

Shields Library

University of California, Davis

The Oral History Center

THE STORY OF SEED CERTIFICATION IN CALIFORNIA

1937-1976

RECOLLECTIONS OF FRANK G. PARSONS

Introduction by Maurice L. Peterson

Interviews conducted by
Harriet R. Parsons, Burt Ray,
and Avrom I. Dickman



Frank G. Parsons
October 1973

All uses of this manuscript are covered by an agreement between the Regents of the University of California and Frank G. Parsons, dated March 1, 1979. The manuscript is thereby made available for research purposes. All literary rights in the manuscript, including the right to publish, are reserved to Frank G. Parsons during his lifetime. Quotations for publication require the permission of the University Librarian, Shields Library, University of California, Davis.

INTRODUCTION

FRANK GEORGE PARSONS was born on a farm near Benton City, Missouri, June 14, 1910, the eldest of the ten children of George Frederick Parsons and Hila Mary Finuf Parsons. At the age of six, his family moved to a diversified farm near Winfield, Kansas just above the Oklahoma border. He grew to manhood on that farm with his five brothers and four sisters. Many of his attitudes and personal characteristics were shaped during this period. They contributed much to his long and successful professional career.

The Parsons were a hard-working family, sharing difficult times including the dust bowl era of the 1930s and the nation's longest and most severe economic depression. Although Winfield, Kansas at that time had rather limited cultural and recreational opportunities, growing up in a family numbering an even dozen is never dull. They learned to be resourceful, the art of give and take, and that compromise was preferable for the common good in a large family. These lessons were useful to Frank in later years in his relations with many diversified special interest groups in California agriculture.

Frank learned early from his father to work and accept responsibilities, but it was his mother who encouraged him to get an education, even though the prospects for financial assistance were remote. Farming with horses provides countless hours to think and to dream. There also were pleasant and leisure times on this Kansas farm--times when Frank could lie in the grass watching fleecy white clouds float overhead in the deep blue sky. These were times for marvelous day dreams such as flying away to distant places never seen. These dreams became reality in later years when Frank learned to fly.

Frank attended a country school with nine grades and about thirty students. Many duties were required before and after school, especially for the eldest of ten children. There were pigs, sheep, and chickens to be fed, cows to be hand milked, and horses to be curried and harnessed in preparation for work in the field.

After finishing nine grades in the country school, Frank attended high school at Winfield, about five miles away. There he encountered the first of several people who had considerable influence over his life. The teaching of vocational agriculture in high school was a relatively new and important segment of education in rural communities at that time. Ira Plank was the vocational agriculture instructor, and it was from him that Frank discovered opportunities for careers in agriculture for college graduates. Naturally, Kansas State College at Manhattan was the place to pursue these studies.

Catastrophic events were taking shape as Frank was finishing high school in 1928. The great economic depression of the 1930s was beginning to break. It coincided with a series of drought years made even worse by the conversion of much of the western range country to wheat production during and just after World War I. With the drought came poor crops, and the economic depression brought low prices. Millions of acres of wheat land were abandoned, denuded of all vegetation. The Southwest became known as the dust bowl. These events were dramatic enough to convince any thinking young man of the need for trained agriculturalists, but the means to bring this about were difficult.

From 1928 to 1931 Frank assisted his father with the farming and time permitting worked at various jobs when they could be found to earn money to go to college. After three years, Frank had saved only about forty dollars, and fees for enrolling at Manhattan were seventy-five dollars. Determined by this time to enter college, he borrowed additional money to enroll at Kansas State College in the fall of 1931.

Frank's original idea for a college major was animal husbandry, an interest growing out of several years of 4-H club work. That specialization was not to be however, and for a practical reason. Remaining in college depended on employment. This was available in the Department of Agronomy. It took only two or three weeks to convince Frank that agronomy provided not only employment but an interesting field of study. At an hourly wage of twenty-five cents per hour, he was able to earn the twenty-five to thirty dollars per month to pay room rent and his one third share of the food which he and two friends prepared in their bachelor quarters. Frank's share of the food bill for one nine-month period was thirty-six dollars, but this was supplemented by potatoes, turnips, apples, and meat from the family farm.

At Manhattan, Frank came under the influence of two men who were further to shape his life. One was Dr. F. L. Duley, for whom Frank worked, and who later emerged as one of the nation's leading researchers on soil conservation methods. Dr. Duley pioneered methods of farming that left the trash on the surface to prevent soil and water erosion. Frank captured Dr. Duley's enthusiasm and feeling of urgency for his work. The other man who helped mold Frank's attitudes was R. I. Throckmorton, for many years the head of the Department of Agronomy at Kansas State College. Throckmorton was greatly respected and admired. He was decisive, yet open minded; authoritative yet friendly. At weekly staff meetings, usually held on Saturday mornings, Throckmorton presented items for discussion, listened to and encouraged open discussion, then summarized the various points of view, and made his decision. It was final. This same combination of fairness and toughness was exhibited by Frank in many meetings with seed growers and industry groups over the many years.

Another positive and enduring influence over Frank's life came

about in a casual way. At a 4-H Club dance near the beginning of his sophomore year, he met an attractive student named Harriet Reed. From that day forth, she was the sole object of his social life. That friendship blossomed into marriage on July 21, 1934. It has been a very happy and fulfilling marriage. Their three grown children, two sons and a daughter have been a great pleasure and satisfaction to them.

Frank and Harriet were married at the beginning of Frank's senior year in college. Harriet had graduated the previous June. Frank's part time job and Harriet's management of an apartment complex in exchange for a rent-free apartment of their own provided the means for two living almost as cheaply as one. After Frank's graduation, he was employed full time by Kansas State College at \$1,800 per year, dividing his time between management of the agronomy farm and working for the Kansas Crop Improvement Association.

In 1937 Frank was offered a position with the Department of Agronomy at the University of California, at Davis. For reasons he cannot fully explain, perhaps the spirit of adventure, Frank and Harriet decided to come west. Their belongings were loaded into a 1936 Ford sedan, and they arrived in Davis to start work on December 1, 1937.

The next thirty-nine years is the subject of Frank's oral history titled THE STORY OF SEED CERTIFICATION, 1937-1976. It is an interesting story of the people and events leading to the development of California as the nation's leading producer of certified seed. California pioneered new ideas in certification in tune with many changes that were occurring within the seed industry. There is much satisfaction from nearly forty years of leading a program which has brought national and international recognition. We, in the Department of Agronomy and the seed industry in California are proud and pleased that you have brought us so far, Frank. It makes the work much easier for those who follow.

M. L. Peterson
Professor of Agronomy
University of California, Davis
March 1, 1979

HISTORY OF THE INTERVIEW

Frank G. Parsons has been the full time manager and head of seed certification in California from 1937 until his retirement in 1976. Quite naturally his life story is closely tied to the project to which he has devoted so many years of his life.

When the idea of an oral history memoir was first proposed to Mr. Parsons, he expressed the opinion that perhaps he should write the history of seed certification instead. After several discussions with him and his collaborator-wife Harriet Parsons, it was clear that the history portion of seed certification based upon documents and records should be written with the personal human relations portion recalled using oral history techniques.

This work therefore combines oral history in which the spoken word is retained with an account written by Mr. Parsons of major aspects of the history of seed certification. It has the advantage, we believe, of projecting the personality of the main character, Frank Parsons, as conveyed by his verbal expression and recall, in addition to the greater detail of written history.

The oral history portion may be identified by the question and answer format, the written portion by the passages uninterrupted by questions.

The questions were asked by Harriet Parsons (HRP), Burt Ray (BR), and A. I. Dickman (AID), whose brief biographies follow. The manuscript was edited by Frank and Harriet Parsons and A. I. Dickman. The typing was done by Jane Gray; proof reading was done by Muriel Spaulding; and funding was provided by the California Crop Improvement Association.

This publication is another in the series on the subjects of agriculture and livestock produced by the Oral History Office, Shields Library, UC Davis. These titles are made available by purchase to academic libraries, friends and colleagues, and to the general public. The Shields Library collection of Oral History Office titles is a basic archival resource from which scholars may create a history of the agricultural industries of California.

A. I. Dickman
Head, Oral History Office

BIOGRAPHIES OF INTERVIEWERS

HARRIET REED PARSONS

Born in Holton, Kansas, daughter of a physician, she was graduated from Kansas State University in 1934. Married Frank Parsons July 21, 1934. She has three children, and in addition to her occupations of mother and home-maker, Mrs. Parsons has collaborated with her husband on many of his publications and projects.

BURT RAY

Born in Southern California, he grew up in the Sacramento area. He was graduated from UC Davis in 1950, and his first and only job has been in the California Seed Certification project. In 1976 Ray succeeded Frank Parsons as Director of Foundation Seed and Plant Materials Service and as Executive Secretary of the California Crop Improvement Association.

A. I. "DICK" DICKMAN

Born in Pennsylvania he was graduated from Penn State University in 1932. He became associated with the UC Davis Oral History Office in 1971 and was appointed Head in 1973. He has been involved in producing thirty titles of memoirs of persons and subjects involved in agriculture and livestock as well as of campus historical figures.

PREFACE

The title of this oral history is rather all-inclusive. The story told revolves continually around seed certification. It tells much about the seed industry in California and the United States. It deals at length with the International Crop Improvement Association (the name later changed to Association of Official Seed Certifying Agencies).

Plant breeders' rights and the evolution of the Plant Variety Protection Act are discussed. California Crop Improvement Association's support of research and its close cooperation with the University of California is brought out in the questions and answers. The foundation seed program and how it relates to seed certification is described. Statistics covering the growth of seed certification in California are included.

Tribute should be paid to all the individuals in California who have aided the cause for certified seed during the past forty years, or who have participated some way in the seed certification program. In addition to those in the University of California and the California Department of Food and Agriculture there are farmers, farm advisors, agricultural commissioners, vocational agriculture teachers, seed industry people and others. It is unfortunate that names of more participants can not be included, but they number in the thousands.

Frank G. Parsons

WHAT IS SEED CERTIFICATION

AID: Frank, in order to acquaint readers in a general way with what we are going to be talking about in this oral history, can you give a capsulized version of seed certification, a sort of what, why, and how explanation?

FGP: Seed certification is a system used with agricultural plants for keeping track of their genealogy and maintaining them in the pure state through succeeding generations. I think we understand the principles better when we consider animals. Most everyone, at least vaguely, knows that pure bred or "pedigreed" pets or livestock animals have breeding or mating limited and controlled in such a way as to keep the breed pure. If animal reproduction is thus controlled, pure bred Collie dogs, for example, are allowed to mate only with other pure bred Collies. A pure bred Hereford cow is bred only to a pure bred Hereford bull. In each case all of the distinctive breed characteristics are maintained generation after generation. With plants, though different in some respects, this type of control is involved in seed certification. Many agricultural plants propagate and reproduce by seeds. It is through seed certification we control the propagation and reproduction.

AID: Why is all this control necessary? What brought about the need for it?

FGP: Without it the people of the United States probably would not be able to feed themselves today. It is that important. We need to go back about a hundred years. Legislation was passed in this country establishing the U. S. Department of Agriculture and providing through federal funding for the land grant college system. Up to this time man's growing of food crops such as corn and wheat was uncomplicated. He planted wheat seeds to produce wheat. He planted corn seeds to produce corn. With the advent of a more scientific agriculture, however, there were botanists and others who believed that by selecting superior plants the yield of a crop could be increased and other performance improved.

FGP: As the mysteries of inheritance became known, all sorts of possibilities became apparent. To control fertilization of plants could be another way to improve performance. By 1900 there were plant scientists emerging in many states. New and improved varieties of farm crops were developed. A variety within the plant kingdom is a subdivision within a species, like a Collie dog and an Airdale dog. Both are dogs, but different "varieties" of dogs. Wheat is wheat, but one might be variety A and another variety B, greatly different from each other.

If farmers, and people who eat farm crop products, are going to benefit from the scientist's manipulation and improvement with plants, there has to be a means of maintaining the variety in a pure state. Therefore, we have seed certification, which is an organized type of control.

AID: You speak of manipulation. What are some examples?

FGP: We probably will be referring to this later from time to time, but incorporating disease or insect resistance into plants is a common type of plant breeding improvement. Perhaps you want an earlier, or a later, maturing variety. This is possible. Higher yield, of course, is always being sought after. Better bread making characteristics in wheat, a more desirable oil in safflower, a better fiber in cotton, these are examples. The much talked about square tomato, better adapted to machine harvest though not involved in certification, is the result of the plant breeder's efforts, his manipulation you might say.

AID: Frank, can you outline in a few words, the steps in certification?

FGP: I will try. The analogy with animal reproduction and genealogy is useful only up to a point. Seed certification is a means of maintaining the pedigree of plant varieties through a system of control by an agency created for this purpose. With plant varieties, where we want to maintain specific characteristics, we normally allow four generations of reproduction within the seed certification system. These are breeder seed which is the original seed of a new variety developed by the plant breeder. From it is grown the next generation called foundation seed. Foundation seed is planted to grow registered, which in turn is planted to grow certified. The four levels or generations of reproduction in certification are breeder, foundation, registered, and certified. These are the four classes of certified seed. In emergency situations certified seed may be grown from certified, but normally the limitation to four generations is considered necessary to safeguard the purity of a variety.

FGP: Breeder seed, obviously, is what the plant breeder has created, by whatever method he used. There may be only a few pounds of it. This breeder seed is turned over to someone else, usually a special agency engaged in this function, to plant for further increase. Let's suppose there are fifty pounds of breeder seed. It should not be difficult to achieve a hundred-fold increase by planting thin. Therefore, one year later we have 5,000 pounds of foundation seed. Now we are ready to turn it over to the farmer who will plant at a more normal rate. If we assume fifty-fold increase, we will have 250,000 pounds of seed which would be called registered. The farmer sells this registered seed to other farmers or to a seed company and when planted one more year gets us 12,500,000 pounds of certified seed.

This certified class of seed, fourth in the series of generations perpetuated, is now available in sufficient quantity for all farmers to be able to buy some. Normally the seed certification process ends with the certified class, more foundation seed being continually produced to keep the certified class replenished. We do not continue perpetuation of any one lot of seed indefinitely. The important thing to remember is that there are requirements to be met throughout this reproduction cycle. Care must be taken to keep out mixtures. Seed must be planted on clean soil. Inspections are made, both in the field and of the seed, to assure that impurities have not crept in. All of this is under the regulation and supervision of a seed certifying agency.

A simple definition of seed certification is that it is a system or program for maintaining and preserving, and making available to the public, seed that is pure for the variety it is supposed to be. These certification systems or programs use records, inspections, and supervision to accomplish the objective. The steps, in a few words, can be stated as follows:

1. Planting seed of one of the four classes, on clean land, isolated a certain distance if cross fertilization is involved.
2. Inspection of the growing crop (field inspection).
3. Inspection of the seed (seed inspection).
4. Harvesting and processing in a manner to avoid contamination.
5. Labeling with the official certification label.

AID: Who performs seed certification? It sounds as if it is something separate, or over and beyond just growing the crop.

FGP: It is. In the United States, beginning very early in the twentieth century in a few states, there were associations of growers formed to do this job. In more recent times these have evolved into crop improvement associations or certifying agencies of one kind or another, in some states and countries becoming strictly a government run program.

AID: Why couldn't the farmer take care of keeping track of the seed he produced without any outside regulation?

FGP: Theoretically he can, and in actual practice we have many seed producers, particularly seed companies that supply vegetable seeds, who do maintain varietal identity excellently. However, with farm crops, the seeds of which move in large volume, it is very impractical. One grower, one generation, might not be too difficult. However, farm seeds go from one party to another. Ownership is changed. In harvesting, handling, and processing there are many chances for mixing and loss of identity. That was the reason, and still is, why we need an independent system operated by specialists in seed multiplication.

The important thing to keep in mind about certifying agencies in the United States is that every one performs as an impartial entity, usually designated by law to certify seed. You can call it a public service, even though vested with certain regulatory powers.

A KANSAS BACKGROUND

AID: Okay. I think you have laid the groundwork for our story of seed certification in California. Why don't we begin by your telling something about your background. You came from Kansas, did you not?

FGP: Yes. I grew up on a farm there and had graduated in agronomy at Kansas State University two years before coming out here.

AID: It seems to me that what you did during those two years may be important to our California story. Would you tell us a little about that period of your life?

FGP: There isn't any question about its being significant in shaping my convictions as to what a good seed certification program should be. I was very fortunate to be employed by Kansas Crop Improvement Association. There I worked with a man, A. L. Clapp, who was on the agronomy department staff of Kansas State University and secretary-treasurer of the Association. He was in charge of seed certification for the state and in that capacity was known as one of the leaders in the nation. The principles of certification he believed in are just as sound today as they were then. I could not have had better training for the job I was going to take in California.

