

Recollections of Avocado History at U.C.L.A.

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The introduction of the avocado into California in 1871, its exploitation 1900-1915, and successive developments during later years reflect the efforts of many pioneer individuals and organizations who have contributed to the history of the industry in this state. An historical aspect of this saga are the contributions made by several investigators, teachers, and students who were concerned with the Division of Subtropical Horticulture in the College of Agriculture on the Los Angeles campus of the University of California from 1929 through 1965. This College no longer exists at U.C.L.A., but the attainments of its staff and students are well recorded in the history and achievements of the California avocado industry.

The Federal Land Grant College legislation, the Morrill Act, was signed by President Lincoln on July 3, 1862. This act provided the basis for the establishment in each state of an institution of higher learning which provided instruction in the sciences, arts, and agriculture to be made available to any qualified citizen. The University of California was established under this act in 1868 at Berkeley, which became the administrative center for all subsequent developments of this great institution.

Instruction in subtropical horticulture in the University of California was first provided in the Division of Citriculture at Berkeley from 1912 to 1928. When the decision was made to offer undergraduate instruction in southern California in 1928, the University proceeded to establish a fully developed campus at Los Angeles, including a section of the College of Agriculture and the Agricultural Experiment Station, as a part of the Land Grant College edict established in 1862. Preparations for the college at Los Angeles began with the planting of a demonstration orchard as a part of the Experiment Station in mid-May, 1929. Instruction in agriculture at Los Angeles was first offered in 1932.

Several prominent individuals with major interests in and with knowledge about avocado became concerned in the early years with the establishment of the College of Agriculture at U.C.L.A. and the subsequent development of the project on that campus. Dr. J. Eliot Coit, who in 1912 founded the Division of Citriculture (which became the Division of Subtropical Horticulture) on the Berkeley campus, provided guidance and advice in making decisions regarding the transfer of a branch of the College of Agriculture to southern California beginning in the mid-1920s. Somewhat later, Knowles Ryerson, who eventually became Assistant Dean of Agriculture at Davis, was requested to assist in the site selection for the new college in southern California. Professor Ira J. Condit, another great name in early California avocado history, was one of the first instructors to offer courses on the U.C.L.A. campus.

The remarkable orchard collection associated with the College of Agriculture was contained in approximately 10 acres. This orchard, though limited in size, was possibly the best ever assembled for teaching and research of subtropical fruits according to visitors from many institutions and experiment stations throughout the world who had visited or utilized the orchard. Among the specific collections were 27 recognized species of *Citrus* plus several botanical relatives such as *Poncirus*, *Fortunella*, and *Epimocitrus*. More than 125 named cultivars of citrus fruits were represented. Other species included 110 cultivars of persimmon, 7 cultivars of loquat, 8 cultivars of almond, 37 cultivars of fig, 12 cultivars of cherimoya, 12 white sapote, 5 jujube, 3 feijoa, 20 grape, and a number of other species -such as olive, walnut, guava, banana, cacao, papaya, medlar, peach, plum, apricot, pecan, and many of avocado.

The California Avocado Association visited the newly established orchard as part of a Field Day on October 19, 1929, shortly after the first citrus trees had been planted. No avocado trees had been planted at that time. Professor Robert W. Hodgson presented on the occasion a lecture concerning the plans and prospects of the Division of Subtropical Horticulture in respect to avocado research and teaching. He mentioned that in February 1928, the Regents had made the decision to move the Division of Subtropical Horticulture to southern California and that the first land allotment of 10 acres to agriculture was made in October, 1928. President Campbell had approved funds for this development on April 1, 1929. Work started on the orchard on April 17th of that year. The orchard record book kept by E. R. Eggers states: "May 15, 1929 - Finished digging holes, started planting trees at 10:30 a.m. with two crews. May 17 - Finished planting main orchard". The official opening date of U.C.L.A. was set as May 29, 1929, when a truckload of books and equipment and several cars with students came from the old campus on Vermont Avenue. The planting of the subtropical horticulture orchard had preceded the official University opening of the campus; thus the College of Agriculture became the pioneer college on the campus.

In 1938, an agreement was reached between the board of directors of the California Avocado Association and the Division of Subtropical Horticulture to establish and maintain at Westwood an avocado variety collection in cooperation with the Variety Committee of the Association. The original collection of 14 varieties was planted in 1939. The Variety Committee met at Westwood periodically throughout many years to evaluate this collection.

The avocado cultivar collection eventually established in the young orchard represented most of the varieties of interest to the industry at the time. The majority of the then-prominent cultivars had been introduced by Wilson Popenoe. Several were of seedling selections made in California. The collection included such varieties as Anaheim, Benik, Blake, Carlsbad, Clifton, Coban, Coit, Collinson, Corona, Dickey A, Dickinson, Duke, Dutton, Edranol, Elsie, Frey, Fuerte, Ganter, Hanson, Hass, Hazzard, Helien, Itzanma, Jaina, Juan, Kanan, Kashlan, Leucadia, Linda, Lula, Lyon, MacArthur, MacPherson, Matney, Mayapan, Mexicola, Middleton, Miller, Mundo, Murrieta Green, Nabal, Nirnliah, Northrop, Panchoy, Pierce, Prince, Puebla, Queen, Rincon, Ryan, Sharpless, Spinks, Stephens Choice, Taft, Takal, Topa Topa, Worsham, Wurtz, and Zutano.

