A HISTORY OF ENTOMOLOGY IN MISSISSIPPI

1st Edition

A Collection of Historical Accounts

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MISSISSIPPI ENTOMOLOGICAL ASSOCIATION

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PrefacePreface

The history of entomology in Mississippi is a rich one. Guided by outstanding leaders and individuals, entomological efforts in Mississippi have endured challenges and problems to realize great accomplishments in events, research, teaching, service, and professional functions.

Realizing the need to document these strides, and recognize the important individuals in this great field of agriculture, the historical committee of the Mississippi Entomological Association (MEA) determined to publish accounts of the significant events of the numerous and various components of entomology in Mississippi, past and present. The project began in 1986, with Harry R. Fulton, state apiarist and pesticide registration specialist, Mississippi Department of Agriculture and Commerce, Division of Plant Industry, and Chairman of the of the MEA historical committee , spearheading work on the project. This publication, the result of the commmittee's diligent work, relates the evolution and the achievements of the many programs, activities, research, and personalities that comprise Mississippi's rich entomological legacy.

The recollections of these pioneering entomologists will be preserved for future generations to ponder and consider as they make decisions that will better the field of entomology. We only pray that future generations can add and preserve in writing their entomological acheivements in Mississippi.

Acknowledgments

Much appreciation is expressed to the many persons who contributed their time and talents to bring all the information together for publication.

Many different fields of entomological expertise are represented in these writings; scientific, educational, regulatory, industrial, private, and others.

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Co-author

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Co-author

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Co-author

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Edwin P. Lloyd, Starkville, MS:
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Boll Weevil Research Unit
Mississippi State University

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Progressive Farmer Network

ENTOMOLOGY DEPARTMENT
MISSISSIPPI STATE UNIVERSITY

C.A. Wilson, L.W. Hepner, and R.G. Luttrell

Mississippi State, MS

Before 1910 Entomology and Zoology were included as disciplines in the Department of Horticulture at Mississippi A & M College (now Mississippi State University). Later the two were combined to form a separate department in the College of Arts and Sciences. In 1962 the Department of Zoology was established in the College of Arts and Sciences, and the Department of Entomology was established in the College of Agriculture and the Mississippi Agricultural and Forestry Experiment Station (MAFES). In the next nine years, the Department operated out of widely separated buildings but in 1971 moved to its present location in the Clay Lyle Entomology Complex (CLEC).

The construction of the Gast Boll Weevil Rearing Facility near the CLEC in 1971 provided additional support for research projects by Entomology Department staff. Additionally, the USDA Boll Weevil Research Laboratory was near the CLEC, providing excellent opportunities for research projects of graduate students. The MSU Entomology Department has adjunct professors from the Mississippi Cooperative Extension Service Entomology Department, as well as staff in the USDA Boll Weevil Research Laboratory and Forest Products Utilization Laboratory in Starkville, and USDA Southern Field Crop Insect Management Laboratory and Hardwood Insects Laboratory at the Delta Branch Experiment Station at Stoneville.

Teaching

A few courses were taught before 1910. The curriculum gradually expanded from about 1910 until 1940. During this period the first graduate courses were offered leading to the Master of Science degree. Strong emphasis was given to training economic entomologists, and many graduates served positions in various divisions of the U. S. Department of Agriculture. In fact, L. O. Howard's book, *History of Entomology,* stated that Mississippi State University during this period had more entomologists in federal employment than any other entomology department in the United States.

Professor R. W. Harned is regarded by many as the "Father of Entomology" in Mississippi and in the South. Because of his efforts, the Mississippi Legislature in 1918 established the State Plant Board to protect against entry of migrant pests and to prevent spread of those established in the state. The State Plant Board served as a model for the creation of similar agencies in many other states.

Shortly after World War II (1946) the teaching staff was overloaded with duties caused by rapid student growth. Thus the curriculum was expanded, additional staff

positions were filled, and graduate teaching and research advanced to the point that the first Ph.D degree was awarded in 1962. To this date (1989), approximately 162 B.S., 24 M.A., 175 M.S., and 112 Ph.D. degrees have been awarded in Entomology.

The move into the new Clay Lyle Entomology Complex in 1971 greatly expanded the laboratory and lecture space needed to conduct the expanded teaching program.

Research

In the late 1800's through the early 1900's entomological research was primarily on basic taxonomy; however, some attention was given to problems in economic entomology. After 1910 and until about 1965, research emphasis was on control of economic insects pests. It was during this period that research on cotton insects was first strongly emphasized. This pattern of research continued until World War II. During the war very little research was conducted because of the deep involvement of the staff in the war.

After World War II several new staff members were added to the department. Research was initiated in stored grain, vegetable, fruit, livestock, household, ornamental, forest and medical pests. Work on cotton insects continued.

A. L. Hamner served a long and productive career in the Department, where he conducted research and directed the research of several students in their masters degree programs. He did pioneer research on cotton insects. His cotton de-fruiting studies and his work on rearing boll weevils on artificial diets are especially important. He studied many insect problems. He was always very careful and thorough with his research work.

When the Department of Entomology was transferred to the College of Agriculture in 1962, there was a rapid expansion of staff positions and addition of adjunct professors. Basic research expanded to include discipline, as well as commodity approach. This greatly increased the research activities in the Department. The staff, approximate dates of initial employment and departmental responsibilities since World War II are listed:

Department Heads

Glen W. Herrick	1897-1908
R. W. Harned	1908-1931
Clay Lyle	1931-195l
Ross E. Hutchins	1951-1962
James R. Brazzel	1963-1968
Fowden G. Maxwell	1968-1974
Daniel L. Shankland	1976-1980
T. J. Helms	1981-1987
Clarence Collison	1989-Present

Acting Heads

C. Arlie Wilson	1975-1976,1980
Randall G. Luttrell	1988

FacultyFaculty

1923 A. L. Hamner - Cotton, Pecan Insects
1947 Henry B. Green - Field Crop Insects
1948 C. Arlie Wilson - Diseases of Honey Bees
1948 Ted Brook - Field Crop Insects
1948 Melvin Burton - Field Crop Insects
1950 R. E. Schuster

1951 P. A. Caraway
1952 Leslie L. Ellis - Cotton Insects
1953 James G. Teer
1954 William W. Neel - Livestock and Nut Tree Insects
1958 Russ Andress - In charge of Museum
1958 Leon Hepner - Leafhopper Taxonomy
1959 Marion Laster - Field Crop Insects
1960 James D. Land - Toxicology
1961 Johnnie Ouzts - Medical Entomology
1962 James R. Brazzel - Head, Cotton Insects
1963 Frank Bailey - Livestock Pests
1965 Henry Pitre - Field Crop Insects
1965 George Allen - Insect Pathology
1965 Bradleigh Vinson - Insect Physiology
1967 Robert Combs - Livestock Pests
1967 Howard Chambers - Toxicology
1968 Fowden G. Maxwell - Head, Cotton Insects
1968 Peter Sikorowski - Insect Pathology
1969 Aubrey Harris - Cotton Insects
1970 James L. Frazier - Insect Physiology
1972 Beverly R. Norment - Medical Entomology
1974 Mike Schuster - Cotton Insects
1974 T.Evan Nebeker - Forest Insects
1975 Dan Shankland - Head, Cotton Insects
1975 Edward Pieters - Cotton Insects
1975 Greta Tyson - Electron Microscope
1977 David Hogg - Cotton Insects
1979 John Schneider - Cotton Insects
1980 Richard Brown - Insect Taxonomy
1980 William Kitten (D.B.E.S.) Cotton Insects
1981 Tom Helms - Head, Cotton Insects
1981 Richard Roush - Insect Genetics
1981 Randy Luttrell - Cotton Insects
1982 Gordon Andrews - Cotton Insects
1983 Gerald Baker - Insect Morphology
1983 Sonny Ramaswamy - Insect Physiology
1985 Jack Reed - Insecticide Evaluations
1988 James Mallett - Population Genetics

Department Highlights

Programs

Master of Agriculture in Pest Management Degree Program - Initiated in 1974 as multidisciplinary curriculum involving Entomology, Plant Pathology and Weed Science. Graduated 33 students between 1974-1982.

Forest Entomology- W. W. "Bill" Neel was the entomologist assigned to work in forest entomology in 1970 in addition to other duties. His forestry related research focused on coniferous seed and cone insect problems and was aimed primarily at control strategies utilizing chemicals.

Needs were great and resources inadequate for forestry needs, so Dr. Neel assembled a job description and formal document describing the need for a permanent forest entomologist (1971-1973). Approval was gained in 1973 and T. Evan Nebeker was hired in the spring of 1974.

The original job description indicated that Evan Nebeker would be working on regeneration insect problems; however, with a new focus on the southern pine beetle,

Dendroctonus frontalis Zimm, the overall direction of the program was changed.

The field of forestry was undergoing some dramatic changes during the mid-1970's. To increase the research efforts positions in forest pathology, forest economics, silviculture, and forest management were established in the Mississippi Agricultural and Forestry Experiment Station. Persons filling these positions have worked together to provide an excellent interdisciplinary team effort.

Forest entomological research has been based on the theme of understanding the forest system in such a way that pest management recommendations could be based on sound ecological principles. Initial efforts concentrated on the southern pine beetle and its associates; basic population estimates (sampling), developmental rates, predator/prey interactions, and stand thinning along with the impact of other forest management tactics. Such studies have involved other entomology faculty members such as J. L. Frazier, and P. P. Sikorowski.

Dr. Neel retired in June of 1985 which concluded investigations at MSU on chemicals for controlling insects in pine seed orchards.

With the establishment of an interdisciplinary team and the expansion of the MSU Forestry Department research efforts on the southern pine beetle took on a new emphasis where the host became a more important component. The impact of harvesting practices on the soil, tree rooting patterns, growth patterns, and susceptibility to bark beetle attack were recognized as important approaches to take. Current research is focused on gaining an understanding of the host defensive systems, how they are modified, their heritability characteristics, and on the interactions between the bark beetle, its host, and its associated microorganisms. Cooperative efforts have been generated with chemists, pathologists, tree physiologists, soils scientists, and geneticists. New technologies to detect infestations, such as acoustics, are being investigated.

Heliothis Hybrid/Backcross Program- In 1968, Dr. Marion L. Laster, entomologist at the Delta Branch Experiment Station of MAFES, discovered that interspecific hybridization between female *Heliothis subflexa*, which feed primarily on *Physalis*, groundcherry, and male *H. virescens* results in males that are sterile and females that produce sterile males when backcrossed to male *H. virescens*. Subsequent backcrosses have an identical result. Dr. Laster recognized the potential of this phenomenon as the basis of an autocidal control system: rearing and release of sterile-male-producing females should reduce the fertility of wild-type females in the following generations.

Numerous studies were done in the laboratory, in field cages, and in computer simulations to investigate the mechanism of the sterility, biological characteristics of hybrid/backcross individuals, and potential for suppression of wild populations.

Four major field studies were attempted. The first involved the release of hybrid/backcross individuals in Puerto Rico during 1977 to study mating under natural conditions. The second, 1979-1981, was an attempt to suppress the *H. virescens* population of St. Crois with high rates of release. The third, 1981-1983, was designed as a mark/release/recapture experiment to determine which release rates are necessary to achieve suppression of *H. virescens* in the Mississippi Delta. Information obtained on the movement of

H. virescens prompted investigations to determine levels of movement among areas of irrigated cotton in southwest Arizona in 1985. Lack of funding has reduced the level of research on the hybrid/backcross in recent years.

Awards

Marion Laster - First Mississippi Corporation "Award of Excellence" Research

W. W. "Bill" Neel - First Mississippi Corporation "Award of Excellence" Research Award , 1978.

Henry Pitre - Mississippi State University Alumni Association Faculty Achievement Award for Research, 1984.

Howard Chambers - Entomological Society of America, Southeastern Branch, Distinguished Achievement Award for Teaching, 1984.

T. Evan Nebeker - First Mississippi Corporation "Award of Excellence" Research Award, 1988.

Fowden Maxwell - J. Everett Busart Memorial Award, 1972. Entomological Society of America's highest award.

Outstanding Educator of America, 1973.

Universisty Fellow Mississippi State University, 1974-1976.

Gamma Sigma Delta Distinguished Award, 1975

Entomology Department Graduates

Mississippi State University

Name	BS
Stiles, C. F.	1911
Cockerham, Kirby Lee	1914
Bailey, John Wendell	1915
Lyle, Clay	1917
Young, Martin T.	1917
Colmer, Robert P.	1920
Ewing, Ky Pepper	1920
Brannon, Charles H.	1921
Chapman, Andrew J.	1922
Hull, Frank M.	1922
Ingram, Jessie W.	1922
Young, Hiram C.	1922
Douglass, Nelson Lee	1926
Roney, James N.	1926
Douglas, William A.	1928
Bond, George L.	1929
Henderson, C. A.	1930
Pate, Benjamin D.	1930
Randolph, Josh	1930
Tate, H. Douglas	1930
Todd, Thomas G.	1930
Breland, Osmond Philip	1931
Henderson, T. F.	1931
Majure, James Benton	1931
Rainwater, Clyde F.	1931
Rainwater, Homer T.	1931
Simmons, Samuel W.	1931
Caviness, Charles R.	1932
McGarr, Rex	1932
Stubblefield, Louis H.	1932
Bennett, Albert G., Sr.	1933
Smith, Keith Howell	1934
Sylvester, Clyde W.	1934
Dale, Madison S., Sr.	1935
Redd, Jabus C.	1936
Carter, William M.	1938
Conner, James T.	1938
Fancher, Charles Clyde	1938
Guice, O. T., Sr.	1938
Wilson, Ernest W.	1938
Applewhite, Kermet H.	1939
Cochran, James H.	1939
Crowson, David L.	1939
Epps, James Milton	1939
McVey, Eric A., Jr.	1939
Owen, Woodrow O.	1939
Richmond, Clyde A.	1939
Vanderford, W. B.	1939
Smith, James M., Sr.	1940
Wilson, C. Arlie	1940

Adams, Curtis H.	1941	Brown, Joe Jack	1958	Dickinson, Ronald I.	1966
Clanton, Roy T., Sr.	1941	Buttram, James Ross	1958	Lee, Horace W.	1966
Green, Henry B.	1941	Coleman, Leslie F.	1958	Leeper, Ray O., III	1966
Hare, William H.	1941	Mitchell, Bob Dwain	1958	Neely, Samuel W.	1966
Adams, Paul K.	1942	Mitchell, Henry C.	1958	Norris, Ted W.	1966
King, John R., Sr.	1943	Mitchell, Larry B.	1958	Palmer, Charles P.	1966
Scoggin, John K.	1943	Nicaise, Randolph W.	1958	Smith, James W., Jr.	1966
Strong, Rudolph G.	1946	Page, Frank Critz, Jr.	1958	Black, E. Russell, Jr.	1967
Day, Augustine	1947	Rives, Aaron B.	1958	Crosby, Cary B.	1967
McWilliams, John G.	1947	Stephens, Wilburn L.	1958	Humber, James F., III	1967
Cochran, William E.	1948	Stone, Clyde Michael	1958	Moody, J. Reynard	1967
Daughdrill, Billy H.	1948	Kimbrough, James W.	1959	Parks, Enoch M., III	1967
Elmore, Christopher M.	1948	Pitts, Charles W., Jr.	1959	Johnson, William L.	1968
Graham, Andrew J.	1948	Shuford, James W.	1959	Makamson, Thomas L.	1968
Kilpatrick, John W.	1948	Knapp, Joseph L., Jr.	1960	Watson, H. Clifton	1968
Lochridge, John A.	1948	Davis, Frank M.	1961	Williams, Michael R.	1968
Young, David F., Jr.	1948	Vickers, David H.	1961	Bell, Charles R.	1969
Bailey, James E.	1949	Buford, William T.	1962	Frazier, A.E.	1969
Johnson, H. S., Jr.	1949	Falls, William A.	1962	Frazier, Albert L., Jr.	1969
Applewhite, Ray	1950	Harris, J. Patrick	1962	Gunter, James A.	1969
Blocker, Morris Gray	1950	Haynes, Jack W.	1962	Livingston, James M.	1969
Dunnam, James W.	1950	McKibben, Gerald	1962	Ray, Henry W., Jr.	1969
Mitchell, E. Bruce	1950	Meeks, Roy A., Jr.	1962	Simmons, Cecil L.	1969
Batson, William N.	1951	Smallwood, Paul R.	1962	Stewart, Becky A.	1969
Campbell, William V.	1951	Tate, Jon D.	1962	Adams, Jack P., Jr.	1970
Harris, Jessie M.	1951	Thomas, Gustave D.,IV	1962	Alexander, Stephen D.	1970
Andress, Calvin R.	1952	Tingle, Frederic Carley	1962	Barnett, James D.	1970
Goza, Aaron W.	1952	Wiygul, Glenn	1962	Bell, Charles S.	1970
Shipp, O. Elmo	1952	Bell, Marion R.	1963	Cain, Stephen N.	1970
Wilson, Argie	1952	Boone, Charles O.	1963	Cook, Joe R.	1970
Molpus, James E.	1953	Dyess, Edwin G.	1963	Cummins, Allen E.	1970
Land, James D.	1954	Harlan, Don	1963	Davis, Cecil W., Jr.	1970
Sparks, David H.	1954	Humphreys, James B.	1963	Etheridge, Jimmy B.	1970
Webb, John S.	1954	James, Billy Frank	1963	Gaskin, Roy C.	1970
Arnett, William Harold	1955	Jones, Richard L.	1963	Gates, Jeptha M.	1970
Graves, Jerry B.	1955	Mauldin, Joe K.	1963	Haskins, James R.	1970
Womack, Herbert	1955	Oakes, James F.	1963	Hines, Billy M.	1970
Bonner, Singleton S.	1956	Young, Seth Y., III	1963	Laseter, Michael W.	1970
Gladney, Horace M.	1956	Harris, Frank A.	1964	Maxcy, Frank B.	1970
Harris, James J.	1956	Lewis, W. Joe	1964	McCormick, Eddie O.	1970
Neal, Gene E.	1956	Lowery, Houston F., Jr.	1964	Moore, Stephen T.	1970
Parham, Price H.	1956	Nichols, Franklin	1964	Robinson, Danny W.	1970
Robinson, Charles L.	1956	Skelton, Emery D.	1964	Rose, Fred W.	1970
Tynes, James S.	1956	Thaxton, James P., Jr.	1964	Bryson, James O.	1971
Webb, James K.	1956	Barefoot, Howard L.	1965	Cannon, Charles E.	1971
White, James F.	1956	Bouchard, Dennis F.	1965	Dalton, Robert E., II	1971
Adams, Milton D.	1957	Burney, John F.	1965	Westmark, Ronald A.	1971
Chiles, James W.	1957	Chesnut, Thomas L.	1965	Fulton, Harry	1972
Martindale, James D.	1957	Smith, James Winfred	1965	Peeples, Michael L.	1972
Nation, James L.	1957	Boyd, Farrell J., Jr.	1966	Beach, William	1973
Tingle, Milton F.	1957	Bradford, William D., Jr.	1966	Clanton, Roy T., Jr.	1973
Ainsworth, Joseph H.	1958	Collins, Homer L., Jr.	1966	Nichols, Samuel E.	1973

Skelton, Louie M.	1973
Worley, John	1973
Boykin, James C.	1974
Crawford, J. W., III	1974
Foresman, David M.	1974
Rutland, Donald Hayes	1974
Simpson, James Jr.	1974
Furr, Randle E., Jr.	1975
Cauthen, Melton D.	1976
Eckler, Scott C.	1976
Gammill, Wilson J.	1976
Kinard, Hugh C.	1977
Layton, M. Blake., Jr.	1977
McKissack, Billy S.	1977
Morgan, David R.	1977
Rabby, John C.	1977
Wilson, Galen B.	1977
Zummo, Guy R.	1977
Bowles, Jon S.	1978
Frasier, Larry E.	1978
Gammill, John W.	1978
Hale, Mark S.	1978
Hooper, Frederick L.	1978
Posey, W. Jeff	1978
Smith, Bruce D. A.	1978
Weed, Clifton H.	1978
Welch, John M., Jr.	1978
Bishop, Joseph R.	1979
Cordell, Larry K.	1979
Fancher, Wayne B., Jr.	1979
Millwood, John T.	1979
Mink, Billy E., Jr.	1979
Skinner, David K.	1979
Thomas, W. Mack	1979
Mitchell, Henry R.	1980
Short, David S.	1980
Wasser, William	1980
Whitehead, James R.	1980
Boykin, Gladis D., III	1981
Crafton, Glenn E.	1981
Hankins, David M.	1981
Morgan, Robert C., Jr.	1981
North, Robert J.	1981
Smith, Arthur D., Jr.	1981
Winters, Stephen R.	1981
Jeffcoat, David A.	1982
Polk, Mark Christopher	1982
Richards, Timothy K.	1982
Wilson, Brian S.	1982
Wofford, J. Thomas	1982
Castro, Marco	1983
Smith, David Hilton	1983
Winstead, Rodney W.	1983
Baucum, Leslie	1984
Heering, David C.	1984
Russell, Wiley R.	1984
Trabanino, Carlos R.	1984
Pongetti, James M.	1985
Riley, Dennis G.	1985
Allen, Kevin W.	1986
Brown, Brenda Booth	1986
MacDonald, Steven L.	1986
Schuster, Anthony	1986
Davis, Michael Todd	1987
Ledlow, Michael	1987
MacDonald, John R.	1990

Name	MS
Ludlow, Clara	1901
Stockard, C. R.	1902
Blumenfeld, Simon F.	1910
Stafford, Ethelbert W.	1914
Bailey, John Wendell	1917
Arnold George F.	1918
Allen, Harry W.	1923
Langston, James M.	1925
Snapp, Oliver I.	1925
Roney, James N.	1927
Barnes, Olus L.	1928
Hutchins, Ross E.	1930
Haug, Gordon W.	1931
Lyle, Clay	1931
Ward, James W.	1931
Bynum, E. K.	1932
Flint, Robert N.	1932
Ingram, Jessie W.	1932
Majure, James Benton	1932
Todd, Thomas G.	1932
Hutchins, Annie	1933
Douglas, William A.	1934
Carter, William M.	1939
Coleman, Sidney H.	1939
Guice, O. T., Sr.	1939
Moran, Earl Joseph	1939
Wilson, Ernest W.	1939
Cochran, James H.	1941
Epps, James Milton	1941
Redd, Jabus C.	1944
Murphree, Limon C.	1947
Fortune, Irma A.	1948
Strong, Rudolph G.	1948
Cochran, William E.	1949
Faulkner, Lloyd R.	1949
Graham, Andrew J.	1949
Kilpatrick, John W.	1949
Young, David F., Jr.	1949
Daughdrill, Billy H.	1950
Dragovick, Alexander	1950
Henley, Felix T.	1950
King, Charles E.	1950
Lochridge, John A.	1950
Bailey, James E.	1951
Freeman, Herman	1951
Furr, Randle E., Sr.	1951
Hunsucker, Carl L.	1951
McCoy, Kenneth E.	1951
Mitchell, E. Bruce	1951
Byrd, Felton	1952
Campbell, William V.	1952
Day, Augustine	1952
Harris, Jessie M.	1952
King, John R., Sr.	1952
Morgan, Kenneth C.	1952
Richey, Thomas M.	1952
Ritchie, Thomas M.	1952
Robertson, Bertram S.	1952
Sanchez, Louis O.	1952
Andress, Calvin R.	1953
Burton, Melvin F.	1953
Edwards, Thomas H.	1954
Rawson, James W.	1954
Rogers, Mills L.	1954
Sims, R. Douglas	1954
Wilson, Argie	1954
Applewhite, Ray	1955
Molpus, James E.	1955
Palmer, James	1955
Peets, Norman D., Jr.	1955
Sparks, David H.	1955
Stokes, Virgil C.	1955
Wasser, Chester C., Jr.	1955
Webb, John S.	1955
Goza, Aaron W.	1956
Miller, Walter O.	1956
Rea, James M.	1956
Smith, Thelma	1956
Smith, Virgil K., Jr.	1956
Applewhite, Carroll D.	1957
Boren, Roger B.	1957
Dunnam, James W.	1957
Womack, Herbert	1957
Goodman, Oscar G.	1958
Graves, Jerry B.	1958
Mason, George L.	1958
Shipp, O. Elmo	1958
Bancroft, Harold R.	1959
Bennett, Albert G., Sr.	1959
Buttram, James Ross	1959
Doler, James L.	1959
Harris, James J.	1959
Land, James D.	1959
McIntire, William S.	1959
Rives, Aaron B.	1959
Ouzts, Johnny D.	1961
Watkins, William C., Jr.	1961
Moore, Bobby	1962
Tynes, James S.	1962
Boyd, Claude E.	1963
Davis, Frank M.	1963
Haynes, Jack W.	1963
Vinson, S. Bradleigh	1963
Harris J. Patrick	1964
Meeks, Roy A., Jr.	1964
Thomas, G. D., IV	1964
Tingle, Frederic C.	1964
Vickers, David H.	1964
Wiygul, Glenn	1964
Adair,H. Marcus	1965
Bailey, Jack C.	1965
Boone, Charles O.	1965
Harris, Frank A.	1965
Howell, Gordon S.	1965
Jones, Richard L.	1965
Lewis, W. Joe	1965
Mauldin, Joe K.	1965
Oliver, Billy F.	1965
Skelton, Emery D.	1965
Vardell, Henry H.	1965
Buford, William T.	1966
Chesnut, Thomas L.	1966
Ganyard, Milton C., Jr.	1966
Grimes, Scottie L.	1966
James, Billy Frank	1966
Jao, Lien-Tsai	1966
Kincade, Robert T.	1966
Peden, Walter L.	1966
Richey, Hilton M.	1966
Tumlinson, J. H., III	1966
Walker, Alton I.	1966
Barefoot, Howard L.	1967
Barry, Robert M.	1967
Bouchard, Dennis F.	1967
Bradford, W. D., Jr.	1967
Clay, Bobby F.	1967
Gregory, Barry G.	1967
Hoelscher, Clifford E.	1967
Holder, David G.	1967
Hudspeth, William N.	1967
Leeper, Ray O., III	1967
Mitchell, Henry C.	1967
Mitchell, Larry B.	1967
Nichols, Franklin	1967
Redmond, Kenneth	1967
Shirar, Charles R., III	1967
Thompson, Jimmy L.	1967
Bell, Marion R.	1968
Boling, Johnny C.	1968
Boyd, Farrell J., Jr.	1968
Collins, Homer L., Jr.	1968
Dickinson, Ronald I.	1968

Hao, Grace Tan-Fang	1968
Humber, James F., III	1968
Londono, Ruby	1968
McGovern, William L.	1968
Peach, Michael J., III	1968
Polles, Sammy G.	1968
Steele, Charles E., Jr.	1968
Black, E. Russell, Jr.	1969
Coakley, Jerry M.	1969
Davis, L. B.	1969
Fabacher, David L.	1969
Guillot, Frank S.	1969
Harrison, Gerald	1969
Ho, Kai-Kuang	1969
Law, Paul K.	1969
Moody, Dwight S.	1969
Moody, J. Reynard	1969
Norton, William N., Jr.	1969
Wang, Jung San	1969
Watson, H. Clifton	1969
Williams, Michael R.	1969
Chamkrachang, Prasert	1970
Coley, Jack D.	1970
Glover, Dorwayne, Jr.	1970
Hughes, Franklin F.	1970
Jarratt, James H.	1970
Johnson, William L.	1970
Laonipon, Visit	1970
Scott, William P.	1970
Clark, William J.	1971
Gates, Jeptha M.	1971
Haskins, James R.	1971
Maxcy, Frank B.	1971
McCoy, John R.	1971
Moore, Charles A.	1971
Patel, Vishnubhai C.	1971
Ray, Henry W., Jr.	1971
Baughman, Odie M., Jr.	1972
Cain, Stephen N.	1972
Hines, Billy M.	1972
Latson, Larry N.	1972
Lindig, Oliver H.	1972
Moore, Stephen T.	1972
Simmons, Cecil L.	1972
Alexander, Stephen D.	1973
Barbosa, Sebastiao	1973
Bryson, James O.	1973
Hillhouse, Thomas L.	1973
Roach, Edwin R.	1973
Roth, James P.	1973
Smith, Charles M.	1973
Sri-Arunotai, Surarit	1973
Townsend, Joe R., Jr.	1973
Bryson, Charles T.	1974
Fulton, Harry	1974
Hormchan, Praparat	1974
Jech, Larry E.	1974
Sorepirojn, Utumporn	1974
Watkins, Robert M.	1974
Anderson, Ronald E.	1975
Gray, Ben	1975
Hatfield, Larry D.	1975
Miles, Levenia R.	1975
Sindhusake, Chalerm	1975
Watts, Klois J.	1975
Donahoe, Michael C.	1976
Dyess, Edwin G.	1976
Fisher, William R.	1976
Halford, William	1976
Jones, David C.	1976
Kitten, William F.	1976
McDaniel, Sidney G.	1976
Pair, Sammy D.	1976
Snodgrass, Gordon L.	1976
Thead, Larry G.	1976
Urrelo, Rafael	1976
Wigle, Charles D.	1976
Bertsch, Marvin L.	1977
Jong, Yaw-Shong	1977
Lambert, W. E., Jr.	1977
Mizell, Russell F., Jr.	1977
Purser, Geoffrey C.	1977
Rhodes, Alvin R.	1977
Bleicher, Ervino	1978
Boykin, James C.	1978
Gammill, Wilson J.	1978
Kinard, Hugh C.	1978
Valerio, Jose R.	1978
Carpenter, Terry L.	1979
Ferreira, Joana M. S.	1979
Hall, Peter Keith	1979
Nause, Charles L., Jr.	1979
Scanlan, S. M., Sister	1979
Hutchinson, William D.	1980
Willers, Jeffrey L.	1980
Bloomquist, Jeffrey R.	1981
Elmore, Christopher M.	1981
Mitchell, Henry R.	1981
Beardmore, Richard A.	1982
Bong, C. F. Joseph	1982
Miller, Chris E.	1982
Nashnosh, Ibrahim M.	1982
Stone, Terry B.	1982
Eroles-Harkins, Lualhati	1983
Hutchins, Scott H.	1983
Conley, James M.	1984
Ma, Wai Keung	1984-85
Ng, Sen-Seong	1984
Whitehead, James R.	1984
Wilson, Brian S.	1984
Castro, Marco	1985
Kaomini, Mien	1985
Porter, R. Patrick	1985
Winstead, Rodney W.	1985
Wofford, J. Thomas	1985
Chan, Wai Pang	1987
Lee, Susanna Sau-tuen	1987
Mink, Jeffrey	1987
Tonhasca, Athayde	1987
Cho, Soo Won	1987
French, Ned M.	1988
Videlia, Guillermo w.	1989