I was not employed just by Kansas Crop Improvement Association. Half my appointment was with the University as agronomy farm foreman. That was an interesting experience. It was customary to fill the job with a young fellow just out of school. I suppose it could be considered a sort of training position for a better job. It may seem odd to put a relatively inexperienced person into this post, but it worked out well--for two reasons. There was an older man, experienced in farming, who lived on the farm, and who was largely responsible for farming operations. Then the department chairman, R. I. Throckmorton, paid considerable attention to the whole operation. He was a man I admired very much and from whom I learned a great deal which has been valuable to me.

FGP: My position as foreman was to a considerable extent to represent "Throck," as he was called on the farm, to act as a liaison between the staff research people and the employees on the farm, and to see that everything was coordinated. It was a heady experience for a young fellow, because everyone knew I had the total support of this strong department chairman. I knew that Throck would back me all the way. It was just that I darned well better be right, or I would be grilled by him later.

Looking back, and thinking about that two years, I believe I must have been kept busy. Mr. Clapp was not only in charge of seed certification, he took care of what was called Cooperative Experiments. This was an activity which provided for test plots of various kinds scattered all over the state. I was involved with this too. We would haul planting equipment on a trailer out into the counties to put in these plots. Wheat, oats, corn, and sorghums were the main crops we tested. All this was done with the help of the county agricultural extension agent who usually took care of the harvesting.

Between seed certification and Cooperative Experiments, I would travel everywhere in Kansas at some time during the year. There is not a county in the state (there are 105 counties) that doesn't grow farm crops. Most of the counties are rectangular in shape, averaging twenty by thirty miles in size. I would spend the night in a hotel in the county seat, often finding accommodations a little primitive. The diversity in agriculture and terrain here in California as compared to that of Kansas has always fascinated me.

AID: What was your salary in Kansas?

FGP: \$150 a month, \$1,800 a year.

AID: What made you decide to move to Davis?

FGP: The reason that I came to Davis is still a little obscure in my mind except that I must have had a bit of adventure in my soul. Professor Ben Madson, who was then chairman of the Department of Agronomy, University of California at Davis, wrote to the department chairman, Mr. Throckmorton, chairman of agronomy at Kansas State University, asking if there might be someone who would be interested in a position in California with the Department of Agronomy to be in charge of the foundation seed project and seed certification. When approached with this proposition late in the summer of 1937, I was very hesitant about accepting something so far away from where I had grown up. Also, the pay didn't sound any better than what I was getting. I don't know

FGP: if California made a definite offer in the beginning, but it resolved shortly into their being able to offer a salary of \$1,900 a year. After a great deal of counseling with people like Throckmorton and Clapp with whom I had been working, and talking it over with my wife, Harriet, we decided to make the move. It offered possibilities for new surroundings, adventure, a new land, the exciting state of California--and more important, I would be in charge of a program all by myself, an opportunity which might not be offered there in Kansas.

The decision was made, and we packed our worldly possessions in a 1936 model Ford sedan and headed for California the latter part of November, 1937. I said we put all of our worldly possessions in the car. Actually, we made up a shipment of about 200 pounds which we sent by rail freight. We came the southern route and saw places like the Grand Canyon and other sights across Arizona and New Mexico where we had never been before. We came into southern California and spent one night in San Bernardino and were very impressed by palm trees, citrus, and flowers such as we had never seen. We visited in Los Angeles seeing some of Harriet's relatives and then came on north through Bakersfield. I remember stopping for gas in Bakersfield and talking with the fellow who filled the car about California weather, particularly that in the Bakersfield area. "Yes," he said. "It does get pretty hot, but you don't notice it much. It is a dry heat."--Whatever that meant.

AID: Didn't you wonder why California went so far out of the state to find someone to manage certification here?

FGP: I suppose I did, though it is customary for universities to shop around for considerable distances in getting science related personnel. It helps to avoid in-breeding. Then, too, the foundation seed and certification programs had been around a lot longer in the mid-west, thus accumulating a store of experience that would be useful in California. I think we progressed faster out here as a result of bringing in an outsider, not that I was the only individual who could have been hired and done the same job.

ARRIVAL IN DAVIS AND REPORTING FOR WORK

FGP: When we arrived in Davis the night of November 30, it was after dark. We came through the underpass on Richards Boulevard (the much discussed underpass today) and entered the city which at that time was under 2,000 in population. We saw this sign that said "Business District" which meant that we needed to turn right immediately after coming through the underpass. We drove north on G Street, which was the business district, and we still couldn't believe it. We turned around and came back through, finally deciding we hadn't found it and would look for it next morning. Then we found that it was the business district all right. We had been informed that Davis was a small town, but we were not prepared for it to be that small.

We did not have a place to stay, so we looked for a motel or hotel, and wound up out west of town at what was called the "Y," a name that will mean something to the old-timers. There was a motel of sorts there, and that is where we spent the night. It was rather a miserable room, not at all the type of room we had stayed in down in Southern California.

AID: How far west of town was the "Y"?

FGP: That is where Highway 113 intersects Russell Boulevard, so it is about two miles west of the campus. The thing that impressed us then and for all of that winter was the cold. It was the typical, wet, sort of foggy condition, and while the temperature was never below the '40s, it just cut through to the marrow of our bones. I think there is something about the California winters that affects people that way when they first come from the midwest and the east.

Anyhow, I reported for work . . .

AID: Excuse me, where did you eventually find a place to live?

FGP: We stayed in the old University Hotel on the corner of Second and B streets. It has been torn down, and that is where Sambo's

FGP: Restaurant is today. We were there for four days, during which time we learned that Mr. Quessenberry, for whom the Quessenberry Drug Store is named and which he actively operated at that time, had built three duplex units near the corner of First and B, on the west side of B. We rented one of these apartments and moved in, living there until the following spring when we moved over to C Street, between Second and Third, into a small house which had just been completed.

AID: Well, back to your showing up for the new job. That was December 1, 1937.

FGP: Yes. I reported for work at the agronomy department, which at that time was housed in an old wooden building where Everson Hall is located today. The agronomy building had earlier been used by the School of Veterinary Medicine. The part where I was to be officed had been used as an operating room and maybe a stable or two.

I met the members of the department. Then Ben Madson said, "I am going to turn you over to John Bransford. He knows the town; he knows the University, and he will spend a day or two showing you around. Then we will get you started on your job." So we were in the hands of John Bransford. Our friendship with him has continued until this day. He had an interesting career himself, becoming a dentist eventually, even though earlier trained in agronomy.

AID: What was the UCD campus like then?

FGP: It was mighty small. Under a thousand students--mostly men. There were agriculture, home economics, and veterinary science. A good share of the buildings were of wood-frame construction, all grouped near the quad. The quad, by the way, had been used for growing farm crops only three or four years before I arrived. The only masonry buildings I can recall being on campus in 1937 were Hickey Gymnasium, Animal Science, and Walker Hall.

WHAT I FOUND

AID: What did you find in Davis as to the position that you were to fill?

FGP: I was surprised to find a rather well developed pure seed program. It actually was a certification program, an excellent one, though they had not been using the word certified. They were using a coined word--"Calapproved." And when one spoke of Calapproved seed it was all the same as speaking of certified seed elsewhere in the United States. However, there had been a pure seed program, or seed certification scheme, prior to Cal-approved.

The first attempt at seed certification in California began in 1925. Members of the California Farm Bureau Federation felt a need for such a service; therefore, they created what was known as the Pure Seed Association. This organization led by T. A. Kilkenny, who was president for most of its existence, had as its goal the certification of grain seed. It was only moderately successful, and by 1929 was apparently running into difficulties in keeping the organization alive.

The Pure Seed Association, while operating independently of the University of California, saw the need for cooperating closely with it. J. Earl Coke, then extension agronomist with the University, became interested in the certification cause and recommended a new approach at a Farm Bureau meeting at Asilomar, November 10, 1930. He proposed a system of seed certification which is similar to that of today. It was based rather largely on the proposition that the work of the program could be carried on successfully at the county level with local county committees doing field inspection and, with the aid of the farm advisor, carrying out most of the functions of the program.

This new program was known as the Approved Seed Plan. The Field Crops Department of the Farm Bureau appointed a state committee which worked closely with the Agricultural Extension Service and the Department of Agronomy to guide the program. The first crop

FGP: produced under the Approved Seed Plan was grown in 1931. The Approved Seed Plan while operating unofficially that year was more or less officially adopted as a state program in January of 1932. The use of the word "certified" to describe the product appears not to have been used at any time following 1929 until after I arrived. The word Calapproved seems to have been used first in July 1932. The word was copyrighted by the California Farm Bureau Federation and continued to be used for a good many years.

The state committee guiding the Approved Seed Plan, which by 1936 had become known as the California Farm Bureau Approved Seed Plan, became more formally organized in 1936. Five districts were formed in the state, each of which elected a grower representative. In addition to this, there were appointed representatives from the Extension Service, Department of Agronomy, State Department of Agriculture, and the Farm Bureau, plus an agricultural commissioner. J. E. Coke remained the leader of the program through 1934. He worked closely with Fred N. Briggs who at that time was actively breeding wheat and barley and a man by the name of Gus Wiebe who was a USDA cereal breeder stationed at Davis. These three men were the principal figures in the seed program, at least at the state level. The main crops being grown for approval were wheat, barley, oats, beans, milo, sudangrass, and rice. There were a few others, but not of any important volume.

AID: These were all agronomic crops, no vegetable crops?

FGP: These are all agronomic crops. At that time, and even to this day, certification is not very important with vegetable crops.

AID: Now, why is that?

FGP: Well, this gets into a whole story by itself, but I'll answer it briefly. First, vegetable seed is a relatively small volume commodity. For many years vegetable seed companies have had active research programs of their own and have either been responsible for developing the new varieties, or have worked closely with those public institutions that have developed new vegetable varieties. The identity of vegetable seed is maintained much more easily than is possible with agronomic crops, because they are grown under contract usually. Therefore, seed certification is basically not nearly so necessary with vegetable seeds. Furthermore, the vegetable seed interests have traditionally been opposed to seed certification which represents a type of state or government control that the industry does not particularly desire.

AID: Who was in charge of the pure seed work when you arrived?

FGP: At the time that I arrived in Davis, the pure seed program, the Calapproved Seed Program as it was called, had been taken over by Burle J. Jones, who had succeeded Coke as extension agronomist. The reason for my being employed was that the seed program had expanded to the point where it was almost impossible for one man to handle it and also perform all the duties expected of an extension agronomist. Therefore, I came to relieve Burle Jones. One of the most pleasant years in my life was 1938, spending a great deal of time with him learning about the program, traveling up and down the state, inspecting fields, getting to know California seed producers, and otherwise becoming familiar with the program that I was to take over. As I became familiar with the work, I did relieve Burle of the job and by late 1938 and early 1939 was doing virtually all the work and management of the program by myself.

In addition to the certified, or Calapproved, seed program the department was producing foundation seed. I had to take that on too. The varieties that Briggs and others were developing had to be multiplied. You can't have a seed certifying program without a foundation seed program.

It was interesting that the seed program had developed to such an extent, and with so many similarities to other states--plus innovations in the California set-up which gave potential for a superior program. It struck me very soon that here was an opportunity for someone to build on what was already here and help to bring about an ideal system.

FOUNDATION SEED

AID: Maybe we ought to talk about foundation seed. You said that it was a class of seed grown by a special agency.

FGP: In California it was at that time strictly an agronomy department function. Remember that foundation seed is only the second step of increase in the certified process. So it is small in volume. There isn't yet enough to distribute widely to farmers. It was a mighty good thing that I knew farming because I was the farmer when it came to growing foundation seed. In those days, I think every variety certified was a public variety, that is developed and released by the state agricultural experiment station. Almost without exception in all states, the experiment station through its farm crops or agronomy department grew the foundation seed. Separate foundation seed organizations were to come later.

I remember planting grain with a six-foot grain drill pulled by two horses. The old Farm Division which did the farming for the departments of the college here in those days had horses. Fortunately, I knew all about driving horses. We would leave a one-foot strip between the six-foot drill widths for easy walking when the field was rogued later.

AID: What do you mean by rogue?

FGP: That is a term for removing anything that doesn't belong. You remove the rogues which might be a foreign plant of any sort, a weed, or another crop, varietal off-type, etc.

AID: Was the harvester horse-drawn too?

FGP: No. We did not have a combine harvester such as is used today. We used a stationary machine with wheat, barley, and oats. It was called a grain separator and was powered through a belt driven by a tractor. We would cut the grain with a grain binder which tied it in sheaves. After drying, the sheaves would be hauled in and threshed with this grain separator. With beans

FGP: things were even more primitive. After cutting and drying, the plants would be placed on a large canvas and the seeds threshed out by driving a two-horse team pulling a ring roller piece of equipment around and around over the plants. After the beans were shelled out, we had to winnow them out of the straw and chaff. That is just about like in biblical times. Anyhow, I produced foundation seed, and it kept me busy, along with my responsibility for certification.

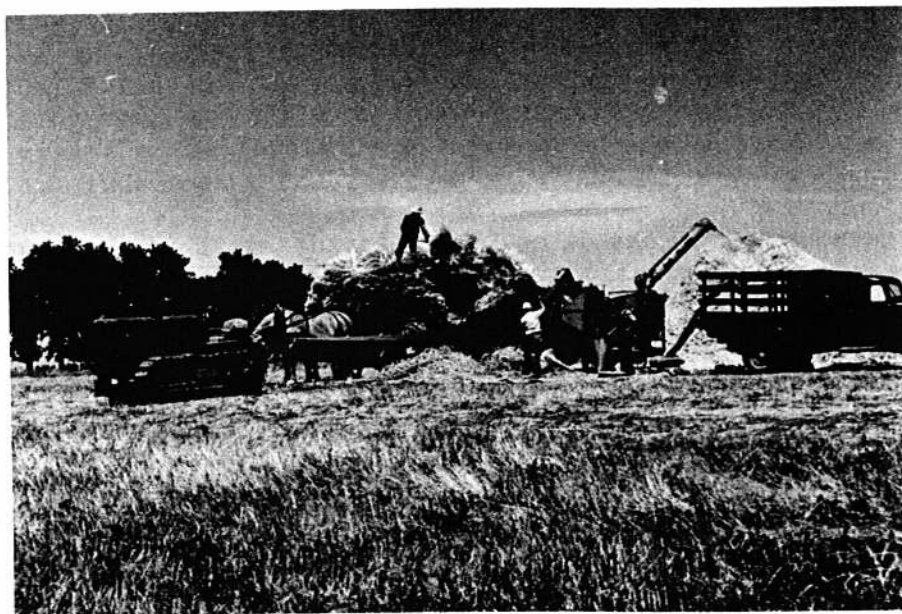
AID: Was your pay from two sources?

FGP: My pay was entirely from the University. The University funded my salary, this \$1,900 I was being paid. You might wonder why the transfer of directing the program from the Agricultural Extension Service to the agronomy department. As I understand it, agronomy was able to dig up the funds to employ me, and the Extension Service could not. I might just as easily have wound up in Extension, but as it worked out I was employed by the Department of Agronomy and have been a member of it until retirement. There was a name change during that period. It is now the Department of Agronomy and Range Science.

I think it is of great significance that foundation seed is still a University activity today, here in California. Many states have gone the route of separating it off into an independent agency, which to my way of thinking is not always best.



Harvesting foundation seed in the late 1930s, with grain binder.



Threshing foundation seed with stationary grain separator in the late 1930s.

OBJECTIVES

AID: What were your objectives when you took this job?

FGP: It took me a while to get my feet on the ground, but basically, I had very few objectives. I wanted to take what we had and improve on it. Most important, it seemed to me, was for California to have a program which fitted with that of other certifying agencies. Most of the other states had crop improvement associations, or organizations of that nature, which were doing the certifying of seed. California had a good program. Nevertheless, we were using this word, Calapproved, which didn't mean anything elsewhere. It was a unique term and perhaps desirable to use, but California was not using the word certified to describe its product which was similar to what was being carried on in certification programs elsewhere in the country. So my main objective was to get California caught up with the rest of the world, not only in terminology but in procedures. It seemed to me that if we could retain all the good features of the California system, and add the better parts of other state programs, we could be the best in the nation. I wanted to create a California Crop Improvement Association. As it turned out that took a few years.

