

A Short History of the Hawaii Agricultural Experiment Station, 1901–1982

Beatrice H. Krauss

The late Beatrice Krauss wrote this history while she was a research affiliate with the Harold L. Lyon Arboretum and the Hawaii Agricultural Experiment Station (HAES), as well as a member of the graduate faculty of the Botany Department, University of Hawaii at Manoa. CTAHR Publications and Information Office records do not indicate why the document was never published. Because it is such an entertaining and informative overview of the college's research branch during the period covered, it is now being posted on the CTAHR Web site (June, 2003). Some text originally included as footnotes is placed here in brackets.

I. The First 75 Years

[The first part (I) of this history covers the years 1901–1976; it was originally written to commemorate the 75th anniversary of the establishment of the Hawaii Agricultural Experiment Station. Part II brings the history up to the commemoration of the 75th anniversary of the founding of the University of Hawaii, 1907–1982.]

The Fifty-sixth Congress of the United States, in its first session, appropriated \$10,000 to enable the Secretary of Agriculture to investigate “the field and establish an experiment station in Hawaii” as had been done for Mainland states. In pursuance of the act enabling this action, Dr. W. C. Stubbs, director of the Louisiana Agricultural Experiment Stations, was sent to Hawaii during the summer of 1900. The results of his inquiry were presented in a report transmitted to Congress in January 1901 and published as House Document No. 368 of the Fifty-sixth Congress, second session, and later as Bulletin No. 95 of the Office of Experiment Stations of the U.S. Department of Agriculture.

Recognizing that the Hawaiian Sugar Planters' Association already had an experiment station to study problems associated with the sugar industry, Dr. Stubbs recommended that the new Federal station “devote its energies chiefly to other agricultural interests,” suggesting that the staff devote its attention to “the culture of fruits, vegetables, rice, forage crops, coffee growing, stock raising, dairying, irrigation and forestry.” Dr. Stubbs further recommended that the station to be established “should be under the control of the Secretary of Agriculture and independent of local institutions.”

The tract known as Kewalo-uka, on the “outskirts of the city of Honolulu,” was recommended as a site for the station. This tract had been set aside by former Territorial* officers for experimental investigations in agriculture and forestry; however, the necessary formalities for this project were never fully carried out. Subsequently, 20 acres were reserved by Presidential proclamation as a site for a hospital for the Navy Department, and 7 acres for the same purpose for the Marine-Hospital Service under the Treasury Department. [*After the overthrow of the Hawaiian monarchy in 1898, Hawaii was subsequently annexed to the United States as the Territory of Hawaii, from June 14, 1900, to August 21, 1959, when Hawaii became the 50th State.]

Acting upon the suggestions made in the abovementioned preliminary report, as to both site and scope of activities, Congress appropriated \$12,000 for continuing work during that current fiscal year. Jared G. Smith of the USDA Section of Seed and Plant Introduction was transferred to the Office of Experiment Stations Washington, D.C.. and appointed special agent in charge (i.e., director) of the new but as yet unestablished Hawaii Agricultural Experiment Station (HAES); he arrived in Honolulu on April 5, 1901, and set up a temporary office in the Territorial capitol building.

The tract selected for the site of the Station consisted of 154 acres lying along the eastern slope of Punchbowl and southern slopes of the Tantalus ridge, with elevations extending from 125 to 1,359 feet. Sixty-two acres were reserved for a stone quarry and a public park (now Makiki Cemetery) by the Territory. During the first year of operation, 24 of the 92 acres assigned to the Station were cleared of a dense growth of guava and lantana bushes, prickly pear, and algaroba, and 13 acres, of 15-year-old eucalyptus. It is interesting to note that the preparation of the land in the first-mentioned area, i.e., clearing of all plants, removal of all tree stumps and roots, and plowing the land to a depth of 20 inches, cost \$30 an acre.

In the 7 months following Smith's arrival in Honolulu, the above-mentioned land clearing and some buildings had been completed, as well as a plant nursery established, and poultry experiments inaugurated. Surveys of the coffee-growing areas on the Island of Hawaii and plans for needed research on this crop had been made. [Export of coffee for that year, 1901, had been 2,600,000 pounds.] Surveys had also been made on the possibility of reviving several once-important export crops: white and sweet potatoes, and rice, through proper research. Smith also noted the importance of taro, the Hawaiians' staple food; of poultry; and of various minor crops; and the need for experimentation.