Name	Year-PhD
Bancroft, Harold R.	1962
Ouzts, Johnny D.	1963
Snow, James W., Jr.	1964
Tynes, James S.	1964
Adams, Curtis H.	1965
Davis, Frank M.	1965
Knapp, Joseph L., Jr.	1965
Vinson, S. Bradleigh	1965
Young, David F., Jr.	1965
Brook, Ted S.	1966
Khan, Azzizar R.	1966
Laster, Marion L.	1966
Pate, Travis L.	1966
Allen, George	1967
Bailey, Jack C.	1967
Combs, Robert L., Jr.	1967
Gilliland, Floyd R., Jr.	1967
Ledbetter, Roy J.	1967
Parrott, William L.	1967
Awad, Toson M.	1968
Harris, Frank A.	1968
Lewis, W. Joe	1968
Oliver, Billy F.	1968
Chesnut, Thomas L.	1969
Dinkins, Reed L.	1969
Norment, Beverly R.	1969
Ricks, Beverly	1969
Adair, H. Marcus	1970
Barras, Donald J.	1970
Boling, Johnny C.	1970
Brewer, F. Douglas	1970
Green, Henry B.	1970
Hays, Donald B.	1970
Hoelscher, Clifford E.	1970
Kincade, Robert T.	1970
Patrick, Charles R.	1970
Polles, Sammy G.	1970
Shaunak, Krishan K.	1970
Timmons, Frank K.	1970
Bhirud, K. M.	1971
Harris, J. Patrick	1971
Mitchell, E. Bruce	1971
Mitchell, Henry C.	1971
Sartor, Clyde F., Jr.	1971
Schuster, Michael F.	1971
Solomon, James D.	1971
Vitelli, Mario	1971
Andrews, Gordon L.	1972
Coakley, Jerry M.	1972
Coakley, Toni P.	1972
Fabacher, David L.	1972
Hamer, Jimmy L.	1972
Head, Robert B.	1972
Jarratt, James H.	1972
Moody, J. Reynard	1972
Black, E. Russell, Jr.	1973
Henson, Rodger D.	1973
Khan, Mir A. A.	1973
Barbosa, Sebastiao	1974
Broome, Joe R.	1974
Clark, William J.	1974
Eskafi, Fred M.	1974
Jones, Flernoy G.	1974
Latson, Larry N.	1974
Moore, Charles A.	1974
Bell, Marion R.	1975
Galindo-Toro, Dario	1975
Leggett, Joseph E.	1975
Nichols, Philip R.	1975
Nicholson, W. F., Jr.	1975
Robinson, James V.	1975
Simmons, Cecil L.	1975
Hillhouse, Thomas L.	1976
Naresh, Jagdish S.	1976
Poole, Michael A.	1976
Smith, Charles M.	1976
Calderon, Mario C.	1977
Charoenying, Sawarng	1977
Dzuik, Larry J.	1977
Glover, Dorwayne, Jr.	1977
Hormchan, Praparat	1977
Lambert, Lavone	1977
Mohamed, Abdul K. A.	1977
Foil, Lane	1978
MacGown, Matthew W.	1978
Cosenza, Gilson W.	1979
Hatfield, Larry D.	1979
Kitten, William F.	1979
Pendergrass, Jimmy E.	1979
Snodgrass, Gordon L.	1979
Anderson, Ronald E.	1980
Mizell, Russell F., Jr.	1980
Mullins, J. Walton	1980
Ave', Dirk A.	1981
Burkett, Gerald R.	1981
White, William H.	1981
Bird, T. Gary	1982
Farlow, Robert A.	1982
Thomas, Billy R., Jr.	1982
Belcher, Dennis W.	1983
Ramalho, Francisco de S.	1983
Thead, Larry G.	1983
Ali, Said M.	1984
Chandrapatya, Angsumarn	1984
Goddard, Jerome (Captain)	1984
Mulrooney, Joseph E.	1984
Thomas, W. Mack	1985
Seward, Ronnie W.	1986
Willers, Jeffrey L.	1986
Wiygul, Glenn	1986
Adamski, David	1987
O'Leary, Patricia F.	1988
Halford, William T.	1987
Ng, Sen Seong	1988
Ali, Abbas	1989
Ward, Kenneth E.	1989
Felland, Carl M.	1989
Khokhar, Malik S.M.	1989

Name	Ms-Ag
Harnan, Miguel	1972
McCarty, Robert	1972
Sonepirojn, Utumporn	1974
Edwards, Michael W.	1975
Craig, Charlie	1976
Wilson, Gary	1976
Poole, Tim	1977
Mulrooney, Joseph E.	1978
Cannon, Chas. E (Gene)	1979
Rabby, John C.	1979
Donahue, Harold	1980
Molpus, John	1980
Pitts, Dan	1980
Dabbs, Dudley	1981
King, Virgil A., III	1981
North, Robert J.	1982
Porterfield, C. Dunk	1982
Skinner, David K.	1982
Smith, Arthur D., Jr.	1982
Wasser, William	1982
Weatherly, Robert Loyd	1983
Winters, Stephen R.	1983
Corban, Kevin	1985
Phelps, Jay	1985

Graduates With Incomplete Information

Bell, William A.
Betts, Johnnie E.
Brock, W. Carlton
Burnham, Roy W.
Caylor, John R.
Davis, Robert Ira
Faulk, Alfred W.
Few, W. C.
Gorrell, Richard M.
Hammond, Abner N.
Henry, James R.
James, U. E.
Johnston, H. G.West
Macon, J. W.
Moss, Billy G.
Pearson, Wm. G.
Reed, W. D.
Roberson,James E.
Shannon, W. R.
Shappley, N. P.
Tate, John R.
Taylor, Horton G.
Thomas, John H.
West, Willie Jobe

Mississippi Entomological Museum

Dr. Leon Hepner
Starkville, Ms.

The insect museum, as such, was begun in 1918 when the Mississippi State Plant Board was established. Before then research at Mississippi State was primarily on taxonomy and biology. Many specimens were collected and sent to specialists. H. E. Weed sent thousands of specimens in the 1890's. Prominent workers in the early years of the museum were Henry Dietrick, R. W. Harned, Gladys Hoke, J. M. Langston, E. W. Stafford, F. W. Benjamin and M. R. Smith. J. M. Langston was curator of the museum in its early years. Many specimens included in the collection were sent in to be identified and others were studied by taxonomists. In World War II fumigants were not always available, and many specimens were lost to dermestids. In 1958 Langston retired, and "Russ" Andress became curator of the museum on a part time basis and was followed a few years later by John D. Ouzts. During all this time the museum was under the State Plant Board jurisdiction. In 1972 the museum was placed under the direction

of the MSU Entomology Department when it moved into its new building, but no curator was named. With the dedicated service of Leon W. Hepner, specimens were maintained and preserved from dermestid attack until 1980, when Hepner retired. In 1979 William H. (Bill) Cross headed a 17 member committee to develop a proposal for a Mississippi Entomological Museum. In 1980 a wide base of support for the museum was evident. The Mississippi Entomological Museum (MEM) became a reality in 1980, and Richard L. Brown was employed as director. Under Bill Cross's direction all insect specimens housed at the USDA Boll Weevil Laboratory were transferred to the museum. It was located in the MSU Entomology Department, Clay Lyle Entomology Complex and now occupies more than 3500 square feet. It includes the State Plant Board Collection, Mississippi State University Department of Entomology Collection, USDA-ARS Cotton Insect Collection, and private collections of William H. Cross, Charles Bryson, and John McCoy. The MEM includes a research collection, library, historical archives, the Ross Hutchins photograph collection, and public displays. The research collection now contains more than 575,000 specimens, including over 35,000 vials and 9,000 slides, and emphasizes the fauna of SE United States and Neotropics. The MEM includes past collections, beginning in the late 1800's, of H. E. Weed, Henry Dietrich, J. M. Langston, R. W. Harned, Gladys Hoke-Lobdell, E. W. Stafford, M. R. Smith, and F. H. Benjamin. The collections are especially strong in Cicadellidae, Coccoidea, and holometabolous orders. Recent collecting trips of certain entomologists have added substantial material from Central and South America, the Seychelles, New Caledonia, and Fiji. The MacDonald Collection, emphasizing Lepidoptera of Panama, is housed in the MEM. The MEM is active in exchanges and loans, and more than 140 loans have been made since 1981. The museum sponsors the annual William H. Cross Expedition to localities outside Mississippi with collectors and an honorary expedition leader/visiting specialist selected from interested applicants and nominees. The staff and resident associates include Richard L. Brown, Director (Tortricidae), Terence Schiefer, curator (Coleoptera), Matthew MacGown, associate curator (Hymenoptera), Leon Hepner, curator emeritus (Cicadellidae), Gerald Baker, research associate (Acarina, Morphology), Larry Corpus, research associate (Dolichopodidae), Michael Ellsbury, research associate (insects on legumes, Lepidoptera), and John MacDonald, research associate (Tabanidae, Lepidoptera).

ENTOMOLOGY IN THE MISSISSIPPI COOPERATIVE EXTENSION SERVICE

David F. Young, Jr.
Starkville, MS

The land grant colleges had been established for more than 50 years and state Experiment Stations at these colleges more than 25 years when the Cooperative Extension Law was enacted in 1914.

For years the agricultural colleges and federal and state departments of agriculture had issued publications and reports on agricultural matters, sending members of their staffs to lecture to farmers' institutes, and sending the press advice for farmers. Much good had been accomplished, yet agriculture was depressed and much of the newer knowledge found application on only a limited number of farms. It was to help remedy this situation that the Extension was organized. Fourteen years after the Extension was organized there were 40 Extension entomologists in the nation. Mississippi did not have an Extension Entomology Department until 31 years after the Extension Service was organized.

In 1945, when the Mississippi Extension Entomology Department was established, the Extension entomologist was a liaison between subject matters, departments of the agricultural colleges, and the county Extension agents. Extension entomologists brought information together from the state agricultural college, the federal department of agriculture, and like institutions for the Extension county agents to use locally. Extension entomologists continue to simplify complicated results of research so farmers may understand and apply them. Extension entomologists in the early days were more involved in the biology and control of all insects causing economic damage to agricultural crops, livestock, and structures, so as to improve economy. Thus, these pioneering entomologists were often referred to as "economic entomologists."

The Entomology Department, Mississippi Cooperative Extension Service, recognized as one of the most efficient nationwide, had its beginning in 1945, when L. C. Murphree was employed as the first full-time Extension entomologist. Prior to the formal establishment of the Extension Entomology Department in 1945, Clay Lyle, head of the Entomology and Zoology Department at that time, demonstrated the need for an Extension Entomology Department by serving without pay for two years as a part-time Extension entomologist. Early Extension economic entomologists, such as L. C. Murphree, A. G. Bennett and David Young, were knowledgeable in the biology and control of all insects causing economic damage to agricultural crops, livestock, and structures. L. C. Murphree left Extension in 1952, when he accepted a position with the Coahoma Chemical Co. of Clarksdale, Mississippi. A. G. Bennett had been employed six months earlier in 1952, as Murphree's assistant, and succeeded Murphree as head of the Extension Entomology Department.

David F. Young, Jr. was employed as an assistant Extension entomologist in 1955, making two entomologists available for the state. There were no additions to personnel until

Roy Meeks was employed in 1965. He worked for about eight months and left for the Stoneville Pedigree Seed Co. at Leland, Mississippi. James H. Cochran was appointed to this position in 1967, remaining in it until his retirement in 1979. A. G. Bennett retired in 1970, and Young became the new head of the Extension Entomology Department. Under Young's direction the Department expanded to include eleven professionals, ten with Ph.D. degrees and one with a Masters degree. By 1980 the staff with support personnel numbered thirty five. All of the new personnel were highly trained and experienced and each brought necessary specialized skills to the Extension Service as the department moved into many new pest management programs. All new programs were usually started with farmers in several counties and expanded until most were statewide in scope. The Safe and Proper Use of Pesticides Program in 1965 and the Pesticide Applicator Training Program in 1978 were initiated statewide.

The area pest management concept with Extension entomologists being located in all four Extension districts in Mississippi was recommended and implemented in 1976. Four entomologists were employed, one for each Extension district: Robert Head, Northeast District; Roy Reid, Northwest District; Pat Harris, Southeast District; and Farrell Boyd, Southwest District. Their principal duties were to develop pest management programs for farmers that proved to be highly effective. A number of states tried to duplicate this approach. The concept permitted county agents and farmers to have direct access to the area entomologists and their technological skills.

Throughout the history of Extension entomology the greatest emphasis was on cotton insect pests. This was primarily because of the economic importance of this crop in Mississippi, which for many years was produced on 1.5 to 2 million acres by more than 100,000 cotton producers. Cotton insect control has always been a complex matter for farmers, who have demanded a lot of attention from the Extension Service. As Extension shifted toward a pest management concept in the late 1960's and the 1970's, it was able to help agricultural consultants become established in working with cotton producers. The reliance of the pest management concept on good scouting techniques helped to make this possible.

A survey in 1985-86 showed that 97.3% of all cotton in Mississippi was scouted and under pest management programs. This shift to pest management greatly reduced the number of insecticide applications used per acre from 16 to 22 to 8 or 9 applications. Insecticides for this crop dropped from 41 million pounds used in 1972 to 18 million pounds in 1978. This reduction occurred before the use of pyrethroids and was primarily because of the effectiveness of pest management programs. Insecticide usage leveled off to around 6 million pounds annually, on approximately 1 million acres of cotton, grown by about 3700 farmers.

Extension Entomology's direct tie to research has been a major strength. The Department's effectiveness has also been enhanced by its good working relationship with agricultural consultants, commercial entomologists, regulatory agencies and other elements of the agricultural sector. The Extension Entomology Department helped plan and implement two of the largest entomological programs ever undertaken in this nation cooperatively with Animal Plant Health Inspection Service and Agricultural Research Service of the U. S. Department of Agriculture. To a large extent this was due to its track record in successfully developing large-scale pest management programs for farmers. The first major program was the 1971-73 South Mississippi Pilot Boll

Weevil Eradication Experiment, which originally covered 37 south Mississippi counties and parts of Alabama and Louisiana. Fifteen agencies in the three states played a role in this $5 million project. The second program in 1978-80 was the Optimum Pest Management Trial in Panola and Pontotoc counties that ran concurrently with the Boll Weevil Eradication Trial in North Carolina and was compared with it as an alternative approach to boll weevil control.

David Young and H. C. Mitchell were the principal Extension entomologists involved in the south Mississippi program, with Gordon Andrews, Ron Seward, Clyde Sartor and Bob Head playing leading roles in the Optimum Pest Management Trial in Panola and Pontotoc counties.

Historically Extension entomological meetings of major importance were designed to bring advanced technology to farmers, county agents, consultants, insecticide dealers, commercial entomologists, pest control workers, and representatives of other agricultural groups. The largest of these meetings has been the annual Insect Control Conference, jointly sponsored by MEA and Extension since 1955. Three other meetings of importance have been pest management workshops held annually at Greenwood, Jackson, and Mississippi State University. These meetings have drawn heavily from state and federal researchers, industry, Extension, and other groups for speakers. Six to eight cotton scout training meetings have been held annually for agricultural consultants and field scouts. Many other pest management scout schools have been held annually in individual counties for Extension organized pest management programs for cotton and soybean farmers.

4-H club members who choose entomology as a project have numbered in the thousands over the years. In the late 1950's and 1960's, the annual enrollment average was near 6,000, nearly one sixth of all 4-H entomology students enrolled nationwide. Mississippi has had many national 4-H entomology winners. Many of these winners and others have entered MSU, majoring in entomology.

Through the National Science Foundation Visitation Program and the 4-H program, the MSU Entomology Department attained its greatest period of student growth in the 1960's.

David Young retired in 1983, and Pat Harris became department head. Harris remained in this position until his transfer to his former area pest management position at Decatur in 1986. With the transfer of Harris, the Extension Entomology Department was combined with the Plant Pathology Department. William Moore, Extension Plant Pathology leader, began serving as head of the combined departments. Funds that had been secured by the Extension Entomology Department in 1965 had been used to hire Moore and to create the Plant Pathology Department. Since then additional funds secured through the Extension Entomology Department's efforts have been used to hire other pathologists and to help support and maintain the Plant Pathology Department.

Highlights

Many Extension entomology programs were added during Dr. Young's tenure as department head. These programs have played a key role in assisting our farmers in coping with their entomological problems. They were conducted by the Extension staff at MSU and the area pest management specialists in cooperation with county Extension personnel and their farmers. Many of these programs would not have been successful without the cooperation and support of researchers, consultants, industry representatives, and all related agricultural segments in Mississippi. All their coordinated efforts were and are directed toward helping our farmers. The programs were:

1965 - **Safe and Proper use of Pesticides** - Funding of $1,031,730 served to educate pesticide users in the safe and proper use of pesticides in a statewide program. New personnel were employed to assist with this program. Responsibility: David Young and Edna Ruth Morgan.

1968-69 - **Boll weevil Diapause Control** - This program for Monroe and Sharkey counties was conducted by David Young of Extension and Ed Lloyd of the USDA Boll Weevil Research Laboratory. Later the program was expanded statewide by the Extension Entomology Department, following the pilot effort in the two counties. Funding for the two county program came from Extension, ARS-USDA,National Cotton Council,and cotton producers.

1971-73 - **South Mississippi Pilot Boll Weevil Eradication Experiment** - Funded for $5,000,000 the program involved fifteen agencies in three states. The researcher's objective was to determine the technical and operational feasibility of eliminating the boll weevil population by integrating several suppression techniques simultaneously with improvements in application technology. Extension's role was to secure the cooperation of the farmers and keep them informed throughout the program. Responsibility: David Young and H.C. Mitchell.

1972-73 - **First Pilot Pest Management Program for Cotton** - Initial funding was for $185,000. The two-year program was conducted in Grenada and Yalobusha counties to organize farmers into a non-profit pest management society and to demonstrate the effectiveness of a pest management approach to controlling cotton pests with chemicals, beneficial insects, cultural control, and making use of pheromone traps, scouting, and diapause control. Responsibility:David Young, Clyde Sartor, Reynard Moody, and James Lowe.

1972 - **Mississippi Pesticide Applicator Training Program**-Initial funding was $332,633 with an annual funding of $27,000. Objectives were to train 45,000 private and 4500 commercial pesticide applicators in the safe and proper use of pesticides. Retraining now occurs every three years for commercial and five years for private applicators. Aerial applicators receive additional training each year. Responsibility: David Young, Jim Hamer, Ted Brook, and Ruth Morgan.

1973 - **Project Safeguard** - Initial funding was $82,000. Statewide training for small producers with thirty acres or less of cotton, soybeans, and peanuts was conducted. Each producer was instructed in the use of safety gear, with toxic pesticides replacing DDT. Responsibility: David Young and Jim Hamer.

1976 - **Cotton Pest Management** - Original funding was $235,299 with an annual funding of $140,000. Objectives were to organize cotton producers statewide into non-profit pest management societies and to demonstrate the effectiveness of the pest management approach to controlling cotton insects. Responsibility: David Young, Sartor, and Head.

1978-80 - **Optimum Pest Management**- Initial funding was $1,776,118. This program ran concurrently with the North Carolina Boll Weevil Eradication Trial. Both programs were evaluated by teams studying the biological data, environmental impact costs, and benefits. The Optimum Pest Management Trial was conducted in Panola County, with Pontotoc County serving as an untreated check. The specific objective was to develop and demonstrate the technological and operational capability for implementing a community wide optimum cotton insect management program to maintain boll weevils and other insects below treatment levels through voluntary participation of cotton producers. Responsibility: Young, Sartor, and Head.

1978 - **Pesticide Impact Assessment** - Original funding was $222,286 with an annual funding of $47,542. The objective was to evaluate rebuttable presumptions against the registration of pesticides and to provide information on the benefits of pesticides to Mississippi agriculture for EPA to weigh against the ostensible risks that supported cancellation proceedings. Responsibility: David Young and Ruth Morgan.

1978 - **Soybean Integrated Pest Management**-Initial funding was $733,390 with an annual funding of $160,900. The objective was to organize soybean producers into a non-profit pest management society and to demonstrate the effectiveness of a multi

disciplinary approach to controlling weeds, plant diseases, nematodes, and insects in soybeans. Responsibility: David Young, and Jim Hamer.

Mississippi State University Staff

1955 - 1983: David Young - Served as leader of the Extension Department of Entomology.

1960: Edna Ruth Morgan - Pesticide coordinator and pesticide impact assessment specialist: Responsible for pesticide education, assessment of risks and benefits of pesticides, and pesticide applicator training.

1972: Jim Hamer - Extension entomologist: Responsible for insects of soybeans, sorghum, livestock, poultry, forage and pasture, peanuts, stored grain, sunflowers, and medical arthropods (mosquitoes, etc.).

1975: James Jarratt - Extension entomologist: Responsible for household and structural pests, 4-H, apiculture, and insects of commercial and urban vegetables, fruits and nuts, ornamentals, turf, and pets.

1976: Robert B. Head - Extension entomologist: Responsible for insects of cotton, corn, small grains, along with commercial forestry.

Area Specialists

1976: Milton R. Reid - Area pest management specialist: Responsible for insects of rice and department programs in Bolivar, Humphreys, Issaquena, Leflore, Sharkey, Sunflower, Tunica, Quitman, Coahoma, Tallahatchie, and Washington counties.

1977: Pat P. Harris - Area pest management specialist, Decatur: Responsible for programs in Southeast District.

1979: Mike Williams - Extension entomologist

recently transferred from the area pest management position at Pontotoc to the MSU office to assume the responsibility in cotton insect modeling and transfer of computer technology to farm situations.

1980: Douglas M. Gaydon - Area pest management specialist: responsible for Extension educational programs in Northeast Extension District.

The following are entomologists who also worked for Extension Entomology in Mississippi:

L.C. Murphree - Retired, Starkville, MS	1945-1952
A.G. Bennett - Retired, Starkville, MS	1952-1970
Roy Meeks - Stoneville Pedigree Seed Co., Leland, MS	1965-1966
James H. Cochran - Retired, Long Beach, MS	1967-1979
H.C. Mitchell - deceased	1971-1979
Clyde F. Sartor, Jr. - Consultant, Vicksburg	1971-1976
Julius R. Moody - ICI Americas, Grenada, MS	1972-1975
James Lowe - ICI Americas,Grenada, MS	1968-1976
Ted Brook - Retired, Texas	1975-1984
Farrell Boyd, Jr. - Consultant, Clinton, MS	1976-1977
Gordon Andrews - Department of Entomology, Stoneville, MS	1976-1982
Lavone Lambert - Entomologist, USDA, ARS, Soybean Unit, Stoneville, MS	1976-1980
Ron Seward - Memphis, TN	1978-1982

THE STATE PLANT BOARD OF MISSISSIPPI

H. R. Fulton, B. L. Graves, and J. R. Haskins
Mississippi State, MS

House Bill 517, enacted on March 27, 1918, established the three member State Plant Board to regulate and control the introduction and spread of injurious insects and plant diseases. The law was enacted because of the efforts of R. W. Harned and served as a model for similar agencies in many other states. Because R. W. Harned was elected secretary at the first meeting and two of the members were located at the Agriculture and Mechanical College (A & M), many of the State Plant Board meetings were held at A & M College. This close association with A & M College resulted in the State Plant Board's office being located in the Department of Zoology and Entomology from 1922 until 1971. It also resulted in many students being hired by the Plant Board during 52 years of expansion.

Establishment of the Division of Plant Industry

In 1971 the State Plant Board was abolished and the Division of Plant Industry (DPI), under the Mississippi Department of Agriculture and Commerce was created. The organization, activities, and authorities of this new agency remained the same as those of the State Plant Board. The staff of the old plant board operated DPI. The State Entomologist, who had previously supervised the State Plant Board and served as secretary, became Director, with a Chief Inspector and General Inspector as his Assistant Program Supervisors. In 1979 three members were added to the board by legislation. The law established an advisory board to guide DPI and to help promulgate regulations. The Advisory Board, in effect, retained the authority of the old State Plant Board. In 1979 three members were added to the board by legislation.

Housing Facilities

In 1971, with the establishment of DPI and after the separation of the Department of Entomology from the Department of Zoology at Mississippi State University's Harned Biology Building, it became obvious that office and laboratory space would be needed for DPI. Before 1971 the Plant Board had been housed with the Department of Entomology because the Head of Entomology had served as Secretary to the Plant Board, although it was not a part of the department. With the separation, the Department of Entomology was to be housed in the new Clay Lyle Entomology Complex, with the original plans including an annex for DPI. However, the complex had been funded from private and federal grants along with some state monies that would not permit building the annex for DPI at the center. The problem was solved when the legislature agreed to utilize funds collected from the registration of pesticides and seed testing fees to construct housing for DPI and the Seed Testing Laboratory. In the meantime DPI was temporarily housed in Memorial Hall at MSU. Bonds amounting to $200,000 were sold to obtain funds for construction, and in 1973 the new facilities were erected on property donated

by MSU. With increased activities in pesticide regulation and enforcement, it soon became evident that additional facilities were needed, and an additional $230,000 in bonds was sold to secure funds to construct an annex. The annex was completed in 1978. In 1986 the indebtedness of the buildings was paid.

Activities

The first meeting of the Plant Board on May 18, 1918, was held at A&M College. The following employees took office: Nursery Inspector, George F. Arnold; General Inspector, C. B. Haddon; Secretary, R. W. Harned; Chairman, P. P. Garner (Commissioner of Agriculture); a stenographer and clerk; and temporary inspectors.

Plant Board activities in those initial years were aimed at working cooperatively with the U.S. Department of Agriculture's Bureau of Plant Industry, Bureau of Entomology and Plant Quarantine, and the Federal Horticultural Board to survey and control the spread of the sweet potato weevil, *Cylas formicarium elegantulus*(Summers), citrus canker, *Xanthomanas citri* (Hasse), and pink bollworm, *Pectinophora gossypiella* (Saunders). Soon twelve pests, including the cotton square weevil, now known as the boll weevil, *Anthonomus grandis* Boheman, were declared to be public nuisances, and sixty pests were declared to be especially injurious justifying preventive and control measures. Early regulations called for inspecting nurseries, orchards, and other horticultural crops. Specific regulations cited how most plants would be certified and shipped to prevent spread of citrus canker, sweet potato weevil, pink bollworm, cottony cushion scale, *Icerya purchasi* and San Jose scale, *Asipidiotus pernicious* (Comstock). Quarantines were soon imposed to prevent introduction of gypsy moth, *Porthetria dispar* (Linne), orange maggot, *Anastrepha trypeta luidens* (Loew.), and Meditteranean fruit fly, *Ceratitis capitata* (Wiedeman) from other countries and the Alfalfa weevil, *Hypera postica* (Gyllenhal) from our western states.

In 1919 the Plant Board supplied farmers with sweet potato slips to insure noninfested plants were being used to control the sweet potato weevil. On April 20, 1920 the Plant Board authorized purchase of its first automobiles (Fords). In that year the first formal hearings were held relating to pink bollworm regulations, which necessitated nine meetings by the Plant Board. Of significance was the hiring of Clay Lyle and R. P. Colmer that year as assistant inspectors on December 1 and June 10, respectively. That year regulations were adopted to prevent introduction and dissemination of infectious diseases of honey bees, *Apis mellifera*.

In 1920 efforts were begun to control the spread and destructiveness of the Argentine ant, *Iridomyrmex humilis* (Mayr). By 1922 as many as 55 cities in Mississippi were conducting control programs. This activity continued to grow as more towns became involved and began utilizing bait cans. Control programs expanded and efforts intensified in years to come. In the 1960's Mirex for fire ant control almost eradicated the Argentine Ant.

The accelerating expansion of the Plant Board's activities and authority was indicated when on March 19, 1921, forty-two persons were on the payroll. At the close of the 1986 calendar year, only twenty-nine were employed by the Division of Plant Industry. These employment figures illustrate the importance placed on insect and disease control in those early years, as their economic threats to agriculture and horticulture began to be realized.

In April, 1921, the Plant Board published the first "Quarterly Bulletin of the State Plant Board." The publication was continued for a

number of years but was phased out in the early 1930's when budgeting and financial restraints resulted from inadequate appropriations by the Legislature. On July 28, 1921, the 18th meeting of the Plant Board was held in conjunction with what might be considered the first Insect Control Conference. This convention of predominantly employees of the Plant Board was held from July 25 to 30. The program included four formal addresses and twenty-nine presentations related to pest problems.

In 1922 an attempt was made to abolish the Plant Board through legislation. In one respect the attempt was beneficial because a resulting in-depth study showed that the Plant Board had protected an agricultural and horticultural industry valued annually at $658,643,156 at an average annual cost of only $25,000. This cost-benefit ratio was very low compared to that of many other states' programs. In subsequent few years, activities of the Plant Board were limited mainly to bee inspections, nursery inspections, insect surveys for various insect pests, sweet potato weevil control, Argentine ant control, and other existing quarantines and programs.

In 1929 the Plant Board became involved with rodent control, which developed into a very extensive program. That first year, assistance was given to the U.S. Biological Survey in conducting 60 city-wide campaigns. By 1945 rat control programs were underway in 92 towns. This program proved very beneficial to municipalities. It was discontinued in 1975 because of problems in registering the rat bait and producer establishments (in each city) with the
U.S. Environmental Protection Agency. Also, pest control firms were complaining that this program was in direct competition with private enterprise. Complaints also arose from the public in 1929 concerning termite, *Reticulitermes,* damage to homes and other structures. Soon unethical pest control operator activities became a problem, which in the late 1930's resulted in enactment of the law governing regulation of professional services.

The early 1930's marked a turning point in the activities of the Plant Board. The legislature began drastically to reduce appropriations. In 1932 reductions in salaries ranged from 35-40 percent. By 1934 funds for operation of the Board were only 37.5 percent of previous highs of $135,000 in 1929 and 1930. Employees did receive pay raises from 1932 to 1937. With reduced funds the Plant Board had to reduce services. Only 12 field inspectors were retained, and only the most important programs were continued, with very few being initiated in the next two decades.

Bee Inspection Program

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After the enactment of the Mississippi Bee Disease Act of 1920, regulations were adopted on July 7, 1920 requiring the movement of bee colonies only under permit and allowed for inspection and the destruction of diseased colonies. At that time American Foulbrood (AFB) was forcing many beekeepers out of business because there was no effective treatment available, and affected bees and equipment had to be destroyed. Reports indicated that 50% of some beekeepers' colonies were infected. In 1921 initial inspections of 6,129 colonies revealed an average of 10.55% AFB infection. In 1922 only 1.59% of 5,445 colonies were infected. These figures indicated the success of the program after infected colonies had been destroyed in 1921. Thereafter the number of colonies inspected each year continued to increase, while AFB incidence gradually declined. Having maintained an incidence generally below .5%, Mississippi has about the

best record in the country, considering migratory beekeepers coming into Mississippi each fall since the mid 1950's. Besides the good inspection program, continued low incidences of AFB can be attributed to drug preventative programs. In the 1940's, the use of sodium sulfathiazole proved to be effective in preventing the completion of the reproductive cycle of the spore-forming bacteria, Bacillus larvae. The vegetative stage could be killed, thus the brood cycle of the bees would not be affected. However,the spores still were viable, and diseased colonies still had to be destroyed. In the early 1950's terramycin became available, which also prevented development of AFB symptoms (dead larvae) and controlled the non-spore producing bacteria that caused European Foulbrood.

Further advancements in warding off bee diseases came in the 1970's. The drug fumagillin became available to control the protozoan caused nosema disease, *Nosema apis*. In 1976 the Division of Plant Industry purchased and began using an ethylene oxide fumigation chamber that killed all stages of most bee diseases. AFB infected equipment no longer had to be burned at a tremendous loss to beekeepers. In 1979 alone, more than $20,000 in equipment was saved.

In 1984 the tracheal mite, ***Acarapis woodi,*** (Renne), was discovered in Texas and then in Florida. On September 26, 1986, regulations were adopted in Mississippi to quarantine certain states generally infested or those with no acceptable regulatory control program to combat introduction and spread of the tracheal mite. Sampling and laboratory diagnostic procedures in detecting infestations proved inadequate and the mite continued to spread throughout the U. S. Certification procedures to allow shipment of packaged bees and movement of the some 40,000 to 60,000 colonies out of Mississippi each spring became almost too much of a burden on the budget strained DPI. Two part-time entomology students were hired with the assistance of APHIS-PPQ to conduct a tracheal mite survey while at the same time providing certification. In the fall and winter of 1984 and 1985, seven hundred fifty samples per year consisting of 50-100 bees each were cross-sectioned, cleared in potassium hydroxide, and examined individually under the microscope for tracheal mites. Lab work alone required at least 30 minutes per sample. No tracheal mites were detected in Mississippi until the fall of 1986. By May, 1987, fifty-two bee yards involving eight beekeepers and ten counties south of Interstate 20 had been confirmed as having infestations ranging from 1% to 50% infested bees. All infestations were in migratory beekeeping operations. Two treatments with menthol crystals on an experimental basis were successful in controlling but not eradicating the mite, and the colonies were allowed to be moved to other states in May, 1987.