One of the first things I did was to encourage membership in the International Crop Improvement Association. This was a North American organization of certifying agencies in Canada and the United States. There were perhaps thirty agencies affiliated with the ICIA, and I thought it imperative that California join. In 1940 we did join, and I attended my first meeting which was held in Chicago and found that all of my beliefs were confirmed. If California was going to carry on a certification program in the United States, we should not only belong to the International Crop Improvement Association, but begin to adapt our organization, reorganize, and otherwise develop a program that other states would recognize and would know what we were talking about when we discussed it.

AID: When this took place, were your California colleagues aware of

AID: the fact that joining the International Crop Improvement Association automatically meant that they would no longer use the word Calapproved?

FGP: I am sure that they recognized that if we continued to use the word Calapproved at least we should also adopt the additional term "California Certified." I worked toward this end, but it wasn't until 1944 that this came about.

AID: That was four years after joining the International. Why so long?

FGP: Don't forget that World War II came along about then, and that slowed everything down. It affected seed certification--it affected everything. It affected the University drastically, and such things as whether we said California Certified instead of Calapproved didn't seem nearly so important. We had been working on it, however, and plans had been going ahead to incorporate the California Approved Seed Plan into a crop improvement association, and this did come about in 1944 when, at the annual meeting, the state committee formally approved by-laws and incorporation papers. The name of the organization was California Crop Improvement Association. We did begin to use the words California Certified, even though in our standards, in our regulations, and on our tags we continued to use the word Calapproved. However, the directors of Crop Improvement Association voted on May 16, 1946, to drop the term Calapproved unless exclusive right to it could be obtained from the Farm Bureau. Farm Bureau did not wish to part with the ownership and copy-right so we discontinued its use with the certified program. Later there was an organization, a cooperative, formed (a marketing association) known as Calapproved Seed Growers Association. They used the copyright Calapproved, but as a brand designation. For many years, however, there occasionally would crop up a little confusion as to whether Calapproved seed is synonymous with certified or not.

AID: You have indicated that some of what you found here in California was unique and that you wanted to retain those features. What were they?

FGP: I'll undoubtedly be talking about this later, but the most important was the county agricultural commissioner system. One of the greatest problems in seed certification programs in other states is the lack of on-the-spot control. Much as we stress the responsibility and integrity of the individual grower and seed handler, it is very helpful to have local or county representatives to assist in supervision, inspection and sampling. I could see that by working closely with the agricultural

FGP: commissioners we could solve these problems. The other feature of the California program that I liked was the involvement of county committees.

AID: Now, during the committee meetings, prior to that meeting which formally approved joining the International Crop Improvement Association, was there opposition to joining that was apparent to you?

FGP: No, actually there was no opposition. I think it just took a while to really appreciate the value of going along with the rest of the country. We weren't exporting much certified seed, although we were getting into that pretty fast. I am thinking particularly of certified red kidney beans. We were beginning to ship seed out of California, and I am sure that everybody

FGP: could see that this business might continue to grow--making it even more important for us to adopt a program which would be recognizable in other states.

AID: Let's talk about the International Crop Improvement Association. I think it will help lay the groundwork for the rest of your story. Harriet, you might take up the interviewing here.

INTERNATIONAL CROP IMPROVEMENT ASSOCIATION

FGP: In telling about the International Crop Improvement Association one should consider some of its early history. Records show that representatives from various states and two or three provinces in Canada got together in 1918 or 1919 to talk about pure seed programs, the need to perpetuate varieties in some sort of orderly manner, to make plans for conducting seed shows which was a popular thing in those days. Officially, the International Crop Improvement Association was created in 1919 and continued to meet annually with representatives from perhaps ten or a dozen states and two Canadian provinces engaging in the discussions. As time went on more states became members of this organization. However, what I want to talk about is largely going to begin about 1940 when California became a member of the International Crop Improvement Association.

HRP: Was one of the reasons they got together because the land-grant colleges were putting out many more varieties of seeds, better adapted, and so on?

FGP: Certainly this was a factor. The land-grant colleges began to turn out improved varieties early in this century, but the tempo continued to step up, and it was over a period of quite a number of years that realization gradually took place that such varieties soon lost their identity and that some scheme was necessary to maintain the original purity.

HRP: Were the farmers slow to accept the new varieties, and was that the reason for the seed shows?

FGP: I think that was true. The leaders in agriculture from the Agricultural Extension Service and the experiment stations were continually frustrated at the slowness with which good seed was accepted, so there were all sorts of efforts to devise programs which might expand the use of better seed.

HRP: Were the certification people a part of the universities?

FGP: Well, the certified seed programs began to develop as early as 1905 and 1906, but hardly in the form that they exist today--though they were close to the agricultural colleges. The idea of maintaining pedigrees of crop plants developed over a long period of time, and apparently there was not much uniformity of thinking. Just when the word "certified" developed, I am not sure. There was what you could consider a pedigree maintenance program of sorts existing very early in this century and, it was gradually becoming more refined.

Each state and province in Canada was carrying on its own approach to seed certification, and yet in all of these discussions, as near as I can find out, there was not much worry about becoming uniform or organized on a national or international basis. There had been the formation of various agencies that later were to become official certifying agencies, and generally the leadership in such organizations originated with the land-grant colleges. The Extension Service, the agronomy departments, and plant breeders in the agronomy departments were very active in encouraging and helping to develop the early seed certifying agencies.

It was not until the late 1930s, really, that the workers in seed certification began to thoroughly understand the need for a uniform approach to the problem. One thing that was becoming apparent was that it took a well organized routine, step-by-step program in the certification of seed. I am referring to the need for more than one class of certified seed and even though the words "foundation" and "registered" had been used prior to this, it was not until the late 1930s that there was any organized use of the terms registered and foundation, in addition to the word certified. The foundation seed produced by the agricultural experiment stations was planted by farmers who had received this foundation seed, and often they grew it year after year, being certified every year as long as it met the standards.

HRP: Where did the foundation seed come from? What was its background?

FGP: The foundation seed was what emerged out of the plant breeder's program. Sometimes it was a case of purifying existing old-time varieties and providing a source of pure seed which was labeled foundation, and sometimes it was the initial seed stock of a brand new variety. Really the term breeder seed had not been thought of at the time and did not come onto the scene until much later. The need for a class between foundation and certified became apparent along about 1940, and when I first became acquainted with the International Crop Improvement Association

FGP: the people involved were beginning to use the three designations, foundation, registered, and certified, each being a class of certified seed. It was not until the 1940s that much thought was given to creating a set of standards that would be a guide for any state wanting to certify seed. Up to this point each agency had been more or less going its own way, and even though they were comparing notes with their fellow workers once a year there was apparently not too much concern over being uniform.

I like to think that I came onto the scene at a very opportune time as far as the International Crop Improvement Association was concerned. It seemed to me, from the time I first got acquainted with seed certification, that the International Crop Improvement Association provided an operational background for anyone involved with seed certification, even though meetings were usually held only once a year. By attending those meetings there was an opportunity for people with similar interests to talk about mutual problems, to clear up their thinking, and to go home with a much more objective approach to one's own program. I know that was true in my case.

It was my goal, from the time California first became affiliated with the International Crop Improvement Association in 1939, to become a leader in the organization and to attempt to get out of it everything possible that would be useful in operating the program in California. Since the big thing being discussed, at the time California became a member, was the creation of uniform standards, and since I felt that it was imperative that states be more or less uniform, this gave me an opportunity to be rather active in the International Crop Improvement Association.

HRP: You were president of the organization at one time, were you not?

FGP: I was president in 1948 and 1949 and, hopefully, did make a fair contribution then. It seems to me my greatest contribution to any national approach to seed certification or consideration of problems has been a continuing one over a long number of years where I have generally held out for rather simple objectives. Foremost of these is cooperation of all parties concerned and the need to recognize at all times the problems the seed trade has in handling certified seed and, of course, to maintain the integrity of certification, without which you don't have anything in the first place.

HRP: I remember you used to come home from ICIA meetings and talk for hours about the discussions, some of them heated, that took place.

FGP: There was a great struggle to reach agreement on such things as standards. For example, a weed that was a problem in one state would not be a problem in another. It was very difficult to realize that there had to be a great deal of compromise and understanding of each other's problems to reach agreement on anything like uniform standards. Nevertheless, these efforts persisted, and in spite of World War II which had been going on, the first standards were published in 1946. These were labeled "Minimum Seed Certifications Standards," although there was nothing to prevent an agency from going above them if it wished.

HRP: Would an agency demand certain requirements for use in its own state which would prevent seed coming in from another state? For instance, your comment on weeds in one state not being a problem in another.

FGP: Well, there were problems. Of course, as long as seed produced in a state remained in that state, it didn't much matter. But one has to consider that in parts of the United States, for example the corn belt, all that may separate one farmer from another is a state line and that sales of seed may take place across state lines. It is obvious that there had to be some uniformity or all sorts of chaos would result. So even though it wasn't terribly important that California observe the same standards, as say Iowa, nevertheless if uniform standards between states were desirable, it had to be desirable whether the states were contiguous or distant from one another. As we now know, California was going to be much more involved than one might have dreamed at that time. With the development of alfalfa and clover varieties, the seed of which was to be produced in California and sold back east, certainly it was imperative that all states involved be interested in a uniform approach to seed certification.

In addition to the need for more uniformity, it became apparent that there were other problems when certified seed went from one state to another. The International Crop Improvement Association was instrumental in getting state members to agree on a system of recognizing certified seed from other states for purposes of what was called interagency, or interstate, certification. This is important because in many cases seed from one state entering another needed to be recleaned; sometimes it was blended with other seed of the same variety; in some cases it was thought desirable to get other certification tags on it, and it became obvious that a method of accommodating these problems was necessary. So, what was called an interstate certification program was developed. In 1949, the Board of Directors of California Crop Improvement Association agreed upon, or approved in principal, the concept of interstate certi-

- FGP: fication as recommended by the International Crop Improvement Association. This meant, using alfalfa seed as an example, it was possible under interstate certification to ship it from California to anywhere in the United States and still have it reprocessed without losing its identity for certification.
- HRP: You spoke of difficulty in reaching agreement on standards and other matters. Have members of ICIA ever reached complete agreement on anything? It seems to me you are still talking about arguments similar to those of many years ago.
- FGP: I could chuckle and say you are right. However, we are arguing about new things, too. The important thing is that we agreed a long time ago that there had to be such things as uniform standards and that members ought to abide by them. We established many basic concepts that stuck. Arguments since have been over detail, like whether the amount of varietal mixture should be half of one percent or only a fourth of a percent. Isolation distances often are argued over, in view of new research--or maybe the arguing is because there is a new crop of people involved with certification, and who have different ideas.

PLANT BREEDING

AID: Let's talk about plant breeding that was in progress when you arrived. What were some of the developments that affected certification?

FGP: There were a number of interesting developments late in the 1930s and early in the 1940s. I think the one of greatest significance in California was the release of rust resistant wheats. Dr. Fred N. Briggs, who followed what was at that time a somewhat revolutionary method of plant breeding known as the back-cross method, had produced wheat varieties which were resistant to stem rust, a disease that is sometimes disastrous.

AID: Why was his method of back-crossing revolutionary?

FGP: To describe it as simply as possible, he believed in taking existing varieties which were doing well in California, and incorporating into them disease resistance of one sort or another. This he did very successfully both with stem rust resistance of wheat and resistance to a disease called bunt.

The usual approach to plant breeding, at least at that time, was to make many crosses, explore a lot of different varieties, and try to find something new and better that might replace the old variety.

Briggs' theory was to take the good varieties that we already had, with characteristics which were valuable to California, and improve them. For example, no cereal variety was of use in California if it shattered badly. With our dry, hot summers many of the ordinary type varieties would shatter. The seeds would fall out before harvest. Over a period of many years we had acquired varieties that resisted this shattering, with other desirable traits that were useful in this environment. Briggs figured that by taking a variety which had good resistance to whatever it was he wanted, he could cross this into a desirable variety that we already had, then back-cross, meaning that he would continue to cross onto the desirable parent, year after

FGP: year, maybe a dozen generations. He would eventually come up with a new variety which had all the desirable characteristics of the existing one, plus the added characteristic of resistance to the disease.

His first releases were late in the '30s. There were two important ones out of Baart and White Federation wheats. He didn't believe in new names for them. He thought why not use the names they already had. So what was done was to name them Baart 38 and White Federation 38, taking the year that he made his first release. Then it took us a couple of years to build up a supply of foundation seed. It was in 1940 actually that we produced our first commercial crop of certified seed of those two varieties. It was rather coincidental, and fortunate in a way, that we had a bad stem rust infestation that year--so these varieties were certainly tested in the field. Farmers could see and compare the resistant types alongside the older varieties bearing the same name but without the number 38 meaning resistance. On the one hand they could see a one hundred percent crop while the nonresistant, older type might almost be a complete failure.

AID: Just to pursue this back-cross one minute longer, suppose that that were the situation today facing a wheat breeder, how would he solve the problem under today's conditions?

FGP: The situation is a good deal different today, and yet, it isn't different. We know that a new disease, or new strain of an existing disease could strike us most anytime. The plant breeder of today has a lot more germ plasm on which to draw, and he probably could put things together a bit faster than was possible in the early '40s. However, breeders, I think, would be more inclined to use the back-crossing method today than they were at the time Briggs first introduced it. Fortunately, most wheat varieties, and for that matter a high percentage of all of our agronomic crops, have fair resistance to most everything that is apt to occur. Now what we are afraid of is the development of a race of one of these diseases which suddenly could overcome the resistance in a variety. Therefore, the plant breeder continues searching for germ plasm and varieties from which new resistance may be used if needed.

AID: What do you mean when you use the term germ plasm?

FGP: This is the resource material with which a plant breeder works, which doesn't tell you much either. The word is used rather loosely to mean the hundreds and thousands of plants, or seeds of plants, that a plant breeder often has available to draw on for use in cross-breeding or other breeding techniques. Ideally, I suppose a breeder would like to have at his disposal a

FGP: plant or a seed of every different variety and strain in the world of the crop he is breeding. Somewhere, in such an enormous collection, it might be that any conceivable characteristic could be found. Screening for, or finding what one wants, is frequently a problem. Anyhow, the word germ plasm, as I like to see it, means the reservoir of stuff with which a plant breeder works--much of it of little value by itself but possibly very useful if incorporated with something else.

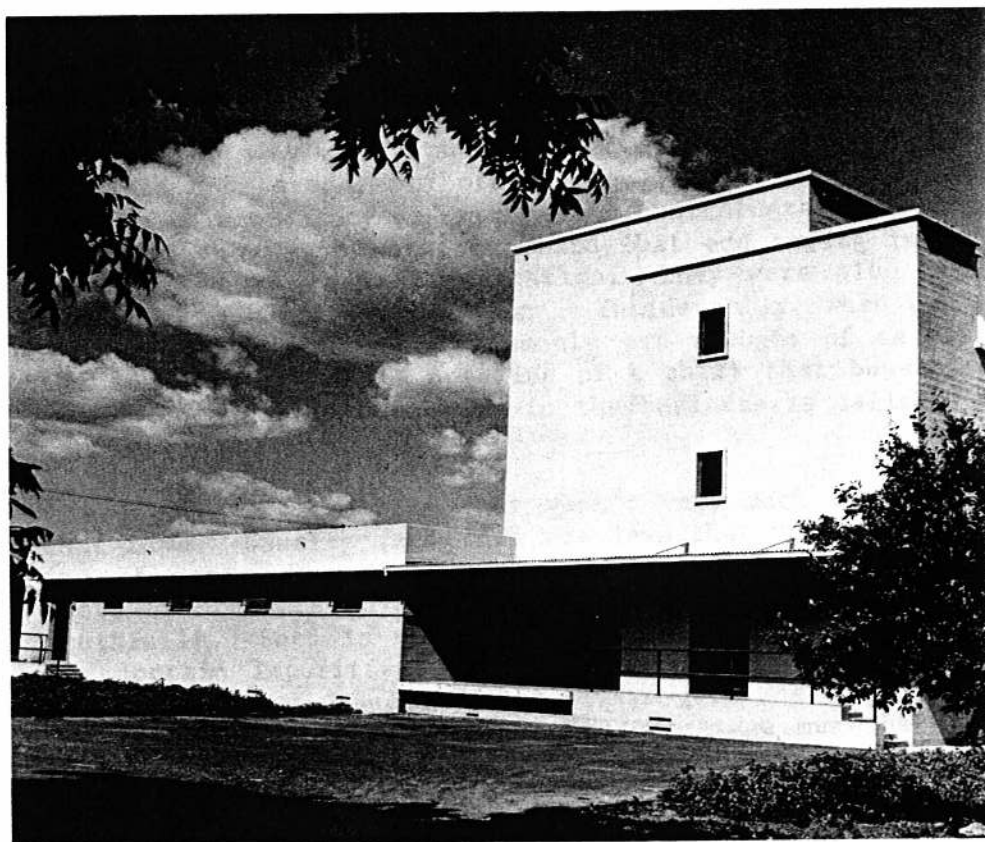
I am reminded that we almost lost the first multiplication of Baart 38 and White Federation 38 wheats in a fire that destroyed the agronomy seed warehouse. This was in 1938. The warehouse burned to the ground, but we were able to get in and salvage enough viable seed of each variety so as to make new plantings. There wasn't as much foundation seed as there would have been otherwise, but we still had enough to make a fair sized release in the fall of 1939.