In his first year as director, Smith employed M. T. Sedgwick as agriculturist and his assistant. In this same year, Sedgwick wrote an article on chickens and their diseases in Hawaii; this was published as HAES Bulletin No. 1, of which about 2,000 copies were distributed in the Territory.

During the second year after the establishment of the Station, experiments had been initiated on taro rot and potato blight; investigations on the improvement of raising coffee, and a large variety of fruits, as well as such abandoned crops as cotton, castor bean, and manioc; cattle grazing; and a study of forage and fiber resources. In January 1902, through the efforts of the Station, the Farmers' Institute of Hawaii was started; this society was organized "to help farmers throughout the Territory"; six sessions were held that year. Also that year, Bulletin No. 2, "The Root Rot of Taro," by Sedgwick, was published. The staff now consisted of, besides Smith and Sedgwick, F. E. Conter, assistant agriculturist, and D. L. Van Dine, entomologist.

Interesting as it might be to record the activities and accomplishments of the Station year by year, this is impossible in a history of this length. Therefore, highlights and especially outstanding accomplishments only will be presented.

In 1904, a new office and laboratory building, and in 1910, an additional building, were constructed at the lower (*makai*) limits of the area assigned to the HAES; this was on the site of the present Lincoln and Stevenson Intermediate Schools. Also, more residences for staff members were being built "on the Hill," as the area where the director's house and the first office were located was called. This "Hill" is now the site of the Papakolea homestead area.

By 1907, the last year of Smith's directorship, the following were added to the staff: J. E. Higgins, horticulturist; E. C. Shorey, chemist; Alice R. Thompson, assistant chemist; C. R. Blacow, assistant in tobacco experimentation (located at Paauilo, on the Island of Hawaii); and two specialists: F. G. Krauss, in charge of rice investigations, and Q. Q. Bradford, assistant in rubber investigations. The appointment of these specialists points to the importance of these crops in the Hawaii of that day. It is interesting to note, in passing, that at the time of his appointment, Krauss received an annual salary of \$2,000, half of which was paid by the Bishop Estate! Also in that year, Higgins' salary was raised from \$1,700 to \$2,000!

During that year of 1907, work was either initiated or was being continued by Higgins on shipping such fresh fruit as pineapples, avocados, papayas, and bananas to the Mainland; this research was to be continued for many years thereafter, with much success. The entomologist, Van Dine, was occupied with the study and control of such insect pests as the sweetpotato weevil, first found in numbers in that year, and the melon fly, which already was a bad pest (first noted in 1898); such human pests as mosquitoes and fleas; and with silk culture. Seventeen bulletins and 20 press bulletins had been published by the end of this year of 1907. The HAES was also putting up exhibits at farm fairs.

In 1908, E. V. Wilcox was appointed special agent in charge, the designation then of the director; and the staff was increased to nine.

The year 1911 saw the first HAES demonstration farms being established on the Island of Hawaii, one at Hilo and another at Glenwood. Substations had already been set up in the Nahiku district, on Maui, to investigate rubber; at Homestead, on Kauai, to study fruit crops; and at Waipio, on Oahu, where investigations on potatoes, sorghum, legumes, and broom crops were conducted. By 1913, additional substations were planned for Waiakoa, Laupahoehoe, Waimea, and Kona (Hawaii), Kaupo (Maui), and Kapaa (Kauai). These substations and demonstration farms were an integral part of the HAES, and, and over the years, made valuable contributions to the agriculture of Hawaii.

During 1913, the Station helped in the formation of six cooperative associations of farmers; these were set up primarily to promote crop marketing and distribution of farm products. Also in 1913, the Station was put in charge of a marketing division for Hawaii-grown products.

The year 1914 saw the organization of the Extension Division, although the work at the substations and demonstration farms, the fostering of boys' and girls' agricultural clubs, assistance in agricultural farms, etc. – all of an extension nature – had already been carried on by extension agents.

Because of the withdrawal of Territorial funds, all substations except the one at Glenwood were abandoned in 1915. However, much of the work done at these substations and demonstration farms was taken care of by collaborators who devoted portions of their own farms for demonstration work through the newly created Extension Division. Work of this kind was established at Haiku, Maui; Hilo and Kamuela, Hawaii; and Kalaheo, Kauai. Also, as an adjunct to the main Station, a substation was maintained at an elevation 1,000 feet higher than the Station, farther up the slopes of Mt. Tantalus; here, plants such as coffee, rubber, Chinese wood-oil nuts, macadamia nuts, citrus trees, and roselle, plants that did not thrive in the plots at

the lower elevations of the Station, were cultivated. For several years, including 1914, a small tract on Wyllie Street was leased by the HAES for experimental purposes.