In 1987 the dreaded Varroa mite, *Varroa jacobsoni*, was detected in Wisconsin in colonies shipped from Florida. Extensive surveys found heavy mite infestation in many areas of Florida from which thousands of colonies had been transported to many midwestern and eastern states. The destructive mite has now been found in over twenty states. In October, 1987 a light infestation in two hives was detected in an apiary of 50 colonies brought from South Dakota. The infestation was eradicated and no other infestations have been detected. Bee inspections have been done by one or more inspectors who performed other duties on a year-to-year or season to season basis. Some early inspectors in 1921 were J. L. E. Lauderdale, G. E. Riley, and Clay Lyle. Specific names of area inspectors who performed bee inspections in most years are not known. In 1943 Homer D. Tate was assigned solely to do bee inspections and to supervise other field inspectors. He remained in charge and was very active in the

Mississippi Beekeepers Association until his retirement in October, 1967. For the next 7 years the program was supervised first by Joe Hall and then by Edwin G. Dyess. In 1974 Harry R. Fulton was hired as a district inspector to work 20 hours a week in Lowndes, Oktibbeha, Noxubee, and Webster counties, and in 1975, upon completion of his Masters degree, he was given charge of the State- wide Bee Inspection Program and to serve in a supervisory and administrative role in pesticide registration and sampling. He continues to serve as such.

Imported Fire Ant Program

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In 1947 another pest problem arose that received attention and funding. That pest was the imported fire ant, *Solenopsis saevissima richteri* (Forel) that was creating great concern in the hay producing areas of the Black Belt. In 1948 the Mississippi legislature appropriated $15,000 to fund research and control programs. A break-through came in 1961 when Mirex bait was developed. It gave good control, and aerial application programs were soon underway. In the 1958-68 period the Legislature provided from $50,000 (1958) up to $300,000 (1966-1968) for the fire ant program but provided no funds for 1968-1970, even though the seriousness of the pest mandated quarantines and control programs. Funding in addition to USDA programs was soon reinstated. By 1969-70 concerns by ecologists began to develop over the environmental effects of Mirex, which eventually resulted in the ban of Mirex in 1978 by EPA.

In 1970 the Imported Fire Ant Division of the Mississippi Department of Agriculture and Commerce was established with two objectives: (1) to begin at the northern fringe of the infested zone and treat southward all known areas of infestation with the hope of eradicating the fire ant; and (2) to treat other infested areas to the south where the ants interfered with livelihoods and recreation. The establishment of this separate agency left the Plant Board, later Division of Plant Industry, with only the responsibility of enforcing quarantines by such means as insuring that all soil being moved with nursery stock, etc. was treated and that all other soil movement activities were in compliance with the quarantines.

From 1970 until a climax in 1978, many thousands of acres were treated with Mirex with good results; however, environmental effects on wildlife prevented treatment of wooded and reserve areas, thus preventing eradication. Since the ban of Mirex several other baits have been developed, but none were as cheap and as effective as Mirex. The fire ant continues to spread northward and now has extended its range into Tennessee. At present no statewide control program is in effect. Another benefit of Mirex is that its use is considered to be the contributing factor in elimination if not eradication of the Argentine Ant. By 1967 only a few scattered complaints of these ants occurred, and the Plant Board discontinued the Argentine Ant Control Program. Bill Fancher was head of the Fire Ant Division until his retirement in 1973. Marion Uetschy then operated the agency until it was phased out in the 1980's.

White-fringed Beetle Program

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The white-fringe beetle, *Graphognathus (=Pantomorus) leucoloma* (Boheman) was first found in Laurel, Mississippi in June, 1937. Quarantine measures were instituted in the following year, but by 1940 infestations had been found in eight counties and by 1943 in 11

counties, making eradication doubtful. However, quarantines were to remain in effect, requiring nurseries and other regulated articles to be treated along with some heavily infested farms. Fortunately, by 1953 infestations were being controlled by DDT to the point that the beetle no longer posed a serious threat. In 1975 federal authorities dropped the quarantines, and Mississippi did also.

Pesticide Programs

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The weather in 1949 was favorable for the buildup of large cotton insect populations, especially boll weevils. Farmers began to complain about the performance of the newer organochlorine-insecticides in controlling insects and suggested that inferior products were a possible cause, resulting in the Legislature's enacting the Economic Poisons Act of 1950. The Act called for the registration of economic poisons, the collection and analysis of samples to insure that products met label claims, and enforcement of the law by the State Plant Board.

In 1950 a total of 1621 products were registered by 191 firms remitting $2985 in fees. In that first fiscal year, 822 samples were analyzed for deficiencies in active ingredients and 110 (13.4%) were below listed label guarantees, but generally by only small percentages. No prosecutions were initiated because manufacturers replaced any stocks found to be deficient and methods of analysis in some cases needed refinement.

In 1964 the Economic Poisons Act was amended to define spray adjuvants as pesticides, thus requiring their inclusion within the law. The number of pesticide firms and corresponding numbers of pesticides registered has increased continually. By 1989 the number of products registered had reached a high of 7,654 being registered by 647 companies.

In 1971 regulations were amended to require the registration of bulk tank locations where pesticides were to be dispensed and mixed on site and to define fertilizer-pesticide mixtures as pesticides. Using bulk tanks saved the applicator the expense and time of disposing of empty containers and reduced exposure to concentrates, especially where aircraft were being loaded.

In 1970 with the establishment of the Environmental Protection Agency (EPA) and a new emphasis on protection of man and the environment from undue pesticide hazards, DPI was forced to undertake more stringent enforcement of state and federal laws.

Enforcement agreements with EPA have been in place since 1975, when the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) was passed. At that time, training and certification programs for applicators of restricted use pesticides were instituted. EPA has made funds available to DPI for enforcement and has gradually shifted enforcement activities of FIFRA to the states.

The Economic Poisons Act was replaced by the Mississippi Pesticide Law of 1975, enacted to bring state law into compliance with the Federal Insecticide Fungicide and Rodenticide Act requiring training and certification of applicators of restricted-use pesticides and the licensing of restricted-use pesticide dealers.

In 1987, with an emphasis and concern developing on the contamination of ground water, the legislature amended the Mississippi Pesticide Law to raise the registration fee for pesticides to $50 per brand name. The fees collected were to be used to fund ground water studies in Mississippi.

Pest Control Program

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Legislature passed House Bill 112 on February 16, 1938, authorizing the Plant Board to adopt regulations for governing and licensing pest control operators. Rule 69 was adopted for this purpose, to become effective July 1, 1938. There were minor changes in these regulations in 1939, 1944, 1946, 1947, 1948 and 1950. These primarily addressed bonding requirements and monthly reporting of only those houses treated (instead of all houses inspected). Effective July 1, 1946, Rule 69 was amended, outlining specific treatment requirements regarding termite treatment.

In 1955 the Attorney General ruled that the State Plant Board no longer could accept cash bonds, resulting in minor changes. In 1957, at the request of the pest control operators, the regulations were changed to require education and/or experience before qualifying to take the license examination. The regulations were revised in 1959 to outline concrete slab pretreatments for termites. (These types of structures were becoming prevalent, and the regulations did not specifically outline their pretreatment requirements.)

Effective January 1, 1963, each employee of an operator who solicits business or otherwise represents the operator in dealings with the public, had to be provided with an I.D. card, to be purchased from the State Plant Board. The regulations were amended April 9, 1965, and November 14, 1966, and defined a bonafide employee of a licensed operator. These amendments gave the board the authority to suspend or revoke a license if an operator sublet his license or allowed a person other than a bonafide employee to practice pest control under his license. Under the termite treatment requirements, the regulations abolished the ventilation requirements. Before then all properties treated had to have adequate ventilation (approximately 2 square feet of opening for each 25 linear feet of wall), making certain that no "dead ends" or corners were left unventilated. These revised regulations abolished the requirements to screen all ventilators and other openings underneath the building with 20-mesh non-rusting screens. On October 24, 1968, following the recommendations of the Attorney General's office, the high school education requirement for taking the license examination was deleted from the regulations. On May 26, 1969, the pest control regulations were amended, changing the qualifications to take the license examination. In 1971 after the Division of Plant Industry was created from the State Plant Board, the pest control regulations were significantly revised. The regulations were amended to include new definitions, license categories, examination procedures, reporting procedures, marking of vehicles and equipment, and approved chemicals and minimum treatment requirements. On February 23, 1974, the regulations were again amended, changing the qualifications to take the pest control license examination. The landscape, gardening, and tree surgery regulations were separated from the pest control regulations effective March 29, 1977. Prior to this time the regulations were together. There were significant changes in these regulations. Branch offices were defined, and permit holders were required to operate these offices. All license and permit holders were required to be commercially certified. Several reasons for denying, suspending, or cancelling a license were added. These regulations outlined the procedure for a hearing before the Advisory Board and the action to take for an appeal to the Chancery Court of the county of residence or the Chancery Court of Hinds County. They outlined the wood destroying beetle treatment requirements.

The regulations were amended June 25, 1980. These regulations created the pest control

advisory council. The regulations also contained a provision for the license holder to issue a temporary I.D. card and the procedure for issuance of the temporary I. D. Effective April 1, 1985, a copy of all clearance inspection reports had to be given to the mortgager, the seller, the buyer, and the realtor. All individuals performing fumigation must have a fumigation license. These regulations gave the Commissioner the authority to deny, suspend, or cancel an I.D. card. These regulations prohibit an individual from having more than one license or I.D. card to perform the same service at any given time. All companies were required to have a license holder residing in the state if a place of business is located in the state. Pesticide containers, except application devices, were to be labeled to show the name of the pesticide, the E.P.A. registration number, and the concentration of the pesticide. These regulations prohibited less than label concentrations or volumes of termiticides.

Sweet Potato Weevil Eradication Program

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The Mississippi Plant Act of 1918 was enacted by the State Legislature and was approved by the Governor March 27, 1918. This act was to prevent the introduction into and dissemination of insect pests and diseases injurious to plants and plant products within this state. One of the first acts of the Plant Board was the scouting for sweet potato weevils, *Cylas formicarius elegantulus* (Summers). In the first year weevils were found in Hancock, Harrison, Jackson, and Pearl River counties. Efforts were initiated to eradicate the weevil from Mississippi.

In 1932 the Plant Board in cooperation with the United States Bureau of Entomology and Plant Quarantine had reduced the number of properties infested with the sweet potato weevil in Harrison, Hancock, Jackson and Pearl River counties from more than one thousand to less than one hundred. In that year the Plant Board appropriation was cut 62½ percent and federal cooperation was withdrawn. As a result, the weevils quickly reinfested the farms from which they had been eradicated and spread to new territory.

From 1937 until today sweet potato weevils have been found infesting sweet potatoes throughout the southern one third of the state. Because of this pest, commercial sweet potato production is not feasible in much of south Mississippi. Most of the commercial sweet potato acreage is centered in the weevil free north Mississippi counties of Calhoun and Chickasaw. Even in these two counties outbreaks of weevils occurred in 1981 and 1983, requiring the destruction of more than 7000 bushels of potatoes. Both of these infestations were eradicated, but they focused the need on continuing the work of the Sweet Potato Weevil Eradication Program.

Sweet Potato Certification Program

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About the same time the Sweet Potato Weevil Eradication Program was being set up, the need for disease and insect free sweet potato seed and plants was being recognized. At the time severe losses were occurring from two diseases, black rot, *Ceratocystis fimbriata*, and stem rot, *Fusarium oxysporum f. batatas*.

In August, 1920 the Plant Board added the Potato Inspection Department. J. C. Holton was placed in charge, and he immediately began to formulate rules to prevent the further spread of

potato diseases and to make it possible for farmers with uninfected land to get healthy, disease-free potato seed. These rules were passed by the Plant Board in December, 1920. Among these rules was one prohibiting the movement or shipment into or within Mississippi of seed sweet potatoes or sweet potato plants that had not been officially inspected and found free from disease and insects. Certificate tags were issued to potato growers whose seed and plants passed inspection, one tag being required on every parcel or package of plants or tubers.

Over the years the Sweet Potato Inspection Program has been very successful. The farming community accepted this inspection program and has taken full advantage of this service offered by the Plant Board. The number of growers served by this program peaked in 1943, with 1755 growers being certified. In 1986 there were 118 growers involved in the certification program for sweet potatoes. Because of the Plant Board's persistent efforts over the years in educating the farmer in the correct use of fungicides and resistant varieties, black rot and stem rot are no longer major problems in potato production.

Tomato Certification Program

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In 1950 a disastrous outbreak of late blight, *Phytophthora infestans*, in the Copiah County Commercial Tomato Area was believed to have been caused by infected tomato plants shipped from Florida and other subtropical points. Since Mississippi did not require the inspection and certification of tomato plants at that time, the Plant Board was urged to provide an inspection system and prohibit importation of plants from other states. This was done, and it is believed the quality of plants produced in the state has been greatly improved. In 1952 plants from states that had established Tomato Plant Inspection Programs were allowed to be sold in the state after the Plant Board had issued a special permit. This special permit was issued only after a satisfactory certificate of inspection had been filed with the Plant Board stating that the plants or plant beds had been regularly inspected and would continue to be inspected at stated intervals.

In 1954 all shipments of out of state tomato plants were again halted because of disease outbreaks. This changed again in the 1960's to allow tomato plants to enter our state if they came from a state with a Disease Inspection Program. Today only plants from south Florida are not given right of entry in Mississippi.

As of the spring of 1986, there were 226 certified tomato plant growers in Mississippi. Growers basically are producing quality, disease-free plants and cooperate fully with the program.

Nursery Inspection Program

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In 1908, with the passage of the first Nursery and Orchard Inspection Law, the Nursery inspection program was initiated. The objective was to stop the shipment of infested plants into Mississippi, many of which could not be shipped to other states. Unfortunately no funds were appropriated, and the program was poorly implemented. Each nursery was required to apply for inspection by an entomologist at the A & M College Experiment Station. The Program was not effective until the Plant Act was enacted in 1918. Forty-two regulations were adopted under the law designating eight insect pests as nuisances and regulating the movement of their hosts. Numerous pests were designated as especially injurious, and to prevent the spread of

these pests, the law called for the inspection of plants at nurseries and other sites where they were grown and/or held for shipment or sale.

George F. Arnold was appointed as the first nursery inspector on July 1, 1918. He resigned in October of 1918. He was replaced by D. W. Grimes.

Early inspections showed San Jose scale, *Asipidiotus perniciosus* (Comstock) to be the chief pest. The infested plants were removed and burned. Freedom from pests allowed for certificates to be issued for shipping plants. All common carriers were required to notify the Plant Board of any shipments of plants.

In 1918-19 three publications entitled "Nursery Inspection Circulars Nos. 1, 2, and 3" were published to advise growers of the regulations and pest situations.

In 1928 the requirement that carbon copies of invoices be attached to nursery tags on shipments of plants was issued. Also in 1928 inspections were made at railway stations, ports, and parcel post stations. Of 16,877 shipments inspected, 337 were rejected.

The number of nurseries in Mississippi continued to expand until the late 1960's. In the late 1940's more nurseries began to grow ornamental plants resulting in discovery of a wider range of minor insect pests. In the early 1950's many nurseries were being treated with soil insecticides to insure that regulated pests would not be shipped in soil associated with nursery stock. Early chemicals used were organochlorines such as DDT, dieldrin, heptachlor, and chlordane which offered residual control. By 1987 all organochlorines had been cancelled by EPA for these uses, leaving no long lasting treatment available to nurserymen. In contrast, many organophosphorous insecticides have been used for many years to control foliage feeding insect pests.

By the early 1970's the white fringed beetle had become a somewhat insignificant pest, and in 1975 the White Fringed Beetle Quarantine was lifted.

Pink Bollworm Regulatory Program

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The pink bollworm, *Pectinophora gossyiella* (Saunders), was first discovered in the United States in the fall of 1917 at Hearne, Texas. To prevent the spread of this especially injurious pest to surrounding states, one of the most extensive regulatory campaigns ever known was begun.

With the passage of the Mississippi Plant Act in 1918, it became illegal to ship cotton, cotton seed, or cotton seed products into Mississippi from any place where this pest had been declared to exist by the Federal Horticultural Board. In spite of Federal regulations, by 1929 the pink bollworm had spread to New Mexico and Arizona, and by the early 1950's isolated infestations were known to occur in Oklahoma, Arkansas, and Louisiana. In the west, California and Nevada in part had infestations by 1967. To date the only confirmed infestation to become established east of the Mississippi River occurred in north Florida and south Georgia in 1932. Eradication in the nine-county area where cultivated cotton was grown was successful. However, a very low level infestation occurs in south Florida's wild cotton that is not near any cultivated cotton.

Beginning in March, 1920, H. H. Kimball served as Chief Inspector in charge of pink bollworm work for the Plant Board. In 1925, at his request, he was reassigned to regional work.

In 1926 the Plant Board repealed the embargo on shipment of cottonseed from other states. This action was necessary because the Supreme Court ruled that no state could impose quarantine

restrictions that conflicted with federal quarantines. Federal quarantine allowed interstate shipment of cottonseed from all states, even from regulated areas, when inspected and shipped under permit. In effect Mississippi's more strict regulation was illegal and had to be repealed.

In 1954 Plant Protection Quarantine Stations to be located at the Mississippi River Bridges in Vicksburg, Greenville, Natchez, and Lula were funded at $46,000 for the primary purpose of preventing the introduction of the pink bollworm. However, in years to come they proved themselves to be valuable in controlling the spread of other pests, such as sweet potato weevil, honey bee diseases, and many others.

Time consuming inspections at quarantine stations for regulated articles were made on all vehicles coming across the bridges. Unfortunately in 1976 the legislature deemed it necessary to discontinue funding for the quarantine stations, and they were abandoned.

At the time the quarantine stations had been established, it was considered necessary that additional inspections or surveys be carried out in Mississippi to detect any pink bollworm infestations. Gin trash inspections were begun using a machine that separated live worms from the trash. Thousands of bushels of trash were processed until the late 1960's, when pheromone traps were developed.

Mississippi, as might be expected, has not escaped pink bollworm invasion. Fortunately through the efforts of regulatory officials and the farming community, these invasions have been eliminated.

Significant was the detection of pink bollworm moths in the Mississippi Delta beginning in 1981. One male moth was collected by Bill Batson, USDA, APHIS, PPQ, in a routine survey at Stoneville. Following this find extensive surveys were initiated under state and federal guidelines.

A number of moths were detected in Washington and Bolivar counties that indicated a pink bollworm regulated area be established in Washington County in 1983, and for Bolivar County in 1986. Restrictions on shipping certain items from the zone and mandatory stalk destruction were imposed. The program has proven to be successful because no life stages other than male moths have ever been detected.

Argentine Ant Program

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The Argentine Ant, *Iridomyrmex humilis*, was first known to occur in Mississippi in the early 1900's; however, no method of control was available until the mid 1910's. It was considered one of the most serious pests known to man. It presented problems in poultry production, orchards, beekeeping, and many other agricultural enterprises. Consequently, it was deemed to be a nuisance by the Plant Board.

With the development of a control bait, the Plant Board gave its assistance in conducting control campaigns in different communities. In 1920 control campaigns were begun in four localities. Effective control and prospects for potential eradication justified expansion. One of the most extensive campaigns was conducted in Jackson in 1922. It required filling, capping, and distributing 50,000 cans of poisoned syrup.

By 1931 one hundred-twenty-five campaigns were on-going. It seemed that this was to be one of the most successful insect control campaigns ever conducted. By 1941 the ants had been eradicated from some 60 locations.

With the onset of World War II, supplies of sugar for the bait and aluminum for the bait cans became unavailable. The program began to fall apart, and the ants made a comeback, with more than 300 localities known to have infestations in

1947. However, after World War II concluded, supplies were soon available and the program held its own. Since the use of Mirex began in the 1960's to control fire ants, the Argentine Ant has almost become extinct.

Gypsy Moth Program

Harry R. Fulton
Mississippi State, MS

The Gypsy Moth, *Porthetria dispar*, was first found in the United States in 1869, and control was initiated in 1889. The first federal control program was initiated in 1906 and the first quarantine in 1912. Quarantine procedures have been successful in limiting the infestations to New England; however, with the rise of a more mobile tourist industry, especially relating to recreational vehicles, gypsy moth finds have been reported in southern and western states. Adults are often found hitchhiking on vehicles, and females often attach egg masses to vehicles. With the enactment of The Plant Act in Mississippi in 1918, the gypsy moth was declared to be a public nuisance and its some 85 listed host plants became regulated items. Consequently, the Plant Board began scouting for this pest. In 1976, with the development of a pheromone trap, an extensive survey was begun. Some 200 such traps were placed in recreation and camping areas. The first gypsy moth was trapped in Mississippi in 1981. Extensive surveys with more than 4,000 traps in 1982 and 5,500 in 1983 were initiated, but no additional moths were trapped. In 1984 three moths were captured. A total of 6,447 traps were operated in 1985, by USDA, PPQ personnel, and DPI inspectors, and no moths were trapped. Officials are optimistic that this pest has not become established in Mississippi.

Japanese Beetle Program

Harry R. Fulton
Mississippi State, MS

The federal Japanese beetle quarantine (No. 48) as enacted in 1920. As such the pest was restricted mainly to the northeastern states. Gradually, however, it extended its range into Tennessee and Alabama, and in 1977 surveys were initiated in Mississippi utilizing pheromone traps. Of 81 traps operated, one beetle was caught near Aberdeen. Intensified trapping in that area did not yield additional beetles in 1978. In June, 1979, a lone beetle was collected in a cotton field in Panola County, but again extensive follow-up trapping yielded no beetles in 1979 or in 1980.

It is generally thought that the beetle has almost reached its ecological range limitations, and its economical significance does not warrant extensive expenditures for trapping and survey; thus such activities have been discontinued.

Personnel

Harry R. Fulton
Mississippi State, MS

The State Plant Board through 1967 consisted of the Commissioner of Agriculture, the Director of the Mississippi Agricultural Experiment Station, and the Chief Entomologist and Head of the Entomology Department at A & M College (now Mississippi State University).

The Commissioners of Agriculture were P. O. Garner, 1918-27; J. C. Holton, 1927-39; Si Corley, 1940-67; and Jim Buck Ross, 1968-Present.

The Directors of the Agricultural Experiment Stations were E. R. Lloyd, 1918; J. R. Ricks, 1919-30 and 1932-37; W. R. Perkins, 1930-32; Clarence Dorman, 1938-47; Russell Coleman, 1947; Frank J. Welch, 1948-51; Clay Lyle, 1951-58; Henry H. Leveck, 1938-67; and James H. Anderson, 1968-70.

The State Entomologists were R. W. Harned, 1918-31; Clay Lyle, 1931-51; and Ross E. Hutchins, 1951-68.

In 1968 the legislature expanded the membership of the State Plant Board to include the Director of the Cooperative Extension Service and the Head of the Plant Pathology and Weed Science Department at Mississippi State University. For the next three years, the Board consisted of the following: Commissioner of Agriculture, Jim Buck Ross; Director of the Agricultural Experiment Station, James H. Anderson; Head of Department of Entomology, F. G. Maxwell; Director of the Cooperative Extension Service, W. M. Bost; and Head, Plant Pathology and Weed Science, Department W. W. Hare.

The following persons have served as Director of the Division of Plant Industry by appointment of the Commissioners of Agriculture: R. W. Harned, 1918-31; Clay Lyle, 1931-June, 1951; Ross Hutchins, 1951-June, 1968; O.T. Guice, Jr., 1968-June, 1975; and Jack D. Coley, 1975-Present.

Advisory Board for
The Division of Plant Industry

Commissioner of Agriculture and Commerce:

Jim Buck Ross	1968-Present

State Chemist, Head, Mississippi State Chemical Laboratory:

James P. Minyard	1971-Present

Head, Plant Pathology & Weed Science Department:

W. W. Hare	1971-80
Charles Laughlin	1980-1982
W. K. Porter	1983-1984
James McGuire	1984-Present

Head, Entomology Department:

F. G. Maxwell	1971-75
C. A. Wilson	1975-76
Dan Shankland	1976-80
Thomas J. Helms	1981-1987
Randy G. Luttrell	1988
Clarence H. Collison	1989-Present

Head, Agronomy Department:

R. G. Creech	1979-Present

Soil Conservation District Officer:

Gus Evans	1979
Robert D. Morrow	1980-82
Robroy Fisher	1983-84
John Oglesby	1985-Present

State Soil Survey Leader:

E. E. Pettry	1979-Present.

Following are some DPI employees who should be honorably mentioned:

Dr. Clay Lyle: Employed December 1, 1920 and became State Entomologist and member of the Plant Board in 1931. On July 1, 1951, he became dean/director of Agriculture of Mississippi A & M College.

R. P. Colmer: Employed as assistant inspector on June 10, 1920 and later became chief inspector, serving in that capacity from 1951 until he retired in 1966.

O. T. Guice: Employed in 1938 as chief inspector, became State Entomologist in 1952 and served in that position until he retired in June, 1975.

J. C. Redd: Employed as a general inspector in January, 1944, resigned in April, 1946.

Homer Tate: Employed as full-time bee inspector in April, 1944, continued in that position until he retired in 1967.

James H. Cochran: Employed in 1945, became plant pathologist and inspector in 1959 and served in that position until he joined the Extension Service in 1967. M. M. Price: Employed at Lucedale in 1948 and served as District Entomologist until retirement in 1978.

David F. Young, Jr.: Employed at Tylertown in 1949, transferred to Leland in 1951 and served until he joined the Extension Service in 1955.

L. B. Davis: Employed in 1952 and resigned in 1965. Johnny D. Ouzts: Employed as assistant Entomologist in 1961, resigned in 1963 to accept a position with Delta State University.

Richard Welch: District Entomologist from 1957 until retirement in 1986.

Lester G. Clayton: District Entomologist from 1968 until June 30, 1986 when he retired.

N. L. Douglas: District Entomologist from January 9, 1928 until death on March 29, 1969.

L. J. Goodgame: District Entomologist from May 24, 1928 until retirement December 31, 1968.

Ross E. Hutchins: District Entomologist and State entomologist from September 6, 1929 until he retired on May 31, 1968.

J. M. Langston: District inspector from August 20, 1918 until his retirement on June 30, 1958.

R. Z. Pepper: District Entomologist from April 28, 1938 until he retired on September 1, 1973.

F. A. Smith: District Entomologist from June 2, 1926 until he retired on May 31, 1969.

Current Staff

The current staff consists of the following: Director and Administrator of all Programs, Jack D. Coley; Secretary, Klinelle Coleman; Secretary for Agricultural Aviation Board, Teresa Oswalt; Deputy Director and In Charge of the Overall Pesticide Program, Robert H. McCarty; Secretary, Jackie Ganann; Supervisor Pesticide Registration and Honey Bee Inspection, Harry R. Fulton; Secretary, Bonnie Hays; Licensing/Certification of Commercial Applicators, James R. Haskins; Secretary, Shelia Reed; Private Certification and Supervisor EPA Enforcement Inspection., Tommy McDaniel; Secretary, Carolyn Graham; Accountant, Thomas E. Whitfield; Secretary, Valerie Palmer; Accounting Clerk, Mary Arledge;Supervisor of Nursery Inspection and Export Certification, Edwin G. Dyess; Secretary, Gloria Cardin; Supervisor of Sweet Potato, Tomato, and Cabbage Inspection, Benny Graves; Secretary, Helen Mize; and Printer, Bobbie Ray; Coordinator USDA Grant Programs, Leslie Vissage; Coordinator Special EPA Projects, Bob Brand; Groundwater Special Programs, Don Goode.

ENTOMOLOGY AT DELTA STATE UNIVERSITY

Johnny D. Ouzts
Cleveland, MS

A course in entomology has been taught at Delta State University in the basic teacher education curriculum of the sciences since the inception of the program. Before 1968 Delta State offered only the basic course. Student requests for advanced courses prompted officials to approve a three-hour course in medical entomology, which developed into a companion for the course in medical parasitology. This introduced the other side of entomology and thereby attracted attention beyond the agricultural concept.

The inception of the graduate program allowed expansion of the curriculum to include graduate level courses. Since 1968 courses in economic entomology, aquatic entomology, invertebrate zoology , taxonomy of immature insects, pest management procedures, and medical entomology have been added. Thesis and independent research are two options for the graduate student.

Now a student completing B.S. and M.S. degrees may earn 34 hours in entomology-related courses in the Biological Sciences curriculum.

ENTOMOLOGY AT MISSISSIPPI COLLEGE

Bill P. Stark
Clinton, MS

General Entomology was first offered as a formal course in the Mississippi College Biology Department in 1920-21. Prof. M. P. Somes apparently joined the Mississippi College faculty after serving as chairman of the Clemson Entomology Department and as an assistant state Extension entomologist in Minnesota. By 1929-30 a course in Economic Entomology was also listed in the catalogue and was probably taught by W. O. Sadler, who later received his Ph.D. from Cornell after study with Needham, Comstock and Johanson. Both General Entomology and Economic Entomology remained in the catalogue through the 1930's

and 1940's, but we are not sure how frequently they were taught. Entomology courses were removed from the catalogue in the early 1970's but returned in the 1980 catalogue. Bill Stark was responsible for this latter course, which continues to be offered every other spring as a senior level biology elective for majors. A non-majors core science course, "Insects and Man," has also been offered on alternate years since 1983. When Bill Stark joined the Mississippi College faculty in 1976, there was no curated insect collection, but a number of boxes of decimated student collections indicated that entomology had been taught in the 1960's. Our present general collection is small (fewer than 5000 pinned specimens), but Stark's research collection of Plecoptera exceeds 50,000 specimens in alcohol. Bill Stark has authored or co-authored a number of publications on his research dealing with Plecoptera. He has also developed keys to identify species of Plecoptera.

ENTOMOLOGY AT THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Fred G. Howell
Hattiesburg, MS

The history of entomology at the University of Southern Mississippi (USM) basically is the history of entomology related courses offered by the Department of Biological Sciences over the past four decades and the discipline's role in stimulating and supporting research activities over the past two decades. The department has never offered a degree in entomology or any of its subdisciplines. No collections are maintained, except for "wet" specimens used in the basic course for "hands on" experience.

The study of insects, however, has played an important role in training both graduate and undergraduate students seeking degrees from this department. An introductory course in Entomology, Medical Entomology, and Arachnology have enriched backgrounds of undergraduate students and provided them with basic, general information regarding the life forms commonly encountered on a day-to-day basis. These courses have often served as starting points for students interested in advanced studies either at USM or other universities. Graduate students have often focused on material first encountered in Aquatic Insect Ecology, a graduate level course, and pursued advanced research studies in aquatic insect biology. Monies generated by externally funded research grants or contracts have "paid the bills" associated with these projects.