This fire convinced everyone that we were terribly vulnerable, having a wood warehouse and a wood frame office building. If we were to lose all of a plant breeders material it would take years to recover. Some industry friends made a gift of money to the University, following the seed warehouse fire, with which Dr. Briggs purchased a large steel fire-proof safe. This was used to store the more valuable seeds, the germ plasm I speak about. It was not long before a new concrete seed warehouse with seed cleaning plant was built. This building was to serve us for many years. It sat just east of where Bainer Hall is located. Architecturally, in my opinion, it would have fitted into the campus beautifully. However, it was deemed otherwise, for one reason or another, and was demolished about 1970. The present seed house is on the agronomy farm a mile or so west of the campus.

I have said it in one way or another, and will be saying it again, but seed certification's life blood is from plant breeding. New varieties, and maintaining the old ones coming out of plant breeding research, is what it's all about.



California Seed Council, meeting on Agronomy Farm, Davis, Sept. 1942. Left to right: (?), (?), William Hay, Ben Madson, Leatha Bunting, Walter Ball, Ann Pearson, Ray Hanley, Fred Briggs.



Agronomy Seed House, 1941, across street from where Bainer Hall now stands.

CALIFORNIA SEED COUNCIL

AID: Frank, what were your colleagues like when you got into California seed approval? I don't know if I am phrasing the question right. When you met your California seed colleagues--who were they; what kind of an association did they have with the University, etc.?

FGP: Maybe a better term would be constituency. My colleagues here at Davis I have talked about a little already. There were people like Ben Madson, Fred Briggs, and others in the University. However, I soon came to know a large number of people outside the University with whom I became very familiar and began to work with closely. I guess you could say they became colleagues. I am thinking of the seed industry which at that time was relatively unorganized. There were prominent seed companies in California that handled either vegetable crop seeds or field crop seeds, or both. I recall that they were attempting two things. They did not have a central statewide organization and they were working toward that end trying to agree on some sort of a trade organization. They were also trying to agree on a California seed law. Incidentally, when one speaks of seed companies, which commonly are thought of as making up the seed trade, one is speaking of a party that buys and sells seed. An individual engaged in the business is called a seedsmen.

A seed law is something that wasn't very much in existence at that time. Usually seed laws are laws that regulate the labeling of seed. They do not guarantee quality or anything like that, but require anyone selling seed to label it accurately and truthfully. Seed is not necessarily pure seed. A bag of seeds may contain impurities, such as weed seeds, other crop seeds, and inert matter. Seeds do not always grow one hundred percent. The "grow-ability" or germination percentage must be stated on the label as well as percentage of any impurity.

There had been passed in 1939 a Federal Seed Act which regulated nationwide the labeling of seed and this gave a lot of impetus

FGP: to the creation of such a law for California. The seed industry was working diligently to develop both a seed law and a state-wide seed trade association.

It was through the California Seed Council that industry pursued the creation of a seed law. To describe the Council briefly, it was made up of representation from the University (vegetable crops and agronomy departments, plus the Agricultural Extension Service), the State Department of Agriculture, California Polytechnic University, the agricultural commissioners, California Association of Nurserymen, the seed analysts (both official and commercial), and the California Farm Bureau Federation plus, of course, representatives from the seed industry. This body, the California Seed Council, with a few additional representatives, exists today as a very active, yet informal, type of organization. However, in those early days, the early '40s of which I am speaking, the Council was more active than it has ever been since, in reconciling the problems associated with creating a seed law. I attended many meetings of the Council during the first years I was here, and the only topic which was of tremendous importance to the seed industry was the creation of this seed law. A proposed law was finally agreed upon, and the Council decided that it could be submitted to the legislature. It was passed, I believe, sometime in 1940. It is still one of the better laws, I think, governing seed anywhere in the country.

AID: It was copied after the Federal Law of 1939?

FGP: To a considerable extent it was copied after the Federal Seed Act.

AID: First, will you tell me when the California Seed Council was first organized?

FGP: The constitution and by-laws in use today state that the first constitution and by-laws were adopted December 20, 1928.

AID: Who was responsible for its organization?

FPG: A bit of history connected with this might be of interest. There was an effort elsewhere in the United States to create a Seed Council movement. A man in Montana thought up the idea and got one started in that state, but it didn't last very long. A few other states tried to create a Council, including California. However, California was the only state which organized one that was successful and still exists today.

AID: But, I suppose, with definitely changed powers, than it was originally?

FGP: No. Its powers are still the same--those of moral persuasion I guess you would say, because the Council has no formal structure; it is not incorporated or anything like that.

AID: It is not an enforcement agency?

FGP: It is not an enforcement agency. It is a forum, I guess you could say. People interested primarily in seeds can get together and be influential enough so that once they agree on something it can be accepted most everywhere as expressing the desires of the industry. A great deal of the Council's effort has been, then and now, directed toward legislation. Since the early creation of the California Seed Law the big thing that the Council has done from time to time is to recommend amendments in the seed law. The state legislature has such respect for the Council that it never considers legislation which has not first been agreed to by the Council. I think this is highly significant and speaks well of the Council.

AID: How often does the Council meet?

FGP: It used to meet pretty much as needed. Then it began to have three meetings a year and in recent times two meetings a year.

AID: Since not every state has a Seed Council, was this one of the reasons that the University was so close to the industry here in California?

FGP: I don't know if this had anything to do with it or not. The state of California just was, and is, a bit different with regard to things of this nature. The seed industry in the State of California has always been fairly close to the University and has had a great deal of interest in the University research. We in the University have worked with industry advisory committees. We have had joint industry/University seed conferences, and there has been a very healthy relationship for many, many years.

CALIFORNIA SEED ASSOCIATION

AID: What about the seed trade organization you mentioned? Was one formed?

FGP: Yes. The California Seed Association was created and got underway in the year 1940. A man by the name of William B. Early was its first president, from 1940 to 1942. I mention his name because in reading the minutes of Approved Seed Plan Committee meetings, I find that W. B. Early was a representative from the seed trade on the certification board, or what later became the certification board. My association with the California Seed Association has been very close, and it is through this organization that most of us here at the University work when we are cooperating with the seed trade. Many of us here attend their annual conventions and other meetings, and some of us serve on committees for the organization. The California Seed Association has been very friendly with the University.

AID: And this has been a traditional closeness. Was it due to the influence of people like Madson, Briggs, those kinds of people?

FGP: Oh, I think without question. I recall vividly that Ben Madson and Fred Briggs were most cordial to people in the seed trade, knew them well, and spoke highly of them, and at the same time could sit down and argue with them, debate points affecting seeds or seed law, or anything of that sort, and it was this mutual respect for one another that I immediately felt on the part of people like Briggs and Madson.

Over the years since the California Seed Association was created, its relationship with California Crop Improvement Association has been not only harmonious but very valuable. I have always felt that certified seed should move in regular seed trade channels, and thus a certifying agency needs to work closely with industry.

WORLD WAR II

AID: To digress, World War II was going on. This must have had an impact on your job.

FGP: We might talk about the effect the war years had on certification. We have been telling about what things were like in the early '40s, but we haven't said anything about the war. Some of the organization, or reorganization, and other plans I had were slowed down with the entry of the U. S. into World War II. Our staff here at the University was stripped to the bone. Of course, agronomy, where I was, was a pretty small staff anyhow, but three or four individuals were taken into the service. I was not. I was classified in whatever classification that exempted one from military service, because I was engaged in an agricultural pursuit important to war effort.

I remember one year, early in the war, there was recognition of the value of certified seed in the form of different pricing authorized by what was called the Office of Price Administration. It was proposed that certified seed be regulated at a higher price than other seeds. This did not go into effect finally because the percentage of certified seed available across the nation was so small that any attempt to single it out and make a different price structure for it would be very disruptive, or so it was considered. The proposal of a higher price was important though because it did point out that certified seed might be pretty valuable. And then in connection with Lend-Lease purchases of seed for other countries, the government tried to contract for one million pounds each of certified blackeye peas and one million pounds of certified red kidney beans. Since California produced a high percentage of the certified seed of both these crops, it was natural that seedsmen came to California to attempt to fill that need for government contracts. I remember working one summer for a time with seedsmen to go around and try to get acreage lined up for the production of certified seed of these varieties. We were only partially successful, and as it turned out the people involved were not able to make complete delivery on their contracts. However,

FGP: we put in a great deal of effort to try to accomplish this.

AID: Was this quite a coup, quite a triumph for the California certified seed industry that the government specified that it wanted certified seed to fill this order?

FGP: I don't know whether you would call it that. It represented some sort of an achievement for certification to have this much recognition. It indicated the government's interest and acknowledgement that there was something better than just ordinary seed, and one way to get it was to specify certified. It certainly focused some of the attention of seedsmen on certified seed. Nationwide, the seed industry had not paid that much attention to certified seed.

There were other things during the war that were of interest. If you traveled at night along the coast you encountered the blackouts with the cities not having much light showing, the barrage balloons over Vallejo, and things like that. If you can believe it, the city of Santa Barbara was virtually a ghost town for a while because of the scare of Japanese submarines that might land. (As a matter of fact, one did land at Goleta, which is near Santa Barbara.) Everywhere up and down the coast, if one traveled as I did in connection with certification, we were constantly aware of the vast numbers of troops on the road and the encampments that were strewn up and down the coast. I think that California was as war conscious or more so than any state, because after all we are on the west coast, and once the U. S. got into the war with Japan, we were most acutely aware of it. It had its affect on such things as rationing of gasoline and rationing of tires. I drove a University car then, and it made things a little scary at times not knowing whether you would be able to get gas enough to get home or whether your tires would hold out or not.

AID: Were there many people of Japanese origin involved in the seed industry?

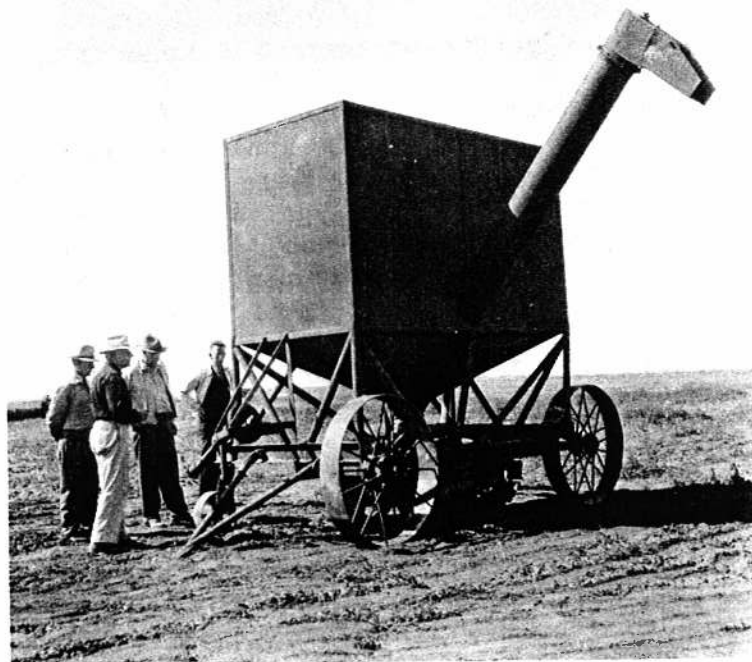
FGP: We had large numbers of Japanese farmers who grew crops of all kinds, and some of them grew certified seed.

AID: What was the effect of their incarceration during the war?

FGP: Well, of course, this was a loss to agriculture. Personally, I think that some of our better farmers were immobilized at a time when we needed them the most.



Cultivating "Victory Garden" during World War II, 1943. Left to right: Coit Suneson, Merton Love, Fred Briggs.



Portable bulk tank built by George Smith, Kings County, in the early days of handling California grain in bulk, 1942.

CROPS GROWN FOR CERTIFICATION IN THE 1940S

BR: Was the acreage of certified grain concentrated in certain parts of California, or where was most of it grown?

FGP: Certified grain acreage was concentrated to some extent but was scattered through the state as well. There was an active program along the coast, primarily in the county of San Luis Obispo. Then there was a concentration in the San Joaquin Valley, particularly in Kings County which had the most active program, but there were also certified seed growers and certified grain grown in counties such as Kern, Merced, Fresno, and Madera. There was a fair amount of interest in certified grain seed production in the Imperial Valley and Riverside County. So you can say that there were three centers of interest in certified grain, the coast, central valley, and the Imperial Valley.

BR: You didn't mention Sacramento Valley or Northern California.

FGP: Sacramento Valley was not very prominent in the production of certified grain in those days. You could always find a field or two, but when you speak of centers of interest, there wasn't very much grain being certified in the Sacramento Valley. Certified red kidney beans, however, were grown almost exclusively then in the counties of Yuba and Sutter which are in the Sacramento Valley.

When I think of red kidney beans I must tell a bit about our growing certified seed for the state of New York. Plant pathologists there and elsewhere had learned that bean seed grown in the dry summer climate of California did not carry the organisms for bacterial blights and anthracnose, diseases that were disastrous some years in New York if farmers there planted back their own seed. Through efforts of people like Merle Collins, farm advisor of Yuba County, growers out here began in the early thirties to produce red kidney bean seed and ship it east. It was obvious that this was the solution to the disease problem. Unfortunately, with the demand that developed for California grown seed, there was the temptation for handlers along the line

FGP: to substitute lower priced eastern grown seed and put "California Grown" labels on it. Here was a case where certification was the answer. Farm Advisor Collins, working with a few reputable handlers in New York, did a great deal to educate the farmers there toward asking for seed with the California certified tag on it.

One would think the plant breeders could find resistance to these bean diseases, but it has not been that easy. We still sell certified red kidney beans, both light red and dark red plus a few white kidneys, in New York. On and off Michigan dealers buy California certified beans of certain varieties, but this has not been as consistent a market as the one of New York.

BR: You said that rice was also grown in those days. Was it concentrated in the valley?

FGP: Certified rice seed production was concentrated almost totally in the Sacramento Valley, and only a few counties like Glenn, Colusa, and Butte were involved. I mentioned grain sorghums. These were rather small acreages, and the variety Double Dwarf milo was the principal one. Sudangrass began to come into the picture about the mid '30s, and the first improved variety of Sudangrass that came, the University was instrumental in developing. Sudan 23 began to be certified.

AID: Were the same factors such as climate, market, soil that are responsible for what crops you grow, were those same factors responsible for how much seed was certified from those crops?

FGP: There wasn't very much relationship. The production of certified seed, while it did follow somewhat the same areas that produced the commercial crop, this wasn't necessarily true. The places where certified seed was produced tended to be more where growers were interested in seed production. I don't know that you could say that there was a direct correlation between the volume of the commercial crop produced and the certified seed produced.

AID: I am curious then, with the University here in the Sacramento Valley, why Sacramento Valley lagged behind these other three grain centers in the state.

FGP: Well, that is a good question. Perhaps it is that land-grant colleges and experiment stations tend to command less respect in their immediate vicinity than they do some distance away. Of course, there was a concentration of grain production in the areas I have already mentioned, but of greater importance is the situation or circumstances that you found in San Luis Obispo

FGP: County or in Kings County. There was an active county pure seed committee and a farm advisor who was promoting certified seed production which made for a lot of enthusiasm in areas like that. While it might have been related to the overall production of that crop, it went far beyond what it might have in an area of similar crop production but which had less of this enthusiasm on the part of a few individuals.

AID: Like the farm advisor?

FGP: Like the farm advisor. I think, too, that the philosophy of having county pure seed committees in those early days did a lot to get the program started. Speaking of early day grain farm advisors, I want to pay special tribute to N. L. McFarlane, Riverside County; Homer Keller, Kings County; Curtis Berryman, San Luis Obispo County; John Benson, Fresno County; and Sheldon Jackson, Merced County. There were many others who came later, but the ones I have named were there in the beginning, were especially active, and performed a great service to the certified grain seed program.

