edited by W. Wang, J. Schnoor, and J. Doi., American Society for Testing and Materials, pp 105-118.

Bali, K. M. and M. E. Grismer. 1994. Calibration of dual-energy gamma systems for determining

liquid saturations during multiphase flow in soil. *International Agrophysics*. 8(1):1-8.

1.
Feeding value of dried shredded sugarbeets as a partial replacement for steam-flaked corn in finishing diets for feedlot cattle.
Arrizon, A. Carrasco, R. Salinas-Chavira, J. Montano, M. Torrentera, N. Zinn, R. A.
Journal of Animal Science; 2012. 90: 6, 1892-1897.
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2.
Effect of corn variety and fat supplementation on digestion of diets for feedlot cattle containing dry rolled or steam-flaked corn.
Plascencia, A. Alvarez, E. Corona, L. Gonzalez, V. M. Montano, M. F. Salinas-Chavira, J. Zinn, R. A.
Animal Feed Science and Technology; 2012. 173: 3/4, 159-166. 29 ref.
[Journal article]

3.
Effects of forage level in feedlot finishing diets on carcass characteristics and palatability of Jersey beef.
Arnett, E. J. Fluharty, F. L. Loerch, S. C. Zerby, H. N. Zinn, R. A. Kuber, P. S.
Journal of Animal Science; 2012. 90: 3, 960-972.
[Journal article]

4.
Comparative effects of processing methods on the feeding value of maize in feedlot cattle.
Zinn, R. A. Barreras, A. Corona, L. Owens, F. N. Plascencia, A.
Nutrition Research Reviews; 2011. 24: 2, 188-190. 37 ref.
[Journal article]

5.
Digestion and energy value of macerated sudangrass hay used in growing-finishing diets for feedlot cattle.
Plascencia Jorquera, A. Serrano Ponce, J. G. Sanchez-Mendoza, B. Barreras Serrano, A. Calderon-Cortes, J. F. Lopez-Soto, M. A. Montano Gomez, M. F. Zinn, R. A.
Scientia Agricola; 2011. 68: 6, 615-619. 24 ref.
[Journal article]

6.
Effect of level of dietary zilpaterol hydrochloride (beta 2 agonist) on performance, carcass characteristics and visceral organ mass in hairy lambs fed all-concentrate diets.
Rios Rincon, F. G. Barreras-Serrano, A. Estrada-Angulo, A. Obregon, J. F. Plascencia-Jorquera, A. Portillo-Loera, J. J. Zinn, R. A.
Journal of Applied Animal Research; 2010. 38: 1, 33-38. 10 ref.

7.
Influence of mechanical maceration on wheat straw on characteristics of digestion in growing-finishing diets for feedlot cattle.
Serrano-Ponce, J. G. Sanchez-Mendoza, B. Alvarez, E. G. Aguirre-Ortega, J. Gonzalez-Vizcarra, V. M. Lemus-Flores, C. Lopez Soto, M. A. Mendoza-Martinez, G. D. Plascencia, A. Stuart, J. R. Zinn, R. A.
Livestock Science; 2011. 142: 1/3, 175-180. 23 ref.
[Journal article]

8.
Influence of method of surfactant supplementation on characteristics of digestion and feeding value of fat in Holstein steers fed a high-energy finishing diet.
Davila-Ramos, H. Gonzalez-Castellon, A. Barreras-Serrano, A. Estrada-Angulo, A. Lopez-Soto, M. A. Macias-Zamora, J. V. Plascencia, A. Vega, S. H. Zinn, R. A.
Journal of Applied Animal Research; 2011. 39: 3, 192-195. 15 ref.
[Journal article]

9.
Effects of fungal infested steam-flaked corn on characteristics of ruminal and total tract digestion in steers.
Alvarez, E. Barajas, R. Calderon, F. Montano, M. Salinas-Chavira, J. Zinn, R. A.
Animal Feed Science and Technology; 2011. 168: 3/4, 145-151. 31 ref.
[Journal article]

10.
Influence of abomasal infusion of the non-ionic surfactant Tween 80 on postruminal fatty acids digestion in steers fed a fat-supplemented, high energy diet.
Davila-Ramos, H. Gonzalez-Vizcarra, V. M. Lopez-Valencia, G. Montano, M. F. Plascencia, A. Valdes, Y. S. Vega, M. A. Zinn, R. A.
Indian Journal of Animal Sciences; 2011. 81: 4, 424-426. 18 ref.
[Journal article]