Faculty and Courses

Perhaps the first entomology course offered at USM was in the 1940's, but it was not taught by an entomologist until 1955, when Barry D. Valentine, a master's degree entomologist from Harvard, taught the course. Valentine left in

1958 to pursue the Ph.D. degree at Cornell University. J. William Cliburn, a vertebrate biologist by training, taught the course in the next few years, concentrating, in his own words, on "houseflies and tumble bugs, the only two insects of which I knew anything." Bryon Smith, a graduate entomologist from the University of Georgia, taught the course from 1964 through 1968. Ed Cupp taught entomology from 1968 through spring semester 1974. Cup added Medical Entomology to the department's offerings then. He left in 1974 to assume a faculty position at Cornell University. Fred Howell (Ph.D., Texas Tech University, 1972) began teaching entomology in the fall of 1974. Smith often taught off-campus courses at night on the Gulf Coast. Howell added two related courses to the department's offerings: Arachnology (1976, graduate and undergraduate levels) and Aquatic Insect Ecology (1978, graduate level).

Research

With no "mission-oriented" research and no consistent, predictable funding base, entomological research activities within the department have generally followed the interests of specific faculty. Programs have often changed almost overnight due to loss of a particular faculty member. Fire ant research, for example, virtually disappeared when Cupp left USM in 1974. He took his NIH sponsored research with him. Cupp was apparently the first entomologist at USM who actively sought research funding and supported graduate student research. Cupp worked during his sojourn at Southern with Gary Blumquest, a biochemist from the Chemistry Department, who was interested in insect physiology. Together Cupp and Blumquest ultimately produced two or three M.S. degrees and at least one Ph.D. The one area in which research emphasis has remained constant through almost two decades is that of biology and ecology of aquatic insects and the application of this knowledge to environmental health. Billy J. Grantham, a USM Ph.D. graduate (1969), worked on his degree while serving as a biologist with the Fishery Division of the Mississippi Game and Fish Commission. Grantham was interested in survey work of Mississippi streams and rivers when he joined the USM faculty in 1970. This was important because it came when the National Environmental Policy Act (1969) and the Clean Water Act began to influence the tone of Mississippi waste water discharge permits to industries operating on natural water courses. Grantham's contacts and expertise from his Game and Fish Commission experience were valuable in securing contracts with industries in need of "baseline, pre- and post-data" to satisfy permit requirements.

The current state of entomology at USM has its roots with the Grantham era (1968-1980). Grantham was made Head of the Department of Biology in 1973 and through his administrative and research leadership assembled a group of faculty capable of interdisciplinary work in aquatic biology. One of those hired in 1974 was Fred Howell, an archaeologist by training but an aquatic insect ecologist through experience at the Savannah River Ecology Laboratory near Aiken, South Carolina. Another was Steve Ross, a Ph.D. ichthyologist from the University of South Florida, 1974. Howell and Grantham immediately went to work in 1974 with the Weyerhaeuser Company to establish baseline conditions in the Tombigbee River near Columbus, Mississippi, in anticipation of the company's proposed paper mill in the "Golden Triangle" of Mississippi. That project, along with Ross and Howell's study (1975-1979) of Black Creek near Purvis, Mississippi, for the South Mississippi Electric Power Association helped solidify graduate student support for those interested in aquatic insects.

Future Prospects

Entomology's role at USM is expected to grow in significance. The difficult period from Grantham's death until the present when only one "entomologist" was on board appears to be over. The department has hired an insect geneticist, William Hanratty (Ph.D., University of Pittsburgh, 1975), who assumed a new faculty position in September, 1987. Also, Grantham's replacement will be replaced in the coming year; a national search for an aquatic invertebrate specialist is underway. It is possible that an aquatic entomologist will eventually fill that position. Perhaps a new chapter in entomology at USM is about to begin.

ANIMAL AND PLANT HEALTH INSPECTION SERVICE PLANT PROTECTION & QUARANTINE

Thomas M. Harris
Jackson, MS

Plant Protection and Quarantine (PPQ) is one of the program units within The Animal Plant Health Inspection Service (APHIS).

The Southeastern Regional Office of APHIS is located in Gulfport, MS. It serves Mississippi, Tennessee, Kentucky, North Carolina, South Carolina, Georgia, Florida, Puerto Rico, Bahamas, and Virgin Islands. The work unit office of PPQ for Mississippi is located in Jackson, with work stations in Gulfport, Hattiesburg, Brookhaven, Jackson, Greenville, Winona, and Tupelo. Many of the insects, weeds, nematodes, and plant diseases that attack U.S. crop are
foreign invaders that entered before the advent of agricultural quarantine laws. Today, it is APHIS-PPQ'S responsibility to administer these laws to help prevent entry of foreign pests. Protection of America's agriculture is provided through pest exclusion- inspection of agricultural imports in the country of origin or at U.S. ports of entry; survey and detection- working with state officials and others to find new or exotic pest infestations early; eradication - where feasible, when potentially damaging pests slip through our defenses or enter through natural means; management- suppression or containments through combinations of biological, cultural, and 6 chemical means when the most practical choice is to live with a pest; and regulation-establishing rules for interstate and international commerce that minimize the risk of pest introduction and spread.

In 1920 the Federal Horticulture Board established terminal inspection stations in Mississippi at Ocean Springs and A & M College and in 1921 at Gulfport, Jackson, Holly Springs, Meridian, and Leland. Other programs involving PPQ are as follows: Soybean Cyst Nematode- survey, regulatory and control; Whitefringed Beetle, *Graphognathus (=Pantomorus) leucoloma* (Boheman), survey, regulatory and control; sweet potato weevil,

Cylas fornicarius elegantulus (Summers)- survey and control; boll weevil, *Anthonomous grandis* (Boheman),- eradication trials; red imported fire ant, *Solenopsis invicta* (Bureu)- survey, regulatory and control; Japanese Beetle, *Popillia japonica* (Newman)- survey; cereal leaf beetle, *Aulema melanopus* (Linnaeus)- survey; Khapra Beetle, *Trogoderma granarium* (Everts)-survey; Mediterranian Fruit Fly, *Ceratitis capitata* (Wiedeman)-survey; pink bollworm, *Pectinophora gossypiella* (Saunders)-survey, regulatory and control; Gypsy Moth, *Porthetria dispar* (Linne')-survey; Formosan Subterranean Termite, *Coptotermes formosamus* (Shiaaki)-survey; Barberry- regulatory; witchweed- survey; Phony Peach Disease-survey and control; biological control- alfalfa weevil, *Hypera postica* (Gyllenhal), citrus whitefly, *Dialeurodes citri* (Ashmead); Hoja Blanca- survey; pesticide monitoring in soils; pesticide residue prior to creation of The U.S. Environmental Agency; Cooperative Economic Insect Survey; Cooperative National Plant Pest Survey and Detection Program; Acarine Mite, *Acarapis woodi* (Rennie)- survey; Varroa Mite, *Varroa jacobsoni* (Audeman)- survey; egyptian cottonworm, *Spodoptera littorealis* (Bairdunae)-survey; african cotton leafworm, *Spodoptera litura* (F.)-survey; Asiatic Rice Borer, *Chilo suppressalis* (Walker)-survey; False Codling Moth, *Cryptophlenia leucoteta* (Mayrick)-survey; Maize Borer, *Chilo partellus* (Swinehoe)??-survey; Citrus Canker- regulatory; Golden Nematode, *Heterodera rastochierosis*.

There have been many interceptions of plant pests not known to occur in the U.S. at Mississippi ports of entry. For example, on June 11, 1983, the Belgian motor vessel, "Brussel," arrived at Gulfport from Australia. The Captain told the PPQ officer inspecting the ship that while coming through the Panama Canal, a swarm of bees came aboard the ship and lodged on his magnetic compass above the bridge. The swarm was eradicated by the PPQ officer. Specimens were identified as Africanized honey bees, *Apis mellifera scutellata* (Linnaeus). For domestic programs, the primary impact has been on delaying spread of the pest until effective control measures could be developed. For example, the soybean cyst nematode quarantine was invoked on July 26, 1957 and revoked on September 30, 1972, after development of resistant varieties.

Generally, PPQ programs have prevented losses caused by destructive pests. The slogan, "APHIS -Protecting American Agriculture," has been adopted and is used with the logo.

Officers in charge of Mississippi programs: Joseph W. Patterson, 1956-1960; T. D. Persons, 1960-1969; Woodrow O. Owens, 1969-1972; William F. Helms, 1972-1974; Kenneth Blocker, 1974-1978; Edward F. Cullen (acting), 1978-1980; and Thomas M. Harris, 1980-Present.

BOLL WEEVIL RESEARCH LABORATORY

J. W. Smith, E. P. Lloyd and T. B. Davich
Mississippi State, MS

In the late 1950's, when the boll weevil, *Anthonomus Grandis* (Boheman) developed resistance to insecticides and when production practices brought a long cotton growing season favoring greatly increased overwintered populations, the cotton industry needed intensified research to rid the U. S. of the boll weevil. In 1958, at the request of Congress, a working group appointed by the Secretary of the Department of Agriculture and chaired by E. F. Knipling, then Director of the Entomology Research Division, ARS, U. S. Department of Agriculture, was appointed to study the boll weevil problem and make recommendations for a long-term approach dealing with it. As a result of the committee's recommendation, the Boll Weevil Research Laboratory was established in 1961 on the campus of Mississippi State University and an increased emphasis was given to boll weevil research at other ARS locations and in the State Agricultural Experiment Stations.

In November, 1960, T. B. Davich was appointed Director of the Boll Weevil Research Laboratory. He served as consultant to the architect in designing various laboratories and their needs for hoods, power supplies and other requirements, and recruited scientists and support staff. The laboratory staff consisted of scientists from many disciplines, including agricultural engineers, plant physiologists, plant geneticists, chemists, soil scientists, and entomologists specializing in insect pathology, mass rearing, host plant resistance, insect physiology, insect genetics, and insect ecology. The staff also included entomologists who tested laboratory findings and concepts under cotton growing conditions.

The Boll Weevil Research Laboratory was formally dedicated in March, 1962. Attending the dedication were scientists and agricultural administrators from throughout the Cotton Belt, as well as several congressional leaders. E. F. Knipling keynoted the dedication by indicating that research findings by scientists at the laboratory must result in major technical improvements to provide a long-term solution to the boll weevil problem.

In the first seven years of research at the Boll Weevil Research Laboratory, scientists made several major advances. These advancements included the following: (1) development of the diapause control program with a later refinement that included insecticidal application against the last reproducing generation for area-wide suppression of late-season populations of boll weevils; (2) discovery that male boll weevils produce a pheromone; (3) identification of the male produced pheromone, named grandlure, and its chemical synthesis and formulation for field use; (4) development of the boll weevil pheromone trap; (5) development of ultra-low-volume sprays of azinphosmethyl and malathion for boll weevil control that were less costly to apply and more efficient than water emulsion sprays of the same insecticides; (6) development of mass-rearing technology for the boll weevil; and (7) verified through testing that

busulfan effectively sterilized male boll weevils in small scale laboratory experiments. The National Cotton Council appointed a Beltwide Boll Weevil Eradication Committee chaired by R. R. Coker that concluded that research advances merited efforts toward eradication of the pest. Subsequently this committee appointed a site selection subcommittee. After visiting all boll weevil infested states, the subcommittee selected southern Mississippi, with adjoining areas in Alabama and Louisiana, as a test site that represented the most difficult area from which the boll weevil would have to be eradicated--a high density boll weevil population, long growing season allowing for the development of many generations of boll weevils, mild winters conducive to good winter survival, and small fields with many obstructions which made them difficult to treat with aircraft.

The Pilot Boll Weevil Eradication Experiment was conducted in 1971-1973 in south Mississippi and in adjacent areas of Louisiana and Alabama by Animal Plant Health Inspection Service and Agricultural Research Service of the U. S. Department of Agriculture in cooperation with the Entomology Department, Cooperative Extension Service, and Wildlife Department of Mississippi State University,the Entomology Departments of Louisiana State and Auburn Universities, the Plant Industry Division of the Mississippi Department of Agriculture and Commerce, and the National Cotton Council of America. Each of the components used in the experiment was evaluated by scientists at the Boll Weevil Research Laboratory.

Upon completion of the experiment, the Technical Guidance Committee for the Pilot Boll Weevil Eradication Experiment concluded it was feasible to eliminate the boll weevil as an economic pest of cotton in the United States. The committee of the Entomological Society of America appointed to evaluate results of the experiment concluded the boll weevil had not been eradicated from the core area. The results of the experiment and conclusions of the Technical Guidance Committee were questioned by some entomologists and other scientists. To resolve the difference the eradication effort was delayed and instead a Boll Weevil Eradication Trial was undertaken in northeastern North Carolina with adjoining acreage in southeastern Virginia. Meanwhile the following technical advances were made by scientists at the Boll Weevil Research Laboratory: (1) development of the infield pheromone trap for suppression and detection; (2) development of the insect growth regulator, Dimilin, for population suppression; (3) improvement of mass rearing techniques for producing several million boll weevils per week; and (4) improvement in sterilization procedures achieving a high degree of sterility in both sexes of the boll weevil.

As the Boll Weevil Eradication Trial was being implemented in North Carolina, two scientists (E. P. Lloyd and G.H. McKibben) from the Boll Weevil Research Laboratory moved to Raleigh, North Carolina (joined by W.A. Dickerson from Columbia, Missouri) to provide direct research support to the trial and to collect data for a detailed biological evaluation of the trial. Additional research support was also provided by the scientists who remained at the Boll Weevil Research Laboratory. The Boll Weevil Eradication Trial and the companion Optimum Pest Management Trial (Panola County, Ms.) were conducted concurrently from 1978-1980. Scientists from the Boll Weevil Research Laboratory had lead roles in further refining area-wide eradication and management suppression technology during the trials. Major improvements were made in trap design, pheromone dispensers, and design of trapping arrangements for suppressing and detecting incipient boll weevil populations. Both the eradication and management trials were judged

to be biological and technical successes by the State/Federal Biological Evaluation Team, with W. H. Cross (Boll Weevil Research Laboratory) as team leader.

At the completion of the trials, a special committee appointed by the National Research Council of the National Academy of Sciences did not agree with the Biological Evaluation Team report. However, the Biological and Evaluation Team report was generally accepted by cotton entomologists and the cotton industry across the Cotton Belt.

Since completion of the Boll Weevil Eradication Trial, elimination of the boll weevil as an economic pest of cotton has been achieved in North Carolina and is very close to elimination in South Carolina through a cooperative state, federal, and producer effort. In March, 1987 the North Carolina Department of Agriculture and the North Carolina Boll Weevil Eradication Foundation held a "mock" boll weevil funeral. Extension of the eradication effort to Georgia, Florida, and Alabama is underway at this writing.

Late in 1981, through the efforts of the Mississippi Entomological Association (MEA), Congress passed a bill changing the name of the Boll Weevil Research Laboratory to the Robey Wentworth Harned Laboratory. The bill was signed by President Reagan changing the name of the Laboratory to honor Professor R. W. Harned who is known as the Father of Entomology in Mississippi and who was in charge of cotton insect research for the USDA from 1931 to 1953. The laboratory was renamed and rededicated at the annual meeting of MEA on November 10, 1982.

In 1982 T. B. Davich relinquished direction of the Boll Weevil Research Laboratory to E. P. Lloyd, who returned from North Carolina along with G. H. McKibben. Davich retired in 1983. From the period of January, 1982-September, 1985, six scientists were employed at the Boll Weevil Research Laboratory. The research thrusts of these scientists were to develop new low cost technologies for fringe areas of the Cotton Belt where the boll weevil was a sporadic problem and to develop efficient containment barrier technology for the protection of eradicated areas.

In 1986 the direction and management of the Boll Weevil Mass Rearing Research Unit was transferred to the Southern Field Crop Insect Management Laboratory at Stoneville but remained in the Robert T. Gast Rearing Laboratory on the Mississippi State University Department of Entomology grounds. The Cotton Host Plant Resistance Research Unit was placed in the Crop Science and Agricultural Research Laboratory in late 1978. This laboratory was renamed the Crop Science Research Laboratory in 1985 and became a part of the Cotton Host Plant Research Resistance Unit.

In March of 1986 the national program staff of the Agricultural Research Service reduced the Robey Wentworth Harned Laboratory to a six-scientist boll weevil research unit. E. P. Lloyd retired in October, 1986. On January 1, 1987, J. W. Smith of the Southern Field Crop Insect Management Laboratory, Stoneville, transferred to become research leader of the unit.The Boll Weevil Research Laboratory, which later became the Robey Wentworth Harned Laboratory, through its research on the boll weevil has had a tremendous impact on the ongoing eradication effort and on control of the boll weevil in all areas of the Cotton Belt. Staff members of the Laboratory received recognition from the USDA by being awarded three Superior Service Awards. The MEA awarded five Research Awards and one Distinguished Service Award to staff members.

CORN INSECT RESEARCH LABORATORY

Frank M. Davis
Mississippi State, MS

The history of corn entomology research conducted in Mississippi by scientists of the United States Department of Agriculture- Agricultural Research Service (ARS) can be divided into three eras: the 1940's and 1950's; the 1960's; and the 1970's and 1980's. In the 1940's ARS initiated research on insects attacking corn at what was then called State College, Mississippi. According to C. A. Henderson, the first scientist assigned to the corn project was W. A. Douglas. He was joined in 1953 by C. A. Henderson, in 1954 by J. W. Ingram, in 1957 by R. A. Blanchard, and in 1958 by H. C. Cox. They were housed on the first floor of the old "Biology" building on the Mississippi State University campus.

Basic and applied research was conducted on a variety of insect pests of both dent and sweet corn. Notable research accomplishments during this period were the development of corn earworm, *Heliothis zea* (Boddie) resistant dent corn (e.g., Dixie 18) and the management of corn earworm and fall armyworm, *Spodoptera (=Laphygma) frugiperda* (J.E. Smith) on sweet corn using insecticides. The development of resistant corn was a joint research effort between entomologists and ARS plant breeders located at State College. During this period, R. C.(Bob) Eckhardt and C. O. (Clarence) Grogan were the plant breeders. Also, the group cooperated during the summers with C. V. Walters, a noted sweet corn breeder from Indiana, to develop improved sweet corn lines.

All of these entomologists, with the exception of Douglas and Henderson, had retired or transferred by 1960. In the 1960's the corn entomologists were relocated in the new USDA Boll Weevil Research Laboratory and a new scientist, Frank M. Davis was employed in 1965.

A number of graduate students were trained by the corn entomologists during these years. They were F. M. Davis,
J. L. (Joe) Knapp, T. L. (Lloyd) Chestnut, and E. R. (Russell) Black. In addition, the research unit sponsored an undergraduate student in entomology through the college co-op program. He was Cecil Simmons, who is presently a member of the Mississippi House of Representatives serving as Speaker Pro-Tem.

Research during this period centered around the southwestern corn borer, *Diatraea grandiosella* (Dyar), a highly destructive pest that was detected in Mississippi in 1958 and leafhopper vectors of what was then called the corn `stunt' viruses. During the mid-1960's ARS initiated a plant resistance team for developing corn varieties resistant to the southwestern corn borer. The team of Gene E. Scott as plant breeder and Frank Davis as entomologist began an artificial rearing program for the borer and techniques for screening plants for resistance

were developed.

A wide variety of papers were published during this period on topics such as insecticide control of the southwestern corn borer and other insect pests of corn; the role of the yellow-shafted (flicker) woodpecker in reducing overwintering populations of the southwestern corn borer; female southwestern corn borers attract males; amino acids and reducing sugars in silks of corn resistant or susceptible to corn earworms, *Heliothis zea* (Boddie); and competitive displacement between natural populations of the maize weevil, *Sitophilus zeamais* (Motschulsky) and the angomois grain moth, *Sitotroga cerealella* (Olivier) in Mississippi. W. A. Douglas and C. A. Henderson retired in 1970 and 1972, respectively. Frank Davis joined the newly formed Corn Host-Plant Resistance Research Unit that consisted of G. E. Scott (research leader and plant breeder), Eugene Rosenkranz (plant virologist), and M. C. Futrell (plant pathologist). The overall mission of this research unit was to develop germplasm with resistance to the major insects and pathogens attacking corn in the South.

In 1976 Congress appropriated new monies for expansion of research on the southwestern corn borer. At this time, W. Paul Williams was hired as plant breeder for insect resistance and the old 'Gast' rearing rooms within the Boll Weevil Research Laboratory were refurnished for use by corn entomology. In 1978 the Corn Unit was merged with the newly formed Crop Science Research Lab. under the direction of Johnie N. Jenkins.

Research in this period centered on identification and development of resistant corn to the southwestern corn borer and the fall armyworm, lepidopterous rearing, techniques for infesting and evaluating corn for resistance, and identification of the southwestern corn borer female sex pheromone. Two graduate students, J. C. (James) Boykin and Sen-Seong Ng, obtained their Master of Science degrees, working on corn entomology problems.

The more salient research accomplishments of the 1970's and 1980's have been the release of eight inbreds and population of corn with resistance to leaf feeding by both the southwestern corn borer and the fall armyworm; the development of a highly efficient lepidopterous rearing system that has been used as a model for many private and public research programs; the identification of the female southwestern corn borer pheromone; and the development of trapping technologies for using the pheromone in integrated pest management programs.

COTTON PHYSIOLOGY & GENETICS RESEARCH LABORATORY

Jack C. Bailey
Stoneville, MS

The Cotton Physiology and Genetics Research Laboratory along with the Southern Weed Science and Bioenvironmental Insect Control Laboratories were established in 1970. After the Narcotic Insect Research Unit was closed in 1976, Dr. Jack C. Bailey joined the Host Plant Research Resistance Team of the Cotton Physiology and Genetics Research Laboratory that now consists of an entomologist, a geneticist, a plant physiologist, and a plant pathologist.

The entomological aspect of the team has been responsible for research designed to: (1) Improve existing and develop new field, greenhouse and laboratory techniques for screening germ plasm for resistance to insects; (2) screen and evaluate cotton germ plasm for resistance to plants; and (3) determine cooperatively with team members the genetic, chemical, physiological and/or morphological nature of detected resistance.

Four insects: tarnished plant bug, *Lygus lineolaris* (Palisat de Beauvois); *Heliothis* spp.; spider mites, *Tetranyclus* spp.; and leafhoppers, various spp.), have been used in this study. Results on technique development and resistance evaluation have been published. Progress in developing resistance in the cotton plant to attacks of early-season insects is promising.

COTTON INSECT RESEARCH LABORATORY

C.R. Parencia
Stoneville, MS

In the summers of 1938 through 1945, R.L. McGarr conducted research on cotton insects, primarily the boll weevil, *Anthonomus grandis* (Boheman) and the cotton aphid, *Aphis gossypii* (Glover) in cooperation with the Mississippi Agricultural and Forestry Experiment Station near State College. So far as the writer remembers, McGarr reported directly to

Professor R.W. Harned, who headed cotton insect research in the Bureau of Entomology and Plant Quarantine, USDA, from 1931 to 1953. In the winters he studied the pink bollworm, *Pectinophora gossypiella* (Saunders) at the Pink Bollworm Laboratory in Brownsville, Texas.

In field tests at State College, Ms 1:1 and 1:2 mixtures of calcium arsenate plus sulphur controlled boll weevils almost as well as calcium arsenate alone, with considerably lower subsequent cotton aphid populations in plots treated with the mixtures. Adding derris to these materials reduced cotton aphid populations to levels in the untreated check. Calcium arsenate with two percent nicotine in alternate applications and one percent in all applications gave satisfactory control of the boll weevil, kept cotton aphid populations at levels in the untreated check, and increased yield, whereas calcium arsenate alone decreased yield because of heavy cotton aphid populations. Studies of the relationship of the development of cotton aphid populations, calcium arsenate used for boll weevil control, and nitrogenous fertilizers applied to cotton showed nitrogenous fertilizers increased cotton aphid populations when the cotton was treated with calcium arsenate, but no appreciable difference was observed when calcium arsenate was not used.

Research at State College was discontinued in 1945 and McGarr headed research at a sub-laboratory of the Brownsville Laboratory at San Benito, Texas from then until 1950 when he joined the staff of the Brownsville Laboratory for the remainder of his career.

IMPORTED FIRE ANT RESEARCH LABORATORY
Gulfport, Mississippi

W. A. Banks and B. M. Glancey
Gainesville, FL

Research on the red imported fire ant, *Solenopsis invicta* (Buren), was begun by the Agricultural Research Service (ARS) of the United States Department of Agriculture (USDA) at Gulfport, Mississippi in February, 1968. Senator Spessard Holland, then chairman of the Senate Agricultural Appropriations Committee, requested that USDA determine the feasibility of eradicating fire ants with mirex bait. The Plant Protection Division (PPD) of ARS, now part of the Animal Plant Health Inspection Service (APHIS), as the action agency in charge of the fire ant program requested that the research needed to answer Senator Holland's query be conducted by the Entomology Research Division (ERD), ARS.

The required funding was transferred from PPD to ERD, and two fire ant laboratories were established under direction of the Insects Affecting Man and Animals Research Laboratory (Iamarl), one at Gainesville, Florida

and the other at Gulfport. B. Michael Glancey was transferred from Gainesville to Gulfport to establish and direct the laboratory. Staffing was completed with the transfer to the laboratory of Clarence Stringer from PPD at Gulfport and the reassignment of Paul M. Bishop from ERD and Charles H. Craig and B. B. Martin from PPD as technicians.

The Gulfport laboratory continued as a sub-laboratory of the IAMARL in Gainesville, Florida until the reorganization of ARS in 1972 when it was given full laboratory status and placed under direction of the Mississippi Valley Area Office at Stoneville, Mississippi. In 1972 Jerry A. Mitchell joined the staff of the laboratory after the White-fringed Beetle, *Graphognathus* spp., Laboratory was closed. In 1976 B. B. Martin transferred to Corn Host Plant Resistance Research at Mississippi State and was replaced by Adrian Glover. In mid-1977 Glancey returned to IAMARL and was replaced as Laboratory Director by William A. Banks. Adrian Glover also transferred to Gainesville to be replaced in January 1978 by Mrs. Lavenia Miles from the then Bioenvironmental Insect Control Laboratory at Stoneville, Mississippi. Two other additions were made to the staff in 1978: Daniel Pennington replaced the late Charles H. Craig about mid year, and Donald Harlan transferred from ARS, Weslaco, Texas in October.

Pennington left the laboratory in late 1980 to take a position with the U. S. Department of Interior. The group was further weakened by the unexpected death of Clarence Stringer in December, 1980. The loss of the two staff members severely hampered the research effort, and discussions were begun in 1981 concerning options for refilling the positions or consolidating all the ARS fire ant research at Gainesville. Selection of the latter option, which was already being seriously considered in light of increasing inflation and costs, was influenced by the decision of Harlan to leave USDA to enter private business in October, 1981.

The Gulfport laboratory played a very important part in the research conducted on the fire ant during the almost 16 years of the lab's existence. The unit cooperated with the Gainesville laboratory in conducting one of the three large scale eradication trials that determined eradication of the fire ant with mirex bait was technically feasible. After eradication trials, the Gulfport laboratory demonstrated for the first time the existence of a replete caste in the fire ant, the production of trophic eggs by the fire ant queen, and the production of larval and queen pheromones by fire ants. Research showed conclusively the presence of multiple fertile queens in fire ant colonies, a phenomenon that continues to be investigated and that may ultimately prove to be one of the most significant discoveries concerning fire ants. The laboratory also played a very significant role in proposing and evaluating the dispersal of baits utilizing wind currents. This finding alone saved several million dollars in application costs during the large mirex treatment programs for fire ant abatement in the 1970's. Following the withdrawal of mirex registrations in the late 1970's, the Gulfport laboratory played a very important role in testing and developing "Amdro" and "Logic", two baits currently marketed for fire ant control.

SOUTHERN FIELD CROP INSECT MANAGEMENT LABORATORY AND ITS PREDECESSORS

C. R. Parencia and D. F. Martin
Stoneville, MS

The Delta Cotton Insect Investigations Laboratory, Division of Cotton Insects, Bureau of Entomology and Plant Quarantine, U.S.D.A, was established in 1934 in Stoneville in cooperation with the Mississippi Agricultural Experiment Station. The laboratory was established to investigate problems relating to the overall control of cotton insects, with particular emphasis on plant characteristics in relation to insect abundance and to develop specific controls for major cotton pests in the upper Delta area.

E. W. Dunnam established the laboratory and remained in charge until he retired in 1955. M. E. Merkl joined the staff in 1953 and served as entomologist-in-charge from 1955 until 1963 when he transferred to the Boll Weevil Research Laboratory at Mississippi State University. T. R. Pfrimmer served as entomologist-in-charge from 1963 to 1967, when D. F. Martin became laboratory leader. Research conducted at the laboratory had considerable impact on the development of the new organochlorine, organophosphorous, and carbamate insecticides and their applications as emulsion sprays for the control of cotton insects in the mid-1940's and the 1950's. It also played an important role in the development of systemic insecticides applied as seed treatments or as granule formulations applied in-furrow at planting for control of early-season cotton insects in the 1950's and 1960's.

In 1953 a program was initiated at Stoneville to determine the insect species involved in the transmission of anaplasmosis of cattle and to develop controls for insects responsible for transmission of the disease. Calvin Jones initiated a two-month survey in April, 1953, before Leyburn F. Lewis was transferred to Stoneville in June, 1953, to assume responsibility for the program. Robert H. Hoffman replaced Lewis in 1956, and the program was expanded into a full program on research of livestock pests of the mid-delta. Hoffman was replaced by Robert H. Roberts in 1961.

In August, 1967 research on soybean insects at Stoneville was initiated by the Grain and Forage Insect Research Branch of the Entomology Research Division, Agricultural Research Service (ARS), and Jack C. Bailey was assigned to conduct the research. Host plant resistance, systemic insecticides, and insect survey projects were initiated. The soybean insects project became a part of the Bioenvironmental Insect Control Laboratory in 1970.

In 1970 the Cotton Insects, Livestock Insects,

and Soybean Insects Laboratories became a part of the newly established Bioenvironmental Insects Control Laboratory. The livestock insect research was discontinued in 1975, and the soybean insect research was moved to the Soybean Production Research Unit in 1976.

A growing concern over the potential adverse effects of insecticides in the agricultural environment that culminated in reported fish kills in the Mississippi and other rivers led to congressional appropriations for a new insect control laboratory at Stoneville, Mississippi. The purpose of the new laboratory was to develop ways of meeting insect problems that would avoid or minimize the use of broad spectrum, residue-forming, and persistent insecticides that could pose immediate or long-range hazards to man, fish, wildlife, beneficial insects, and other organisms in the environment.

Appropriated funds for construction of the laboratory were released in December, 1967. The entomology laboratory, named "Bioenvironmental Insect Control Laboratory," was one of three laboratories to be housed in what is now known as the Jamie Whitten Delta State Research Center. Construction of the laboratory began in July, l968 and was completed in August, 1970. The laboratory director, Dial F. Martin, was moved to Stoneville in May, 1968. Entomologists at Stoneville who had been quartered with the Delta Branch Experiment Station of the Mississippi Agricultural and Forestry Experiment Station began moving into the new building in September, 1970. The first funding for the new staff was released in early spring, 1971. The mission of the laboratory was to develop ways of meeting insect problems that would avoid or minimize the use of broad spectrum, persistent insecticides that may pose immediate or long range hazards to man and his environment.

The name of the laboratory was changed to Southern Field Crop Insect Management Laboratory in 1981. The mission of the laboratory was and is to improve crop production efficiency by improving biological, chemical, genetic, and cultural control tactics. These efforts are supported by basic research on the biology and population ecology of insect pests and their natural enemies. The laboratory also includes the Stoneville Research Quarantine Facility, through which organisms may be imported, and an insect rearing section for supporting research. The Pecan Production Research Unit was placed under the supervision of this laboratory in 1986. The Boll Weevil Rearing Research Unit of the R. W. Harned Boll Weevil Research Laboratory at Mississippi State Universitywas placed under the supervision of this laboratory in 1985, though it remained in the Robert T. Gast Insect Rearing Laboratory Facility on the grounds of the Entomology Department, Mississippi State University.