Aside from the cultivars of *Persea americana*, there were specimens of *Persea longipes*, *P lingue*, *P borbonia*, *P floccosa*, *P nubigena*, *P indica*, and *P schiedeana*.

Other botanical relatives included *Laurus nobilis* and *Umbellularia californica*. These materials were utilized in many botanical and horticultural investigations by staff and students. The avocado cultivar collection was established to serve also as a windbreak row along the north side of the orchard. Some cultivars were in formal rows within the orchard and in the nursery holding block.



Avocado rootstock progeny nursery on the campus of the University of California at Los Angeles, spring 1936.

Several of the specific research projects on avocado initiated at U.C.L.A. and supported by the industry resulted in much of the early useful information on the avocado which is recorded in the literature. During the period 1934-1964 the California Avocado Society ("Association" prior to 1941) Yearbooks carried 105 articles by staff members describing research on all aspects of the avocado. More extensive and numerous other reports on avocado research done at U.C.L.A. appeared in other journals of the period such as the Proceedings of the American Society for Horticultural Science, Soil Science, Plant Physiology, Botanical Gazette, and several other professional and general publications.

The major individual who initiated the program of development and guided the progress of the entire project at U C. L. A. was the late Robert W. Hodgson, Assistant Dean of the College and Director of the Experiment Station at U.C.L.A. His classic publication, "The California Avocado

Industry" (California Agricultural Experiment Station Circular No. 43. revised 1947), is still a basic reference source for all aspects of the avocado. Professor Hodgson's studies on the alternate bearing problem in the Fuerte and the concept of Fuerte "strains" were eventually utilized by the industry. Many of the staff assembled by Hodgson became involved in problems confronted by the expanding avocado industry in mid-1930s. Professor Fred F. Halma-with the assistance of E. R. "Spex" Eggers, the first superintendent of cultivations, and Ted Frolich, a laboratory technician- initiated an extensive field project to evaluate avocado seedling rootstocks from several sources in respect to soil salinity tolerance, graft compatibility, and other characteristics. Attempts to grow avocado cultivars from rooted cuttings resulted in the development by Ted Frolich of the "etiolation treatment" to induce rooting in "hard-to-root" cultivars. The development of this fundamental method of root induction eventually has resulted in the practical utilization of clonal rootstocks in the avocado industry and has become the universal method for production of avocado trees in nearly all countries of the world where avocados are grown commercially.

The early investigations by R. W. Hodgson and S. H. Cameron on carbohydrate reserves in avocado trees as related to annual growth behavior, the alternate cropping phenomenon, and to pruning responses provided basic knowledge for subsequent pioneer studies by Professor Arthur Wallace on mineral uptake by avocado plants, particularly those growing in calcareous soils. The subsequent studies on the use of chelates as soil amendments to correct for lime-induced chlorosis conditions in avocado resulted from researches first demonstrated in the laboratory of Professor Wallace. The biochemical studies of Professor David Appleman on the physical and chemical changes of the fruit during growth and storage were possibly among the first investigations which contributed to our basic knowledge of the properties of the avocado fruit.

The initiation of an avocado breeding program at the request and with the support of the industry was made in 1938, when Dr. Walter E. Lammerts was hired to collect appropriate parent materials and make the first controlled pollination crosses. A number of rather attractive hybrid seedlings developed under the program were field tested in Ventura and San Diego Counties, but none proved to be of value. The breeding program was later conducted by Professor Royce Bingham, who made some basic observations on pollination responses and floral behavior in relation to production of avocado hybrids. In 1960, the avocado breeding project was transferred to the Riverside campus under the direction of Dr. B. O. "Bob" Bergh.

Some of the early investigations on avocado fruit anatomy and pollination problems were initiated by Professor C. Arthur Schroeder, who demonstrated the unusual character of fruit development in the avocado which increases in size by cell division throughout the life of the fruit from the pistil stage to fruit maturity. Most other fruit species undergo cell division primarily during the first three weeks following pollination. Subsequent growth in such fruits is mostly by cell enlargement. The growth of avocado fruit tissue *in vitro* as a tissue culture was first demonstrated by Schroeder. Subsequently, other avocado tissues such as petioles, stem sections, and root segments were also grown *in vitro*. The mode of fruit growth in avocado, essentially that of a juvenile tissue, was reflected in the striking respiratory studies of Professor Jacob

Biale who demonstrated for the first time the climacteric rise in the respiratory rate of avocado fruit and its relationship to the softening of the fruit at maturity. Professor Biale and his students were among the first to describe the role of native ethylene in the softening of avocado fruit. These studies on fruit respiration provided the basic information for the industry to validate and refine its standards of temperature and atmospheric conditions and to develop storage procedures for economically handling and marketing avocado fruits.