BR: Do you think that the more progressive areas of the state, like the Imperial Valley--better not say progressive, but the more intensive type farming areas in vegetables and such, would bring out far more interest in seed than in the areas like the Sacramento Valley which were primarily grain and livestock?

FGP: I think that we have found over the years that the farmer who was accustomed to more intensive farming had a bit greater ability to cope with the problems associated with seed production. After all it took more attention to detail, cleaning up the equipment, using clean land, and that sort of thing, so this probably was a factor.

AID: While you are talking about that, I don't think that you have discussed why raising certified seed is a relatively precise type of operation. What do you need to do it well?

FGP: Seed certification is a system whereby the identity and purity of newly developed varieties is maintained. And the system involves planting the right kind of seed onto land that has not grown a similar crop for a certain period of time and handling it in a way that would avoid any mixture. The requirements of certification specify further that any crops that cross-pollinate with any other crops must be isolated a certain distance. These are requirements that make the production of certified seed a little bit difficult at times.

FGP: The field must be reasonably free of weeds. Mixtures of any

FGP: kind must be held to a minimum. All of these requirements do make production of certified seed a somewhat more difficult, more painstaking effort than ordinary crop production.

AID: Will the percentage of weeds permitted vary from crop to crop?

FGP: Yes. The standards specify the amount of weed seed permitted in certified seed. This does vary from crop to crop. Generally it is somewhat the same, but there are differences. The primary purpose of certification is to maintain the pedigree of the seed, to inspect it while it is growing in the field, to see that it is handled both at harvesting and processing in a manner to avoid any mixture. It is inspected in the seed. We get samples into the certification office, and these are examined for weed seed content and mixtures of any kind. There is a test for germination. All this is part of the certification program.

AID: If I were going to enter into this program as a farmer, what special equipment, if any, would I need?

FGP: You might not need special equipment because for the most part the farmer can use the equipment that he uses in producing any other crop. The principal precaution that a farmer must take is to see that any equipment which he uses is clean, and free of other seeds that might contaminate the certified seed.

AID: What is his financial reward for this?

FGP: Well, in the first place, what are his financial obligations? It costs so much an acre when he files an application to grow certified seed. Then the grower has to pay a certification fee on the seed produced. The premium that one gets for the seed has varied over the years, from virtually nothing to a substantial amount. It is hard to be specific. One might say that \$.50 a hundredweight for certifiable grain is a reasonable premium for the farmer himself to receive at the time of harvest. However, the seed has to be processed specially to meet certification standards and handled in a manner that avoids mixture, which means that other costs are involved. When you add storage until planting time, the premium might be several dollars per hundred to the consumer. It depends upon whether the farmer who produces it assumes all of the financial obligations from beginning to end. He may dispose of his crop at harvest time and only have into it a small amount of the total cost that might be involved in the certification of the seed. A seed company may have purchased the seed from the farmer before any processing costs were involved.

AID: Is this a contract with the seed company?

FGP: Seed in California is grown under a number of arrangements. Certified seed sometimes is grown by a farmer without any contract at all. The farmer may take it to a processing plant, have it processed or cleaned, have it brought to certification standards, put into bags or containers, and sold by himself in which case he performs all of the functions of production.

Most times, however, the farmer is satisfied to dispose of the crop once it is harvested to a professional seedsman or seed handler. Often he has it under some kind of a contract with the seed company, or if not under contract, the farmer may sell it to a seed company as soon as harvesting is complete.

BR: It doesn't sound like your everyday farmer ought to grow certified seed.

FGP: The everyday sort of farmer should not attempt to grow seed. It is not all that difficult, but usually there is enough extra care involved and more attention to detail required, than many farmers want to get into. Unless they understand this and enjoy doing it, they are not happy with the added work that is involved in certification. They discover that they should have checked the field more carefully for weeds or mixtures of some kind. They are inconvenienced by the isolation that may be required with cross-pollinated crops or something of that kind. It takes a farmer who understands these special problems and difficulties to really enjoy producing certified seed.

BR: One who would normally farm that way anyway?

FGP: Yes. One of the interesting developments in the mid '30s was production of the first certified Ladino clover. This is a giant form of white clover that is useful for pasturing. It is very important that there be something to assure the fact that Ladino clover is in fact Ladino clover, the giant form of white clover, because otherwise one might get common White Dutch clover which produces plants only one third to one half as big a Ladino clover.

BR: You can't tell by looking at the seed?

FGP: The seed is identical. I think it was in 1936 that a man by the name of Victor Hoag near Gridley grew the first certified Ladino clover. This was planted with seed imported from Italy where Ladino clover was developed, and thus began the production of certified seed of one of our more important crops. It went along through the '30s and into the '40s, increasing in acreage all the time. More growers became involved and, we actually reached a peak of 42,000 acres of certified seed of Ladino

FGP: clover being grown in California.

BR: What caused the big increase in clover acreage?

FGP: The increased production of Ladino clover was brought on primarily by the increased demand over the United States for improved pasture crops, and part of the reason for California getting into the production of Ladino clover was the inability of Oregon, where most of the Ladino was being grown, to produce enough seed to satisfy the market demand.

BR: Do government price supports and programs have much affect on seed production?

FGP: Very definitely, and Ladino clover was a good example. I suppose in the period that we are talking about price support by the government was more important than increased usage of Ladino clover. I think that the support price was \$2 per pound. Maybe it was more than that during the period of time when the U. S. government had a price support program on such crops. This accounted for the enormous increase in certified seed production of Ladino in California over and above what the normal demand might have caused it to increase. In fact, a surplus of seed resulted, and it took several years to use up that surplus.

BR: What are some of the other crops that were of interest at that time?

FGP: One crop that we haven't mentioned that came into prominence, in 1943, was flax. The crop was grown for certification for a few years primarily in the Imperial Valley, and the variety Punjab was the principal one being grown at that time. It reached rather a large volume. It was not grown for its fiber, because the straw didn't have desirable characteristics for making fabric that flax grown elsewhere did. We grew flax primarily for its oil content and the making of linseed oil. There was a small effort to utilize the straw that was grown from flax in the Imperial Valley. Large stacks of it were accumulated and an attempt made to develop an industry which never did succeed. It was thought that this straw could be used in the manufacture of paper, particularly such papers as those used for cigarette paper, but to my knowledge not very much of this flax straw ever got used for that purpose.

We have talked about grain, meaning wheat, barley, and oats. These, and beans and rice, were our most important crops being certified in the early days. Then there was sudangrass, and a small acreage of grain sorghum (milo). There were a number of forage crops, the seed of which we certified in a small way--

FGP: crops like burnet and rose clover, and various pasture grasses. At one time or another we may have had a field for seed certification of virtually every agronomic crop ever grown in the state. This gets almost into the hundreds.

BR: You haven't mentioned cotton. This is an important agronomic crop in California.

FGP: It sure is--usually the most important dollar-wise. And this is a story all by itself. We don't certify cotton seed to any extent. There has been a little in Imperial Valley but none certified north of the Tehachapi Mountains.

From way back in the '30s there has been the one-variety cotton law, which makes it unlawful to plant in the San Joaquin Valley any variety other than Acala from the USDA station at Shafter. All cotton seed planted in the San Joaquin Valley must have descended from breeder seed released by the Shafter station. Traditionally this breeder seed has been turned over to the California Planting Cotton Seed Distributors, an organization which grows and distributes seed of the subsequent generations. The Distributors have maintained what is essentially a certification program, making our participation unnecessary.

I am not saying it wouldn't have been better to have also had certification, but cotton interests have thought otherwise. The important thing is that there has been pure seed available to growers.

BR: How about corn?

FGP: Corn was not a very important crop to California until fairly recently. We had maybe a hundred thousand acres in the '40s, mostly grown in the Sacramento-San Joaquin River delta region. I think we did certify a few acres of an open pollinated variety at one time, but it was of very short duration. In later years we certified a small acreage of hybrid corn.

The significant thing with corn is that though we now are growing a good sized acreage, seed certification is not involved to any great extent. This is true also in the corn states back east. The reason is that virtually all corn grown is hybrid corn, and the hybrids are nearly one hundred percent owned by seed companies. You plant hybrid corn seed each year. You don't plant the crop produced from it because if you did you would take a considerable loss in yield.

When hybrids are involved there really isn't much need for seed certification. To elaborate further would take a whole chapter,

FGP: and I don't believe it is relevant to our story--at least not right here.

BR: And then alfalfa seed came into the picture.

FGP: Yes, and I propose to take it up as a separate item to cover in considerable detail--not because it is more important to certification in California than grain or rice or beans, but it did bring us into a new era of intense activity.

THE ALFALFA STORY

FGP: Alfalfa began to come into prominence with California seed certification during the late '40s, then hit us with full force in the '50s. Note that I haven't made much mention of certified alfalfa seed production up to this point. The first alfalfa seed produced for certification in California was with varieties adapted elsewhere, primarily the North Central states and through the Corn Belt. Farmers in those areas depended on areas of similar climate for seed. Most of the seed used in the Corn Belt was purchased in places like Montana and Idaho. However, the availability was always uncertain because of frequently unsatisfactory seed growing conditions. California came into the picture because research in the '40s caused the plant scientists to decide that if production of seed of these winter-hardy varieties adapted to the North Central Corn Belt states was confined to only one generation outside the region of that adaption there would be no loss of winter-hardiness. This was a revolutionary concept, of enormous significance to California.

California has ideal conditions for producing alfalfa seed because of its lack of summer rainfall and ability to control irrigation water, as well as to satisfy the need for pollinating alfalfa by the use of honeybees. There was a great deal of skepticism however, as to the ability of California to produce seed of these winter-hardy types unless under some sort of a regulated program. This made seed certification a natural vehicle for the production of seed and gave as much impetus to the seed certification program in California as anything that has ever happened.

About this time Ranger alfalfa was developed. It was of tremendous importance to farmers in the great north central alfalfa growing region of the U. S. because of its resistance to bacterial wilt disease, which had become ruinous to production. In order to make an abundance of seed of this variety available it was obvious that it needed to be brought to someplace like California where large yields of seed could be obtained and a rapid increase made. In 1945, the first certified field of

FGP: Ranger alfalfa was grown by the Howard Rose Company at Hemet, an intensive farming operation engaged in the production of rose plants. Perhaps it was for this reason that the company became interested in a crop like certified alfalfa seed which also requires intensive farming, compared to growing alfalfa hay. A year later California grew its first crop of certified seed of Buffalo alfalfa, a variety developed in Kansas and adapted to that area. It was grown by A. M. Jongeneel on Ryer Island near Rio Vista. Thus was launched one of the most intensive programs ever to produce alfalfa seed--and all under certification. The production of certified alfalfa seed developed by leaps and bounds. By the early '50s it was being produced in such amounts as to make disposal a problem, which brought on the formation of what is known as the Certified Alfalfa Seed Council, which we will discuss later.

AID: Where was the Ranger variety developed? We talked about the Buffalo variety from Kansas.

FGP: Ranger was largely a creation of U. S. Department of Agriculture. It is a composite of several lines which were put together and released in the state of Nebraska. Another variety that came along rather shortly was from the East Coast. It was developed in New Jersey and bears the name of Atlantic. Then as time went along more and more varieties were developed. In the 1950s we began to get into the certification of privately developed varieties, and private companies from that point on began to be very active in the development of varieties of their own which soon were being certified along with the publicly developed varieties. I think it was this great upsurge in certified alfalfa seed production that was largely responsible for the creation of alfalfa breeding departments in several different companies.

AID: It is interesting that alfalfa seed can be grown so much more effectively in California, and yet for all those years the varieties were developed in the Midwest or East. I wonder why.

FGP: Well, one has to consider that alfalfa was an important crop in California, but California had its own varieties adapted to a totally different environment, and these varieties were not nearly so winter-hardy. They did not go dormant in the winter as do the northern varieties, and we were engaged in producing seed of these for our own use--most of it noncertified. We did import seed from South America some of the time. California was operating in its own sphere, growing alfalfa hay and either producing seed or acquiring it from places like South America.

Alfalfa seed production was a relatively unimportant thing in

FGP: California. These other states, like Wisconsin, which are large users of alfalfa seed were having their problems in that they had to depend on some outside source for seed. A place like Wisconsin is almost totally unable to grow its own seed. The high summer rainfall and insect and disease factors makes seed production extremely difficult and not very worthwhile throughout areas such as that. Never was there an abundance of seed nor a sure supply. Therefore, with this realization finally, that it was safe to take varieties outside of a cold environment for seed production, came an assured supply of seed--with certification safeguarding its identity.

AID: What growing and cultivation procedures do you need for growing the alfalfa seed?

FGP: Well, the production of alfalfa seed usually has consisted of nothing more than just letting the crop go ahead and bloom, set seed, and then harvesting the seed crop. However, in California the production of certified alfalfa seed is a specialized business. It involves planting in rows and handling it as a seed crop, and not as a hay crop. In other words, seed is not a by-product of hay production. All that the farmer produces from that field is alfalfa seed. He may get a small amount of hay early in the season, because it is sometimes desirable to mow the plants back, but by and large, the production of alfalfa seed is a specialized business and involves handling the crop just as though it were a crop of corn. It is being grown solely for seed.

AID: Do they get as many crops a year of seed as they do of alfalfa for hay?

FGP: No. Almost universally there is only one crop of seed harvested. There have been efforts in the past to get more than one crop, but this has not been successful.

AID: Why not?

FGP: There is not sufficient time. Alfalfa blooms over a fairly long period of time if it is allowed to do so, and it continues to set seed. The earlier formed seed gets mature, the new bloom comes in and is pollinated, and more seed is made. This process sort of goes on and on. It is better to just let it accumulate, and harvest it perhaps in late August or early September, going for the maximum amount of seed that is obtainable, rather than to try going for two crops. If you get involved with two harvests the added amount of seed that you might get just doesn't pay for the extra effort. A good seed producer always hopes to have yields of perhaps 1,000 pounds per acre. Often he doesn't

FGP: make this, and state averages are frequently around 500 pounds per acre, which isn't bad. The successful grower, however, does need to think in terms of 700 to 800 pounds of seed and hope for sometimes 1,100 to 1,200 pounds of seed per acre.

AID: Is there any need for an alfalfa breeder to breed a plant with a uniform set?

FGP: I would say not. The plant is such that this probably couldn't be done in the first place, because it is what you call an indeterminate type of plant. It continues to flower which is part of what makes alfalfa desirable as a forage crop. If one were to breed a variety which set all of its seed at once, it very likely would be a very poor hay producer, and after all the basic purpose for alfalfa is for hay or forage.

AID: Which makes it different from the tomato plant that was changed remarkably.

FGP: That's right.

AID: We started to talk about alfalfa seed production. Can you go into that, and tell me what is involved?

FGP: Perhaps I should start with Mr. Luther G. Jones, who did more in a short time to help alfalfa seed growers than anyone else. He was in the Department of Agronomy, University of California at Davis. He was very much interested in seed production problems but did not have adequate funds to do all he wanted to. In 1952, the Crop Improvement Association directors decided to turn \$10,000 over to the University to be spent over a two-year period for studies in seed production. This contribution to research developed later into the support of a graduate assistantship and was continued until Jones retired. Several excellent men got their early training in this graduate assistantship that was supported by the Crop Improvement Association. Jones had a reputation with farmers that was enviable by any standard. He was highly respected. He believed in the practical approach. His research was oriented strictly toward production, and his ability to observe what was needed was almost uncanny.

Up to this point alfalfa seed was harvested incidentally to hay production and was not grown as a crop all by itself. It soon became obvious that if California growers were going to produce alfalfa seed successfully, they would need to plant it as one would corn or grain sorghum, or any other annual crop with the idea of getting maximum production. Just what factors were involved in bringing about such production were not very well known. With Jones working in this area it soon became clear.

FGP: that planting in rows was the most practical approach. This enabled the farmer to cultivate for weed control and to handle the crop with a minimum of expense. It allowed his planting of very small amounts of seed, even as low as one half pound per acre sometimes was used. Usually the recommended amount to plant was one pound per acre.

After planting, of course, the next most important things were proper handling of irrigation, insect control, and weed control. By furrowing out between the rows, irrigation could be accomplished, and incidentally not so much water was needed as to grow a hay crop. Excessive water was undesirable. The idea was to keep just enough water in the ground to have the plants growing nicely. One of the things Jones soon learned was that there are two types of insects very important to alfalfa seed production. The harmful insects such as Lygus bugs had to be controlled, but also there were beneficial insects that were important to the production of alfalfa seed. Alfalfa is a crop that has to be pollinated if it is going to produce seed. The flowers of the alfalfa plant have a little mechanism that causes a tripping to occur if the insect is to get pollen out of the blossom. Some of the wild bees are very adept at tripping the alfalfa flower, thus collecting pollen which is spread from flower to flower, fertilizing other flowers to produce seed. The honeybee is the one pollinating insect we have in California which can be satisfactorily controlled. Therefore it is the common insect used for this purpose.