The laboratory, as did its predecessors, continues to impact Delta cotton production systems through its extensive research on insect species attacking cotton. E. G. King is laboratory director.

The laboratory has served the cotton producers well over the years with its extensive evaluation program on the efficacy of candidate insecticides against various insects. Its research on control of early-season cotton insects has resulted in increased yields and two week earlier plant maturity than in untreated fields. In cooperation with the DBES it has developed the male sterile hybrid concept for controlling the tobacco budworm, *Heliothis virescens* (Fabricius), on cotton. Development of technology for mass producing millions of tobacco budworm hybrids made possible the

testing of the male sterile hybrid concept on the Island of St. Croix, 1976-1980. Populations were reduced to an extremely low level, indicating the concept merited testing on the mainland. Also, in cooperation with DBES it has contributed considerably to knowledge of bollworm, *Heliothis zea* (Bodde), and tobacco budworm populations early in the season over large areas. Much work has been done on bollworm and tobacco budworm populations on early-season host plants and their relationship to early infestations in cotton. Results of studies on controlling the two species on early-season wild host plants have been so promising that the study has been expanded to cover a larger area. The control of the two species with predators and parasites and the migration of the two species are being investigated. Several species of insects are mass reared in the Insect Rearing Unit and are made available in cooperation with the Cotton Foundation to scientists, public and private, in various laboratories having need for them in their research programs.

Personnel

Name	Degree	Employed
Adair, H. M.	Ph.D.	1978-79
*Bailey, J. C.	Ph.D.	1967-89
*Beland, G. L.	Ph.D.	1972-79
*Bell, J. V.	Ph.D.	1972-82
*Bell, M. R.	Ph.D.	1985-Present
*Brewer, F. D.	Ph.D.	1970-84
*Calhoun, S. L.	B.S.	1944-51
*Cleveland, T. C.	M.S.	1974-Present
*Dunnam, E. W.	Ph.D.	1936-55
*Furr, R. E.	Ph.D.	1952-82
*Harlin, D. P.	M.S.	1972-74
*Harrison, W. W.	M.S.	1983-Present
*Hatchett, J. H.	Ph.D.	1973-75
*Hoffman, R. A.	M.S.	1957-61
*Hopper, K. R.	Ph.D.	1983-Present
*Jones, Walker	Ph.D.	1980-85
*King, C. E.	Ph.D.	1954-58
*King, E. G.	Ph.D.	1972-88
*Lambert, Lavone	Ph.D.	1980-Present
Laster, M. L.	Ph.D.	1959-Present
*Lewis, L. F.	B.S.	1953-56
*Lloyd, E. P.	Ph.D.	1956-63
*Martin, D. F.	Ph.D.	1968-80
*Merkl, M. E.	Ph.D.	1953-63
*Parencia, C. R.	B.S.	1977-80
*Pfrimmer, T. R.	Ph.D.	1957-85
*Polles, S. G.	Ph.D.	1977-80
*Powell, Janine E.	Ph.D.	1981-Present
*Roberts, R. H.	Ph.D.	1961-75
*Roth, J. P.	Ph.D.	1977-78
*Scales, A. L.	B.S.	1963-73
*Scott, W. P.	M.S.	1976-Present
*Smith, J. W.	Ph.D.	1971-86
Smith, W. R.	B.S.	1948-50
*Snodgrass, G. L.	Ph.D.	1981-Present
*Stadelbacher, E. A.	Ph.D.	1964-Present
*Stark, S. B.	Ph.D.	1984-85
*Young, O. P.	Ph.D.	1983-Present

* Employee of Federal cooperating agency.

SOUTHERN FOREST EXPERIMENT STATION

Forestry Sciences Laboratory

Wood Products Insect Research Project

Joe K. Mauldin
Gulfport, MS

The current mission of the project is to develop chemical, biological, or physical methods of controlling or preventing damage to stored or in-use wood by termites; *Reticulitermes* spp., and wood-destroying beetles; *Dendroctonus* spp, *Scolytus* spp, or *Amphicerus* spp. With some temporary additions and deletions, this mission has remained since the research was begun in the mid-1930's.

In 1938 Harmon R. Johnston was assigned as the first entomologist in the Project and was stationed at the Harrison Experimental Forest, about 20 miles north of Gulfport in the Desoto National Forest. His research assignment dealt with the biology and control of subterranean termites and ambrosia beetles, *Amphicerus* spp. Johnston was under the direction of T. E. Snyder, who was stationed in New Orleans, Louisiana, headquarters for the Southern Forest Experiment Station. Snyder, who was an internationally known and respected termite specialist, was the first entomologist assigned to the Southern Forest Experiment Station in 1934.

In 1945 the U. S. Army Corps of Engineers provided funds to greatly expand the research on control of subterranean termites. About this time Snyder transferred to Washington, D. C., and his successor, Joseph R. Kowal, was stationed at Gulfport.

In 1946 three additional entomologists (Sam Dews, J. Vaugh, and Herb Secrest) were employed, making a total of five professional entomologists attached to the Gulfport Project at that time. The Project was mainly involved in wood products insect research, but some time was devoted to studying and making recommendations concerning control of insects attacking forest trees.

Two new entomologists (John F. Coyne and Robert Morris) were employed in 1948 to replace Dews and Vaughn, and the research was expanded to include sawflies, *Neodiprion* spp.; ips bark beetles, *Ips* spp.; southern pine beetles, *Dendroctonus frontalis* (Zimmerman); and black turpentine beetles, *Dendroctonus terebranc* (Olivier). This Project was responsible for all work on forest insects for the Southern Forest Experiment Station (Alabama, Arkansas, Louisiana, Mississippi, Tennessee, and East Texas) and for all work in the United States on insects attacking wood products.

In 1955 Morris and all work on insects that attach living hardwood trees was transferred to Stoneville, Mississippi. In 1961 all research on insects attacking living southern pines was transferred to Alexandria, Louisiana. Wood products insect research remained at Gulfport. Coyne remained in Gulfport, but his research concerned southern pine beetles and tree genetics. Following are personnel changes from

1946 to 1958: R. E. Lee was hired in 1951 to replace Coyne, who was transferred to Liberty, Texas, to work on the southern pine beetle; Morris was reassigned to the Panama Canal Zone in 1952 to begin accelerated testing of new insecticides against termites; and two more entomologists (Virgil K. Smith and Raymond H. Beal) were hired in 1956 and 1958, respectively. Johnston was appointed Project Leader at Gulfport in 1954 when Kowal transferred to Asheville, North Carolina. However, the number of scientists engaged in this research remained about the same, three or four.

Studies were initiated from 1946 to 1958 that resulted in improved control methods for subterranean termites. Some of the studies are still in progress on the Harrison Experimental Forest. These are the studies that proved the effectiveness of the organochlorine insecticides aldrin, chlordane, dieldrin, and heptachlor for subterranean termite prevention and control. These chemicals have been used successfully to protect wooden buildings and other wood products in the United States for more than 30 years. Control methods for ambrosia beetles and bark beetles in logs and pulpwood were also developed. Benzene hexachloride was proven effective against ambrosia beetles, bark beetles, and southern pine beetles. Lindane (the gamma isomer of BHC) is still being used to protect green logs from ambrosia beetles. Snyder's work resulted in a series of classical publications of worldwide importance that dealt with a "Catalog of the Termites (Isoptera) of the World."

In 1965 considerable pesticide research monies were allotted to the Project to expand the research on wood products insects. As a result, three professional entomologists (Richard V. Smythye, Joe K. Mauldin, and J. P. Secrest) were employed. A chemist (Fairie Lyn Carter) was employed in 1965, and in 1967 another entomologist, Lonnie H. Williams, was employed to fill the position vacated by Secrest. The number of scientists at this time was six.

In 1969 the Project was divided into two projects. One headed by Johnston, was devoted to the control of subterranean termites and powderpost beetles. The other, headed by Dr. Smythe, was devoted to developing new, safe, and effective control techniques based on studies of the biology, behavior, and physiology of subterranean termites and powderpost beetles.

After Johnston retired in 1971, V. K. Smith served as project leader for the control part of the work until 1973 when the two projects were combined into one, with Smythe serving as the Project Leader. Smythe transferred to Washington in 1974. Michael I. Haverty was appointed as Project Leader and Ralph W. Howard as a chemist in 1975. Mauldin was appointed Project Leader in 1977 after Haverty transferred to California and continues as Project Leader. Carter, who retired in 1984, was replaced by C. A. McDaniel, and Howard transferred to Manhattan, Kansas. Virgil Smith retired in 1980 and was replaced by Susan Jones in 1981. Ray Beal retired in 1986 and Bradford Kard was hired in 1987.

Results from the research conducted by this project have been used to protect millions of wooden structures and wooden products from damage by subterranean termites and wood-destroying beetles. However, the scientists in the Unit continue to search for new and safer chemicals and methods for protecting wood because of the controversy about the chemicals now in use. Based on data from the Gulfport Unit, the Environmental Protection Agency has registered and approved labels for three chemicals since 1980. These chemicals are chlorpyrifos (Dursban), isofenphos (Pryfon 6), and permethrin (Torpedo and Dragnet). Currently the Unit is continuing to search for alternative soil treatment chemicals, evaluating borate compounds for wood protection, testing a bait-toxicant method of termite control, and

extracting and identifying chemicals from naturally termite resistant woods for evaluation as wood protecting chemicals.

SOUTHERN FOREST EXPERIMENT STATION

Southern Hardwoods Laboratory

SOUTHERN HARDWOOD INSECT AND DISEASE RESEARCH

J. D. Solomon
Stoneville, MS

Hardwood forest research at Stoneville began with a test planting by Mississippi State University in 1937. Two years later, in 1939, a cooperative agreement for hardwood research was made between the Southern Forest Experiment Station and the Mississippi Agricultural Experiment Station under the Norris-Doxey Farm Forestry Act. Early in 1940, the man who was later to be known affectionately as "Mr. Hardwoods," John A. Putnam, came to Stoneville to organize a research project in hardwood management. In 1945 the Stoneville program had three scientists with offices in the Delta Branch Experiment Station building and officially became a branch of the Southern Forest Experiment Station, called the Delta Research Center.

The early 1950's saw an expansion of Stoneville's research program. Robert C. Morris, the first entomologist, joined the staff in 1954 and began the insect research program. His early work dealt mainly with losses from defects caused by insect borers. In 1958 K. M. Peterson worked for one year on cottonwood insects. J. D. Solomon joined the research center in 1961. The following year, 1962, a new laboratory facility with 18,000 square feet of research space was dedicated by Senator John C. Stennis. At that time, the official name was changed from Delta Research Center to Southern Hardwoods Laboratory. Also in 1962 the research was reorganized into three projects, with R. C. Morris becoming Project Leader of the insect project. In the 1960's Morris' major efforts were devoted to cottonwood insects, forest tent caterpillar, ***Malacosoma disstria*** (Hubner), and losses caused by insect borers. Solomon was concerned primarily with the insect borers of oaks and other hardwood species.

In 1969 L. P. Abrahamson joined the insect project. His responsibilities were developing

chemical controls and gathering impact data for the forest tent caterpillar, a defoliator of gum forests primarily in the flooded river bottoms of Alabama and Louisiana. He was also involved with testing chemicals for control of several cottonwood pests. Abrahamson left the project in 1973 to accept a position with State and Private Forestry in Atlanta, GA.

Forrest L. Oliveria came to Stoneville in 1976. His work was concerned primarily with cottonwood insects, with emphasis on natural and chemical control of the cottonwood leaf beetle, ***Chrysomela scripta*** (Fabricius), and the poplar tentmaker, ***Ichthyura inclusa*** (Hubner). Also he was involved with measuring the impact of defoliation by the poplar tentmaker. Oliveria transferred to State and Private Forestry in Alexandria, LA, in 1979. In 1976 Bob Morris retired and T. H. Filer became Project Leader of both the insect and disease projects. Reflecting over a 31-year career with the Forest Service, Morris pioneered much of the early research on southern hardwood insects. He developed the earliest impact data resulting from defects caused by insect borers in hardwoods (losses averaged $21 per Mbf). His procedures were later used by other regions to generate impact estimates, and his loss figures are still referenced today by those who write about this group of insects. Through his work on cottonwood insects, he was elected secretary-treasurer of the Poplar Council of the United States in 1970. He became active in the International Poplar Commission and made several trips to European countries and China to study and consult on the insect pests of ***Populus***.

Solomon's work on the insect borers of hardwoods is well known. Bark indicators (active attacks and over-grown bark scars) have been characterized so that evaluation techniques can be developed for borer infestations. A major component of the sex pheromone of the carpenterworm, ***Prionoxystus robiniae*** (Peck), has been identified, synthesized, and found to be competitive with virgin females in attractancy. The pheromone and its isomers have been effective in attracting four species of borers in the family Cossidae.

Survey and control procedures utilizing the synthetic pheromone are yet being pursued. Research has revealed that borer-caused losses can be minimized with practices that encourage natural enemies, by removing brood trees, by preventing bark injuries, by promoting tree vigor, and by using chemicals through trunk spray or gallery injection. Biological control of insect borers with pathogenic fungi and parasitic nematodes looks promising in current studies. A recent study described and illustrated 16 kinds of insect borer-caused defects in hardwood lumber that could be used to manufacture character-marked products of exceptional beauty for decorative purposes. A major effort to prepare a guide book covering and illustrating 300 species of insect borers of hardwood trees is underway.

The Project (1954-present) has made some significant contributions to the field of hardwood entomology. In addition to those contributions already mentioned, the Project has identified the important insect pests of southern hardwoods and is developing working biologies of the major species. Illustrated guides to pests of cottonwood, sycamore, oak, pecan, and hickory have been published, and another guide to the pests of green ash is in preparation. Research revealed that the growth of gum forests defoliated by the forest tent caterpillar was reduced by 50%. Chemicals, rates, and timing of applications were also worked out. Insect impact studies in intensively cultured cottonwood plantings showed that losses can be substantial. In nurseries, growth loss and culls from insect damage can reduce production by one-third. Plantations have suffered from insect-caused growth loss, stem deformity, and mortality. Methods for predicting losses and

controlling infestations are being formulated into a management guide for growers. Future research will determine causes of increased oak mortality in the South and develop hazard ratings for such a decline in stands and will develop biological controls for the major insect borers. Solomon is the only entomologist currently at the Laboratory, but additional work is supported through cooperative grants at Mississippi State University and the University of Kentucky.

NARCOTIC INSECT RESEARCH UNIT

Jack C. Bailey
Stoneville, MS

In 1972 the Insect Identification and Parasite Introduction Research Branch initiated a project at Stoneville on the ARS Laboratory grounds to determine whether insects might be used to control of narcotic plants. Jack C. Bailey, who served as research leader for the Soybean Insect Research Unit, was appointed research leader for the new unit in March, 1972. He spent the first two years helping design and overseeing construction of a facility that was to be the finest phytophagous insect quarantine facility in the world. Equipment was purchased and staff hired during the two year construction period.

The opium poppy was selected for this research. Two host specific beetles were researched, with one showing promise in controlling the opium poppy. With a change in the National Administration, the project lost support and the work was discontinued in 1977. The outstanding contribution of the project was making possible the availability of a fine quarantine facility. After the narcotic insect research project was discontinued, the quarantine facility was converted to a conventional quarantine facility. Beginning in 1978 the Southern Weed Science Laboratory and the Southern Field Crop Insect Management Laboratory jointly used it. Since 1985 the facility has become an important quarantine facility managed and operated by the Southern Field Crop Insect Management Laboratory.

PECAN PRODUCTION RESEARCH UNIT

Vernon Calcote
Stoneville, MS

Pecan production research with USDA, ARS was established in 1976 to satisfy research and Extension needs of pecan producers in the Mississippi Delta. The unit immediately began a research program to study the biology, ecology, and control of various insects that attack pecans and to test pecan selections for their adaptability to the mid-south area. The first research entomologist responsible directly to the Area Director was Sammy Polles, who conducted an extensive research program from 1976 to 1980. Following Polles, David Drews, a horticulturist, served as research leader from 1982 to 1984. He was followed by Vernon Calcote in 1984. In late 1986, the unit was moved to the Southern Field Crop Insect Management Laboratory with J. W. Smith as research leader.

SOUTHERN WEED SCIENCE LABORATORY

Neal R. Spencer
Stoneville, MS

In June of 1971 Kenneth E. Frick, a research entomologist with the ARS of the U.S.D.A., was transferred from California to Stoneville, MS to develop a biological control of weeds research program for the Mississippi Delta. In April, 1972 a reorganization occurred in the ARS and the old branch system was changed to a regional and area structure. This placed Frick in the Southern Weed Science Laboratory (SWSL) under C.R. Swanson.

The SWSL staff, working on the biocontrol of weeds, was increased in 1972 by the addition of George Vogt, who came from the insect identification group at the Smithsonian Institution. He had done the preliminary foreign studies on the insects to control alligatorweed and thus had an excellent background for the Stoneville program. In June, 1972, P.C. Quimby arrived from New Mexico who was interested in aquatic weed control and thus worked as a team with Vogt. In 1978 Quimby became research leader of the biological control of weeds group within SWSL.

C. G. McWhorter assumed the directorship of the SWSL in 1974 and overall responsibility for the biological control of weeds research program.

Frick developed a research program on the biological control of purple nutsedge, ***Cyperus rotundus*** L. He carried out extensive testing of the indigenous moth, ***Bactra verntana*** (Zeller)

and studied the host specificity, biology, and rearing methods to increase its effectiveness as a biological control agent.

Insects to control alligatorweed, ***Alternanthera philoxeroides*** (Mart.) were first investigated by George Vogt in South America. As a direct result of this research, three insect species were imported into the U.S. for alligatorweed control. The three introduced species were ***Agasicles hygrophila*** (Selman & Vogt), ***Amynothrips andersoni*** (O'Neill), and ***Vogtia malloi Pastrana*** - the genus named after Vogt. From 1973 through 1982 Quimby and Vogt studied alligatorweed/insect/and weather interaction throughout the lower Mississippi Valley and east Texas. They concluded that, the insects have encountered a harsher climate in North America than in South America, biological control of alligatorweed can be termed a success.

Quimby and Vogt also observed the effects of South American insect introductions on waterhyacinth, ***Eichhornia crassipes*** (Mart.) Solms. Together with Ron Baer, Patricia O'Leary, Stratford Kay and Johnny Ouzts, they investigated the augmentation of the native noctuid, ***Arzama*** (Bellura) densa (Walker) for control of waterhyacinth. Walker Jones, working in the Southern Field Crop Insect Management Laboratory ARS/USDA, Stoneville, Mississippi, was also interested in biological control of weeds. He first worked on a native rhopalid, ***Niestrhrea louisianica***, for control of velvetleaf, ***Abutilon theophrasti*** (Medic). He also investigated the potential for biological control of such weeds as balloon vine, ***Cardiospermum halicacabum*** (Linnaeus).

Neal R. Spencer moved from the Biological Control of Weeds Lab-Eurpope to the SWSL in 1982. He began work on the biological control of curly dock, ***Rumes crispus***. Two hundred insect species were collected from ***Rumex*** in Europe, two of which were evaluated for their potential as biocontrol agents of curly dock. ***Pyropteron chrysidiforme*** (Lepidoptera, Sesiidae), while little known in Europe, shows favorable biocontrol potential and may be useful in the United States and Australia after further testing. Velvetleaf, ***Abutilon theophrasti***, a weed found in corn, cotton, and soybeans, may be the most economically important weed ever targeted for biological control. This cropland weed requires $340 million yearly in control efforts. Neal Spencer researched and published the history of velvetleaf's introduction into the United States and the economics of its impact on agriculture. Together with Steve Stegink, he looked at the origin of velvetleaf to develop a search plan for biocontrol agents. Additional papers cover the use of a native insect and plant pathogens for control of velvetleaf reproduction. The work was discontinued in the Southern Weed Science Laboratory and Spencer joined the staff of the Southern Field Crop Insect Management Laboratory in January of 1986.

USDA SOYBEAN PRODUCTION RESEARCH UNIT

Lavone Lambert
Stoneville, MS

The USDA initiated a small soybean research program at Stoneville, MS in 1943 with one research agronomist. The early research was directed toward identifying and developing high yielding cultivars. From 1948 to 1967 much of the research effort was directed toward developing cultivars with resistance to diseases and to soybean cyst nematode. During this time a research geneticist and a research plant pathologist were added to the unit.

In 1968 the first entomological research was conducted. Edgar E. Hartwig, Research Leader of the Soybean Production Research Unit, ARS, and Sam G. Turnipseed and John W. Van Duyn, Clemson University, conducted cooperative studies at the South Carolina Blackville Research Station. They evaluated 426 accessions from the USDA-ARS soybean germplasm collection for resistance to damage by the Mexican bean beetle, Epilachna varivestis (Mulsant). This cooperative research resulted in the identification of three accessions that were highly resistant to foliar feeding by the Mexican bean beetle. The first research in Mississippi connected with the Soybean Production Research Unit was begun in 1969 at Mississippi State University by W. J. Clark, F. Aubrey Harris, Fowden G. Maxwell, and Edgar E. Hartwig. Results of this research showed the soybean accessions identified in South Carolina as being resistant to Mexican bean beetle were also resistant to foliar feeding by bean leaf beetle, Ceratoma trifurcata (Forster), striped blister beetle, ***Epicauta vittata (Fabricino), and bollworm, Heliothis zea*** (Boddie).

The reason for the first entomological research conducted by the Soybean Production Research Unit being conducted cooperatively with entomologists at other locations was that no entomologist at Stoneville was assigned to conduct research on soybean. However, in 1975, Jimmy H. Hatchett transferred to the Bioenvironmental Insect Control Laboratory, now the Southern Field Crop Insect Management Laboratory, at Stoneville to conduct research with soybean insects. Also, Gary L. Beland, in addition to conducting research with corn insects, expanded his program to include studies with insects that attacked soybean. A cooperative research program was developed by the Soybean Production Research Unit with the Bioenvironmental Insect Control Laboratory. Studies were conducted to characterize the resistance of the three resistant accessions identified in South Carolina, and a breeding program was begun to develop cultivars with high levels of resistance to foliar-feeding insects.

In 1977 Hatchett transferred to Manhatten, Kansas to research resistance to the Hessian Fly, ***Mayetiola destructar*** (Say) in wheat. At that time Beland transferred to the Soybean Production Research Unit. Thus, Beland was the first entomologist to conduct research within the Unit. Beland continued on the staff until 1979 when he resigned his appointment to accept a position with Funk Seeds International at

Bloomington, Illinois.

In January, 1980 Lavone Lambert accepted the position vacated by Beland. Before joining the Soybean Production Research Unit he served as soybean entomologist with the Mississippi Cooperative Extension Service. The position within the Soybean Unit had been vacant the previous year, and in addition, during the year, the biological technician assigned to the position accepted reassignment to another location. Therefore, it was necessary to reestablish a research program and to rebuild the supporting staff. Historically, the position had served primarily to support the comprehensive, long-term breeding program. A major portion of the scientific effort was directed toward maintaining and rearing laboratory cultures of corn earworm and soybean looper, ***Pseudoplusia includens*** (Walker) and in maintaining several large (1/6 acre) wood-framed field cages for use in screening material developed in the breeding program. In 1981 the Insect Rearing Unit of the Southern Field Crop Insect Management Laboratory began to rear all insects required in the Soybean Production Research Unit's program. This greatly increased the efficiency of the soybean host plant's resistance to insects research by eliminating the scientific and technical man hours required to rear insects, freeing valuable laboratory space and equipment for research use, and making available greater numbers of insects and more species than were possible through laboratory rearing. In addition, the large, wood-frame field cages used in the research program were redesigned. The six redesigned metal-frame cages, in addition to reducing cage costs, reduced the labor required for conducting research and for cage maintenance. These changes allowed the establishment of a strong, comprehensive research program with a staff of four people while maintaining the support effort for the breeding program.

Within the breeding program, a research team consisting of an entomologist, a geneticist, and a plant breeder conduct studies on the genetics of insect resistance and the development of soybean genotypes resistant to insect damage. An insect resistant cultivar has been developed and will be released within the near future.

Additional areas of research by this team include: (1) identifying unknown sources of resistance; (2) evaluating known sources of resistance; (3) determining injury thresholds for insect resistant genotypes; (4) identifying the mechanisms of resistance; (5) studying the influence of insect resistance on injurious and beneficial insects; (6) conducting ecological and biological investigations necessary to accelerate progress in all areas of study.

MISSISSIPPI AGRICULTURAL AVIATION ASSOCIATION

Harry R. Fulton
Mississippi State, MS

In 1949 an attempt was made to form a State Agricultural Aviation Association. The effort failed until 1956, when a small group discussion led by Larry Wade, Mabry Anderson, and C. A. "Bud" Moore led to a spring meeting at Mickey's Barbecue place near Greenville. From the thirty-one members present, the following were elected as officers: Mabry Anderson - temporary president, Vic Sutter - vice president, and Larry Wade - secretary/treasurer.

An official charter for this new association, "The Mississippi Aerial Applicators' Association," was adopted in Clarksdale on June 4, 1956. The first legal convention was held in February, 1957, at the old Edgewater Gulf Hotel, where the Constitution and By-laws were adopted with the primary purpose of the association being to promote good relations among operators and public figures. Meetings with government bodies, Extension Service, and researchers soon resulted in funding for research with aircraft and equipment. Membership and participation soon flourished under the guidance of Cy Emery and a new executive director, George Bullard. A number of affiliate members who were associated with Allied Industries and various ag chemical firms became interested.

After several years Bullard resigned to devote his time to teaching. Mabry Anderson was hired and continues to conduct business and convention affairs of the association. Much has been done to promote the image of "crop dusters" by MAAA. A lot of time was spent on TV and radio agricultural promotional programs and related activities.

Following are accomplishments of MAAA: instituted and helped fund research on aerial application aircraft and equipment that resulted in opening a research lab, later to be named the Raspet Flight Research Laboratory at MSU (for August Raspet); lowered the advolorem-tax on aerial application aircraft to the same rate as that of other farm equipment; played a big role in adoption of FAA regulations now in effect; lowered Work Compensation rates from $24.00/$100.00 earned to $7.20/$100.00 earned; established an Agricultural Aviation Board in 1966 that allowed the industry to govern itself; gained national recognition for safety programs in agricultural spraying, working closely with the Extension Entomology Department in encouraging members to attend the Fly-In's to determine swath width and heights, droplet size, etc., of their planes; played a major role in the organization of the National Agricultural Aviation Association in 1966 at the Mississippi Convention resulting in Dick Reade, a member of MEA, being elected president in the organizational meeting held in Las Vegas; supports the MEA (its president serves as a MEA Director each year).

MISSISSIPPI AGRICULTURAL CHEMICALS COUNCIL

Joe Hardy
Jackson, MS

The Mississippi Plant Food Council, the organization which preceded the Mississippi Agricultural Chemicals Council, was organized about 1960. As the name implies, the original agricultural chemicals organization was organized by the plant food industry. Prominent members of the plant food industry, the Commissioner of Agriculture and Commerce, and Extension personnel were active in the formation of the organization. The earliest available written record indicates the third annual meeting (August, 1962) was held at the Broadwater Beach Hotel in Biloxi. From that date, although at different hotels, all annual meetings have been held on the Mississippi Gulf Coast.

The organization's first constitution and by-laws were adopted on August 9, 1962, at a special meeting in Jackson, Mississippi. On September 30, 1969 the membership voted to make the organization more representative of the entire agricultural chemicals industry by changing its name to the Mississippi Agricultural Chemicals Council (MACC). A special meeting of the organization was held in Jackson on December 13, 1982 to amend the constitution and by-laws in order for the MACC to gain tax exempt status with the Internal Revenue Service. Tax exempt status was subsequently granted by the IRS. From their beginning the Plant Food Council and the Chemicals Council have been active in state and national organizations and causes related to the chemicals industry. The organization became affiliated with the National Plant Food Council on August 15, 1962 and became a member of the National Agricultural Chemicals Association (NACA) and Southern Agricultural Chemicals Association (SACA) in 1973. Additionally, the Council maintains active membership in the Council of Agricultural Science and Technology (CAST), the Association of Mississippi Agricultural Organizations (AMAO), and the Fertilizer Organization Council of the United States (FOCUS).

The Council has continued to be active as an educational organization. In 1971 a decision was made to sponsor clinics to help farmers and dealers with their fertility problems and the calibration of their fertilizer equipment. The first such clinics were held in January, 1972 and were scheduled annually until 1981. In 1981 it was decided that the fertility clinics and fertilizer spreader clinics would be held on alternate years. The Council sponsored its first chemicals equipment calibration clinic at the Delta Branch Experiment Station in February, 1983 and its first annual safety seminar in February, 1984. Over the years the Council has sponsored various other programs and seminars for farmers, dealers, and others in the chemicals industry as well as other projects, such as the Mississippi Agricultural and Forestry and National Agricultural Aviation Museum, the Hold Our Topsoil program, and educational efforts of CAST. The Council has been a strong supporter of educating young people. A scholarship program was begun with the

awarding of a $150 scholarship to a senior agronomy student at Mississippi State University in 1965. The annual scholarship was increased to $300 in 1970, with the classification of the recipient changed to an agriculture school major in his junior year. In 1975 the annual scholarship was increased to $500, in 1976 to two $600 scholarships, and to three $600 scholarships in 1984. Additionally, in 1985 the Council entered an agreement with Mississippi State University to become a patron of excellence. Under terms of the patron of excellence agreement the Council pledged donations of $10,000 over a ten-year period.

The Council has developed three awards to honor its outstanding members. They are "The Man of the Year, "The Masters Award," and for outstanding members who are retiring, "Lifetime Membership."

MISSISSIPPI AGRICULTURAL CONSULTANTS ASSOCIATION

F. Aubrey Harris
Stoneville, MS
and
C. A. Wilson
Starkville, MS

The Mississippi Agricultural Consultants Association (MACA) started as informal weekly meetings of consulting entomologists to have dinner and discuss common problems and their solutions. The first of these meetings was held in June, 1956 at Naaman's Motel in Greenwood, Mississippi. Participating consultants liked the fellowship and exchange of information so they continued meeting for many years before seeing a need for a professional organization. MACA was formed at a meeting, March 6-7, 1973, at a pest management workshop in Grenada, Mississippi. Officers elected were: Bill Harris, president; Argie Wilson, vice president; Jimmy Thompson, secretary-treasurer; and Mills Rogers, director.

The association has continued to hold annual meetings which are recognized by the Division of Plant Industry as approved workshops for annual renewal of a consultant license. Members are currently informed on the latest information relating to consulting. The purpose of MACA is to help promote, upgrade and maintain the business of agricultural consulting as a profession, and to distinguish for the public between professional consultants (employed for a fee) and those who may have a conflict of interest in giving advice on pest management.

The organization now has about 90 members and continues to be active in promoting the interests of the profession in Mississippi.

MISSISSIPPI BEEKEEPERS ASSOCIATION

Harry R. Fulton
Mississippi State, MS

Beekeeping is the oldest entomological profession in Mississippi. It is believed the first hives in Mississippi arrived in Natchez by boat either upstream or downstream of the Mississippi River. In the 1770-1775 era, according to one writer, "it was a common sight to see 100 bee hives in a farm yard, and both buckwheat and clover were then grown, especially for the benefit of those Epicurean manufacturers. Beeswax and honey were articles of export." By 1819, according to Mr. Lincecum, a storekeeper, honey and beeswax were traded for other goods. An issue of the ***Natchez Free Trader and Daily Gazette***, on November 23, 1841, noted that a diary of two men traveling through Jones County related that wild bees were commonly found and that dozens of bee hives were seen on every farm.