The area adjoining the newer (*makai*) buildings, and greenhouses built nearby, were devoted to plantings and experimental plots of a wide range of fruit, ornamental, and economic trees and plants: avocado, mango, mangosteen, papaya, all kinds of citrus (29 varieties in 1911), banana, litchi, hibiscus, etc., where hybridization, pruning, fertilization, and propagation experiments were carried out on a small scale. More extensive studies were conducted on the substations and demonstration farms. Research on the preparation and drying of food products and on the manufacture of starches and vinegar was also being conducted. The horticulture department was actively engaged in acquiring many new varieties of fruits from all over the world, later distributing planting material from the most promising of these throughout the Territory.

In 1915, Wilcox was succeeded by J. M. Westgate as director, with the title of “agronomist in charge”; Westgate came to Hawaii from the USDA Office of Forage Crop Investigations, in Washington, D.C.

Because of the importance of these fields of investigations, a pathologist, C. W. Carpenter, and a man in charge of cooperative marketing investigations were added to the staff in 1916.

With the United States' entrance into World War I, in 1917, the importance of the HAES's role in the production of food for an isolated group of islands became even more pronounced. Besides focusing attention on the vital necessity for local food production for the civilian population, the HAES was called upon to give advice and render material assistance in the furnishing of seeds and plants to the military. Over 100 acres in the Schofield Barracks reservation at Castner, on Oahu, were planted to about 50 varieties of grasses, forage plants, and food crops under test with the cooperation of the HAES. This work continued for several years.

In 1917, the Territorial legislature provided moneys for the employment of several county agents, who were located throughout the Islands. In 1918, the HAES fostered the establishment of the “emergency war gardens” in citizens' home grounds.

Because of the increasingly important role of extension work in the remote areas of neighbor islands of the Territory, and the problems of marketing farm crops from these areas, etc., F. G. Krauss, who had left the HAES as agronomist in 1911 to teach at the College of Hawaii, was asked to return to the HAES in 1915 as superintendent of extension work. His headquarters were on his homestead farm, in Haiku, Maui; this later became a demonstration substation. Krauss also served as temporary Maui County agent. In 1919, R. A. Goff, who had been in charge of the substation at Glenwood, was appointed extension agent for the Island of Hawaii. The list of collaborators was also growing.

Having previously prepared exhibits for small farm fairs, beginning in 1918, and continuing for many years more, the HAES participated in Territorial fairs.

In 1920, Nellie A. Russell, a part-time collaborator in home demonstration work and an experienced home economics demonstrator, was appointed. With this appointment, cooking, canning, and preservation demonstrations—utilizing Hawaii fruits and vegetables—were held at various women's clubs and other organizations in Honolulu as well as on sugar plantations, the

latter for the wives of plantation employees who could not attend the demonstrations in Honolulu and other towns.

Also in 1920, the Haleakala substation was established in a newly opened homestead tract, above Makawao, on the Island of Maui, thus restoring to some extent the work of substations on neighbor islands terminated when all such installations, except at Glenwood, were closed.

The Kamuela Cooperative Experiment Station, with an area of 16 acres, and operated by the Parker Ranch on Hawaii, was established in 1922 to raise crops, primarily forage and grazing, and some other crops of benefit to the ranch and to local Waimea homesteaders.

Also in 1922, Krauss resigned his position as superintendent of extension work, and returned to teach at the University of Hawaii. He had demonstrated that a family of seven could subsist admirably on a diversified farm in Hawaii, had carried on many valuable experiments on various crops, and had gained the friendship and admiration of the managers of the large plantations and ranches on Maui—men who had been bitterly opposed to the opening of the Haiku/Kuiaha homestead tract, and were, for the most part, uninterested in diversified agriculture.

In 1924, Westgate, who had been administering the Station under the title of “agronomist in charge,” was named director, the title accorded the person in charge of the HAES ever since.

Mabel Green was brought to the Station in 1923 to head up all boys' and girls' club work. By 1926, boys' and girls' 4-H clubs had been organized on the four major islands. Their activities were carried on in cooperation with the Territorial Department of Public Instruction and the International Institute of Honolulu. In 1929, the work of boys' and girls' clubs was transferred to the University of Hawaii.