11.
Influence of processing method on comparative digestion of white corn versus conventional steam-flaked yellow dent corn in finishing diets for feedlot cattle.
Plascencia, A. Bermudez, R. M. Cervantes, M. Corona, L. Davila-Ramos, H. Lopez-Soto, M. A. May, D. Torrentera, N. G. Zinn, R. A.
Journal of Animal Science; 2011. 89: 1, 136-141. 35 ref.
[Journal article]

12.
Effect of variation in supplement inclusion rate and laidlomycin propionate on growth performance of feedlot cattle.
Montano, M. F. Loya-Olguin, J. L. Plascencia, A. Salinas-Chavira, J. Zinn, R. A.
Journal of Applied Animal Research; 2010. 37: 1, 83-87. 13 ref.
[Journal article]

13.
Effects of dietary calcium levels on growth performance and digestive function in cattle fed a high-fat finishing diet.
Plascencia, A. Alvarez, E. G. Montano, M. Salinas-Chavira, J. Zinn, R. A.
Journal of Applied Animal Research; 2009. 36: 2, 179-184. 19 ref.
[Journal article]

14.
Comparative effects of virginiamycin supplementation on characteristics of growth-performance, dietary energetics, and digestion of calf-fed Holstein steers.
Salinas-Chavira, J. Lenin, J. Ponce, E. Sanchez, U. Torrentera, N. Zinn, R. A.
Journal of Animal Science; 2009. 87: 12, 4101-4108. 44 ref.
[Journal article]

15.
Influence of beta -agonists (ractopamine HCl and zilpaterol HCl) on fecal shedding of Escherichia coli O157:H7 in feedlot cattle.
Edrington, T. S. Farrow, R. L. Loneragan, G. H. Ives, S. E. Engler, M. J. Wagner, J. J. Corbin, M. J. Platter, W. J. Yates, D. Hutcheson, J. P. Zinn, R. A. Callaway, T. R. Anderson, R. C. Nisbet, D. J.
Journal of Food Protection; 2009. 72: 12, 2587-2591. 13 ref.
[Journal article]

16.
Phase feeding strategies to meet metabolizable amino acid requirements of calf-fed Holstein steers.
Zinn, R. A. Calderon, J. F. Corona, L. Plascencia, A. Montanno, M. F. Torrentera, N.
Professional Animal Scientist; 2007. 23: 4, 333-339. 25 ref.
[Journal article]

17.
The effect of zilpaterol hydrochloride on meat quality of calf-fed Holstein steers.

Holmer, S. F. Fernandez-Duenas, D. M. Scramlin, S. M. Souza, C. M. Boler, D. D. Mckeith, F. K. Killefer, J. Delmore, R. J. Beckett, J. L. Lawrence, T. E. VanOverbeke, D. L. Hilton, G. G. Dikeman, M. E. Brooks, J. C. Zinn, R. A. Streeter, M. N. Hutcheson, J. P. Nichols, W. T. Allen, D. M. Yates, D. A.
Journal of Animal Science; 2009. 87: 11, 3730-3738. 36 ref.
[Journal article]

18.
Effects of preslaughter withdrawal period on response of feedlot heifers to zilpaterol hydrochloride supplementation: growth performance and carcass characteristics.
Robles-Estrada, J. C. Arrizon, A. A. Barreras, A. Calderon, J. F. Figueroa-Saavedra, F. Torrentera, N. Plascencia, A. Zinn, R. A.
Journal of Animal Science; 2009. 87: 5, 1759-1763. 18 ref.
[Journal article]

19.
A comparison of ground oyster shell and limestone as potential alkalizing agents when fed at extra-nutritional levels for enhancement of growth-performance and digestive function in feedlot cattle fed steam-flaked corn-based finishing diets.
Zinn, R. A. Salinas-Chavira, J. Lenin, J. Montano, M. F. Sanchez, U.
Journal of Animal and Veterinary Advances; 2009. 8: 6, 1116-1123. 30 ref.
[Journal article]

20.
Influence of level of zilpaterol chlorhydrate supplementation on growth performance and carcass characteristics of feedlot lambs.
Estrada-Angulo, A. Barreras-Serrano, A. Contreras, G. Obregon, J. F. Robles-Estrada, J. C. Plascencia, A. Zinn, R. A.
Small Ruminant Research; 2008. 80: 1/3, 107-110. 23 ref.
[Journal article]

21.
Influence of level of addition on the feeding value of cane molasses in growing-finishing diets for feedlot cattle.
Montano, M. F. Flores, L. R. Calderon, J. F. Gonzalez, V. M. Salinas, J. Zinn, R. A.