The above early history was researched by Everett Oertel, retired researcher from the U. S. Department of Agriculture Bee Breeding and Stock Center in Baton Rouge, and published in the ***American Bee Journal,*** April, 1976, Vol. 116 (4): 156-157. Many of his statements came from ***Moon's Bee World*** published from 1873 to 1877 by A. F. Moon of Rome, Georgia.

It was not until after 1900, when D. D. Stover migrated from Virginia to Penn Station (now Mayhew), Mississippi with 100 colonies that beekeeping became commercially important in the state. Stover's father had travelled through that area and became aware of its potential for honey production. Stover established Stover Apiaries in 1909 and continued to produce honey until 1918 when he began the production of queens. Later he constructed a large wooden building for use in packaged bee production that continues to be used in the operation today.

In 1935 D. D. Stover was killed in a tragic truck accident in Georgia as he was returning from work in his apiaries there. M. S. Fortune assumed management of the company, which was the largest beekeeping operation in the country for many years. In 1963 P. A. Yelverton became manager of Stover Apiaries.

Other early established beekeeping operations in Mississippi were Hendrix Apiaries of West Point established in the early 1910's, Strickler Apiaries in Jackson County in the 1920's; and Jensen Apiaries of Macon and Shaw Apiaries of Okolona in the 1930's.

According to Oertel and ***Moon's Bee World***, the Mississippi Beekeepers Association was formed in Jackson, Mississippi on November 15, 1873, making it the oldest agricultural organization in the state. Obviously it was composed of beekeepers who operated a few hives to supply a source of sweetening for family use and for barter or sale. Granulated sugar was not available in those early years.

No records of the activities of this early formed group of beekeepers are available. In 1934 Clay Lyle officially organized what is now known as the Mississippi Beekeepers Association (MBA). Unfortunately, detailed records on its activities are not available before the 1960's. Annual meetings were held

regularly and a constitution adopted in 1952. However, the association was not chartered until October 23, 1980.

The Association has initiated many projects through the years to benefit beekeepers. Its purpose as stated in its constitution, "shall be the advancement and protection of the interests of beekeepers commercially, educationally, and socially." Its charter states its purpose as follows: (1) to promote the art and science of beekeeping, to promote research in the fields of beekeeping and pollination of crops, and to promote agricultural growth; (2) to support such research and growth through practical expertise, and whenever possible, through assistance in securing needed finances to carry on beekeeping research and product promotion; (3) to encourage understanding and working relationships among industry, research, and other closely associated agricultural personnel; (4) to serve agriculture through pollination as depicted by the adopted seal and emblem, and (5) to establish and maintain educational exhibits at fairs, ag reviews, etc., to accomplish the above.

In the 1960's the Association's membership consisted of only a few commercial beekeepers. However, those few members were very active and the Association was one of the most respected associations nationwide. The Mississippi Honey Queen program was initiated in 1961 but really didn't function until 1963. Over the next few years it was almost totally financed and sponsored by Stover Apiaries. Mrs. P. A. Yelverton of Mayhew and Mrs. Raymond Ellis of West Point trained and assisted girls in the program. In its initial five years, the program gave Mississippi two American Honey Queens who had competed with and were chosen over Honey Queens from other states. J. W. (Honeybee) Hendrix of West Point was instrumental in persuading the two Clay County girls to enter the state contest, and they became national winners. Following are Mississippi's queens: 1963 - Miss Linda Andrews, West Point, as the American Honey Queen, was awarded $500 by the Honey Industry Council of America; 1964 - Miss Grace Strickland, Pheba, Mississippi Honey Queen, was Mississippi Honey Queen again in 1965 and as the American Honey Queen in that year; 1966 - Miss Stephanie Schutter, Greenville, was chosen Mississippi Honey Queen. These State and National Honey Queens promoted the industry by attending fairs, agricultural shows, and other social events. They also promoted honey on radio and TV programs. The Honey Queen program was very expensive, and the program faltered in 1967 because of inadequate funding.

In the 1960's the Association began to promote honey and pollination at the Mississippi State Fair. It sponsored and awarded prizes for honey baking contests and honey exhibits. These activities continue to be sponsored at the State Fair.

MBA has been active in obtaining enactment of legislation to promote beekeeping interests. Of significance was the enactment of the Bee Indemnification Bill in 1970, which allowed beekeepers to receive payments for bee losses sustained from the application of pesticides. MBA members, especially P. A. Yelverton, devoted a tremendous amount of expense and time in getting this federal legislation enacted. In 1980 MBA, with the assistance of Cecil Simmons, state representative, helped get the honey bee adopted as the state insect. In 1982 MBA was instrumental in passing the Mississippi Honey Labeling Law. So called pure honey products adulterated with up to 90% product corn syrup had been underselling the industry's pure honey in the market.

In 1970 MBA proposed a no comb law, which would prohibit movement of bees on combs into the state. MBA consisted of mostly native commercial package, and queen producers who opposed the newer and fast developing

migratory beekeeping industry consisting of mostly non-native beekeepers. The legislation was not enacted. Such conflicts of interest between the two groups have hampered enactment of new laws and regulations since 1970.

In 1973 a cookbook, ***Golden Treasure of the Hive***, was printed and sponsored cooperatively by MBA and the Mississippi Department of Agriculture and Commerce.

In 1976 MBA established a Master of Beekeeping Award but did not get it entered in the bylaws until 1977. Recipients of the award have been as follows:

W. E. Plant, Hattiesburg	1976
P. A. Yelverton, Mayhew	1985
Robert E. Strickler, Pascagoula	1985
Mr. & Mrs. Johnny Pennington, Pearl	1988

In 1978 MBA established a fund for a scholarship to be awarded annually to an entomology student at Mississippi State University. Recipients of this award are listed in the Scholarship section of the Mississippi Entomological Association's history.

Membership in MBA since the 1960's has increased dramatically. Over the years newsletters written by Harry Fulton have helped recruit many hobby beekeepers as members. In 1973 and 1974, respectively, only 23 and 40 attended its annual meeting. By 1984 membership increased to 250 but has declined to less than 200 in the last two years.

MBA has been an active member in the Association of Mississippi Agricultural Organizations since 1975.

MBA presidents before 1960 - J. V. Pace, M. S. Fortune, Leon Thompson, N. C. Jensen, Eugene Jensen, James Cochran, P. A. Yelverton, Arlie Wilson and some that are not known.

MBA Presidents since 1960:

1967-68	P. A. Yelverton, Mayhew
1969-70	Eugene Jensen, Macon
1970-71	P. A. Yelverton
1973-74	Robert Strickler, Pascagoula
1974-75	J.K. Culipher, Florence
1974-78	Donald Rushton, Laurel
1979-82	J. K. Culipher, Florence
1982-84	Jimmy B. Cagle, Long Beach
1984-86	Charles Martin, Crystal Springs
1987	Jimmy B. Cagle, Long Beach
1988-89	Donald Rushton, Laurel

The secretary-treasurer's position has always been inherited by the state apiary inspector with the Division of Plant Industry, MDAC.

Secretary-Treasurers:

1934-1950	Dr. Clay Lyle
1950-?	Homer Tate
1960-?	Arlie Wilson
1963-67	Homer Tate
1968	Leon Thompson
1969-73	E. G. Dyess
1974	Frank Killibrew
1975-Present	Harry Fulton

MISSISSIPPI ENTOMOLOGICAL ASSOCIATION

Ruth Morgan and David F.Young, Jr.
Mississippi State, MS

Early MEA Forerunner

As recorded in the minutes of a meeting held on March 7, 1921, in the entomological classroom at Mississippi Agricultural and Mechanical College, Professor R. W. Harned stated the purpose of the meeting to be "to organize an entomological society at Mississippi Agric. & Mech. College".

Mr. R. N. Lobdell was elected temporary Chairman and E. W. Stafford as permanent secretary for one year. The group of entomologists met weekly through April, 1921. No accounts of later meetings have been located. At the March 14 meeting a committee consisting of E. W. Stafford, J. N. Crisler, and G. L. Smith, was appointed to select a name for the society. At the weekly meetings presentations as follows were presented:

March 14- "The Mexican Bean Beetle" - "The Tree Fakir"
March 21- "The Mississippi State Plant Board"
April 6- "Sweet Potato Insects & Diseases"
April 11- "Green Japanese Beetle"
April 18- "Lepidoptera Notes"
April 25- "Boll Weevil Back in Louisiana"

At the April 25 meeting the group decided to call the society, **"Ommatidia, The Entomological Society of Mississippi".**

For historical purposes the names of those persons who attended these first meetings are listed below. Those shown with an asterisk attended the initial meeting.

D. L. Alford
* H. W. Allen
* G. F. Arnold
J. W. Bailey
* F. H. Benjamin
* C. H. Brandon
* C. H. Brannon
* L. W. Brannon
* J. N. Crisler
* J. H. Fewell
* G. E. Gaines
T. B. Gallman
* W. C. Grayson
* F. C. Graham
* D. W. Grimes
* J. C. Hardy
* R. W. Harned
* M. G. Harrison
* J. G. Hester
J. C. Holton
* F. M. Hull
* H. H. Kimball
* J. M. Langtson
* R. N. Lobdell
Clay Lyle
* J. O. Maloney
* T. G. McCormick
O. S. McDonald
* D. C. McInnis
L. E. Miles
I. R. Nolan
L. J. Pessin
J. B. Pope
S. F. Potts
* C. E. Posey
E. S. Roberts
* E. M. Roberts
J. F. Russum
* J. B. Rutledge
* H. J. Shoup
* J. A. Smith
* G. L. Smith
* O. G. Smith
* J. E. Snowden
* E. W. Stafford
D. U. Stapleton
* F. O. Swan
W. V. Vurgaut
R. B. Willson

MEA Establishment

Some 33 years later A small group of men concerned with entomology in Mississippi met at Sam's Cafe (Leland, Mississippi) on October 8, 1954. Their discussion centered around the idea of an association that would bring all facets of entomology together and strengthen the field within our state. It was decided that such an organization was needed and had the potential to be successful. The temporary officers selected were W. R. Smith, chairman, and L. C. Murphree, secretary-treasurer. J. C. Redd was chairman of the committee to select the time and place for an organizational meeting. A temporary constitution was proposed. Those present at Sam's Cafe were W. R. Smith, M. E. Merkl, C. E. King, David Young, J. C. Redd, Doc Parrish, J. F. White, L. C. Murphree, Hal Jones, Chuck Boone, Reid Faulkner, and Roy Bailey. A letter prepared and sent to all persons interested in entomology in Mississippi invited each one to attend an organizational meeting at Delta Branch Experiment Station in November of 1954. At this meeting the foundation was laid for the organization by the election of officers and adoption of a constitution. At this meeting A. G. Bennett, Extension entomologist, invited the newly organized Association to participate in the Annual Insect Control Conference to be held in 1955. This jointly sponsored meeting was held January 6-7, 1955. A total of 215 attended the 1955 Annual Insect Control Conference, with 83 joining the Association. Since 1954-55 the Association has steadily grown in numbers, enthusiasm, and service to the people of Mississippi. One of the unique qualities of this Association has been that it represents all groups within the entomological field. The goals of the Association are achieved by collective action.

Annual Insect

Control Conference

In 1955 the Mississippi Entomological Association joined Extension Entomology in sponsoring the Annual Insect Control Conference. Mississippi State has been the home of all conferences except one, which was held in Jackson, Mississippi, in 1964. The Insect Control Conference meets annually for two days about mid-November. The program consists of presentations of invited speakers. Initially, emphasis was placed on presenting entomology research done in Mississippi. Since then the scope of the program has been broadened to present research findings of general interest to the members. Through the years the conference's program committee has obtained many leading entomologists and specialists in other closely related fields as speakers.

The banquet is one of the conference's highlights. The "bingo game" sponsored by the chemical industry has increased attendance and support from the membership. In 1988 the banquet was replaced by a luncheon and hospitality, bingo, "pickin' and grinnin'" were held in the evening.

Newsletters

The Association's monthly newsletters were begun in 1955 by David Young. The newsletter was at one time published monthly but now only several times throughout the year. Its contents vary from resumes of important entomology research and legislation to notes of personal interest about the Association's members.

Emblem

The emblem of the Mississippi Association was originated by a committee composed of C. E. King, David Young, Marvin Merkle, A. G. Bennett and Roy Bailey. The original emblem was the outline of the state drawn on an open cotton boll. A boll weevil and a bollworm look in from opposite sides of the state. In 1956 this emblem was enclosed by a circle.

Legislative Activities

The Mississippi Entomological Association has been active in legislative matters pertaining to entomology, and through its individual members and as a group, has strongly supported many desirable and needed legislative bills that have made significant contributions toward the advancement of entomology in Mississippi. Senator James Molpus of Clarksdale and Representative Cecil Simmons of Starkville were very instrumental in obtaining passage of bills pertaining to entomology.

4-H Entomology

The Mississippi Entomological Association supports the Department of Entomology in the Cooperative Extension Service by promoting entomology in the 4-H Clubs of Mississippi. In addition to making annual donations to the awards program, members of the Association have assisted in the organization of many county entomology projects in 4-H Clubs. This program has produced many national winners in entomology. The Executive Committee of MEA in August, 1957, three years after its formation, established a 4-H Entomology Awards Subcommittee under the Standing Committee on Research and Education. The purpose of the 4-H Entomology Awards Subcommittee was "to provide funds for promoting entomological interest among young people in Mississippi. The funds shall be presented to the Mississippi Agricultural Extension Service 4-H Club Department to be used as awards. Action of this committee should be approved by the Executive Committee." In 1957 MEA presented the first check to the Mississippi Extension Entomology Department in the amount of $1,155 for financing the 4-H Entomology Awards for 1957. Businesses interested in entomology made the awards possible. Winners in 4-H Entomology Demonstration Contests and Entomology Achievement Contests were awarded appropriate awards in 1957. Mike Carter, chairman of the 4-H Awards Committee, presented the check to A.G. Bennett, leader of Extension Entomology in Mississippi. Bennett accepted the check in behalf of 100,000 4-H clubbers in Mississippi with the pledge that his department would attempt to gain 10,000 boys and girls in taking entomology as a project in 1957. This is nearly half of the total enrollment for the entire United States. Thirty engraved

watches were presented during the State 4-H Club Congress. In 1958 David Young chaired the committee and stated that 4-H entomology clubs were being organized, with members of the association serving as volunteer teachers of the clubs. Approximately $1,000 was collected for this program. In 1959 Ted Pfrimmer led a general discussion concerning the 4-H Entomology Awards Program and it was suggested that the incoming chairman appoint a committee to study ways and means of raising the funds for the awards program, and that the committee should consider whether the Association should sponsor the awards program in the future. In 1960 William Giles served as chairman and stressed the need for continuation of off-campus entomology courses and the encouragement of the 4-H Entomology Awards Program, and approved annual contribution of $50 in support of the program and turned the solicitation of funds over to the Extension Entomology Department. This contribution was increased to $100 in 1979 and to $125 in 1982. In 1965, 16 schools and junior colleges were visited, 34 classes taught to 1,170 students. Results were increased enrollment at Mississippi State University and an enrollment in 4-H entomology of 9,000.

In 1984 a Special Funds Committee was appointed to solicit funds for establishing a self-sustaining program, in hopes of fully supporting the 4-H Entomology program. Leo Calhoun, an American Cyanamid representative who had previously been involved in the 4-H Extension Program in Alabama, served as the first chairman of this project. In 1985 Calhoun purchased a plaque, and the name of each company contributing $1,000 or more was listed for display. Such contributors to date are Ciba-Geigy, American Cyanamid, ICI Americas, Shell, Union Carbide, Rhone-Poulenc, E. I. DuPont, Hoechst-Roussel, Helena, and Pennwalt.

National and sectional winners in 4-H entomology:

Year	Name	County
** 1952	John Wayman Sowell	Madison
* 1953	Lillian Agnew	Lee
* 1954	George Willey	Madison
** 1956	Kenneth Boutwell, Jr.	Newton
** 1957	Howard E. Breland	Forrest
** 1961	James Herbison	Bolivar
** 1964	Jerry Patton	Pontotoc
** 1965	Stanley Bell	Sunflower
** 1968	Charles Bryson	Lee
** 1969	Adrian C. Morris	Washington
** 1970	Alvin Rhodes	Rankin
** 1971	Sharon Kay Rogers	Lauderdale
* 1972	Maurice B. Layton, Jr.	Simpson
** 1973	John Bryson	Lee
* 1974	Ricky Lee Patterson	Lee
** 1976	Robert Patterson	Lee
** 1977	Katherine Washburn	Hinds
* 1981	Anna Rose	Desoto
* 1982	Susan Seal	Neshoba
* 1983	Russell Patterson	Lee
* 1984	Angela Westbrook	Desoto
* 1985	Michael Johnson	Jones
* 1986	Billie Stribling	Montgomery
* 1987	Greg Williams	Pontotoc
** 1988	Christopher Shaw	Washington

** National Winner
* Sectional Winner

The Mississippi Entomological Association has consistently promoted entomology in high schools of Mississippi. The Association has provided speakers to inform thousands of students of the opportunities in the field of entomology. Members have assisted in annual high school science fairs and in the National Science Visitation Program for high school

students. A 20-minute, 16 mm color film, "A Better Tomorrow," became a reality in 1976. It is available on loan from the Department of Entomology and Extension Entomology. The film focuses on the academic opportunities available to a student in entomology at Mississippi State University and career opportunities for entomologists. The film is appropriate for showing in schools, civic organizations, garden clubs, junior and senior colleges, workshops, and other such meetings. Sustaining memberships in the amount of $25 contributed by industries was established to fund the movie. This registry was so successful it is still maintained to support the MEA more fully. Committee members who worked untiringly on the production of this film were Clyde Sartor, D. D. Hardee, Jim Frazier, L. C. Murphree, Jack Coley, Robert McCarty and Lewis Coons. Appreciation is expressed to Bev Norment for chairing this committee and his technician, Jacky Martin, for invaluable technical assistance during the filming and David Hutto (photography and editing). The Mississippi Entomological Association has given strong support to the Entomology Department of Mississippi State University. The initial resolution proposing the construction of the Entomology Building was presented to the University Administration in January, 1964. This new building The Clay Lyle Entomology Complex was completed in January, 1971. The well-equipped facility provides an excellent atmosphere for all students in entomology. The Association has also supported establishment of needed staff positions, addition of teaching aids, and research equipment.

Since 1960 the Mississippi Entomological Association has sponsored scholarship awards for outstanding students in entomology. Currently, two $100 scholarships are awarded by the Association each year. Two other scholarships, the J. C. Redd Scholarship ($200 since 1966) and the James Molpus Scholarship ($200 since 1970), are supported by the Association members. In 1964 the Boll Weevil Research Laboratory sponsored a $100 award. The Mississippi Entomological Association and the Cooperative Extension Service sponsored a course in Cotton Insect Control at the Delta Branch Experiment Station in 1958. Arlie Wilson and David Young were in charge of the course. Thirty-three county agents, agricultural teachers, and others received credit for the course. Seminars have been sponsored by the Mississippi Entomological Association for timely presentations of information of broad interest to members of the Association.

Membership, 1955-1988

Sustaining memberships were initiated in 1975 by John Taylor and W. O. Miller. A letter of invitation was mailed to prospective members stating that "sustaining members shall be those individuals or firms who pay a minimum of $25 annually." Each sustaining member is listed in a registry that appears on the reverse side of each Associational newsletter. In 1976 and 1977 there were 26 and 23 sustaining members, respectively. The initial purpose of the sustaining membership was to gain some needed cash to help finance the MEA movie, "A Better Tomorrow." Membership over the years was as follows:

MEMBERSHIP CHART

Year	Membership	Sustaining
1955	83	
1956	123	
1957	161	
1958	130	
1959	200	
1960	220	
1961	245	
1962	277	
1963	268	
1964	280	
1965	293	
1966	282	
1967	280	
1968	246	
1969	305	
1970	326	
1971	326	
1972	343	
1973	300	
1974	407	
1975	471	
1976	524	26
1977	456	25
1978	527	28
1979	525	20
1980	708	19
1981	484	26
1982	404	26
1983	294	26
1984	379	20
1985	338	17
1986	248	22
1987	250	17
1988	272	15

Lifetime Honorary Members

A. G. Bennett
R. Z. Pepper
T. M. Waller
O. T. Guice, Jr.
S. O. Hill
Arlie Wilson
Leon Hepner
F. J. Bartlett
James H. Cochran
T. R. Pfrimmer
J. C. Redd
John Taylor
L. C. Murphree
Dial Martin
F. G. Maxwell
D. F. Young

The following lifetime honorary members who are deceased are remembered:

Clay Lyle
R. W. Harned
E. W. "o" Stafford
J. M. Langston
Al Hammer
L. J. Goodgame
Dr. Ross Hutchins
T. D. Persons
Homer Tate
R. P. Colmer
C. R. Parencia

Distinguished Service Award

The Distinguished Service award is reserved for those who have made significant contributions to the field of entomology in Mississippi. Recipients of this highest award include the following:

1956- **Ethelbert Withrow (Bo) Stafford** was assistant entomologist at the University of Minnesota, served with the New Jersey Agricultural Experiment Station, and the Pennsylvania Chestnut Tree Blight Commission. He spent 3 years (1914-1917) with the Illinois Horticultural Commission before becoming employed at Mississippi A & M College as an instructor. Stafford retired from Mississippi State University as a full professor and then was granted a rank of emeritus professor in 1957. He taught science and biology at Wood Junior College for several years after retirement from MSU.

1957- **Robey Wentworth Harned** joined the Mississippi A & M College faculty in 1907. He served there until 1931 much of the time as head of the Department of Zoology and Entomology and greatly advanced the field of Entomology in Mississippi. During his early years of service he was the only professional entomologist in Mississippi and thereby was involved in extension, research and regulatory entomology. Harned retired from federal employment in 1953 after 22 years of service in USDA and 46 years of service to entomology.

1959- **Clay Lyle** taught high school and farmed in Texas before becoming employed by the State Plant Board in Mississippi.

In 1925 he became Head of the Department of Zoology and Entomology, Executive officer of the State Plant Board, and Entomologist for the Mississippi Agricultural Experiment Station.

In 1945 Lyle was appointed to Dean of the School of Science and from there he was appointed to dean and director of the Division of Agriculture (School of Agriculture School of Forestry, Experiment Station, and Cooperative Extension Service) in 1951 where he served for 10 years until retirement with 41 years of service to Mississippi State University. After serving as a Consulting Entomologist in Taiwan for two years, Lyle returned to Mississippi State to serve for six years as estate planner with the Development Foundation. In 1969 ill health forced him to fully retire.

1966- **Robert Percival Colmer** began his Entomological career in 1920 with the State Plant Board. In July, 1933 he was appointed chief inspector where he served until retirement on June 30, 1966. During Colmer's tenure, he served actively on the Southern Plant Board and the National Plant Board.

1972- **Albert George Bennett, Sr.** was hired in March, 1952, as an Entomologist with the Extension Entomology Department and became head of the Department later that year. Since 1952 Bennett had been serving as one of the earliest consulting entomologists in Mississippi.

Bennett retired from the Cooperative Extension Service as Head of the Entomology Department in 1970. He still resides in Starkville.

1974- **L. C. Murphree** served the USDA Bureau of Entomology for 1½ years and for the Extension Service for 19½ years, serving as leader of Extension Entomology from 1947 until 1952. Upon retirement from the Extension Service he then worked for 31½ years in the private chemical companies; Coahoma Chemical Company for 20½ years, Riverside Chemical Company for 3 years and Velsicol Chemical Company for 3 years. Murphree

now resides in Starkville, Mississippi.

1975- **Fowden G. Maxwell** was appointed in 1961 to associate professor while a student at Kansas State University and served until graduation in 1961. In June, 1961 he moved to Starkville, MS to develop insect resistant strains of cotton at the USDA Boll Weevil Research Laboratory. While there he served as an adjuvant professor to the Department of Entomology at Mississippi State University. In 1968 he was chosen to be Head of the Department of Entomology at MSU where he served until 1974, at which time he accepted the position as Head of the Entomology Department at the University of Florida. In 1975 he accepted a position as coordinator for Environmental Activities of the USDA in Washington, D.C. He is now chairman of the Entomology Department at Texas A & M University.

1976- **Clifton Arlie Wilson** served in the U.S. Public Health Service from 1942-1945 as a medical entomologist. After serving in the military he was on the staff of the Department of Entomology at Rutgers University from 1945-1948. In 1948 Wilson accepted a job on the staff at Mississippi State University and through the years became a professor of entomology. Wilson served as interim Department Head at three different times.

Wilson now resides in Starkville, Mississippi.

1978- **J.C. Redd** taught in the public schools in Mississippi for nine years, was employed by the USDA, Bureau of Entomology and Plant Quarantine for cotton investigations, served as State Apiary Inspector for the Mississippi State Plant Board, and was Assistant State Entomologist and Zoology Professor at Mississippi State University. He elected to enter into private business in 1946 and organized his pest control company, which today operates branches throughout eight states.

Redd retired from private business in 1978 and resides in Jackson, MS.

1980- **Dial Franklin Martin** was employed as instructor of Entomology at Texas A & M University in 1939, attaining the rank of full professor in 1954. He served as Investigations Leader of pink bollworm research, United States Department of Agriculture from 1957-1965 at Brownsville, Texas; Assistant Branch Chief, Cotton Insects Research Branch, USDA, Beltsville, Maryland, 1965-1968; Laboratory Director, Bioenvironmental Insect Control Research Laboratory, USDA, Stoneville, Mississippi, 1968-1979.

1981- **David F. Young, Jr.** served the Mississippi Agricultural and Forestry Experiment Station as an assistant entomologist and the State Plant Board as district entomologist before joining the Extension Service in 1955. He served as leader of the Extension Entomology Department from 1970 until 1983 when he retired.

1982- **Charlie Parencia** served as teacher and principal of White Hall School in Jackson County, Texas from 1934-1942; as seasonal employee in 1933 and 1935-1941 at the Port Lavaca, Texas, USDA Cotton Insects Research Laboratory; Research Entomologist and Entomologist-in-Charge, 1942-1962, Waco, Texas USDA Cotton Insects Research Laboratory; Assistant-to-Chief, Cotton Insects Research Branch, Entomology Research Division, Beltsville, Maryland, 1962-1972; Staff Specialist, Entomology, National Program Staff, Plant and Entomological Sciences, Beltsville, Maryland, 1972-1976; and Research Leader, Insect Populations Management Research Unit, Bioenvironmental Insect Control Laboratory, AR, SEA, USDA, Stoneville, Mississippi, 1976 to 1981.

He lived in Leland after his retirement and served as collaborator to the Southern Field Crops Insect Management Laboratory, Jamie Whitten Delta State Research Center, ARS, USDA, Stoneville, Mississippi until his death on July 8, l988.

1983- **Ted Pfrimmer**'s research career spanned more than 30 years with the Agricultural Research Service, U. S. Department of Agriculture. His first assignment was at the Waco, Texas Laboratory on the Cotton Insect Survey. His permanent appointment began at the Brownsville, Texas Laboratory. He spent a few years at the Tallulah, Louisiana,Laboratory, with his service culminating at the Stoneville, Mississippi, Laboratory, where he spent more that 25 years as project, research or laboratory leader.

He now resides in Leland during retirement.

1984- **W. O. "Tollie" Miller** served for years as research entomologist and technical specialist for Dow Chemical Company, Wayside, Ms. His most noted contribution to agriculture was his development and patent of the Dow Soil Injection Knife which is used in the application of nematocides and the development of Dursban TC.

He is now retired from Dow Chemical Company and resides in Leland, MS.

1985- **John Taylor** is retired from service at Mississippi Farmers Cooperatives (MFC) in Madison, MS where he devoted 34 years of his talents and time in insecticide and consulting industry.

1986- **Marion L. Laster** has been a staff member in the position of Entomologist at the Delta Branch, Mississippi Agricultural and Forestry Experiment Station, since 1959. He retired in 1988 and resides in Leland where he is still involved in Entomology doing consulting type work.

1986- **Edwin P. Lloyd** served as a research entomologist in Mississippi at Stoneville and transferred to the Boll Weevil Research Laboratory (BWRL) at Mississippi State University in 1964. After thirteen years at the BWRL, he headed the Boll Weevil Eradication Unit at Raleigh, North Carolina. With the success of the eradication program there, he returned to the Boll Weevil Research Laboratory in 1982 to become its director.

On October 3, 1986, he retired from government service. He still resides in Starkville.

1987- **Edna Ruth Morgan** began working for the Mississippi Cooperative Extension Service, Entomology Department in 1960, while continuing her education. She has worked there since 1960 except for one year when she taught school.

1988- **Jack Daniel Coley** began work in Memphis, TN in 1955 as an inspector for the USDA, APHIS, PPQ. In 1958 he joined the State Plant Board as an inspector. In 1966 he was promoted to general inspector, in 1968 to chief inspector, and in 1975 to state entomologist and director of the Division of Plant Industry, Mississippi Department of Agriculture and Commerce, Starkville, MS. He continues to serve in this position.

MERIT AWARDS

In 1972, the Association initiated the Merit Award Program to recognize outstanding entomologists in the area of teaching, research, and service. Recipients of these awards are as follows:

1973

Teaching - Jessie White - Head of the Biology Department, Delta State University

Research - Ted Davich - Head, USDA Boll Weevil Research Laboratory, MSU Entomology, Insect Physiologist.

1974

Teaching - C. A. Wilson - Professor of Entomology, Department of Entomology, MSU.

Research - Ed P. Lloyd - Research Entomologist, USDA Boll Weevil Research Laboratory, MSU.

Service - H. C. Mitchell - Entomologist, Mississippi Cooperative Extension Service, MSU.

1975

Teaching - Howard Chambers - Associate Professor of Entomology, Department of Entomology, MSU.

Research - W. W. Neel – Associate Professor of Entomology, Department of Entomology, MSU.

Service - W. O.(Tollie) Miller -Research Entomologist and Technical Specialist for Dow Chemical Co., Wayside, Ms.

1976

Research - Ted Pfrimmer - Research Entomologist, Bioenvironmental Laboratory, Stoneville, Ms.

Service - Billy Harris, Agricultural Consultant, Greenwood, Ms.

1977

Teaching - James Frazier - MSU Department of

Research - Marion Laster, Entomologist, Mississippi Agricultural and Forestry Experiment Station, Leland, Ms.

Service - Jack D. Coley - State Entomologist/Director, Division of Plant Industry, Mississippi Department of Agriculture

1978

Teaching - Johnny Outz - Entomologist and Professor, Delta State University, Cleveland, MS.

Research - Peter Sikorowski, Insect Pathologist, MSU Department of Entomology

Service - Mr. James H. Cochran Entomologist - MCES, MSU.

1979

Teaching - Robert L. Combs, Livestock Entomologist, MSU Department of Entomology.

Research - Leon Hepner, Insect Taxonomist, MSU Department of Entomology.

Service - John Taylor, MFC Services, Madison, MS.

1980

Teaching - Not Awarded

Research - William (Bill) Cross, USDA Boll Weevil Research Lab/Crop Science, MSU.

Service - Not Awarded.

1981

Teaching - Henry B. Green, Deceased Professor, MSU Department of Entomology, Award accepted by his wife, Mary.

Research - Virgil Smith, USDA Entomologist, Southern Forest Products Research Lab, Gulfport.

Service - Mills Rogers, Rogers Entomological Service, Cleveland, MS.

1982

Teaching - Not Awarded.

Research - James D. Solomon, Entomologist, USDA/Forest Service, Stoneville.

Service - Gordon L. Andrews, Assistant Professor, MSU Department of Entomology.

1983

Teaching - Not Awarded.

Research - Frank M. Davis, Entomologist USDA/ARS - Crop Science Research Lab, MSU.