Beginning on July 1, 1929, the agricultural activities of the sometime-called Federal experiment station (HAES) and of the University of Hawaii were formally brought under the joint control of the USDA and the University, in accordance with a memorandum of understanding approved by the secretary of agriculture and the president of the University. The enlarged experiment station continued to bear the name HAES, and was under the immediate management of the former director of the Federal station. It seemed very fitting that the personnel and facilities of the College of Agriculture of the University, which had begun agricultural investigational work in 1908, and the Federal experiment station, which had been operated as an independent institution since its establishment, be pooled; it was expected that the result of this action would be “an increase in efficiency and economy of administration, and more effective cooperation with other local institutions also engaged in similar experimental work.” The properties of the two coordinated institutions were to be kept separate, however.

In 1929, a department of human nutrition was set up with Carey D. Miller in charge. This began a long, valuable career of nutritional studies of local fruits and vegetables. A new building to house Miller's laboratories was constructed on the University campus.

The year 1931 saw the establishment of a 3.25-acre substation in Kona, where R. K. Pahau was put in charge. Although coffee investigations constituted the most important line of work at this substation, many other crops underwent experimentation. In the same year, the acreage for the

Haleakala substation was increased by a little over 4 acres in the Olinda, Maui, area, in order to carry on extensive trials with pigeon peas, which had become an important forage crop.

The period of the Depression in Hawaii, between 1932 and 1936, resulting in low prices of sugar and pineapples (the leading agricultural products of the Islands), and a maritime strike in 1937, stimulated interest in other crops, and stressed the importance of producing locally a large share of the foodstuffs normally imported from the Mainland.

The offices of the HAES were transferred on August 1, 1935, to a new agricultural building on the University campus; this was later named Gilmore Hall, after John Washington Gilmore, the first (permanent) president of the then College of Hawaii. This main building housed offices for the director and four department heads, as well as some laboratories. A model barn, a piggery, and poultry houses were constructed at about the same time on that part of the “campus” that became known as “the Farm” (most of that part of the present campus that lies *mauka* of Varney Circle). A greenhouse was also erected; the human nutrition department building was already there, as noted previously. The agronomy office and facilities, and part of the horticultural offices and laboratories, remained at the old Pensacola/Prospect Streets location.

In 1936, O.C. Magistad was appointed director, and Westgate was named consultant in tropical agriculture. For that fiscal year of 1935/36, the appropriation to run the Station was \$100,957.78, compared to the \$15,000 (+) appropriation 5 years previously, i.e., in 1930/31, the year that the activities of the Federal station and the University were consolidated.

The Station, in 1937, put into operation Poamoho Farm, a 31-acre area located on the main road between Wahiawa and Waialua on the Island of Oahu; this had been acquired the year before. The Farm consisted of field plots, primarily for the investigation of soils, forage and truck crops, and some tree crops. In the same year, 7 acres were added to the Kona substation.

With the resignation of Magistad in 1938 L. A. Henke, animal husbandman at the Station, was made acting director. The next year, J.H. Beaumont, who had been horticulturist there, was made director.

In 1938, the HAES became a purely Territorial institution, under the authority of the University, with “purposes and objectives parallel to those of the experimental stations of Mainland states.” Beginning in this year, the Station was allotted sugar-processing-tax funds for agricultural research along various lines.

The addition of wings to Gilmore Hall in 1940 allowed for the transference of all remaining departments to the University campus. [This building was demolished in 1973. A new six-storied building, also named Gilmore Hall, was erected in 1977.]

Perhaps it is well to pause at this point, a milestone of sorts in the history of the HAES—in time, a decade short of half a century; with all offices and laboratories of all departments housed in a single building (or two) at the University; with the Station having finally acquired the status of other land-grant institutions across the United States; and just prior to the United States' entrance into World War II.