Journal of Animal and Veterinary Advances; 2009. 8: 1, 190-194. 21 ref.
[Journal article]

22.
Performance by feedlot steers and heifers: daily gain, mature body weight, dry matter intake, and dietary energetics.
Zinn, R. A. Barreras, A. Owens, F. N. Plascencia, A.
Journal of Animal Science; 2008. 86: 10, 2680-2689. 20 ref.
[Journal article]

23.
Influence of the beta -agonist, zilpaterol, on growth performance and carcass characteristics of feedlot steers.
Plascencia, A. Torrentera, N. G. Zinn, R. A.
Journal of Animal and Veterinary Advances; 2008. 7: 10, 1257-1260. 16 ref.
[Journal article]

24.
Influence of day-to-day fluctuations in feed intake on feedlot cattle growth-performance and digestive function.
Barajas, R. Alvarez, E. G. Montano, M. F. Zinn, R. A.
Journal of Animal and Veterinary Advances; 2008. 7: 7, 816-821. 28 ref.
[Journal article]

25.
Influence of ovariectomization (spaying) and feeding system on performance and carcass characteristics of implanted beef heifers.
Plascencia, A. Valenzuela, R. M. Barreras, A. Cervantes, M. Gonzalez, V. M. Zinn, R. A.
Journal of Animal and Veterinary Advances; 2008. 7: 3, 354-358. 25 ref.
[Journal article]

26.
Influence of fat titer and method of addition on characteristics of ruminal and total tract digestion.
Plascencia, A. Alvarez, E. G. Davila-Ramos, H. Montano, M. F. Valdes-Garcia, Y. S. Zinn, R. A.
Journal of Animal and Veterinary Advances; 2008. 7: 2, 145-148. 29 ref.
[Journal article]

27.
Influence of tempering and steaming requirements of flaked corn for feedlot cattle diets.
Zinn, R. A. Salinas, J. Montano, M. Corona, L.
Journal of Animal and Veterinary Advances; 2008. 7: 1, 68-76. 26 ref.
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28.
Influence of intraruminal infusion of acetate on ruminal characteristics and NDF digestion in feedlot steers.
Plascencia, A. Alvarez, E. Zinn, R. A.
Journal of Animal and Veterinary Advances; 2007. 6: 8, 986-990. 28 ref.
[Journal article]

29.

Zinn cites (2)

Influence of dry-rolling and tempering agent addition during the steam-flaking of sorghum grain on its feeding value for feedlot cattle.
Zinn, R. A. Alvarez, E. G. Montano, M. Salinas-Chavira, J.
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30.
Nutritive value of kikuyograss (Pennisetum clandestinum, var. Whittet) in two growth seasons compared to ryegrass (Lolium multiflorum) and sudangrass (Sorgum sudanense) offered to Holstein steers. [Spanish]
Alvarez, E. Rodriguez, J. Rodriguez, R. E. Carrillo, G. Zinn, R. Plascencia, A. Montana, M. Gonzalez, V. Espinoza, S. Aguilar, U.
Interciencia; 2008. 33: 2, 135-139. 31 ref.
[Journal Article]

31.
Influence of surfactant supplementation and maceration on the feeding value of rice straw in growing-finishing diets for Holstein steers.
Plascencia, A. Lopez-Soto, M. A. Montano, M. F. Serrano, J. G. Ware, R. A.
Zinn, R. A.
Journal of Animal Science; 2007. 85: 10, 2575-2581. 28 ref.
[Journal article]

32.
Feed value of supplemental fats used in feedlot cattle diets. (Topics in nutritional management of feedlot cattle.)
Zinn, R. A. Jorquera, A. P.
Veterinary Clinics of North America, Food Animal Practice; 2007. 23: 2, 247-268. 106 ref.
[Journal article]