HRP: Will alfalfa not pollinate if it is not cross-pollinated?

FGP: No. Alfalfa blooms remain closed. That is, the little pollen-bearing parts are enclosed in a small envelope of the blossom, and unless this tripping occurs no pollination takes place. The honeybee of course is after two things when working in the alfalfa field. The collection of nectar is one thing, and this does not require that the alfalfa flower be tripped. If the honeybee is only collecting nectar, no pollination is going to occur. On the other hand, a certain amount of pollen is needed in the making of honeycomb, so if the bees are collecting pollen they will bring about pollination which is absolutely imperative if you are going to get an alfalfa seed crop. There is some tripping during nectar gathering but not much.

HRP: I have heard you say the bee does not like this tripping because it, the bee, gets knocked around in the process.

FGP: That is right. They can get slapped in the face or have their nose pinched. The older bees become rather adept at collecting nectar without tripping the flower. The younger honeybee is

FGP: more awkward, however, and sometimes trips the flowers even while collecting nectar.

HRP: And if they can get pollen in other areas, the honeybee doesn't care to trip the pollen from alfalfa?

FGP: That is true. This makes it important to have alfalfa planted some distance away from other crops that the bee finds more attractive. The bee will travel long distances to get pollen and nectar that it prefers, but if forced to go to alfalfa it will do so. Alfalfa, unfortunately, is not one of its favorite flowers, but if there is no competing nectar and pollen nearby and if the beehives are placed in the field of alfalfa, a pretty good job of pollination can take place.

HRP: However, there has been a great deal of research about the other bees. . .

FGP: Yes. The wild bees of several sorts have been tested. The alkali bee which lives in the soil does an excellent job of pollinating, but maintaining them is very difficult in California. More success has been had with the leafcutter bee which is housed in boards which are bored full of small holes. The leafcutter bee makes its nest in the holes, packing them full of pollen and corking the hole with circular pieces of leaf which it cuts from various plants. The pollen is to nourish the young leafcutter bees as the eggs hatch and the larvae emerge. The honeybee, however, remains the best pollinator for alfalfa under California conditions, even though some growers use a substantial number of leafcutter bees. Actually, the best situation is where a grower has access to both honeybees and the leafcutter bee.

Luther Jones not only taught growers how to grow alfalfa seed, but, perhaps even more difficult, taught them the best ways to harvest it. The alfalfa plant sets seed over a rather long period of time, and it gets tricky knowing when to harvest. Of course the objective is to do everything possible to maximize production, have the harmful insects controlled, have the beneficial pollinator insects adequate at all times, and have growing conditions such as to produce high yields of seed. However, there is a fair amount of shattering which can take place if one waits too long. The proper time to harvest is a compromise. The plants should be loaded with mature seed and a small amount still green. The crop may be cut and put into windrows or harvested direct following application of a defoliant. There are advantages and disadvantages in each.

FGP: Adjustment of the harvester is very important, because the seed

FGP:

can be damaged if the harvester is not properly adjusted. Jones spent a great deal of time investigating the best way to adjust a machine, and sometimes he almost had to fight with a few of the old time harvester operators to get them to make the proper adjustments. Often their response was that they had been harvesting seed for years, and no one was going to tell them how to set a machine. But he would follow along behind the harvester with a pan, collecting the chaff and trash that came out of the rear end. Then he would blow the loose material away and see if there was any seed that was coming through. He could soon tell if there was, and this meant making adjustments in the fans or screens to reduce the loss to a minimum. Also, he could tell by examining the seed, as it was being harvested, whether there was damage due to excessive speed of the harvester cylinder. He found that if speeds were too great the seed would be cracked, chipped, and damaged so that it would not grow satisfactorily when tested later. If Luther had any difficulty getting a harvester operator to cooperate in adjusting the machine, all he had to do was to go to the grower who owned the field. His reputation was such that there was no trouble in getting the machine adjusted. Growers throughout the state thought a great deal of Luther Jones and valued his field research very highly.

Luther was also engaged in research having to do with testing seed. When he was learning that alfalfa seeds could be damaged in the harvesting process he got interested in determining just how bad the damage might be. He began to work in the laboratory to test seed, and he soon found that there was a direct correlation between damage that he could observe visually through low magnification (about a ten-power magnifier) and actual seed test. He began to work with a man named Rodney Cobb who was with the seed laboratory at the State Department of Agriculture, and investigating all sorts of ways to make seed testing more efficient. Cobb was interested in mechanical methods. He developed several devices over a period of years that would do away with much of the hand labor involved with conventional methods. He developed machines that would feed the seeds out automatically onto a disc or a belt so that an analyst could observe them without just having a pile of seed that had to be pushed around with a pair of forceps and everything done by hand.

Luther Jones and Rodney Cobb soon developed a working relationship that led to a number of interesting results. One, in connection with damage to alfalfa seed, was the idea that by visual examination (with a ten-power magnifier) one could come close enough to the actual germination of alfalfa seed to use such information in certification. The certification standard required 85 percent germination. If the conventional method of



Willis Hansen and Luther Jones adjusting alfalfa seed harvester on Hansen farm east of Davis, Sept. 1950.



Willis Hansen and Luther Jones checking for seed loss, Sept. 1950.

FGP: testing was used, several days were required to complete the test. After checking several hundred samples, Luther found that the correlation between damaged seed and failure to germinate was so accurate that by allowing a safety margin of about 5 percent, the certification people would be safe in using his visual observation in place of a regular germination.

HRP: This must have been a real help to the seedsmen.

FGP: This is a tremendous help to all. The certification process was speeded up tremendously. And we must remember that during this period of the 1950s there were so many samples coming into the state seed laboratory that they were unable to keep up during certain seasons. There were delays of sometimes three or four weeks in getting out results to seedsmen and growers. The concept of using something short of complete testing to determine whether seed was certifiable developed during this period. I am thinking of the "GAM" test. That is what you get when you examine the alfalfa seed under the ten-power magnification I spoke about. One checks the seed coat for cracks or other damage, and the results are translated into viability--whether the seed will germinate and grow to be a normal plant. Dr. R. Merton Love, who was department chairman then, suggested we call it the GAM test standing for "gross anatomical morphology." We had been referring to it as the "eyeball" test.

HRP: Eyeball is a lot simpler.

FGP: We still say that occasionally.

There is much more that might be told about production of certified alfalfa seed, but I think excessive detail on any one subject can detract from the main objective, which is to relate in a general way the story of seed certification. We will be mentioning alfalfa seed elsewhere, in discussions both of field inspection and seed inspection. Before leaving alfalfa, however, I want to talk about the problems of selling California certified alfalfa seed and the formation of a promotion scheme.

CERTIFIED ALFALFA SEED COUNCIL

FGP: Any story about alfalfa seed certification is not complete without discussion of the Certified Alfalfa Seed Council. By 1953, it was becoming apparent that certified alfalfa seed grown in California was fast getting to be a surplus item. The north central and eastern states were beginning to recognize the value of planting certified seed even if it was grown in California. Production out here had expanded greater than this market could accommodate. Four seedsmen involved became greatly concerned over the failure of the certified alfalfa seed crop to move in satisfactory amounts. These men were Lloyd Arnold of Arnold-Thomas Seed Service, Ward Waterman of Maricopa Seed Farms, Harold Loomis of J. C. Loomis Co., and Evart VanderMeulen of Calapproved Seed Growers Association. They got together in 1953, in the early part of the summer, and began talking to the E. H. Brown Advertising Agency in Chicago, or more specifically a man by the name of Richard Crabb who was with that agency. They discussed ways to better promote certified alfalfa seed and what to do about it. Out of these conversations was created what was called the Certified Alfalfa Seed Council. Its goals became promotion of various sorts, use of all the media, radio, (not so much television at that time), farm magazines, posters, or other means that would promote certified alfalfa seed. One of the favorite questions asked by members of the Council (and I think that credit for this slogan should go to Ward Waterman) was, "Are we over produced or under consumed?" I think that everyone agreed it was a matter of under consumption, but unless the public was made aware of the product, the situation could not be remedied.

Richard Crabb was intensely interested in the cause and had many ideas for assisting. Money was needed if the effort was going to succeed, so these four seedsmen, or I should say their companies, began to assess the seed that they handled in order to develop a fund to finance the operation of the Council. It seemed that the first thing to do was to try to identify some of the problems, and I think the most important approach taken by the Council was to make contact with agricultural experiment



Left to right: Evert Vander Meulen, Everett Mitchell, Harold Loomis, Lloyd Arnold, Ward Waterman in field of certified alfalfa being harvested on the Raymond Thomas Ranch taken during inspection tour. September 8, 1954.

FGP: station people, both in research and those in Agricultural Extension.

HRP: This was in the eastern area?

FGP: This was in the so-called consuming area which involved those states that were not able to produce their own seed satisfactorily. There was Wisconsin and Minnesota, really big consumers of alfalfa seed, in what you would call the north central area; then as you go east and south there is Illinois, Iowa, and Indiana that use a considerable quantity of alfalfa seed but are almost totally unable to produce it. The states like Ohio, Michigan, New York, and Pennsylvania use alfalfa seed in lesser quantities, but were interested in the Certified Alfalfa Seed Council and the cause for certified seed. The agricultural workers in all these states were consulted regularly, and began to serve as an advisory committee to the Council.

HRP: Why was that? These were people from the colleges and universities. Didn't they have to be cautious about identifying with anything so commercial as the Council?

FGP: It wasn't all that commercial. Certified seed itself is not in that category. The magic ingredient, as far as the Council was concerned, was in not referring to the state where the seed was produced nor mentioning companies. Not once in all of its advertising did the Council use the name California. This was considered at great length, and it was decided that it would be a detriment to the cause if state interests became involved. I think Dick Crabb should get considerable credit for making us stick to that concept.

HRP: In other words certified alfalfa seed is certified alfalfa seed from whatever state it comes?

FGP: That is right, and by leaving out mention of the state of production this was the reason that we could enlist the support of these agricultural experiment station and Extension Service people. From the beginning to the present this group which at first only involved nine or ten states and now twelve or thirteen, has continued to support the endeavors of the Council and have served on the Council Advisory Committee. The committee has been extremely helpful in providing the Council with ideas and putting its purpose across. Having the support of such people is something that just simply can't be measured in terms of dollars.

HRP: They saw the value of certified seed and so were quite willing to promote it for the benefit of their constituents, you might

HRP: call them.

FGP: That is right, and in working so whole-heartedly with the Council they could keep its members on the right track, giving the Council endeavor a respectability that it could not have ever obtained through usual advertising or customary promotion tactics. Richard Crabb of the E. H. Brown Agency recognized this. He already had a very good reputation with the state agricultural workers so he had their confidence, which benefitted the Council. While many thousands of dollars were spent in conventional promotion methods, the what you might call "free" help we have got from state agricultural workers has been worth an untold amount.

Richard Crabb left the E. H. Brown Company later on to form his own advertising agency, and another person who had been connected with the Council's program from the beginning became a member of the firm. This is Betty Howard, who later was the only professional advertising and public relations party working for the Council. She is in business by herself now and is retained by the Council as its director for public relations and information.

HRP: You have been involved with the Council from the beginning haven't you?

FGP: It was natural that I become associated with the Council shortly after its beginning, and I have remained an active figure in it ever since. Also, the extension agronomist here in the Department of Agronomy and Range Science has been included. One cannot think of the Council in its early days without remembering a man by the name of Everett Mitchell. He was the farm editor on one of the big radio stations in Chicago. His slogan was, "It's a beautiful day in Chicago." This he always started his broadcast with, regardless of what kind of day it happened to be. He had perhaps the greatest listening audience of any farm radio person in that period of time. He was extremely interested in the Council's cause and became a good friend of the four originators. They, with Richard Crabb, worked very closely with Everett, and he was most helpful in the radio part of the Council's program.

The fact that Everett Mitchell was so enthusiastic about certified alfalfa was one of its greatest assets. He owned a farm and grew various crops on it out west of Chicago. And of course, any alfalfa that he planted was just naturally certified alfalfa. I remember one get-together that the Council group had at Everett Mitchell's home and at a nearby restaurant that night where a sort of party was held. This dinner and party were

FGP: actually in honor of some of the U. S. Department of Agriculture workers who had been most helpful to the Council, but the high point of the evening was when a German Shepherd dog was presented by the Council to Everett Mitchell. He had had such a dog that he had lost, and this presentation of a pedigreed German Shepherd puppy was most touching as far as Everett was concerned. The dog, a female, was officially named "Lady Certifido," the name Everett used in telling about the dog in his program over the radio.

HRP: I remember your telling me that the Council, in spite of its great success, began to run into difficulty, particularly in the collecting of assessments to finance its operation.

FGP: Yes. Like all such voluntary endeavors it began to have problems in that regard. The original idea was to assess each 100 pounds of certified seed a certain amount--like \$.20, I believe it was at first. One must remember that these four originators of the Council were assessing only the seed they handled and in so doing had to convince the growers from whom they were purchasing the seed that this was a worthwhile investment. As such things go, however, it became more and more difficult to keep everybody agreeable to paying the assessment. Therefore, the California Crop Improvement Association directors were prevailed on to try collecting this assessment but still with growers paying on a voluntary basis. The fee would be assessed against the seed and charged to the grower unless the grower wrote a letter stating that he did not wish to participate.

This went on satisfactorily for a while, but there began to be a few growers who decided for one reason or another that they could not pay the fee. This led finally to the California Crop Improvement board of directors voting to no longer collect the fee on a voluntary basis. It would simply be taken out of the regular certification fee, at so much per hundred-weight certified, and paid to the Council. This meant in effect that the Association directors were recognizing the Council's program as a very beneficial one, worth supporting, and doing a job that otherwise the Association itself might have to get into. The Council had all the advantages of participation by seedsmen, by growers, by state workers, and others. It was being handled without any great expenditure of effort on the part of California Crop Improvement Association personnel.

A more formal organization, of course, became necessary, and the Council was no longer just the four individuals who originated the idea. A board of directors was provided for in the by-laws that were drawn up. This board had on it representatives from the seed trade, several growers, and ex-officio members who were

FGP: from the University. The full board of directors is too large a body to actually handle the detail of administering the Council program. Therefore, what was known as the Operations Committee was created. This Committee was composed of six people, three seedsmen, one farmer, and two people from the University (the extension agronomist and myself). The Operations Committee makes most of the decisions with the public relations person, meeting with the Advisory Committee, and other things of this nature. The board of directors in its entirety is called together only about once a year.

One of the most interesting and more popular activities of the Council in the early days was visiting the consuming states. On several occasions a plane was chartered, and the Operations Committee of the Council, with various members of the Advisory Committee, plus representatives from the agricultural press and radio, would take a trip through parts of the consuming area. The agricultural workers in the state being visited would take the group on a tour of alfalfa hay producing areas, showing whatever might be of interest in that connection. Research plots would be shown, and at all stops the farm press and radio people would be invited. In that way, a great deal of media coverage was obtained and done so in a way that aroused considerable interest on the part of local farm papers and stations having farm programs. The practice of making these tours did not last very long, but there has always been at least one meeting a year of the various agricultural workers from the states of the consuming areas.

About 1969, there developed the idea that an alfalfa symposium would be a good thing, and from that time up to the present there has been a symposium held each year in one of the consuming states. At these symposia farmers are encouraged to come, as are equipment people, agricultural experiment station workers, and agricultural extension service people. All sorts of people who are interested in alfalfa, whether it is in alfalfa seed or the utilization of alfalfa hay, are invited to attend. They have been a great success in recent years. In the earlier days, however, most of the contact was with the Advisory Committee which acted both as a source of continuing information for the council and its public relations office, and also as an outlet for information released by the Council. Many brochures, circulars, and other types of promotional material have been released by the Council, and almost always the brochure or bulletin is developed in such a manner that it can actually be distributed by the agricultural experiment station in the various states.

HRP: These would cover such subjects as what?

FGP: Oh, I remember, one in particular, called "Five Steps to Five Tons." In the early days, five tons of alfalfa hay was almost unheard of in the east, but the agricultural experiment station workers felt it was possible and that if the right production know-how were used this could be attained. So this was one type of publication.

HRP: Did they have something on pests, desirability of fertilizer, and that sort of thing to grow the crop? Did they give those out that would be tailored to the area where these were going to be distributed?