In his first annual report (1901), director Smith wrote: “There is hardly a crop cultivated in all the subtropical regions of the globe but which has been grown here at some period during the past eighty years. Fruits, nuts, dyes, tannins, precious woods, spices, vegetables, drugs, fibers, and forage plants have been grown in endless variety.” During the almost 40 years since Smith made this statement, this list could be repeated, with many more crops added. It might surprise many people living in Hawaii today to learn that the culture of coffee, rubber, cotton, sisal, taro, bananas, and rice, and beekeeping, were once important in terms of local consumption and, in some cases, in terms of export as well. The HAES played an important part in making this so: through the introduction or creation of new varieties, studies on insect and disease control, soil and fertilization investigations, and marketing studies. The Station was invaluable to the ranches in terms of the importation of forage crops as well as their cultivation and maintenance. Until an independent private research institution was started by the pineapple industry in the 1920s, all experimental work on that crop had been done at the HAES. Actually, the HAES demonstrated that there were many crops that could have been of major importance; the limiting factors had become – and were to become – even more acute: a lack of suitable land (the major part of cultivatable land being in the hands of sugarcane and pineapple plantations), and the high cost of skilled farm labor. Promising, but what should perhaps be considered minor, crops included *klu* (cassia) for perfumes, grapes for wine, such starch-producing plants as cassava and *hapu'u*, mulberry for silk culture, cacao, etc.

By 1940, 85 bulletins, 54 press bulletins, 16 circulars, 68 technical papers (appearing in national scientific journals), 2 miscellaneous papers, 18 research reports, numerous popular articles in newspapers and magazines, extension bulletins, and extension newsletters had been published. Some of these, such as the series of bulletins on various fruits and hibiscus, have become “classics,” and are in demand to this day. Reports on the activities of the Station, which were published annually through 1940, then began to appear biennially.

With the United States' entrance into World War II, in December of 1941, the next 4 years found the work at the Station focused primarily in the direction of making Hawaii more self-sufficient, because of curtailed shipping and an increase in military personnel. This involved the establishment of emergency food-and-feed-production programs and research to implement these programs, including developing and perfecting new techniques, and the development of new materials. Although these studies and investigations were necessarily directed toward more practical research, it was recognized that fundamental research must also be continued. As in World War I, the Station cooperated with the military in many ways.

The end of World War II found the Station staff depleted, with vacancies hard to fill because of a nationwide shortage of well trained research workers. Despite this handicap, and with very little increase in appropriations, the report of the activities for the biennium ending June 30, 1946, contained 157 pages recording the accomplishments of a technical staff of 40, distributed among 12 departments. In agronomy and in animal husbandry, the staff was working on the values of new rations, and of silaging local crops; the agricultural chemistry and soils department, on such problems as amendments for highly acid and high-manganese soils; entomology, on the control of insect pests in fruit orchards and vegetable plots, and several recently discovered insect pests on these and ornamental plants; horticulture, on macadamia nuts, avocado, papaya, mango, and orchids; nutrition continued its work on vitamins, and other nutrient constituents in Hawaii foods; parasitology explored methods of controlling parasites of cattle, swine, and poultry; plant pathology, fungal, bacterial, and viral diseases of vegetable and fruit as well as some forage

crops; in plant physiology, nutritional and hormonal investigations were made on sugarcane, with some work on forest-seed germination and viability, and quick freezing of fruit; housing and feeding experiments with poultry occupied much of the time of poultry husbandry; and in vegetable crops, many of the investigations involved the breeding for resistance against several diseases and the improvement of quality, primarily in tomatoes, but also in other vegetable crops.

In 1946, the passage of the Research and Marketing Act was of significant and far-reaching importance to the national agricultural policy. In addition to supporting and extending the agricultural research program of the states and the Federal bureaus of the USDA, it designated large sums to be devoted to the studies of agricultural products. Furthermore, the act stipulated that certain funds allotted to the states must be expended for cooperative research in which two or more state agricultural experiment stations were to cooperate to solve problems that concerned the agriculture of more than one state. Under this act, the Bureau of Entomology and Plant Quarantine (BEPQ), a Federal agency, cooperated with the HAES and other Territorial agencies in biological control investigations. During the same biennium, shops and offices as well as classrooms for research in agricultural engineering were constructed at the University with funds contributed by the Hawaiian Sugar Planters' Association (HSPA) and the Pineapple Research Institute (PRI).

In the 1948–1950 biennium, Congress appropriated approximately \$500,000 to BEPQ to combat fruit flies, with the University of California Agricultural Experiment Station, the Territorial Board of Agriculture, HSPA, and PRI entering into an inclusive cooperative agreement to pool resources and coordinate research sources. Also in this biennium, the Territorial Legislature created the Industrial Research Advisory Council (IRAC) to undertake emergency investigations to protect and encourage industries imperiled by the ravages of the fruit fly. Supervision of this work was by the HAES but conducted by investigators employed for that purpose.