33.
Dietary phosphorus requirement of Holstein steers during early growing period.
Lopez, J. R. Montano Gomez, M. F. Plascencia Jorquera, A. Salinas Chavira, J.
Zinn, R. A.
Journal of Applied Animal Research; 2007. 31: 2, 113-115. 7 ref.
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34.
Starch digestion by feedlot cattle: predictions from analysis of feed and fecal starch and nitrogen.
Zinn, R. A. Barreras, A. Corona, L. Owens, F. N. Ware, R. A.
Journal of Animal Science; 2007. 85: 7, 1727-1730. 16 ref.
[Journal article]

35.
Influence of corn hybrid, protease and methods of processing on in vitro gas production.
DePeters, E. J. Getachew, G. Fadel, J. G. Corona, L. Zinn, R. A.
Animal Feed Science and Technology; 2007. 135: 1/2, 157-175. 33 ref.
[Journal article]

36.
Influence of site of casein infusion on voluntary feed intake and digestive function in steer calves fed a sudangrass-based growing diet.
Alvarez, F. G. Zinn, R. A.

Zinn cites (2)

Journal of Animal and Veterinary Advances; 2007. 6: 2, 249 256. many ref.
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37.
Impact of corn vitreousness and processing on site and extent of digestion by feedlot cattle.
Corona, L. Owens, F. N. Zinn, R. A.
Journal of Animal Science; 2006. 84: 11, 3020-3031. 42 ref.
[Journal article]

38.
Fibrolytic enzyme supplementation, a tool for enhancing energy intake in growing-finishing feedlot cattle.
Zinn, R. A. Ware, R. A.
Nutritional biotechnology in the feed and food industries. Proceedings of Alltech's 18th Annual Symposium: from niche markets to mainstream, Lexington, Kentucky, USA, 13-15 May 2002; 2002. 219-224. 36 ref.
[Book chapter. Conference paper]

39.
Influence of Fibrozyme on digestive function and growth performance of feedlot steers fed a 78% concentrate growing diet.
Zinn, R. A. Salinas, J.
Biotechnology in the feed industry. Proceedings of Alltech's 15th Annual Symposium: under the microscope, focal points for the new millennium; 1999. 313-319. 16 ref.
[Book chapter. Conference paper]

40.
Case study: comparative feeding value of rice straw in growing-finishing diets for calf-fed Holstein steers: fibrolytic enzyme supplementation.
Ware, R. A. Calderon, J. F. Corona, L. Zinn, R. A.
Professional Animal Scientist; 2005. 21: 5, 416-419. 29 ref.
[Journal article]

41.
Partial substitution of alfalfa hay with grass hay (sudangrass, elephant grass) in diets for lactating dairy cattle: digestive function.
Gastelum, M. A. Alvarez, E. G. Guerra, T. E. Corrales, J. L. Moreno, T. Meza, M. Soto, L. E. Zinn, R. A.
Animals and environment, Volume 1: Proceedings of the XIIth ISAH Congress on Animal Hygiene, Warsaw, Poland, 4-8 September 2005; 2005. 233-236. 10 ref.
[Book chapter. Conference paper]

42.
Comparative effects of whole, ground, dry-rolled, and steam-flaked corn on digestion and growth performance in feedlot cattle.
Corona, L. Rodriguez, S. Ware, R. A. Zinn, R. A.
Professional Animal Scientist; 2005. 21: 3, 200-206. 32 ref.
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43.
Influence of partial substitution of lucerne hay with ground vs. macerated rice straw on dry matter intake and performace of lactating Holstein cows.
Ware, R. A. Arellano, G. E. Plascencia, A. Zinn, R. A.
Journal of Animal and Veterinary Advances; 2005. 4: 7, 694-697. 21 ref.
[Journal article]

44.
Predicting carcass dressing percentage in feedlot bulls and heifers.
Torrentera, N. Zinn, R. A.
Journal of Animal and Veterinary Advances; 2005. 4: 7, 659-662. 20 ref.
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45.
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Source data for this compilation is The UC Davis Library, Virtual Public Network (VPN). For other source data, contact Dr. Zinn at the Desert Research And Extension Center; 760-356-3060.

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The previous two pages were a compilation of "Citations" listing titles of Technical Publications with which Eric Natwick was involved.