FGP: Yes. One of the most popular pieces we have ever put out is the Alfalfa Analyst. It has color pictures of all the insects and diseases that may attack alfalfa, with printed descriptions. There is also a section of deficiencies and damage. Many of the publications had the "how to" formula involved. How to fertilize, how to control insects and pests, how to grow more tonnage, how to better utilize the crop--anything to popularize alfalfa. As a matter of fact, as the years went on, the emphasis was not placed nearly so much on using certified seed, as it was on just simply planting alfalfa and learning how to grow a better crop of it.

Also, much has been done on utilizing alfalfa and making greater use of it for all kinds of livestock. Bulletins and brochures were prepared advocating more alfalfa in the ration, not only for animals commonly using it such as dairy cattle, but pointing out that greater use could be made of alfalfa in rations for beef cattle, horses, sheep, poultry, and swine. Alfalfa, in its forage state, is one of the best crops there is for animal nutrition. It contains a high amount of protein, a high percentage of digestible nutrients, and is generally an excellent crop for any livestock. The use of alfalfa by humans is beginning to look very promising, for example alfalfa sprouts and proteins extracted from it. Alfalfa can become an even more valuable crop for mankind.

FIELD INSPECTION

HRP: Frank, tell us about field inspection, why is it important in the certification process?

FGP: We mentioned field inspection, but we haven't gone into enough detail about it. The inspection of fields for certification is probably the one single most important feature, other than the grower planting the right seed, because it is possible to detect certain mixtures.

The basic principle of seed certification is maintaining the genetic purity. This means the pedigree. It means purity of germ plasm. Of course, as I said earlier, the way you start out to maintain the genetic purity is through planting seed of known history or known pedigree. But to follow up on this is the procedure in the certification process known as field inspection. During these field inspections persons go into the field which has about reached the maturity stage, or as the plants are blossoming--that state when it is most easy to determine mixtures of varieties. We look for mixtures of such things as weeds or other crops, but we must always remember that the most important mixture to be on the lookout for is a mixture of the same crop but of a different variety. There are characteristics in the growing plant that make it possible to detect mixtures which cannot be detected in the seed. Seeds of the different varieties within any one crop tend to all look alike. For example, in alfalfa, the seed of one variety is apt to be indistinguishable from seed of another variety.

Of course, we can't talk about field inspection without getting into some of the more human interest problems and some of the difficulties involved. Naturally, it takes a great deal of traveling up and down the state during certain seasons of the year. I can well remember during earlier days in Davis when we traveled entirely by automobile. The highways were not very good, and I was on the road for long periods at a time, and for certain seasons most of the time. One learns a great deal about agriculture in this great state traveling up and down making

FGP: field inspections for seed certification.

One of the most fascinating parts of traveling the highways of California on such a mission is being able to observe agriculture in the different sections. Compared with Kansas and the Middle West where agriculture tends to be much the same in different parts of the state, there is a tremendous contrast in California when one goes from areas with huge fields producing vegetables to others producing cotton, wheat, barley, beans, or flowers. The terrain changes, and this has been one of the more fascinating parts of my job over the years in going up and down the state making field inspections in connection with seed certification. In the spring it is a great thrill to see an entire mountain side covered with the bloom of lupine and California poppy.

AID: In other words, you are bringing out the fact that California has perhaps two hundred crops compared to perhaps six in Kansas.

FGP: That is right. One certainly becomes aware of that during field inspection trips.

HRP: And some are such speciality crops as lima beans that grow only in one area?

FGP: Yes. One sees crops that are grown only in California, and lima beans are a good example. I am thinking of the large lima bean grown along the south coast. There are many such crops that California has almost a monopoly on. We talked about vegetable seeds earlier. There are many crops produced almost exclusively in California.

HRP: More in vegetable and flowers than in agronomic crops.

FGP: That is true. Although we do get into some exotic crops in the agronomic field. We are hearing about one usually considered a desert plant known as Jojoba, which, if we can grow under cultivation, promises to produce an oil that is comparable to the oil from the sperm whale. If we are successful in producing this crop, perhaps we can play quite a role in saving the sperm whale.

HRP: Are you going to bring in some of these pure seed committees who used to help you with your inspection work in the early days?

FGP: Oh, yes. Earlier, we had mentioned county committees which were in existence in several counties. Among other things the county committee aided in the field inspection of certain crops. When I would arrive in the county the farm advisor would meet me, and

FGP: with the county pure seed committee we would go out and inspect fields. Working with these committees was fun. Usually, there would be wagering on what kind of yields would result from a certain field, and maybe we kept a pot with each one putting a quarter in it. Whoever came closest to estimating the yield would get this money later on after the farmer had harvested the field. I remember well, in San Luis Obispo County, where not only the county committee but a huge delegation of farmers went out on the tour that day to inspect certified grain fields. These were mostly wheat fields in the Carizzo plains area of eastern San Luis Obispo County. There were huge acreages in any one field, and much of this area was planted to the variety of wheat known as Baart. This is a wheat with awns, or what we call beards, on it about three inches long. One time when we were looking at such a field--and these fields were so pure that you could walk for hours and never find a single off-type--Dr. Fred Briggs was with the group, and he wandered off by himself to one edge of the field. He later showed up holding a head of wheat which had no beards on it. It was simply an awnless or beardless head of wheat.

AID: Of the same variety, Baart?

FGP: He presented it as being a mixture he had found. Well, this startled everybody because we had been searching all day in various fields, and the certified wheat in the county that year was so pure it was just impossible to find mixtures. Well, he finally admitted that he had carefully taken his pen-knife and removed the beards from this head of wheat so that it was beardless. That relaxed us, and we decided that the field was just as pure as it seemed to be in the first place.

AID: Which is the most difficult variety to recognize as a plant, one from another? I mean in which crop is it most difficult to recognize different varieties?

FGP: Alfalfa is the most difficult in which to distinguish mixtures of varieties, because it is a heterogenous type of crop anyhow. This means that the plants vary from each other within the same variety.

HRP: The color of the flower doesn't tell you?

FGP: Well, generally the flowers of alfalfa are shades of blue or purple and occasionally you have an alfalfa variety that has some yellow in it. Hopefully, the variety has a distinguishing flower color. Many varieties have similar ranges in flower color, though, so we have to rely partly on faith.

HRP: And then there is one that has all the colors of the rainbow.

FGP: Yes. There are a few that have shades of brown, blendings of yellow, purple, and a little bit of green and white. Usually with most agronomic crops, there is some one little distinguishable feature that can be detected at field inspection time. In these situations where you know that there might be another variety that is indistinguishable, we take extra precautions to assure that the farmer did plant the right seed. We realize we are falling back on the integrity and safeguards built into the program that he has planted the proper seed and thus assured that the genetic purity has been maintained.

AID: What does happen when you do find a mixture of other seeds that are not permissible or that is above the tolerance allowed?

FGP: This calls for refusing to approve the field. We do two things. We permit roguing if it is a mixture that can easily be removed. Maybe I had better discuss that term "rogue" in more detail than I did earlier. It really means removing whatever you want removed. I don't know how the term got started, but I suppose years ago an off-type plant was spoken of as a rogue. Well, the term was expanded then to mean removing anything that didn't belong in the field. So, when we ask a farmer to rogue a field, it means for him to get out there and remove whatever is over the tolerance as we have described in our certification standards--pull it up by the roots, and take it out of the field.

There is a tolerance for everything and perhaps it is 0.10 percent or 0.01 percent. If, on field inspection, we find that any mixture goes beyond whatever the standard says, there are two alternatives. One is to refuse certification on the field, or issue a rejection form, and the other alternative would be to permit the grower to go out into the field and remove, or rogue out, the mixture. This would call for reinspection, and we would have to be prepared to go back at a later date and reinspect the field to see if it had finally complied.

AID: On the total rejection, did you have many of these?

FGP: Rejections of fields, in field inspection, is seldom high, percentage-wise. You could say that perhaps 5 percent of the fields in any one given year might be rejected. There are two places where certified seed must meet standards and where we lose a few. Field inspection is the first test that the seed has to meet and where the seed in the field can be refused certification. Then later, if we find something at the seed inspection stage when a sample of the seed is submitted, there again standards have to be met, and the seed sample can be rejected for



Holt "California Special" Combine harvester, built as a ground driven rig in 1917, later converted to engine drive, 48-inch cylinder, 30-foot swath, R. W. Cooper Ranch, 1943, San Luis Obispo County.



Kings County Pure Seed Committee, mid 1950s. Left to right: Dan Newton, Sr., Charles Schwartz, Leonard Newton, (?), Karl Schneider, Louis Hanson, Burt Ray, Norman Wolfesen, (?).

FGP: certification. It might be a mixture that we failed to detect in the field. It might be a mixture that had been introduced in the harvesting equipment. Noxious weeds are sometimes a problem in certified seed, and no noxious weeds are permitted. It is possible that we did not see the noxious weed at field inspection, or it is one of those noxious weeds that we permit at field inspection on the assumption that it can be cleaned out with cleaning equipment. However, if the cleaning process which follows harvest fails to remove any such weeds, these factors can be cause for possible rejections.

AID: What is a noxious weed?

FGP: Noxious means noxious in the sense that it is so designated by state seed laws. A noxious weed, from the grower's standpoint, or strictly from an academic point of view, is one that is very difficult to control, presents a hazard to growing crops by threatening to crowd out the crop, or contaminates the land in such a manner as to make it almost useless for farming. In most states, perhaps in all of them now, there are legally designated lists of noxious weeds. Often they are listed in two categories--the really bad ones and those that are called secondary noxious which are not so bad. In certified seed we don't permit noxious weeds of either category.

HRP: Noxious weeds may vary from state to state, is that right?

FGP: That is true. A weed that is harmful in one state may not be in another. For example, Johnsongrass, a very common sorghum-like plant that infests much of the southern states and the warm parts of California, is not noxious at all in a state like Wisconsin or Minnesota where it is cold. There are many examples of weeds that would be considered extremely noxious in some areas and of no consequence some place else. They simply would not survive.

AID: Would you inspect all of the fields or a percentage of them?

FGP: All certified fields are inspected. In the early days, I was doing all of this. I was never quite sure that I would be home when two of my children were due to be born because it was in May when I was right in the midst of our field inspection. I not only was doing all of the field inspection, I was running the office as well. It was a one-man show, or I should say a one-man and one-woman show, because there was a lady who was in the office, and I did the field work. Later on as we got into the late '40s and early '50s, we began to need additional help, and at various times we have employed up to 15 or 20 field inspectors during the peak season.

AID: Can you enumerate how many fields you had when you were doing it alone and how many fields there were at the peak?

FGP: In the magnitude of 300 to 400 fields in a season's time, when I was doing it alone, and at the height of our program in the 1950s, we had as many as 1,500 growers with perhaps an average of two fields each, which would come to 3,000 fields. However, with California climate like it is, we could start inspecting grain in April in Imperial Valley and wind up in the north part of the state in August.

HRP: The only thing was there were other crops that were in the south end of the state that got ready at a different time, so he was going from one end of the state to the other very frequently.

AID: Were your inspections mostly when the variety was in flower, in bloom?

FGP: Usually, if you just pick a stage and say that this is when field inspection should be made; that's right, you would say in bloom. It isn't important that we follow this exactly because with the small grains like wheat or barley, they can be inspected when the plants are in bloom or for some period after bloom when the seeds have formed and, in fact, are nearly mature. With other crops that stage of bloom does become important because with a plant like alfalfa, the best distinguishing characteristic for an alfalfa variety is the blossom color. So it is more important with some crops that we inspect in the bloom stage than with others.

HRP: Do you want to bring in that story of the pure seed committee going along with you and how they were going to turn down this man's field--I think that is a very amusing story.

FGP: I remember in one county, a very active committee, made up of farmers who were seed growers, was quite interested in seeing that the program go the way it should go--high quality fields, good appearance, free of weeds, and generally such as to do credit to the program. As we went out this day in that county to check fields, the committee was telling me that this one grower, whose field they had already seen, was just getting too careless. He hadn't been taking care of his fields like the committee thought was proper. The field wasn't in very good shape this year, and we were just going to have to turn it down, they said. They were determined about this. "We" were going to tell him that he was going to have to straighten up, and "we" were going to turn the field down. Yet when we got there and climbed out of the two or three cars we were riding in, I went over to the farmer and was getting ready to start this conversa-

FGP: tion about how he was going to have to clean up the field or we were going to have to reject it and all of that, I became aware that the committee was no longer with me. I looked over my shoulder, and they were about fifty feet away. "We" got him told and did reject the field, but I did it.

There were various humorous, and some not so humorous, incidents. Another one was in a county in the Central Valley where there was a grower who had a field of blackeye peas (cowpeas). This field was rather badly contaminated with weeds, though perhaps not sufficient enough to turn the field down, or at least it could be so argued. However, the committee was adamant. There was just no place for a field that had that many weeds, at least for certified seed production in that county. The field was going to be turned down. The grower said that we couldn't do it. Well, we did turn the field down as the standards certainly permitted us to do, because the standards say that on top of everything else, the field must be reasonably free of common weeds and present a good appearance. This grower made considerable noise later about taking action of some kind or another against both the state program and the county committee, but I guess that he was told by various ones that if he was smart he would not pursue the matter, and that was all we ever heard of it. After all, the field had been inspected by a group of his peers--other seed growers.

One rejection I had to make in the early days was a field of wheat in Kings County. It was 1,900 acres, roughly three sections (one mile wide, three miles long). Apparently, grain had been hauled in trucks the year before in a diagonal sort of way across the field. Seeds falling off the trucks had grown along with the planted crop, thus contaminating the field. I thought for a while, after walking through much of the crop, that the offending strip might be cut out separately. However, I had to conclude this was neither possible nor practicable. The field had to be rejected, so I went to find the grower. I was pretty shook up over the magnitude of the thing. It was a huge field. The grower, though, was quite philosophical about the matter and accepted the decision with composure. Some growers in Kings County just don't consider fields of 1,900 acres all that big a deal.

AID: Did any of these ever come to a lawsuit?

FGP: Yes, but not the type of incidents I am talking about now. There was a lawsuit in our history a little later. I will be telling about it when we discuss the mid 1950s.

HRP: I used to worry because California was supposed to have lots of

HRP: rattlesnakes in some areas. You walked right out into fields and through them. How were you going to know whether there were rattlesnakes or not?

FGP: I came from a country where there were no rattlesnakes. I was aware of this for a while, but in tramping hundreds of miles in fields of all sorts, I have never seen a rattlesnake in a field of certified seed or in a field of any cultivated crop. It was only on hunting expeditions or fishing trips that I saw rattlesnakes, in the rough country around streams, or in country where you might be deer hunting. Now, one grower in the Tehachapi area who was growing certified alfalfa seed up a little canyon there did have, according to him, so much trouble with snakes that he simply could not keep men in the field to work with hoes and equipment to chop out the weeds. They would simply refuse to go into the field.

AID: How about rodents? Did you see many rats?

FGP: The common rodents are the pocket gopher and ground squirrels. By all odds, the most common rodent found in the field in California is the ground squirrel, and if control measures are not taken they can be a problem, although usually only around the edges of fields.

SEED INSPECTION

- FGP: The final step in the certification process is seed inspection. There are standards which must be met. A typical standard, for let's say wheat, would specify that the seed germinate 90 percent, that it contain no more than 0.1 percent common weed seeds, no more than 0.1 percent inert matter, plus various other factors. Seed inspection is a different proposition than field inspection. Inspecting a field is relatively free of complications. It lies there, containing so many acres, and you can walk through it, all or whatever part you feel needs inspecting, to determine the true situation. The seed, however, may be in a big bin or in hundreds of sacks. There is no way that you can take a look at each and every little part. You have to rely on a sample of seed, hopefully one that truly represents the entire batch of seed.
- HRP: How do you get the sample?
- FGP: Sampling is under the jurisdiction of the county agricultural commissioner. He may either take the sample or authorize the seed handler to get it. Regardless of who takes it, the big concern is that it be representative of the entire lot, meaning that any portion of the lot should be reasonably like the sample. Basically, there are two ways to get samples. One is to have a device which catches a tiny portion of the stream of seed as it flows out of the cleaning equipment, or to have a person grab a handful regularly. The other is to wait until cleaning is complete, then, by the use of probes, draw small amounts of seed from different places in the bin or pile of sacks.
- HRP: What if the batch of seed varies a lot, and there was a bad weed or something in one of the sacks or some portion of the bin that was missed in taking the sample?
- FGP: That is a problem. We try to eliminate much of this at field inspection. If the field has too much of anything we reject it for certification, or if only a portion of the field is bad we reject that. In other words, we don't let fields get by if the

FGP: seed coming from them is apt to not be uniform. Further, we insist that the farmer and the people responsible for processing handle the seed in a manner to keep it uniform. Sometimes we will request that the farmer make two or more lots of seed at harvest time, if this can keep seeds of similar quality in the same lot.