Through the cooperation of and the funding by the Bureau of Agricultural Economics, and the new funds and authorities obtained through the Research and Marketing Act, the activities and usefulness of the Station became greatly expanded, with new investigations directed to the immediate and unique problem of the flower growers and exporters, fruit and vegetable processors, and the fresh fruit and vegetable exporters.

A new experimental farm, 30 acres of improved and irrigated land at Waimanalo, on the Island of Oahu, was officially assigned to the Station in 1950. Also in 1950, a new greenhouse was built on land adjacent to the University campus—land acquired from the Mid-Pacific Institute in 1945 for the purposes of horticultural research.

In the 1948–1950 biennium, H. A. Wadsworth was made dean of the College of Agriculture, with Beaumont designated as director of the HAES within the College of Agriculture.

During the biennium 1950–1952, Wadsworth was appointed HAES director and continued to serve as dean of the College of Agriculture; Beaumont returned to chair the horticulture department. A food-processing laboratory, sponsored by the IRAC, was built on the University grounds. Besides funds appropriated by the Territorial Legislature and the various Federal grants for research that went to all state experiment stations, the HAES was receiving special grant funds from the IRAC, from bureaus of the USDA, and from private firms and other institutions. Research covered a wide range of subjects: studies of the genesis, morphology, and development

of Hawaii soils, which enabled a better understanding of them and the growth of plants supported by them; the processing of Hawaii fruits and vegetables; a survey of the thiamine, riboflavin, niacin, carotene, and ascorbic acid values of Hawaii foods; marketing; fruit fumigation against fruit flies; consumer-preference tests; control of weeds by herbicides; introduction of superior germ plasm of grasses and legumes; grazing experiments; animal feeding; accessions of papayas for study and breeding purposes; new disease-resistant tomatoes; new flower and other ornamental varieties; cytology of orchids; animal pests and diseases; macadamias; crop-logging, etc., were among the subjects studied.

By the biennium 1952–1954, a department of agricultural economics had been added, and the department of agricultural chemistry and soils had been renamed soils and agricultural chemistry.

During the biennium ending June 30, 1956, M. M. Rosenberg replaced Wadsworth as director of the HAES. In 1954, L. A. Henke, who had been associate director and animal scientist, retired after 38 years of valuable, highly regarded research; and J. C. Ripperton, agronomist, who contributed so much to the improvement of pasture grasses, forage plants, etc., retired after 36 years of service – certainly records for years of employment at the HAES, up to that point in its history at least.

A much-needed facility to house the horticultural, biochemical, animal husbandry, and other departments was built on East-West Road in 1956; this complex of offices and laboratories was named Henke Hall.

In 1957, Beaumont, who had been head of the department of horticulture for two periods, serving as director between them, for a total of 21 years at the HAES, died. He had contributed much in the field of horticulture in Hawaii; he was sorely missed, both as a person and as a scientist. During this biennium of 1956–1958, 165 projects were being actively investigated, with 190 scientific papers reporting results of these investigations published; a total of 17 projects were initiated and 10 completed. In 1958, Wadsworth retired as dean of the College of Agriculture, and M. M. Rosenberg was appointed dean and continued to serve as HAES director.

During the 1958–1960 biennium, funds were assigned to develop a new research center for livestock research at Waialeale, Oahu, and land and funds were provided to establish an East Hawaii branch station, on the Island of Hawaii. The food-processing laboratory was given permanent status, and was transferred from the Territorial Economic Planning and Coordination Authority (EPCA) to the Station, and a new department of food processing and utilization was created. The College's name was changed to the College of Tropical Agriculture. Four “old-timers” retired during this period: Cary D. Miller, renowned throughout the world for her work on human and animal nutrition, after 36 years; G. Fujimoto, from the agricultural biochemistry department, after 38 years; C. M. Bice, head of the department of poultry science, with credits of many innovations in poultry raising, after 32 years; and C. F. Poole, head of the department of vegetable crops, after having brought many new vegetable crops into existence. Otherwise, new and old staff members came and went, over the years.

And so through the biennium years of 1960–1962, 1962–1964, 1964–1966, 1966–1968, 1968–1970, 1970–1972, and 1972–1974. [Substations were established in Hilo, Hawaii; Kapaa, Kauai; and Kula, Maui, in 1970–1974.] During these years, there was a change in administration, C. P.

Wilson being appointed dean of the College of Tropical Agriculture and director of the HAES during the 1964–1966 biennium. He resigned in 1975, with W. C. Mitchell serving as acting dean and director until a permanent dean was to be appointed.