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CONCLUSION

The heritage of desert research in Imperial Valley is important. Successful agriculture in this region has created a strong sense of community, in spite of harsh desert conditions. The persistent nature of the early settlers here and the visionary researchers paved the way for us and now we must follow in their footsteps with the resolve that the importance of Imperial County's agricultural heritage must never be diminished. As a part of the overall California population, Imperial County is small and sometimes perceived to be largely ineffective in having its case heard before the larger populations. But Imperial County's reputation as the "Nations' Salad Bowl" speaks to a vital necessity for the continuation of successful agriculture. So much has to happen. First and foremost is water! Without a steady, reliable source of water Imperial County could easily go the way of places like Pinal County, Arizona where the Gila River Watershed at the San Carlos Reservoir is at less than 1% of capacity. There have been no water allocations to farmers relying on that water source for the last two growing seasons. More and more farm land is going fallow. Could another dust bowl be in the making? Imperial County is so very fortunate to have a water delivery system that is unlike anywhere else. Getting that system established was no small task but, it has remained effective with the continuing efforts of the people and businesses in Imperial County.

The Desert Research and Extension has remained for one hundred years largely through the good work and fortuitous efforts of: 1) our predecessor Walter Packard, the first superintendent of the DREC; 2) the University of California; 3) the local population who convinced the state to locate a research farm here; 4) Irving and Fannie Gleason who sold us the land; 5) the local farmers and the Imperial County Board of Supervisors who purchased and donated the farm to the University of California.

The work of the University of California Desert Research and Extension Center in Imperial County has proudly carried out the mandate handed down to us; a mandate to respond to local needs of local farmers and conduct meaningful research that ensures continued agricultural success in Imperial County.

The voice of the Desert Research and Extension Center gets heard in many venues of which we may not be aware. Technical conventions, technical publications, testimonials before state and federal committees, presentations before national, state and local organizations are but a few. Education and extension efforts to disseminate successful research results is a constant effort. But, in order for successful research to occur, the coordinated team effort of those employed at the DREC are paramount. General Assistance Workers, Farm Maintenance Workers, Physical Plant Workers, Administrative Office Technicians, Science Laboratory Specialists, Agricultural Field Technicians, Staff Research Associates and the Academic Faculty Researchers: their teamwork is not only essential, it is something they exhibit daily. Since arriving here in 2001, the author has witnessed a pride in workmanship at the DREC which has never faltered. So, without successful scientific research, it would be difficult to argue for continued operation at the DREC.

It is important to remain mindful of author Ann Foley Scheuring's words regarding causing research station closures in the early years of UC history; 1) excessive costs in maintaining center operations; 2) a shortage and/or lack of qualified and scientifically competent supervision; 3) inadequately small budgets ultimately causing reductions in research projects leading to a center operation akin to little more than "care-taker" status.

The Desert Research and Extension Center has coped with these issues throughout its history but it seems to the author, that coping with these very issues has made the Desert Research and Extension Center a stronger entity. That is probably a major factor in why it has survived for a century of success. It has met budgetary shortfalls head on and endured with a "hunker-down and get it done" mentality that is most impressive.

With regard to shortages of Center Directors, the leadership at the DREC has come from within. There are five people who have worked here for over 30 years each. Their longevity speaks to an admirably proud work ethic. They know this farm in a way that is very unique. From that group and others, there are those who have stepped up to provide a quality of leadership that is without equal during times when fulltime Center Directors are not available. So the shortfall of Center Directors has been turned into a strength by leadership from within.

As funding for agriculture and research continues to decline, innovative ideas that augment or replace more conventional measures can help keep research centers a viable member of the agricultural community. The Farm Smart Program at the DREC seems to be such an innovation. Since its inception in 2001, the DREC has realized a surprising ground swell of local support from everywhere in the Imperial Valley. With the revenues received from winter visitors and school attendees, the Farm Smart Program has remained largely self-sustaining. It's presence in the community is obvious with the attendees to all programs exceeding 87,000 since 2001. That's an average of about 8,000 people per year!

So, these are the reasons why the University of California Desert Research and Extension Center has seemed to prevail. It has been the author's extreme pleasure to engage in the composition of this centennial publication. Best wishes to all who continue to serve and best wishes for another one hundred years of continued success in agricultural research.