Service - Robert B. Head, Cotton Insect Specialist, MCES, Entomology Department, MSU.

1984

Teaching - W. W. (Bill) Neel, Entomologist, MSU Department of Entomology.

Research - Howard Chambers, Toxicologist/Professor MSU Department of Entomology.

Service - Leo Calhoun, Sales Representative, American Cyanamid Company, Jackson, MS.

1985

Teaching - Richard L. Brown, Associate Professor, MSU Department of Entomology.

Research - Eric J. Villavaso, Entomologist, USDA/ARS Boll Weevil Research Lab, MSU.

Service - Harry R. Fulton, State Apiarist and Pesticide Registration Specialist, Division of Plant Industry, MS Department of Agriculture and Commerce, MSU.

1986

Teaching - B. R.(Bev) Norment, Professor of entomology, MSU Department of Entomology.

Research - G. R. McKibben, Research entomologist, ARS, Boll Weevil Research Unit, MSU.

Service - Robert H. McCarty, Deputy Director, Division of Plant Industry, Mississippi Department of Agriculture and Commerce, MSU

1987

Teaching - Not awarded.

Research - Dr. Henry N. Pitre, Professor, MSU Department of Entomology.

Service - Bob Ratliff, Progressive Farmer.

1988

Teaching - Dr. Henry N. Pitre, Professor, MSU Department of Entomology.

Research - Dr. Randy Luttrell, Assistant Professor, MSU Department of Entomology.

Service - Dr. Jim Hamer, Extension Entomologist, MSU Department of Entomology.

SCHOLARSHIPS

Since 1960 the Mississippi Entomological Association has sponsored and administered scholarship awards to outstanding students in entomology. Initially, two $100 scholarships were awarded by the MEA each year. Two $200 scholarships, the J. C. Redd Scholarship and the James Molpus Scholarship, were established by private individuals in 1966 and 1970, respectively. In 1964 the Boll Weevil Research Laboratory sponsored a $100 award. More recently two additional scholarships have been administered through MEA and awarded at its annual banquet. The Mississippi Beekeepers Association initiated a scholarship in 1979.

After the untimely death of Dr. H. C. Mitchell who had just been elected president of MEA, a fund to establish a memorial scholarship in his memory was set up in 1981, with hopes of receiving sufficient contributions to make it an endowed scholarship fund through the Mississippi State University Foundation. As such MEA would become a Patron of Excellence. In 1983, Dr. Bill McGovern, a former co-worker of Dr. Mitchell, not only pledged enough to become a patron himself but also enough to enable MEA's H.C. Mitchell Scholarship to become a Patron of Excellence.

Since being established many of them have been increased and are currently available as follows:

Scholarships Available:

James E. Molpus	$200
Ms. Entomological Ass'n (MEA)	$500
H.C. Mitchell Memorial (HM)	$1000
J.C. Redd (Redd)	$750
Ms. Beekeepers Ass'n (MBA)	$300

The following persons have received scholarships:

1960 - MEA - Freddie Tingle
1961 - MEA - David Vickers, and Jon D. Tate
1962 - MEA - William Falls
1964 - MEA - T. Lloyd Chestnut
1965 - MEA - James W. Smith
1965 - MEA - Frank Nichols
1966 - MEA - Ray Leeper, and Homer Collins
1967 - MEA - Cary Crosby and Ronald A. Westmark
1968 - MEA - Mike Williams, and William Johnson
1969 - MEA - Becky A. Moore, and Frank Maxcy
1970 - MEA - Jimmy Etheridge, and Steve Alexander
1971 - MEA - James Gill, and Scott Ecklar
1972 - MEA - Alvin Rhodes
1973 - MEA - Maurice Layton
1974 - MEA - Jeff Purser
1975 - MEA - Larry Hatfield
1976 - MEA - Lane Foil
1977 - MEA - Russ Mizell
1977 - Redd - Billy Mink
1978 - MEA - James Whitehead
1979 - MEA - Rusty Mitchell, and William Wasser
1979 - MBA - Stephen Winter
1980 - MEA - Robert A. Farlow
1980 - MBA - Bryan S. Wilson
1980 - Redd - Robert J. North
1981 - MEA- Patricia Frazier O'Leary
1981 - HM - Bryan S. Wilson
1981 - MBA - Tommy Wofford
1981 - Redd - J. E. Mulrooney
1981 - MBA - Bryan S. Wilson
1982 - HM - Tommy Wofford
1982 - MBA - David Smith
1982 - Redd - Scott H. Hutchins
1983 - HM - David Heering
1983 - MBA - Brenda Booth
1984 - HM - David Heering
1984 - MBA - Dennis Riley
1984 - Redd - Brenda Booth Brown
1985 - HM - Kevin A. Watkins
1985 - Redd - William S. McDonald
1986 - HM - Michael F. Ludlow
1986 - Redd - Daniel M. Stout II
1986 - MBA - Michael Todd Davis
1987 - HM - Carl Felland
1987 - Redd - Abbas Ali
1988 - MEA - David Reed
1988 - HM - Joseph Bong
1988 - Redd - James Beisler

GULF COAST MOSQUITO ABATEMENT DISTRICT

David F. Young, Jr.

Starkville, Mississippi

MEA initiated a study of salt-water mosquito problems on the Gulf Coast in 1959. The first step in carrying out this project was establishing a special committee on insects affecting man. Chairman of the committee was Tollie Miller, entomologist with Dow Chemical Company, who had considerable experience in mosquito research and control. Teaming up with the committee was David Young, Extension entomologist, who along with Tollie Miller was

already working to establish or help improve mosquito control programs for the counties and towns of the Delta. The second step in establishing the abatement district was enlisting the help of Dutch Amsler, county agent for Harrison County. Contracts were made with the three boards of supervisors, the eight mayors, and aldermen located in Harrison, Hancock, and Jackson counties for their support. A speaker's bureau was also set up, where any of the 300-plus civic organizations (in the three-county area) could call for films on mosquito control and speakers to discuss the proposed abatement district to their members.

Following many meetings in the three counties, very little, if any opposition was found to the proposed abatement district. Under the Enabling Act of 1927 the three counties could assess additional millage to pay for the proposed program. The first county board of supervisors to approve the program was Harrison County. However, initially the board of supervisors in both Hancock and Jackson counties failed to approve the program. Hancock County said they were "broke" and Jackson County's board opposed raising taxes. The boards did change their minds, however, when Standard Oil moved into Jackson County and NASA into Hancock County and complained about the serious mosquito problem. With these two large industries supporting MEA's efforts, the Gulf Coast Mosquito Abatement District became a reality. The board of supervisors from the three counties selected a commission to run the program, and Chris Elmore, entomologist, was hired at MEA's recommendation to direct the activities of the mosquito abatement district. A start-up budget of $250,000 was approved. The current budget now is approximately $500,000. Other directors have been Cary Crosby, David Sykes, and Roger Alexander. The MEA-sponsored project has brought relief from mosquitoes to the residents of the Gulf Coast and increased tourist trade by millions of dollars.

MISSISSIPPI PEST CONTROL ASSOCIATION

Harry R. Fulton
Mississippi State, MS

The first meeting of several pest control operators in 1950 or 1951 resulted in organization of the Mississippi Pest Control Association (MPCA). J. C. Redd became the first chairman and J. H. Jackson , vice chairman. The Association was begun as a lobbying group to oppose legislation that would adversely affect the industry.

It was not until a December 4, 1954 meeting at the Robert E. Lee Hotel in Jackson that MPCA really became organized and began to function. At that meeting the group voted to apply for a Charter of Incorporation that was achieved on February 23, 1955. MPCA members who signed the document were A. H. Jackson, president; T. A. Mullen, vice president; C. B. Treadway, secretary-treasurer; and G. L. Edwards.

The objective of the Association was to promote general standards and ethics of the pest control industry; to foster research and diffusion of knowledge of the industry among its membership; to cooperate with the National Pest Control Association and with
governmental and educational authorities for the good of the community and industry; to promote civic improvement and to seek to improve the physical, mental, and moral condition of its members and the people of the state of Mississippi.

For the next five years the Association was somewhat inactive, but in 1960 a revitalization effort began. Mills Rogers then served as president, Roy Clanton as vice president, W. E. Jackson as secretary, and John Webb and E. A. Redd as board members. That year a they appointed a committee to meet regularly with the State Plant Board. That committee was composed of President Mills Rogers of Cleveland,
A. H. Jackson of Jackson, and Sam Lindsey of Laurel. This committee was designated as advisory council in 1980.

Many historical records for MPCA have been lost in floods and paper shuffles. Consequently, not much is known about the activities of MPCA between 1960 and the present.

In 1962 Roy Bailey, chairman of the Mississippi Entomological Association's (MEA) Research and Education Committee, reported that the first Mississippi pest control workshop had been developed to be held at Mississippi State University on March 1-2, 1962.

For many years in the 1970's, MPCA met jointly with MEA. In 1980 the group decided to again hold separate meetings from MEA. However, the president has served as a MEA director.
One of MPCA's important functions is to host the Five State Pest Control Association's annual meeting held at five year intervals.

Through the years MPCA has done much to fulfill its purpose. Through its efforts and support of The Division of Plant Industry (DPI) in adopting new regulations, it has enhanced ethics and its public image. Its educational conferences have promoted the availability of

information to its members and the general public.

Honorary members of MPCA are A. G. Bennett -1962, J. C. Redd - 1978, and Oscar Shepherd - 1982.

Past MPCA Presidents

1950-51	J. C. Redd, Jackson
1954	A. H. Jackson, Jackson
1960	Mills Rogers, Cleveland
1962	A. H. Jackson, Jackson
1976	Jimmy Murphy, Corinth
1977	Ron Brown, Jackson
1978	Gene Bowlin, Jackson
1979	Sam Lindsey, III, Jackson
1980	Jerry Gaggini, Jackson
1981	Johnny Coombs, Blue Mountain
1982	Rachel Murray, Natchez
1983	Richard Redd, Jackson
1984	Craig Jefcoat, Bay Springs
1985	Bob Thrash, Gulfport
1986	Jimmy Lindley, Starkville
1987	Frank Barkdull, Jackson
1988	Gordon Redd, Jr., Gulfport
1989	John Kirk, Madison

MISSISSIPPIANS IN THE HISTORY OF THE SOUTHEASTERN BRANCH ENTOMOLOGICAL SOCIETY OF AMERICA

James W. Smith
Starkville, MS

The beginning of the Southeastern Branch can be traced back to a meeting held on August 2, 1904, in Jackson, MS. This meeting was called to consider the depredation caused by the boll weevil, which after entering Texas from Mexico, had reached Louisiana and was rapidly moving northward and eastward to the other cotton-growing states.

It has been said that the boll weevil wreaked more destruction upon American agriculture than any other single insect pest. Cotton growers had experienced fleahoppers, aphids, bollworms and leafworms, but the boll weevil was different. Instead of destroying a portion of the crop, the weevil devastated it. Land values plummeted as the weevil took the South. Nothing as destructive as the boll weevil had been experienced by Southern agriculture since the War between the States. Therefore, it is not surprising that this 1904 meeting was attended by some of the leading entomologists from across the South.

In attendance were C. E. Chambliss of South Carolina, H. A. Morgan of Louisiana, Wilmon Newell of Georgia, E. D. Sanderson of Texas, W. V. Reed of Mississippi, and W. D. Hunter and A.W. Morrill of the Bureau of Entomology, United States Department of Agriculture, Dallas, TX. C. E. Chambliss was elected chairman and A.W. Morrill, secretary. Uniform state quarantine laws and regulations to prevent the introduction of the boll weevil into new areas were the chief subjects discussed at this meeting, and resolutions to that effect were unanimously adopted. In order to facilitate the future transaction of business in connection with state boll weevil quarantines, it was voted that a permanent organization should be established among the official entomologists of the cotton states. Thus the Association of Official Entomologists of the Cotton Belt was formed.

The second meeting of the Association was held in Atlanta, GA., on May 6, 1905, in the Office of the State Entomologist at the State Capitol. Those attending were C. E. Chambliss, chairman; H. A. Morgan, the new director of the Tennessee Agricultural Experiment Station and head of the Department of Zoology of the University of Tennessee; Wilmon Newell, the new state entomologist of Louisiana; W. D. Hunter and A. W. Morrill, the USDA entomologists; Gordon M. Bentley, assistant state entomologist of North Carolina; W. H. Dean and A. C. Lewis, assistant state entomologists of Georgia, G. W. Herrick, state entomologist of Mississippi; R. S. Mackintosh, Alabama state horticulturist and quarantine agent; J. L. Phillips, state entomologist of Virginia; and Ralph I. Smith, state entomologist of Georgia. Discussions at this meeting centered on various phases of the boll weevil re- search and quarantines to prevent the spread of this insect. Plans were discussed for a meeting of the Association at New Orleans, LA., at the same time of the next meeting of the American Association for the Advancement of Science.

Regular meetings were not held the next few years by the Association. Informal meetings

were called when the Southern states were confronted with an entomological problem that demanded attention of their entomologists. Special meetings were held in Atlanta, GA., and Washington, D. C., in 1911 for the purpose of considering the various boll weevil quarantine regulations with a view of obtaining uniformity. In 1917 meetings were held in Gainesville, FL., concerning citrus canker disease and in New Orleans, LA., to consider the pink bollworm, spiny whitefly, and the sweet potato weevil. Participants reviewed scouting methods for these insects and quarantine measures against them. Sometimes in 1906-11 the name of the organization was changed to the Association of Cotton States Entomologists.

On March 1-3, 1920, an important meeting of the Association was held at Vicksburg, MS., and Tallulah, Louisiana, with more than 50 attending. The discovery of the pink bollworm in Louisiana added special interest to this meeting. W. E. Hinds presided and A. F. Conradi, secretary, prepared full proceedings of the meeting. At this meeting a resolution was adopted to affiliate with the Southern Agricultural Workers. Thus from 1921 to 1936 the group met annually as the Entomology Section of the Association of Southern Agricultural Workers.

Interest in the Association of Cotton States Entomologists increased following the large meeting in 1920. The Association met in Memphis, TN., in 1923, Birmingham, AL., in 1924, and Atlanta, GA., in 1925. More than 100 persons attended the meeting in Birmingham on January 10 and 11, 1924, and members voted to apply for recognition as a branch of the American Association of Economic Entomologists. Since this matter was not presented in time for action by that Association at it's annual meeting in Washington, D. C., in 1924, the Association of Cotton States Entomologists again considered the matter at the annual meeting held in Atlanta, GA., on February 3 and 4, 1925, and voted again to apply for recognition as a branch. The fifth annual meeting of the Branch was held in Jackson, MS., on February 6 and 7, 1930, with an attendance of 92. B. R. Coad with the USDA at Tallulah, LA., was chairman and R. W. Harned of Mississippi A & M served as vice chairman. This meeting was concluded with a tour of the Delta Laboratory at Tallulah which at that time was the premiere Federal entomology laboratory dedicated to boll weevil research. Only a few years prior, the first aerial applications of calcium arsenate dust were carried out at the Delta Laboratory, certainly a major event in entomological history. Also, Dr. Coad's connection with aerial application led him to become one of the founders of Delta Airlines, not a small accomplishment for a research entomologist. The Branch held a joint meeting with the American Association of Economic Entomologists in New Orleans, LA., on December 31, 1931, followed by the regular seventh annual meeting in Birmingham, AL., on February 3, 1932, with R. W. Harned from Mississippi serving as chairman and Herbert Spencer, vice-chairman. In order to make the meetings of the Cotton States Branch more accessible to entomologists in Texas and Oklahoma, it was voted at the eleventh annual meeting, held in Jackson, MS., on February 5, and 6, 1936, that future meetings of the Branch would be held annually in the following order: West of the Mississippi, on the Mississippi, east of the Mississippi, and on the Mississippi. It was also voted that whenever possible the meeting be held in conjunction with the Association of the Southern Agricultural Workers. Officers at that time were Clay Lyle of Mississippi State University, chairman, and R. C. Gaines, vice-chairman.

No meeting was held in 1943 because of World War II. The eighteenth meeting was held in 1944 in New Orleans, LA., and was

designated as the Southern-War Conference on Entomology with emphasis on entomological contributions to the war effort. O. W. Rosewall and E. W. Dunnam were chairman and vice-chairman, respectively of this conference.

The 1947 annual meeting was held on January 14, 15, and 16 at the Buena Vista Hotel in Biloxi, MS., with R. C. Gaines, Bureau of Entomology and Plant Quarantine, Tallulah, LA., serving as chairman and J. A. Berly as vice-chairman. Dr. Ernest N. Cory, president of the American Association of Economic Entomologists addressed the group at the general session. The new synthetic organic insecticides were extensively reported on throughout the meeting, and a majority of the papers were accompanied by visual aids in the form of lantern slides. Two special symposiums held on the final afternoon were: (1) The Uses of the Newly Developed Insecticides in Pest Control in the South and Southwest, and (2) Airplane Applications of Insecticides. Those in attendance, who had knowledge relative to these subjects, were urged to contribute.

E. W. Dunnam, USDA Cotton Insect Station, Stoneville, MS., served as chairman of the twenty-fourth annual meeting held in Tampa, FL., with W. C. Nettles of Clemson, SC., serving as vice-chairman and K. P. Ewing of the USDA in Waco, TX., serving as secretary-treasurer. The next annual meeting of the Branch, the twenty-fifth anniversary, was held in 1951 at the Peabody Hotel in Memphis, TN., on February 5, 6, and 7, with J. W. Ingram as chairman. Snow, sleet, and ice covered the highways for hundreds of miles in every direction from Memphis. Considering the unfavorable weather conditions and the fact that there were very few in attendance from Texas and Oklahoma, because of the formation of the Southwestern Branch, the attendance could be considered fair. Registration reached a total of 137. It consisted of 26 scheduled papers, interspersed with invitational speakers. Among the prominent speakers who brought interesting and informative messages were Roy E. Campbell, president of the parent association, Alhambra, CA.; F. C. Bishop, assistant chief, in charge of research, Bureau of Entomology and Plant Quarantine, Washington, D.C.; R.T. Yates, representing the National Agricultural Chemicals Association, Wilmington, DE.; and R. W. Harned, in charge, Division of Cotton Insects, Washington, D.C.

The twenty-seventh meeting, held on February 9, 10, 11, 1953, at the Jung Hotel in New Orleans, LA., was held jointly with the Louisiana Entomological Association and concurrently with the fiftieth anniversary of the Association of Southern Agricultural Workers. This meeting was chaired by Kirby L. Cockerham of Louisiana Agricultural Extension Service, whose annual address was titled "A Plea for a Return to Fundamental Research in Entomology."

A. L. Hamner of Mississippi State College served as vice-chairman, and the new secretary-treasurer was L. C. Murphree from Starkville, MS. More than 50 research papers were presented at this meeting covering a wide variety of entomological subjects. Dr. Charles E. Palm, president of ESA, spoke to the group and congratulated the Cotton States Branch for the honor of holding the first branch meeting of the new Entomology Society of America.

The twenty-eighth annual meeting was held in the Hurricane Room of the Buena Vista Hotel in Biloxi, MS., on January 25, 26, and 27, 1954. This meeting was chaired by Frank S. Arant of Auburn University, and the vice-chairman was H. C. Young. There was considerable discussion about the Miller Bill (H. R. 7125), which dealt with several aspects of the manufacture and application of pesticides. The group felt that this bill was an excellent piece of legislation and urged members of Congress to

give it their full support. In the invitational address, E. F. Knipling, Washington, D. C., spoke on "Entomology in the Reorganized U.S. Department of Agriculture."

In 1954 the one-hundredth anniversary of professional entomology in the United States was celebrated.

The thirty-second annual meeting of the Branch was held in Memphis, TN., on December 2, 3, 4, and 5, 1957. Norman Allen served as chairman, with Charles Lincoln as vice-chairman and Marvin E. Merkl as secretary-treasurer of the Branch. There was no meeting in 1958.

The thirty-third annual meeting of the Cotton States Branch was also held in Memphis, TN., at the Hotel Peabody on February 2, 3, and 4, 1959. Charles A. Lincoln of the University of Arkansas was the last chairman to serve as executive officer under the old Branch name. The vice-chairman was F. G. Guyton of Auburn University. The secretary's report showed a total of 633 members as of January 31, 1959. Florida had the most members with 180 and Georgia second, with 100. This showed the Branch with an increase of 90 members over the past year.

A review of the history on the matter of changing the name of the Branch indicates there has been considerable dissatisfaction with the name by a certain faction during the whole period the organization has been in existence. This dissatisfaction was first voiced at the seventh annual meeting in 1932. A vote favoring changing the name to Southern States Branch was recorded at that meeting, but final action was postponed to the next meeting to permit further consideration of the action. At the 1933 meeting in New Orleans a majority overruled the action taken at the previous annual meeting.

At the twenty-second annual meeting held in 1948 in Atlanta, GA., the Executive Committee recommended that the incoming Executive Committee give consideration to the desirability of changing the name. The Executive Committee recommended at the twenty-third annual meeting in 1949 that a more appropriate name be selected by the incoming Executive Committee. At the annual meeting in 1951 and again in 1952, the Executive Committee reported it had decided to keep the name Cotton States Branch. But a motion to resubmit the matter to the Executive Committee carried. In 1953 the Executive Committee decided to postpone action until after the reorganization of the parent society, which was in progress at that time. There were battles until the end.

The reasons usually advanced for keeping the name were that it had been used for 30 years and there was nothing to be gained by changing the name. The reasoning of the pro name change group were basically anti-cotton. Quoting a report of the committee on changing the name, "The name Cotton States no longer applies to the Southern States. Large acreages of cotton are produced in California, Arizona, New Mexico and Nevada. The 1955 cotton acreage allotment for these four states was 1,630,657 acres. In recent years the Southwestern States Branch has been organized. This branch includes other large cotton producing states such as Texas, Missouri, Oklahoma, and Arkansas. The 1955 acreage allotment for the cotton growing states in the southwestern States Branch was 10,414,677 acres. This leaves 6,067,874 acres for the states composing our Branch, which is only about one-third of the total acreage allotment for the United States. There was a time when cotton was the principal economic crop of the states now comprising the Cotton States Branch. During that time papers dealing with insects attacking cotton formed by far the major part of the program for the annual meeting. That time has passed. Entomologists working in other phases of economic entomology in the states of our Branch now

greatly outnumber those interested in cotton. This diversity of interests is reflected in recent programs. We believe that this diversity of interest and program strengthens both the entomological work being conducted in our states and our Branch of the society. Furthermore we believe this broad interest should be encouraged." With this strong argument the pro-change group won, and since 1960 the name has been the Southeastern Branch of the Entomology Society of America.

The thirty-fourth annual meeting of the Branch was held at the Hotel Desoto, Savannah, GA., on January 25, 26, and 27, 1960. F. E. Guyton of Auburn University was the new chairman of the branch with a new name. Vice-chairman was I. J. Becnel of Metairie, LA., and the secretary-treasurer was Marvin E. Merkl of Leland, MS. Becnel then served as chairman of the thirty-fifth annual meeting held at the Admiral Semmes Hotel in Mobile, AL., January 23, 24, and 25, 1961. Of the 76 papers presented at this meeting, 25 were still related to cotton insect pests, primarily the boll weevil.

The thirty-seventh annual meeting of the Branch was held in the Hotel Heidelburg, Jackson, MS., on January 29, 30, and 31, 1963.

R. J. Kowal of Asheville, NC., served as chairman, with W. Carl Nettles of Clemson, SC., as chairman-elect. There were 283 members and guests registered for the three-day meeting. The registrants were as follows: 229 regular members; 33 student members; 6 invited guests; 15 ladies. The membership received a welcome address from Mayor Allen C. Thompson of Jackson, MS., in which he briefly outlined the progress of Jackson in its municipality, education and recreational programs. Si Corley, Commissioner of Agriculture of Mississippi, gave an address on agriculture in Mississippi. Kowal introduced Ed Steinhouse, president of the Entomological Society of America. Steinhaus discussed briefly some of the problems of the national organization and of the American Institute of Biological Science.

The next Branch meeting was scheduled to be held with the National ESA meeting in New Orleans, LA., on November 29, through December 2, 1965. John C. Alden chaired the Fortieth Branch Meeting at the Jung Hotel on Canal Street, and Marvin E. Merkl served as chairman-elect.

The Dinkler Motor Hotel in Atlanta, GA., was the site of the forty-first meeting of the Southeastern Branch, ESA, held in 1967. Marvin Merkl, research entomologist at the Boll Weevil Research Laboratory, Mississippi State, MS., served as chairman and John Roussell from Louisiana State University was chairman-elect. Following Merkl's address, A. W. A. Brown, President, ESA, London, Ontario, Canada, spoke to the group on "Insect Control in a Changing World." Another invitational paper was entitled "Pesticides and the Environment," presented by Louis A. McLean, Velsicol Chemical Corporation, Chicago, Illinois.

The Buena Vista Hotel on the beach at Biloxi, MS., was the site of the forty-third Branch meeting on January 27, 28, 29, and 30, 1969. C. M. Beckham of Experiment, GA., was chairman with S. R. Morris of New Orleans, LA., as chairman-elect. L. C. Kuitert of Gainesville, FL., served as secretary-treasurer. The general session was in the Hurricane Room, which was prophetic in that later in the year Hurricane Camille demolished most of the Mississippi coastal area, including the Buena Vista Hotel. At this meeting papers were presented by D. D. Hardee and W. H. Cross on the use of male-baited traps in survey, research, and control of boll weevils throughout the cotton belt.

The forty-fourth meeting of the Southeastern Branch was held at the Arlington Hotel, Hot Springs, AR., on January 26 through 30, 1970. Chairman of this meeting was Sam R. Morris of

New Orleans, with W. G. Eden of Gainesville, FL., serving as chairman-elect. The secretary-treasurer job was taken over by T. R. Pfrimmer, ARS, USDA, Stoneville, MS.

Clyde F. Smith of Raleigh, NC., was president of the forty-seventh meeting held January 31 through February 1, 1973, in Savannah, GA., and T. R. Pfrimmer of ESA, from East Lansing, MI., gave the opening remarks and was followed by Everette Oertel, Historian of the Southeastern Branch, who gave a brief history of the Branch up until this time. Also at this meeting Dr. E. N. Lambremont, Louisiana State University, told about the LSU Californium-252 Demonstration Center and the opportunity it presents for studying neutron radiation effects in insects. The accumulation and rate of decline of Mirex in milk, eggs, and poultry meat were discussed by Jerry G. Medley, USDA, APHIS, PPQ, Gulfport, MS.

Dr. T. R. Pfrimmer with the Bioenvironmental Insect Control Laboratory, USDA, ARS, Stoneville, MS., became Branch president in 1974. The forty-eighth meeting of the Southeastern Branch was again held at the Peabody Hotel in Memphis, TN., on January 29-31, 1974. Perry Lee Adkisson was now president of ESA and gave the opening remarks. Attendance was down from previous years, and only 77 papers were presented. Two papers were presented at this meeting on tobacco budworm hybrids developed by Marion L. Laster, Stoneville, MS. Alton N. Sparks, ARS, USDA, Tifton, GA., discussed insects in the Gulf of Mexico, and Edwin W. King of Clemson University, spoke on "The Face Fly as a Possible Source of Protein."

The 1978 meeting was in Gainesville, FL., and Alton Sparks with the USDA, ARS, in Tifton, GA. was president and Fowden Maxwell of Mississippi State University, president-elect. Maxwell served as branch president at the fifty-third meeting held in 1979 at the Opryland Hotel in Nashville, TN. At this January meeting Dr. Maxwell addressed the group on "Present Status and Future Plans of the American Registry of Professional Entomologists." Invitational papers were presented by L. D. Newsom, Louisiana State University, William E. Bowers, Cornell University and Donald E. Weidhaas, USDA, Gainesville, FL.

The fifty-fourth meeting was at the Royal D'Iberville Hotel, in Biloxi, MS. Sam G. Turnipseed from Blackville, SC., was president. Dial F. Martin from Stoneville, MS., was president-elect and James W. Todd, from Tifton, GA., served as secretary-treasurer. Stan Beck addressed the group on behalf of the National Society. The invitational address was given by Homer C. Folks, assistant director for Higher Education, USDA, SEA, Washington, D. C., on "Status of IPM Education."

Dial F. Martin was president of the branch for the fifty-fifth meeting held in Atlanta along with the National meeting on November 30 through December 4, 1980. President James E. Payne, Sr., of Mobay Corporation died in office, July 5, l981, and President-elect Robert L. Rabb of North Carolina State University presided in his place during the fifty-sixth meeting of the Branch in Mobile, AL., January 25-28, 1982. Darryl Hansen, Executive Director, ESA, addressed the general session. The ladies program featured a cruise on the Governor's yacht and a tour of Bellingrath Gardens.

Robert L. Rabb was president at the fifty-seventh meeting held at the Camelot Hotel, Little Rock, AR., January 24-27, 1983. A special boll weevil conference was held in conjunction with the branch meeting. Nine papers were presented at this conference including one by the late Bill Cross, who spoke on "Boll Weevil: Significance of Northern Mexico Populations." This was a well attended meeting, with 170 papers presented. The sixty-first branch meeting was at the Sheraton

Regency Convention Center in Jackson, MS. Don V. Allemann was president for 1987. A special session was held on "The State of the Agricultural Chemical Industry." The session was chaired by J. R. Phillips of the University of Arkansas.

Interests and activities of members of the Branch have changed over the past 85 years. During the first half of our history the emphasis was on agricultural entomology, particularly boll weevil and cotton insect control, although other problems received consideration. As the membership grew, subjects covered at annual meetings became more diversified to include pests of most farm commodities, forest insects, structural pest control, public health and veterinary entomology, systematics, quarantine and regulatory entomology, toxicology, ecology, and other subjects. These expanded interests, were the principal reasons for changing the name to Southeastern Branch.

Following World War II, availability of synthetic organic insecticides stimulated interest in chemical control of arthropod pests. The interest was reflected in research papers presented at annual meetings, indicating that nearly all insect pests could be controlled effectively with insecticides. An address by a member of the Branch at a meeting of the parent society stated that the profession of entomology was on the threshold of an era of insect eradication of major pests with the new synthetic insecticides. However, problems with resistance, residues, carcinogens, and mutagens soon began to arise, and any ideas of eradication replacing control of insect pests were discarded. There was a shift in Branch programs toward more basic and less applied research. Eighty percent of the papers presented at Branch meetings in 1956 and 1957 were on applied subjects. In 1968, eighty percent of the papers were on subjects considered to be basic. More recently, has been considerable emphasis on such subjects as pheromones, diapause, biology, ecology, pathogens and parasites, physiology and toxicology, biological control, integrated control, bionomics, surveys, and pest management.

IMPACT OF MISSISSIPPI ENTOMOLOGISTS ON THE ANNUAL CONFERENCE ON COTTON INSECT RESEARCH AND CONTROL

C. R. Parencia
Stoneville, MS

Each year research and Extension entomologists and associate technical workers from 14 cotton-growing states, the United States Department of Agriculture, the National Cotton Council of America, Cotton Incorporated, industry, and consultant associations meet to review research and experiences of the previous year and to formulate control recommendations.

The conference was established after the development of organic insecticides for cotton insect control in the mid-1940's. The new insecticides were such an improvement over those previously available that their evaluation as quickly as possible was imperative. Of equal importance was that all concerned with cotton insect control have the latest information on the performance of the various insecticides available to them.