In 1969, the University acquired the buildings of the Pineapple Research Institute of Hawaii on Dole Street. The department of entomology, a portion of the agronomy and soils department, the agricultural publications and information office, and others were housed in this complex; it was named Krauss Hall, after F. G. Krauss, who had been a staff member in the early years of HAES, and a consultant to PRI.

If this review of the history of the HAES in the last 35 years seems more scanty than that for the first 40 years, there are reasons for this. For one thing, “space is running out”; secondly, most people remember the personnel involved and the research accomplished in these later years and are curious about and fascinated by the “old times.” Thirdly, the research being done in these later years was being built upon a foundation laid down in the earlier years, becoming, to be sure, more sophisticated and more detailed.

One would like to list *all* personnel and *all* research for the 75 years that the Station has been in existence, and to point to the outstanding people who made up the staffs of the HAES, its substations, etc.; but there is not space for this nor would it be fair to pick out individuals, no matter how much one would like to, for the accomplishments of the Station are the result of the efforts of *all* the staff members, from the laboratory assistants to the heads of departments to the director. As to what these accomplishments are, it would take a book to record these. Suffice to say that agriculture in Hawaii today would not be what it is without the HAES – and this includes the sugar and pineapple industries, which have their own research institutions but have also benefited from research at the HAES.

The wide range of varieties of forage crops, fruits, vegetables, and ornamentals, both imported and bred here, and of breeds of stock imported and created here, now found in the Islands, are the result of the Station's efforts. The improved methods of culture, control of pests and diseases, fertilization schedules, and the processing of a multitude of crops can be credited to the HAES. The development of machinery in agricultural practices and the technology associated with the processing of plant products have originated with the HAES. Aid in marketing of agricultural products is also a “big plus” for the HAES. Research has resulted in the publication of over 2,000 technical papers; this is in addition to hundreds of more practical publications.

Looking to the future, what can Hawaii expect and hope for from the HAES? Certainly more of the fine type of research and personal aid that the staff of the Station and its adjuncts have been contributing in the past, with, one hopes, constant awareness of the needs for new research. One of the immediate needs will be research and demonstrations for the establishment of diversified farms on land made available by the closing of sugar and pineapple plantations. There are many young people eager to have small farms, and now, at last, land will be available. The HAES can do much to help these young people realize their dreams, and in doing so, help Hawaii become more self-sustaining as far as food is concerned.

II. Achievements and Reorganization, 1977–1982

And what have been the achievements of HAES in the last 6 years?

In reviewing the accomplishments of the years following the first 75 years, W. R. Furtick, appointed director of the Station in 1976, to succeed C. P. Wilson, wrote: "More than 200 research projects have been conducted during this period.* The projects are guided by the needs and support of the people of Hawaii. They have been aimed at increasing Hawaii's capacity to efficiently produce a variety of agricultural products, further developing markets for these products, improving the health and quality of life of Hawaii's people, and finding ways to work with and prevent deterioration of the environment and natural resources of our State." [*I.e., June 1976 to December 1979; in the three succeeding years, also covered in this part (II) of this history, this number of research projects was increased by more than a hundred.]

In this short history, it would be impossible to even name, let alone describe, the individual projects and the progress and accomplishments made in each; therefore, only a brief general review follows.

Emphasis in research on fruit, nut, vegetable, and field crops continued to be directed toward breeding programs, both for improved yields and quality, and resistance to diseases and pests; investigation of means for soil fertility improvement; nutritional requirements and environmental influences; disease and pest control; mechanization of planting and harvesting; improving shelf-life as part of postharvest handling; and marketing. Would there were space to describe the many fine results realized in these various fields of research!

With the "phase-out" of the Pineapple Research Institute of Hawaii, it has become the responsibility of HAES to continue already-initiated and begin new research projects with pineapple. Although research on sugarcane continues to be the concern of the experiment station of the Hawaiian Sugar Planters' Association, specialized experimental work, such as studies of nutritional needs, environmental factors, control of specific diseases, and certain economic viability studies by HAES, has been helpful to the sugar producers and their experiment station. Thus HAES, originally established to "devote its energies chiefly to other agricultural interests," i.e., other than sugarcane and, later, pineapple, is now contributing a great deal in the way of research to Hawaii's two major agricultural industries.