The first foreign exploration trip to collect avocado research materials sponsored by the California Avocado Society in 1947 was initiated at U.C.L.A. when Professor C. A. Schroeder, together with Harlan Griswold, president of the California Avocado Society, Harold Wahlberg, farm advisor from Orange County, and Carl Crawford, an avocado grower also from Orange County, visited the forests near Mt. Orizaba in the state of Puebla, Mexico. Collections were made of several botanical relatives of the avocado, some species of *Persea*, and selected "wild" avocados. The objective was to bring back materials which would be useful in the several research programs concerned with rootstock tolerance to the *Phthorhiza cinnamomi* organism and for other general horticultural uses. Several botanical species and avocado selections were introduced as the result of this effort.

Many of the early contributions to our knowledge of insect pests attacking avocado were made by Professor Walter Ebeling and his assistant, Roy J. Pence. Several of the early pests were identified, described, and control measures worked out by these men. The publication "Subtropical Entomology" by Professor Ebeling remains as a classic, widely used text today, as it contains much basic information on the major insect pests of avocado.

The pioneer studies on soils associated with avocado tree decline (avocado root rot) by Professor Martin Huberty and the investigations of Professor Arthur Pillsbury on water distribution by portable under-tree sprinkler systems for avocado are still widely recognized and utilized.

Many early investigations conducted at U.C.L.A. from 1929 to 1965 contributed much to the advancement of the industry and to avocado literature. Possibly the most valuable elements in the avocado history in California were those early students who participated in the college training program at U.C.L.A. and later served as farm advisors or researchers to further the welfare of the industry. The students who were trained at U.C.L.A. during those early years should be given credit and recognition for their initiative, abilities, and inspirations which have subsequently resulted in the advancement and improvements in the industry and in contributions to our knowledge of avocado. Many of the former students became associated directly with the University as farm advisors or Cooperative Extension officers in the major avocado counties of southern California. Among the names prominent in these positions were Arnold White, Joe Coony, Don Rosedale, George Goodall, Marston Kimball, Bob Platt, John Pehrson, Karl Opitz, Bud Lee, James Beutel, and Jim La Rue. Other former students became associated with various aspects of the industry-Cliff Papke, Al Church, Harold Miller, Fred Cunningham, Irving Hardman, Calvin Crawford, Cal Bream, Crawford Teague, Kenneth Glenn, Charles Luger, Carl Winberg, Ted Canham, Will Farmer, Lloyd Rooke, Dick Palmer, Pete Stupin, George Borst, Cliff Trotter, Burnell Yarick, Lon Denison, Bob

Bean, Harry Welch-to list some of those who kept in contact with the department at Westwood. Among former students who joined the University in various capacities were Roy Young, Lee Shannon, Harlan K. Pratt, Art Schroeder, Ed Nauer, Paul Moore, George Zentmyer, and Joe Eckert. Among these students, many have made outstanding contributions to the development and progress of the California avocado industry through their research and teaching activities throughout the years. Still other former students with whom the department lost touch possibly related to the avocado industry at some point in their careers.

The 'Award of Honor' bestowed in most years by the California Avocado Society is given in recognition of outstanding contributions by individuals to the industry. Among the staff members at U.C.L.A. who received this honor were R. W. Hodgson, Walter Ebeling, C. A. Schroeder, F. F. Halma, Ted Frolich, and I. J. Condit. Several former students from U.C.L.A. were also recognized by the "Award of Honor": George A. Zentmyer, Bob Platt, Ted Todd, Don Gustafson, George Goodall, Bud Lee, and Crawford Teague.

In 1958, Clark Kerr became President of the University of California. He announced the decision of the Board of Regents at that time to terminate the activities of the College of Agriculture on the Los Angeles campus and to transfer nearly all projects and staff related to subtropical horticulture, including the teaching responsibilities, to the Riverside campus. This transfer was accomplished during the period 1960-1965. Thus, the College of Agriculture at Los Angeles became a chapter of history.

The only physical evidence which remains today of avocado history at Westwood is the north end addition of Kinsey Hall (the former Physics- Biology Building) in which the College of Agriculture had its administrative offices, teaching laboratories, and classrooms. The great orchard is gone, replaced by three large buildings which presently serve the Health Sciences complex of the campus. A few white sapote trees along Westwood Boulevard east of the "Steam Plant" and one very large eucalyptus tree along Circle Drive just west of the "Steam Plant" are the only remaining plant materials related to the orchard.

Very few staff members at present on the Westwood campus have any recollection of the College of Agriculture. Many are uninformed of the fact that U.C.L.A. is a part of the great land-grant college system-a concept of higher education which probably accounts for the outstanding achievements and leadership in all aspects of agriculture which was achieved by America throughout the many past decades. It is good and proper, therefore, to reflect occasionally on the history of our great avocado industry, on the individuals who were concerned with its development, and on the institutions-among these, the University and its College of Agriculture which have made possible many of our achievements.

Lest we forget.