Professor R.W. Harned, who was in charge of cotton insect research for the Department of Agriculture from 1931 to 1953, is credited with being the "father" of the conference. In the fall of 1946, he called a conference of staff members of his division's laboratories at Tallullah, Louisiana. Appropriate Agricultural Experiment Station and Extension Service personnel of Louisiana and Texas were invited to participate. That was the forerunner of the First Annual Conference on Cotton Insect Research and Control held in Stoneville, MS, November 17-19, 1947. Others in the Agricultural Research Administration (ARA) who supported Professor Harned in initiating the conference in addition to laboratory leaders F. F. Bondy, E. W. Dunnam, R.C. Gaines, K. P. Ewing, and A. J. Chapman, were A. S. Hoyt, F. C. Bishop, R. L. Haller, E. R. McGovran, and M. P. Jones. Those from the states supporting the conference were Dwight Isely and Charles Lincoln, Arkansas; F.S. Arant and Jerry Ruffin, Alabama; C. E. Smith and W. S. McGregor, Louisiana; Clay Lyle and L. C. Murphree, Mississippi; Walter Kulash and Jim Conner, North Carolina; M. D. Farrar, and W.C. Nettles, South Carolina; H. G. Johnston and C. A. King, Texas; and F.A. Fenton and C. F. Stiles, Oklahoma.

Fifty two conferees participated in the first annual conference. Of the ARA Laboratory leaders, E.W. Dunnam (Stoneville), E. P. Ewing, and A. J. Chapman were graduates of Mississippi Agricultural and Mechanical

College, now Mississippi State University. Of the state supporters, Clay Lyle, who succeeded R. W. Harned as head of the department at Mississippi A & M College, L. C. Murphree, Jim Conner, and H.G. Johnston were natives of Mississippi and graduates of Mississippi A & M College. Professor Harned served as general chairman for the first six conferences, K. P. Ewing for the next four, C. F. Rainwater, for the next eight, C. R. Parencia for the next sixteen, and J. R. Phillips since that time with co-chairman from ARS. M. E. Merkl, D. L. Bull, and E. G. King served with Phillips in two-year terms. J. R. Phillips and E. G. King are the current co-chairmen. K. R. Ewing and C. F. Rainwater were natives of Mississippi and graduates of Mississippi A & M College.

Through the years Mississippi entomologists have continued to support and participate in the conference. C. A. Wilson of the Mississippi State University Department of Entomology, along with others from adjoining States, brought their students in economic entomology to the conferences, which were valuable learning experiences for them.

The report that was issued after each conference was considered to be the cotton insect "bible" of the world. It was distributed throughout the world where cotton is grown. Unfortunately, it has been discontinued in recent years.

As a result of the annual conferences, there is no other agricultural area with as much compatibility among State, Federal, and industry personnel in the research, Extension, and control efforts for insects than those that attack cotton. The Fortieth Annual Conference was held in Dallas, Texas January 4-8, 1987.

INSECTICIDE FORMULATORS/PACKAGERS

L. C. Murphree
Starkville, MS

The Agricultural Chemical Industry has had a major impact on increased yields and more efficient production of crops in Mississippi.

Before 1948 calcium arsenate was the primary insecticide used for boll weevil control. It could only be used as a dust, with limitations on its usage. Up to this time there was no chemical formulating plant in Mississippi.

With the introduction of the synthetic organochlorine insecticides such as benzene hexachloride, DDT, toxaphene, aldrin, dieldrin, cotton insect control became much more popular with farmers resulting in a tremendous increase in the usage of cotton insecticides and in numbers of chemical formulating companies being organized in Mississippi.

The following are chemical formulating companies organized in Mississippi since 1948. Some have changed ownership several times. Some have closed down. Several are still in operation.

AGRICULTURAL CHEMICAL CORPORATION (Depester Brand), Greenville, (1951-1962) was owned by Clint Murchison of Texas. Doc Parrish was manager. S. L. Calhoun was consulting entomologist. They bought Greenville Chemical Company in 1951. In 1962 they sold to Thompson-Hayward, who operated the plant until 1981. In 1981 Thompson-Hayward sold their inventory to Uniroyal and the formulating plant to Platte Chemical Company.

CALIFORNIA CHEMICAL CORPORATION (Ortho Brand), Cleveland, was built in the early fifties. John Lockridge was manager. It was sold to General Chemical Corporation in late fifties. General Chemical sold the plant to Cleveland Chemical in 1964.

CHAMPION CHEMICAL COMPANY, Canton, (1957-1969) was owned and managed by Jim Conner. Champion was sold to Riverside Chemical in 1972. Riverside sold the plant to Mississippi Federated Coops. in 1977. MFC closed the formulating plant.

CLEVELAND CHEMICAL COMPANY, Cleveland, (l964-still in business) was owned by Jimmie and Mike Sanders. The company started as Jimmie Sanders Seed Company in 1953. Jimmie formed Cleveland Chemical Company in 1964 and bought General Chemical Corporation's formulating plant.

COAHOMA CHEMICAL COMPANY (Red Panther Brand), Clarksdale, (1948-1972) was organized in 1948 by Harvey Gresham, Buck Butler, Kinchen O'Keefe and Jim Faloon. L. C. Murphree and Cliff Porterfield were consultant entomologists. It was sold in 1972 to Riverside Chemical, who operated it until 1977.

Mississippi Federated Coops. bought the Red Panther Logo and plant in 1977.

GENERAL CHEMICAL CORP (Division of Allied Chemical), Cleveland, purchased the formulating facilities of California Chemical in the late fifties and operated it until they sold Cleveland Chemical in 1964.

GREENVILLE CHEMICAL COMPANY, Greenville, (1948-1951) was organized in 1948. It was in business until it was sold to Agricultural Chemical Corporation in 1951.

HAYES-SAMMON (Mission Brand), Indianola, (1956-1966) sold the plant in 1966 to American Cyanamid who operated it two years and in 1968 leased it to Staplcot'n Association. Staplcot'n operated it until 1982. It has now been converted to a feed mill.

NIAGARA CHEMICAL DIVISION (FMC), Greenville, (1949-1961) had Horace Lee as regional manager. In 1961 it sold the formulating plant to Thompson-Hayward.

OLIN MATHISTON CHEMICAL CORPORATION, Leland, (1959-1984) sold its inventory in 1984 to Uniroyal and closed the plant.

PLATTE CHEMICAL COMPANY AND TRI-STATES-DELTA (Con-Agri.), Greenville, was established in 1981 and continues in business. In 1981 they bought Niagara's and the Agricultural Chemical Company's formulating plants from Thompson-Hayward. Platte Chemical Company manufactures for them and Tri-States-Delta sells.

RED PANTHER CHEMICAL COMPANY, Clarksdale, (organized in 1977 and continues in business) with John Duff as president, Charlie Brown as general manager, and Cliff Porterfield as entomologist and responsible for Tech Service. Mississippi Federated Coop bought the Red Panther Logo and chemical plant from Riverside in 1977. In 1979 it joined with Alabama Farmers Coop and Tennessee Farmers Coop in the operation of Red Panther Chemical Co.

RIVERSIDE CHEMICAL COMPANY, Marks, (1948-1977) became RIVERSIDE-TERRA CHEMICAL, INC. in 1977 and continues in operation. Riverside Chemical was organized in 1948 by William King Self and the Self Family. T. M. Waller was chief agronomist. In 1970 Cook Industries of Memphis bought Riverside but continued to operate it as Riverside Chemical. In 1977 Terra International, Inc. bought Riverside from Cook and now operates as RIVERSIDE-TERRA.

STAPLCOT'N ASSOCIATION, Greenwood, (1968-1982) leased the Hayes-Sammon formulating plant and operated with Don Ford as manager of the chemical division from 1968 to 1982.

THOMPSON HAYWARD CHEMICAL CORP, Greenville, (1962-1981) bought Agricultural Chemical Company and Niagara Chemical facilities in 1962. It sold its inventory to to Platte Chemical Company (Con-Agri) in 1981.

VALLEY CHEMICAL COMPANY, (Ashcraft-Wilkerson), Greenville, (1950-1954) was managed by Paul Betts with Cliff Porterfield as entomologist. It was sold to Valley Chemical Company (Coop) in 1954.

VALLEY CHEMICAL COOP, (Valco Brand), Greenville, (1954-1986) was operated by Henry Crosby, president; Carl Bauer, manager; and George Sistrunk, in charge of

fieldmen. It closed the business in 1986.

The introduction of organic insecticides and changes in equipment for applying insecticides increased the use of sprays. As a result, a number of spray manufacturing companies were organized in Mississippi.

BELL, INC., Inverness, was organized in 1950 by Red Bell, Stan Lanender, and Billie Duncan and continues in business.

GOTCHER MFG. COMPANY, Clarksdale, was organized and owned by Bill Gotcher but is no longer in business.

KBH MFG. COMPANY, Clarksdale, was owned and operated by B. Bass in 1951 and continues to operate.

MAGNOLIA SPRAY EQUIPMENT CORP., Jackson, was organized in 1947 with James Roach as President. It handled Yellow Devil spray equipment. That has been sold to an out-of-state company.

S & N SPRAYER CO., INC., Greenwood, was organized in 1950 by J. C. Norris and Roy Sorrell and continues in business. Buster Norris is the current operator.

MFC SERVICES, Madison, assembled and distributed spray equipment to member coop stores.

In addition to the suppliers of field crop insecticides, the development of the new chemicals resulted in a number of small packagers or insecticides for use in the home, gardens, orchards, and etc.They are as follows:

Bancroft Paper Company, Jackson
B & M Specialty Company, Hattiesburg
Banc Chemical Inc., Jackson
Dacus, Inc., Tupelo
Davis Specialty Chemical Co., Jackson
Enviroco, Raymond
Ginn Chemical Company, Ridgeland
Gen/Special-Davis Specialty, Jackson
Frontier Laboratories, Raymond
Halsen Prod. (Davis Specialty), Belmont
Harris Superior Products, Jackson
Jackson Paper-Davis Spec., Jackson
Janitor's Supply Paper Co., Greenville
Licks Janitorial Supply, Cleveland
MFC Services, Madison
Miller Chemical Co., Inc., Brookhaven
Newell Paper Company, Meridian
Omega Products, Inc., Clinton
Red Panther Chemical Co., Clarksdale
Redd Pest Control Co., Jackson
Sanitary Supply (Davis Specialty), Jackson
Spain, Inc., Cleveland
Sunbow, Inc., Jackson
Smackover, Inc., Hattiesburg
WHF, Inc., Jackson
Winco Chemical Co., Inc., Jackson

PRIVATE RESEARCH STATIONS

W. O. Miller
Leland, MS

The Dow Chemical Company stationed a resident research man (Andy Watson) in Greenville in 1953. Twenty acres of land were leased on the Billups Plantation at Indianola with an office in Greenville. R. G. "Gordon" Hanson came on board as director in 1956 and rented 60 acres of land near the Indian mounds at Winterville. In 1961, 80 acres of land were purchased at Wayside, the present site of the Dow Agricultural Research Center. In 1976 an additional 100 acres were acquired near Burdette. Directors following Gordon Hanson were Bob Hunter, Orlo Jantz, Wayne Wright, Robert Fears, Leonard Smith, John Hunter, and the present, Craig Hanson. The farm manager has been Tom Orsi since 1961.

Hercules Agricultural Chemical Company established a research farm at Prattville, Alabama in 1964 and moved this station to Refuge Plantation near the Arkansas-Mississippi, Greenville bridge in 1969. Jim Land was the director of the Hercules Southern Field Research Station until 1979.

Boots Pharmaceutical Company of England purchased the Hercules Agricultural Chemical's business in 1979 and continued to run the farm at the same location until 1981 as the Boots Hercules Agrochemical Company. Jim Land remained as director.

Fisons of England bought Boots Pharmaceutical's agricultural chemicals business in 1981 and continued to operate at the same location until 1983 as BFC Chemicals. Jim Land remained in charge. Nor-Am purchased BFC Chemicals in August, 1983, and sold the experimental farm to DuPont at that time. Jim Land's duties changed from research director to research and development.

Stauffer Chemical Company established a research farm near Burdette, Mississippi early in 1964 under the supervision of Byron Lake. John Leyton became the supervisor in 1965, followed by Jim Connell, who served until 1987.

ICI Americas purchased the Stauffer station in 1987 and is presently managed by Larry Coombes.

American Chemical Paint Company established an agricultural research farm just south of Wayside, Mississippi early in 1966. Cliff Mitchell was the director until 1974. Directors were David Austin (1975), Malcolm Carter (1976-1978), and Delbert Dyson (1978-1980). Union Carbide purchased the station in 1980 and Larry Coombes served as director until 1987. Rhone-Poulenc Agricultural Company purchased Union Carbide in 1987 and closed the facility.

BASF Wyandotte leased an estimated 120 acres of land about six miles south of Greenville, on the Refuge Plantation, in 1966. This was the beginning of the BASF Research Farm initially managed by Jack Thompson. In 1967 B. Wuerzer became the manager and served until 1975. In 1974 the land was purchased. Each year about 25 additional acres are rented for research purposes. In 1975 M. Schroeder took over the managerial duties, serving until 1985. The current manager is H. Walter. The research station of the Chevron Chemical Company was established on Old Abide Road near the Greenville Airport on the

Hammett Farm on June 1, 1966. The initial director was B. W. Kirby. Boykin Witherspoon assumed the duties (1969-1972) followed by Jan Herholt (1973). A. A. Whipp served as director from 1973 to 1980. R. T. "Bob" Kincade became director in 1980 and continues to direct the research program. In November, 1985 a purchase of 200 acres on the Old Leland Road moved the station to its present site.

The Ciba-Geigy research facility located at Winterville, Mississippi, was established by the Geigy Chemical Company in 1970 with the purchase of 200 acres from the old Malvina Plantation. The first farm manager was David Austin. With the merger of Geigy Agricultural Chemicals and Ciba Agrochemical Company in 1972, the site became known as the Ciba-Geigy Delta Research Farm. James Thomas became the farm manager in 1975. Don Hays has served as the facility manager since 1980. In 1986 the facility was upgraded to station status and is known as the Delta Research Station.

Mobay Corporation, Ag. Chemical Div., established a research farm near Benoit in 1979. The 180 acres have been operating since that time under the supervision of Lyndon Almand. Uniroyal Chemical Company, Inc. established a research farm near Tunica in 1979 under the managerial leadership of George Hoffman. The 40 acres involved were leased. A new manager, Paul Nester, was appointed in 1983 and served until the facility was closed in 1985. Hoechst-Roussel established a research farm on approximately 80 acres a few miles south of Leland in 1980. The original manager was Jim Thomas. In 1984 Martin Hess assumed the managerial duties and continues in the position.

Rhone-Poulenc Ag. Company was established near Burdette in 1981 under the leadership of Richard Verner. He remained director until 1987, when Union Carbide was purchased. The directorship was assumed by Fitz R. Parman from California.

Sandoz Crop Protection Corp. was established in 1982 on 60 acres of land near the Fish Lake bridge just east of Greenville. The first farm manager was David Shibles. In 1983 the size of the stations was increased to 93 acres, 140 acres in 1986, and 153 acres in 1987. Shibles was succeeded by Dan Ragsdale, Pedro Schmid, and the present director, Holland Jordan.

HISTORY OF PRIVATE CONSULTING IN MISSISSIPPI

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Private insect management consulting in a relative new profession in Mississippi. The profession began significant growth in the early 1950's and has thrived because growers needed expert insect control advice. Private consulting in cotton insect pest control advice. Competent individuals saw the opportunity and gave credibility to the profession when they went into business. The Entomology Department at Mississippi State University trained and encouraged young entomologists for the profession, and entomologists at the Mississippi Cooperative Extension Service developed programs that promoted the use of consultants.

Private entomology consulting started primarily as a service to cotton producers for insect control advice, but the service has since been broadened to include other crops such as soybeans, rice, and grain sorghum. However, cotton remains the primary crop for consultant work.

Farmers who have needed insect control advice have obtained this service from many sources including county, area, and state Cooperative Extension Service specialists; insecticide manufacturers, distributors, and dealers; and from individuals who sell both chemicals and services in consulting and application of the chemicals. However, many consultants have organized a professional association which defines a private consultant as one who offers only service for a fee to avoid any possible conflict of interest.

Conditions That Challenged and Encouraged Private Consulting

Advances in agricultural technology and the associated rapid changes in production methods in the late 1940's and 1950's ushered in a concurrent need for more highly trained and skilled agricultural technicals and professionals in all phases of agriculture. For about three decades after boll weevils first infested cotton in Mississippi it was a major pest and there were few control measures available and none were very effective. Calcium arsenate dust was inferior and difficult to apply. Application technology was in its infancy. A few cultural methods such as early planting and stalk destruction helped but had limited effectiveness. This situation existed until the early 1950's when organochlorine insecticides were first produced.

The first two organochlorine products to reach the market after World War II were toxaphene (chlorinated camphene) and BHC (benzene hexachloride), both introduced in 1947. BHC had a quick kill but short residual activity while

toxaphene was slower acting but longer lasting. These two products began the era of organic chemical insecticides. Soon other organochlorine insecticides including DDT, endrin, dieldrin, and others followed, which were highly effective but persistent enough to create environmental problems. This led to Rachel Carson's Silent Spring, subsequent public awareness of pesticide pollution, and finally to the banning of most uses of this class of insecticides.

About a decade after the first organochlorine insecticides were introduced, a new group of insecticides, the organophosphates, were discovered. As each new product was introduced each had unique characteristics. Some were fast acting with short residuals, some were slow acting with long residuals, some were highly effective against only one or a few pests. Each had a spectrum of activity that ranged to slightly different to greatly different from any other product. The result was that growers began to need to know exactly what pest or complex of pests were infesting his crop at a specific time, and to know what choice of insecticide would fit the specific pest situation. Secondary pests, such as cotton aphids, became serious when attention was not given to the biological factors causing their outbreaks and when improper insecticides were chosen and used wrongly. Many factors began to be important in making insect control decisions: (1) the need to avoid unnecessary applications, the need to carefully time applications, (2) the need to choose the right chemical or mixture of chemicals, (3) the need to understand insecticide chemistry and toxicology to assure performance and safety to workers and nontarget organisms, (4) the need to understand insect and crop biology to deal with secondary pests and resistance to insecticides, and (5) the need to know the many regulations applying to the use of the products. The complexity of these interacting factors have increasingly demanded the special training and skills of a professional insect management consultant.

Lack of availability of other sources of advice has contributed to the need for private consultants. Special training in entomology and insect control were essential and not always adequately instilled in other sources and often their time available for scouting and advising was limited. Also, some of the most competent entomologists have worked in sales and technical service for chemical companies and dealers, but their time to spend with individual growers has been insufficient.

Early History

Although significant development of private insect management consulting did not occur until the 1950's, earlier accounts of private consulting in the 1930's indicate a few individuals, who had other jobs and contracted with the larger and more progressive cotton producers to scout a few acres and give insect control advice after hours.

Two individuals known to be in the business in 1932 are A. G. Bennett and L. C. Murphree, both with distinguished careers in entomology with the Mississippi Cooperative Extension Service and in the industry.

Chemical companies developing and marketing the organochlorine insecticides became very competitive and employed entomologists to promote their products. By the early 1950's growers became concerned about the advice obtained from these company entomologists and began to seek private consultants.

Several entomologists started in the private business between 1952 and 1955. All of them will not be recorded here, but selected information from case studies of three of them are presented to document how the profession began its growth. They are Jim Rawson, Tom

Edwards, and Mills Rogers.

One of the first cotton growers in Mississippi to seek a private entomologist was William (Bill) Yandell, Sr., of Vance, MS. In 1952 Yandell called Ross Hutchins, the head of the Department of Zoology and Entomology at Mississippi State College, Starkville, MS, to inquire about the possibility of contracting with an entomology student to look after his cotton insect control program. This resulted in J. W. Rawson, who was completing a B.S. degree at the time at Mississippi State, accepting that challenge during the summer of 1952. The job was to inspect 3000 acres of cotton, decide when any portion needed treatment and to decide what pesticide to use. In additional, this entomologist was charged with the responsibility of purchasing the proper chemicals and supervising their application. Rawson continued to work with Yandell for the next five years while attending graduate schools at Mississippi State and Texas A & M. He later turned the job over to Charles Goodwin in 1957.

Jack Flautt, owner of Flautt Flying Service of Swan Lake, Mississippi, liked what he saw happening on the Yandell Plantation as his planes applied pesticides during the summer of 1952. He and a group of other growers decided that they too would like to employ a private entomologist and inquired of Rawson's capabilities of handling their farms. They were told that 3000 acres were all that one man could properly manage; however, Rawson contacted one of his classmates, Robert (Bobby) Sims, who was interested in a career as a consulting entomologist. Sims contacted the group and became employed by them for the summer of 1953. In 1954 when a group of entomologists graduated from Mississippi State with M.S. degrees, a company named All-Delta Pest Control was formed with headquarters in Greenwood, Mississippi. The group that operated this company (R. Sims, John Webb, Tom Edwards) planned to do domestic pest control work as well as contract consultant work for cotton growers. James Molpus was added as a partner shortly after the formation of the business. After a short period of time, John Webb took over the operation of the domestic pest control business and all other members went their separate ways to work cotton. At the time of this writing, Molpus has deceased, Tom Edwards and Bobby Sims retired in 1988. John Webb continues with All-Delta Pest Control business along with his son. About the same time that All-Delta Pest Control was formed, other entomologists such as Virgil Stokes, Arlie Wilson, and Mills Rogers began their careers as consultants.

Mills Rogers started his cotton entomology consultant business in 1953 after graduating from Mississippi State with a M. S. degree in entomology. He says most of the entomologists who graduated in the 1950's were World War II or Korean War veterans. They were mature and most had families and were serious about their careers. In the first years of business Rogers reports that there was no other person making a living from private cotton entomology consulting in the Boliver County area. He reports starting fees to be as low as $.75/acre. The 1989 per acre fee for most consultants ranges from $4.00 to $5.00.

Rogers reports that in the 1950's few insecticides were applied as sprays. Most cotton insecticides were formulated as dusts which needed to be applied in the early morning before dew dried from the plants or late in the evening after dew began to form so the dust would adhere to the plants. Airplanes applying dusts would leave a cloud of material suspended over a field for several hours on a still morning. While reminiscing Rogers wondered about the reaction of present day environmentalists if they could have seen those dust applications.

Rogers recalls some names of people who graduated from Mississippi State with degrees in

entomology and moved to the Delta to start careers: John Webb at Greenwood, James Molpus at Clarksdale, Robert Douglas Sims at Sumner, Tom Edwards at Clarksdale, and Argie Wilson at Walls.

Tom Edwards graduated in 1954 with a M. S. degree in entomology. Immediately after graduation Edwards began working as a cotton consultant in the Coahoma and Quitman county area. He credits his friends and college classmates Bobby Sims and Jim Rawson with influencing his career decision. Sims went with Edwards to the Delta in February of 1954 to contact growers who might be interested in hiring a consultant. Edwards saw the potential to combine a teaching career with consulting which he pursued until retiring from teaching in 1986.

Some of Edwards' early clients were Marvin Sigmon, Jr. of Sherard, E. J. Mullens, Jr. of Lyon, R. A. Carson of Lambert, and Rufus Wright of Lambert. Fields were small in 1954 with 46 making up 410 acres for R. A. Carson. In 1988 only 8 fields comprised that acreage on the same farm.

In 1954 there was no other entomologist working as a consultant for a fee. Edwards reports a great demand existed for independent consultants after his first year.

Edwards reports a big difference in the work required to check acreage divided into many small fields compared to the larger fields of today. In 1954 he traveled before sunrise to the first field and wait for enough light to see and work until pickup headlights were needed to see how to leave the last field of the day. He consulted on 4200 acres working the "sunup to sundown" hours for six days each week in the growing season. Part of the reason for the long days and full weeks of work on relatively few acres was due to the small fields, but of equal importance was the dedication to doing an excellent job.

One of the important ways that new consultants gained necessary experience before starting their own businesses was by working as scouts and crew leaders for the older consultants. Tom Edwards and All-Delta Pest Control hired several individuals who continued on in careers as consultants of professional entomologists in other capacities. One such individual was Leslie Ellis, who was a professor in the Department of Entomology and Zoology at Mississippi State and who had a consultant service.

Arlie Wilson, also a professor in the same department, had started a consultant service in 1955. Wilson and Ellis combined their acreage in a joint venture in 1959 and worked together until 1967.

Harold Arnett also worked as a crew leader for Edwards and later earned a Ph. D. degree in entomology. Other employees who worked as scouts then formed consultant businesses were Clyde Sartor, Mike Sartor, and Edwards' son, Mike. H. C. Mitchell was a respected researcher and Extension entomologist who started his career as an employee of Tom Edwards.

Many other consultants have had rewarding and productive careers from 1950 until the present.

Regulation and Certification

Private consulting has become a more complex and demanding business than it was 30 years ago. Consequently, consultants have formed professional associations and have sought state regulation and licensing of the profession to enhance their competence and

professional recognition.

Mississippi has a mandatory licensing law to regulate the qualifications of individuals who give advice on pesticide use. Mississippi initiated a consultant licensing program in 1962 that was essentially voluntary, so that any interested individual who met education and experience requirements could be licensed. However, anyone who advertised as a professional consultant was required to be licensed. In 1972 the Mississippi regulation was amended to require licensing of all consultants who give pesticides use advice and charge a fee for the advice. Minimum education and an written examination are required. Annual renewal of each license and participation in approved workshops is mandatory.

REGULATION OF PESTS AND QUARANTINE ACTIVITIES

Harry R. Fulton
Mississippi State, Ms

FEDERAL LAWS

1905 - The Insect Pest Act was passed to prohibit importation or interstate transportation of plant pests.

1910 - The Federal Insecticide Act of 1910 was "an act for preventing the manufacture, sales, or transportation of adulterated or misbranded Paris greens, lead arsenates, and other insecticides, and also fungicides, and regulating traffic therein, and for other purposes."

1912 - The Plant Quarantine Act, (August 20, 1912) delegates additional authority to USDA to restrict and control the entry of plants and their products that might harbor injurious pests. At that time, at least half of the injurious insects in this country were of foreign origin. Heavy infestations of browntail and gypsy moths were the final incentive to pass this law. Some eighty-five quarantines were promulgated during the first sixty (60) years of its existence. Eight or more domestic quarantines are still in force. Since 1912 six amendments to the act have been passed.

1915 - The Terminal Inspection Act (March 4, 1915) allowed states to maintain inspection stations for plants and plant materials shipped through the postal service, a new authority.

1917 - The Mexican Pink Bollworm Act (October 6, 1917), gave USDA authority to conduct surveys in Mexico, establish cotton-free zones along the border, and to cooperate with Mexico in eradicating infestations near the border in Mexico.

1937 - The Incipient or Emergency Control of Pests Act (April 6, 1937) authorized funds to control emergency outbreaks of insects and plant diseases. Amendments were passed in 1938 and 1954.

1942 - The Mexican Border Act (January 31, 1942) was passed to prevent further spread of the pink bollworms from Mexico into the U.S. It allowed inspection and treatment of any vehicle or shipment of materials that might be infested.

1944 - The Organic Act (September 21, 1944) It called for cooperation of USDA with farmers and other groups, states, and provinces, including Mexico, in undertaking programs to control a number of insects and plant diseases. It has been amended routinely to include additional pests. The act gave USDA authority to certify plants and plant products for export at no charge. It also superceded the Mexican Pink Bollworm Act.

1947 - The Federal Insecticide Fungicide and Rodenticide Act (FIFRA) requires registration of all pesticides intended for interstate commerce. USDA was given authority to review data to insure efficacy and safety, thus placing the responsibility of proving a product safe and effective in the hands of the manufacturer before it could be registered.

1948 - The Federal Food, Drug, and Cosmetic Act (FFDCA) established tolerance for residues in foods. Later in 1954 the Pesticide Chemicals Amendment amended FFDCA to standardize the procedures used by FDA in setting tolerances. Another amendment in 1958, Food Additive Amendment, prescribed regulations for the safe use of food additives and prohibited any

residue of carcinogenic chemicals in foods, including pesticides.

1957 - The Federal Plant Pest Act (May 23, 1957) strengthened the authority of USDA to regulate the movement of plant pests into and/or through the U.S. by upgrading the definition of plant pests to include diseases, nematodes, and some other invertebrates deemed to be destructive to plants. It gave USDA employees authority under emergency situations to seize, treat, or destroy articles found violative where a new or unknown pest was found. Where the prevention of the spread of a pest was involved, the least drastic action, such as allowing the affected articles to be exported or returned to points of origin, was required; however, destruction was still an alternative. The law allowed inspections of persons and vehicles without warrants but required warrants to inspect premises.

1962 - The Cooperation with States Act (September 28, 1962) authorizes the Secretary of Agriculture to enter into cooperative agreements or arrangements with state agencies during the administration and enforcement of federal laws and regulations to the extent he deems appropriate in the public's interest. Until this point, all such agreements had some type of restrictions.

1970 - The Environmental Protection Agency was created with authority to enforce and administer FIFRA as well as establish tolerances. The Occupational Safety and Health Act of 1970 deals with toxic substances in relation to work safety.

1971 - President Nixon first proposed a toxic substances control program that was finally passed and signed by President Ford on October 12, 1976, as The Toxic Substances Control Act (TSCA).

1972 - The Federal Environmental Pesticide Control Act, with amendments in 1975 (FIFRA) and 1978, placed the emphasis of pesticide control and regulation on the protection of man and the environment. It called for regulating interstate use and distribution of pesticides, including the requirement that all pesticides be classified for general or restricted use and that users of restricted-use pesticides be certified.

MISSISSIPPI LAWS

1918 - The Mississippi Plant Act (March 27, 1918) authorized establishment of the State Plant Board to protect the agricultural and horticultural industries of Mississippi from the introduction into and spread of injurious insects and plant diseases.

1920 - The Mississippi Bee Disease Act (April 3, 1920) prevents introduction and spread of infectious diseases of honey bees into and throughout Mississippi. At that time, many beekeepers were being forced out of business, with 50% or more of their colonies contracting American Foulbrood Disease.

1938 - A law governing the regulation of professional services was passed because of concern over the number of incompetent and fraudulent people doing pest control work. The law required the licensing of pest control operators.

1950 - The Economic Poisons Act was passed because farmers believed that many of the insecticides being marketed were

inferior. The law required registration of insecticides, fungicides, rodenticides, and herbicides and authorized the commissioner to take samples to be analyzed by The State Chemical Laboratory. The Law was amended in 1972 to include nematocides, plant growth regulators, adjuvants, and insect attractants.

1956 - Legislature established the Plant Quarantine Stations against the pink bollworm.

1966 - The Agricultural Aviation Licensing Act created the Agricultural Aviation Board and required that all aerial applicators be licensed and that all aircraft used in agricultural spraying be registered with the Board. In 1980 the law was amended to require each pilot to be licensed.

1968 - The State Plant Board membership was changed to add the Mississippi Cooperative Extension Service Director and Plant Pathology and Weed Science department leader.

1971 - The State Plant Board was officially renamed the Division of Plant Industry, Mississippi Department of Agriculture and Commerce. The advisory board for the Division of Plant Industry was established.

1975 - The Mississippi Pesticide Law and the Mississippi Pesticide Application Act were enacted to bring state laws into compliance with FIFRA. The Pesticide Law was reworded to include language similar to or identical to FIFRA. The application act requires that all applicators buying and using restricted use products be trained by MCES and certified by DPI.

1979 - The Mississippi Plant Act was amended to add three members to the Advisory Board. The current Board consists of the following: Commissioner of Mississippi Department of Agriculture and Commerce (Chairman); Head, Entomology Department, Mississippi State University (MSU); Head, Plant Pathology and Weed Science Dept., MSU; Head, Agronomy Department, MSU; State Chemist, Head Mississippi State Chemical Laboratory; and Soil Conservation District Commissioner, appointed by The Commissioner.

1980 - The Honey Bee, ***Apis mellifera***, was named Mississippi's official state insect.