The beef cattle industry makes up the largest portion of livestock production in Hawaii, with beef cattle production the major enterprise in the State's rangelands. Research by HAES in this area includes studies in breeding (for reproduction, growth, and development of calves; feedlot performance; and carcass characteristics); experimental feeding; beef cattle management (including projections of consumption in the future); and marketing. Hawaii's dairy industry continues to grow; research at the Station is meeting this challenge by testing different feed components, environmental effects, and different management practices and their effects on milk production.

Swine production represents about 11 percent of the State's total livestock sales. Expansion of Hawaii's swine industry is limited by the high cost of production in competition with Mainland swine. Until Hawaii can compete costwise with the Mainland swine, there cannot be an appreciable increase in this area. Since high costs in the State are due to high feed costs, the Station is concentrating its research on feed-component alternatives and swine waste management.

The commercial poultry industry in Hawaii is composed of chicken egg and meat sectors. The Station continues to concentrate primarily on efforts to discover new management practices, such as effects of environment, forced molting, and new rations, for more efficient, economical egg product.

The mass culturing of Malaysian prawns, catfish, and oysters, now in commercial production, has stimulated considerable research by HAES, especially in the field of engineering.

The export of ornamentals – cut flowers, especially anthuriums, and, more recently, protea, and foliage plants, now in greater demand as rooted stock than as detached leaves and branches – has increased tremendously over recent years. This great demand for these commodities has resulted in much research by HAES scientists in the creation of new cultivars (varieties); the development of and improvement in cultural, propagation, and management techniques; as well as on disease and pest control. Experimental work continues with that important local and export ornamental, orchid, and other new accessions.

The market potentials and market development of Hawaii's many agricultural products, and efficient methods of getting these products to their destinations, are primary areas of current research by the Station in the field of marketing. Closely related to marketing research are the economic projects focusing on such areas as agricultural cooperatives, costs of production of various commodities, and the economic feasibility of the production or processing of new agricultural products.

Since good nutrition is essential to good health, HAES has been conducting studies dealing with foods, especially with those from the tropical Pacific and South Asian areas, the nutrients in these foods, and their effect on human health. Research projects in human development have included sociological studies of rural children and adults, including the elderly, and different ethnic groups. Knowledge gained from these studies can serve as a guide when social programs are developed to help the people of the State lead happier, more productive lives.

The early designation of “Home Economics,” to include “human foods and clothing,” has given way to the more sophisticated titles of “Food and Nutritional Sciences,” “Department of Fashion Design, Textiles, and Merchandising,” and others, to meet the challenge of the modern world.

Scientists at HAES are involved in research studies of Hawaii's natural resources, i.e., the land (soils), the water, and the forests. Such studies have involved the prevention of erosion, increase in fertility of acid soils, the further exploitation of drip irrigation and fertilization, and the management of native forests.

Public concern about the consumption of nonrenewable energy sources, the quality of our environment, and the availability of many natural resources has prompted the Station to study residues from such crops as good alternative energy sources. Initial work on the production of methane and ethanol from livestock manures, food-processing wastes, seaweeds, etc., has been very promising.

In other fields involving environmental quality, the Station continues to be involved in studies of both biological and chemical control of insect pests.

Three valuable units have been created within two departments to provide special services for the public as well as all personnel of HAES. These are the Plant Disease Clinic in the Department of Plant Pathology, and the Soil Analyses and Plant Tissue Analyses Service Centers in the Department of Agronomy and Soil Science. These three facilities have proved to be not only invaluable in their contributions to the research conducted by the HAES scientists but tremendously popular with the public.

The University of Hawaii and the State of Hawaii can well be proud of the achievements of the Hawaii Agricultural Experiment Station during its first 81 years of existence!

However, the Hawaii Agricultural Experiment Station, as such, is no more! On March 16, 1978, as part of a structural reorganization, the Hawaii Agricultural Experiment Station and the Hawaii Cooperative Extension Service were merged administratively under the name "Hawaii Institute of Tropical Agriculture and Human Resources, College of Tropical Agriculture and Human Resources, University of Hawaii"; Dr. Noel. P. Kefford was appointed acting director of the Institute at that time, and named director on January 10, 1980. Dr. Kefford, who had been interim dean of the College since July 1, 1980, was made the regular dean in January of 1982. The administrative offices are in the new Gilmore Hall.

For old-timers, the passing of the original name, Hawaii Agricultural Experiment Station, brings sadness, but it is certain that, under whatever "banner," this institution will continue to carry on its excellent research work, started 81 years ago.