HRP: You mentioned probes that are used in taking samples. What are these like?

FGP: The ones that are used to sample seed in sacks are a short tube-like metal instrument which tapers gradually from one end to a sharp point on the other. This is stuck through the cloth or paper, whichever the sack is made of, and an opening in the side of the tube lets a little seed flow out. If cloth, the opening will close satisfactorily, with a bit of scratching the threads back together. If the sacks are paper you have to cover the hole with a piece of tape.

For sampling seed in bins, a long tube with a smaller tube inside it is used. There are openings the full length of each tube. Before the probe is poked into the seed the inner tube is rotated to close the openings. Once inserted all the way, the inner tube is rotated to align the openings so that seed can flow in. The openings are again closed and the probe withdrawn. You then have a small quantity of seed from each depth. It is important that this probe go all the way to the bottom of the bin.

HRP: Then the sample is tested to see if it meets the standards?

FGP: Yes. However, I should point out that in testing we often do not do as complete a test as the official rules for testing seed would require. We did in the early days but not recently. As far as meeting standards is concerned, the California Crop Improvement Association wants to know whether the seed sample involved meets standards, not its precise percentage of germination, inert matter, or whatever.

HRP: So long as it is as good as, or better than the standards require?

FGP: Yes. If one understands that seed certification standards are minimum standards and that the certifying agency is not concerned with how much over the minimum the seeds test, then one can see that only enough testing is required to determine if the seed met the minimums. For example, if we are talking about germination and the minimum is 85, and the certification agency can assure itself that the seed is at least 85, it is not impor-

FGP: tant whether it is 90 or 92 or 95 or what. And this is exactly what began to develop. There was no question at any of the time but what the seedsman, or handler--whoever sells the seed, is responsible in the eyes of the law for having the seed accurately labeled for such things as germination, weed seed content, inert, and all the rest. It is up to the seedsman to get that information by whatever means he desires. Usually, the seed company had its own laboratory, or used a commercial laboratory, and could get much more rapid results than through our state testing at that time.

HRP: This would make the movement of seed easier for him. If he knew that it was going to pass certification, then he could start moving it and getting it ready for shipment.

FGP: That is true. With this development of short-cut methods the whole certification process was speeded up. We have talked about the examination of alfalfa seed visually to determine how well it grew. Also, with determining laboratory purity, we use short-cut methods. The analysts no longer were expected to actually count out every last particle of inert, or every last weed seed, or other contaminant.

HRP: Or broken seed, or damaged seed, are those counted out too?

FGP: Well, broken seed is counted as inert if the piece of seed is less than one half in size. Anything one half or over in size is counted as whole seed. In practice, the analyst would take out the inert matter, or weed seed, or other crop seed--whatever the offending mixture was, and place it on a balance. If it was less in weight than the standard permitted, the ingredient would not be actually weighed. The analyst was instructed to merely only come up with an actual weight figure when things were close. The minute that any offending mixture became too great, the analyst would stop work on it, and it would be turned down for certification for whatever factor was involved, whether it was weeds, or inert matter, or other crop seed. Of course, the analyst always started with a specific weight in the portion to be examined. One way of getting at dodder, which is a common noxious weed in alfalfa, was not to try to pick it out by hand, but put a one pound sample of alfalfa seed into a dodder mill and run it through mechanically to determine the dodder content.

HRP: How did the dodder mill work?

FGP: The dodder mill is an interesting device. It consists of two rolls mounted in a frame on an incline. These rolls are rubbing together, and they are covered with velvet cloth. The seed is fed into the top. As the rolls rotate outward from the center

FGP: the smooth alfalfa seeds slide down the incline, not going through between the rolls, while the dodder, which has a rough seed or any other seed which has a rough coat, clings to the velvet surface enough so that it is carried up and over the top of the roll and is discharged into a separate spout. This is much faster than trying to pick the dodder seeds out by hand, and since we do not allow any noxious weeds in certified seed finding even one dodder seed in a pound of alfalfa could reject it for certification.

HRP: In telling the Alfalfa Story, you talked about research done in seed testing by Luther Jones and Rodney Cobb in the laboratory, or a good share of it was done in the Crop Improvement Association seed laboratory.

It was decided early in the 1950s that since the state lab was simply unable to keep up with all the certification samples, added to the rest of the work that they had to do, that the California Crop Improvement Association would undertake to develop a seed lab of its own. And this was done. The first seed laboratory was in a rented office building on Second Street in Davis. This room was fitted up with the necessary equipment, and a person was hired to test seed according to both the approved seed testing methods and the Crop Improvement Association technique which involved some of the shortcuts already discussed. This laboratory was under the rather close supervision of the state, and part of the time a state seed analyst was actually present in the laboratory. It did provide a place where Rodney Cobb could put into practice some of the devices that he had developed and which, while not recognized as satisfactory for official seed testing, could be used in the seed certification process.

HRP: He was a state laboratory person, wasn't he?

FGP: Right. Cobb was in charge of the State Seed Laboratory at that time. You know, I think this would be a good place to include a direct quote from Rodney, taken from a statement he made rather recently (May 5, 1977). He had this to say about the laboratory testing of certified seeds for California Crop Improvement Association:

"In the early 1950s there was a seemingly endless flow of seed samples each fall for the laboratory testing necessary to determine whether they met the requirements for certification. That seasonal rush exceeded testing capacity for several months each year and resulted in extreme delays in the certification process. The first move to improve that situation included the establishment in Davis of a branch labora-

Cobb quote: tory operated cooperatively and under supervision of
(continued) the California Department of Agriculture.

At that time the testing was being done entirely by hand in ways that had not been improved since the introduction of seed testing in the 1890s. The bulk of those samples were of 'free-flowing' seed such as alfalfa and Ladino clover. Such seeds were suited to very rapid testing if a machine could be devised for their efficient movement under a very low-power binocular microscope of a type not then available in the United States.

The First Seed Testing Machine

Starting in 1954, I had been designing and making such a machine in my home workshop, except that it was equipped with a hand-lens as the magnifier of the type then in common use except that it was in fixed position instead of being held in the hand as was the common practice. I had demonstrated that machine to the management of the Sacramento Seed Laboratory only to find that its proposed use was rejected without serious consideration. It was then that I decided that the only hope for its actual use under laboratory conditions was through Frank Parsons and the CCIA.

Frank was interested and willing to give it a trial. We agreed that I would build a working model in my home, on my own time, for the cost of materials only--which came to \$22.50, as I recall--and the CCIA would purchase the microscope for it when and if one could be found which met the required specifications. That was in the early summer of 1957. Frank and I, unknown to each other, soon located a desired microscope for the machine, one then newly developed by the American Optical Company and being produced by its Defense Division in New Hampshire for use in the assembly of military electronic devices in the development of the space program which was just then getting under way. We had a good laugh when I hurried to Davis to show Frank the prospectus on that new instrument, and with a grin he told me that he also had learned of it and had purchased one. Its cost was \$200.00 compared to the \$10.50 for the hand lens it would replace. With the arrival of the microscope, in late summer, the machine was ready for measuring its effectiveness during the rush of post-harvest samples that would soon be pouring into the Davis laboratory.

Cobb quote: In the autumn of 1957 and the winter of 1958, tests made on Crop Improvement samples proved that on 2,000 tests of alfalfa seeds the production per worker was more than doubled. The designing of more versatile and improved mechanics of the machine was then made a sub-project of the existing U. S. College of Agriculture Project #1549 with agronomist Luther G. Jones and John R. Goss, specialist in agricultural engineering, also participating. By late 1958, an improved model was operating; later that machine was introduced into the Sacramento Laboratory, and its publication in national and international seed technology journals brought world-wide attention."

FGP: In addition to devices for expediting purity tests Cobb and Jones began to work on different methods of germinating seed. One of their techniques was to use a plastic plate on which was placed a blotter. The blotter was moistened, seeds placed on it with the conventional seed counter, the plates then placed in an upright position, or inclined, partially upright position, and with the bottom part in a tray containing a small amount of water.

HRP: This allowed the blotter to get into the water?

FGP: The blotter itself was not quite in the water, but a small piece of blotter protruding down from the main section acted as a wick to bring moisture up into the blotter.

HRP: Did these have to be tilted at a particular angle?

FGP: The angle is not particularly important, but there seems to be a place that works out the best. A 45 degree angle is somewhat flatter than is necessary, so it was somewhere between vertical and 45 degrees that was determined to work out the best. The seedling grows straight up vertical, so if the inclined plate is slanted at say 30 degrees off the vertical the seedlings growing straight up will be out a ways from the blotter, thus counting is very easy as compared to conventional methods which previously had consisted either of rolling the seeds up in a blotter, like paper towels, or sometimes with small seeds being placed in a petri dish on a blotter with the seedlings curling and growing every which way, which made separation and counting extremely difficult.

HRP: These looked almost like they were growing in a field, I suppose?

FGP: Yes. That is right. It made counting of seedlings very much

FGP: easier. The roots would go down toward the bottom of the blotter and the tops would go up and point away from the blotter. Each by itself and since each seed had been spaced out with the vacuum-type counter that the analyst had used to place the seeds on the blotter, the plants were easy to observe, and one could tell at a glance which were normal seedlings and which were not.

One other advantage of this slant-board technique was that light could get at the seedlings resulting in faster growth. As a matter of fact the testing of certified seed samples began to utilize various shortcuts in this connection. While it was not usually considered orthodox to use more than customary day-length amount of light in germinating seeds, with seed certification the concern was to find out that the seed met minimums, and not necessarily the exact germination. It was found, for example, that by using light nearly 24 hours a day with rice the germination time could be cut in half or less. While this was not considered orthodox testing, it still enabled us to determine whether certification standards had been met, clear the seed by issuance of a certificate, and leave the actual germination figure up to the seed handler involved.

HRP: Even though unconventional, it meant a great deal in speeding up certification, did it not?

FGP: That is true. Often many thousands of dollars were involved in a single lot of seed. Sometimes the planting season was coming on, or a sale had been made, and it was important to move the seed rapidly. If seed certification was going to be utilized to any great extent, it had to be done with a minimum expenditure of time because, after all, it was additive to the time normally involved in the processing and preparation of seed for market. If seed had been harvested early and it was possible to clean it early, with all of the other things taking place well ahead of planting or marketing of the seed, there was no problem. Usually, though, this was not the way things worked out in actual practice.

HRP: Well, germination could vary also if you were going to harvest your seed in the fall, and then by the spring germination could have changed, could it have not?

FGP: Seed germination can change, yes. Usually there is not too much of a problem in the first year. The germination will hold about the same. But with any seed that has been damaged a small amount, sometimes beyond a certain point, germination begins to drop rather rapidly.

THE BLUE TAG--WHAT DOES IT MEAN?

HRP: One of the things that was important in the early days and was stressed was the fact that when you bought certified seed you were getting good seed. You were getting pure seed, weed-free seed, that would germinate well. The blue tag was supposed to mean all of this. Was that really correct, or was that an illusion that I had?

FGP: That the blue tag meant all of these qualities?

HRP: Yes.

FGP: That wasn't an illusion. That is an association most everyone makes with the blue certification tag. It conveys to the public almost everywhere that here is a seed which is high in quality and free of harmful mixtures of any kind. The basic purpose of certification is the genetic purity, which means that the blood-line is pure regardless of any extraneous matter such as weed seeds. It was in some ways an illusion that certified seed was as great as the public thought it was. Actually, in spite of quality standards, it often wasn't perfect.

HRP: And this later became a subject of controversy is the reason that I am bringing this out.

FGP: There was a great deal of controversy that raged across the United States as to what certification was supposed to do. The seed industry a long time ago began to contend that the only important ingredient in certified seed is its genetic purity, that this is the only thing that the seed certifying agencies, the crop improvements associations, should concern themselves with. The argument was that the seed industry itself, the individual seed company, could take care of the mechanical purity. This did not require the semi-technical, professional certification-type program to handle it--I am referring to such things as germination (percentage of seeds which grow), weed seed mixtures, and other crop seed mixtures. The seed industry was saying, and had said for years, that this was none of certi-

FGP: fication's business. The fact remains that from the time certification programs got started very early in the twentieth century, high quality was associated with certification. It was simply unheard of to omit anything so important as germination, quality, freedom from weeds, and other physical nongenetic characteristics. The argument waged hot and heavy and became more of a sore spot between certifying agencies and the seed trade in the 1950s, reaching a climax late in the 1960s and early 1970s. Ultimately, some agencies did adopt what is called "certification for genetic purity only" type programs. This means that they continued to maintain all the qualities of certified seed that involved germ plasm, pedigree, or genetic purity, but leaving the physical characteristics, that is freedom from weed seed, germination, etc., to the seedsman or handler that prepared the seed for market and sold it. Much of the trade thinks this is what it wants.

California, to this day, insists on adherence to certain quality standards in addition to genetic purity. However, some compromises have been adopted. This goes back to the late 1940s. It was in 1948 at an annual meeting, where I find reference in the minutes of the meeting on May 13, of action taken by the Crop Improvement board of directors to remove from the certification tag any mention of laboratory purity, germination, weed seed content, other crop seed content, and that type of information. The tag from that point on has contained only the name of the variety and crop plus a lot number, or certification number. Now this is not elimination of standards for such things as germination or weed seed, but it did permit the seed handler or party who is marketing the seed to put such information on his own label. So this, in a way, was a concession to that argument that standards for germination, weed seed content, etc. was not the business of the seed certifying agency. We call this the two-tag system.

HRP: However, to be certified, it did have to reach certain standards along this line. Is that right?

FGP: That is right.

HRP: And you can get these standards if you wanted to?

FGP: The standards for seed certification have always been well publicized and are available to anyone who wants them.

AID: What was the basis for the seedsmen's opposition to quality standards?

FGP: This gets into a philosophical discussion. The argument goes

FGP: like this: If all of the qualities that go into making good seed are safeguarded by certification procedure, it leaves no basis for competition between the different handlers of certified seed. They used to say, "You have got us all into one strait-jacket. We are selling the same product, and this is contrary to good business. Unless you have some particular gimmick, or some particular feature of your product that you can capitalize on in your promotion and advertising, it is very difficult to sell anything. If the public looks on the blue tag of certification as symbolizing one quality, it makes it much more difficult. And if you want our participation, if you want us, the seedsmen, to handle certified seed, you need to remove this strait-jacket." There is good argument for such statements. On the other hand, there are always, as is probably true with most businesses, seed handlers who are willing to handle an inferior product if they can sell it. And it was felt by certification officials that we could not yet jeopardize the program by eliminating standards altogether.

Now, there had been other compromises made over the years, even in California which has tried to remain free of going all the way into certification only for genetic purity and where we still require standards for such things as germination. Even so, a handler of seed can request that a particular lot of seed be certified, assuming that it meets genetic purity standards, but is out of compliance with some nongenetic factor, such as germination. We now often permit this, but the label then must say on it, "Differs from certification standards on account of. . ." whatever the factor was.

AID: You said earlier that the blue label did not require any mention at all of quality standards.

FGP: That is true. Beginning way back in the '40s, we took such information off the certification label, but we still required that the seed samples meet quality standards.

HRP: Didn't the seed companies themselves put these quality factors on their own labels?

FGP: Yes. You must remember that seed laws across the land require that seed be labeled correctly. All states have seed laws. There is a Federal Seed Act, and all of these laws require that seed be accurately and truthfully labeled. This is another argument that the seed industry used, that labeling requirements of law kept them honest--that "we have to label the seed regardless of certification." The problem was that the law permits the selling of any quality of seed regardless of how poor, so long as it is truthfully labeled. Most of us feel that certi-

FGP: fication, to maintain a proper level of respectability, has to meet certain standards of quality other than just genetic purity.

HRP: And this has been, at times, a very hot issue between the certification people and the seed trade.

FGP: It not only was a hot issue, it was an issue that was discussed, debated and otherwise argued about for years and years. We never came to blows with our friends in the seed industry, but often arguments got pretty intense. Much of my effort at times in such circles as the International Crop Improvement Association was spent in fending off or combating this type of argument. I felt, and still feel today, that there has to be a certain respectability or quality inherent in certified seed.

While we are talking about what the tag means, we should bring in another problem which was that from its beginning, certification carried the connotation, "This seed is recommended." The farmer didn't quite understand that the basic recommendation was that it was of known genetic purity, that it was directly traceable to breeder seed of that variety. To certify was to recommend, and the blue tag meant to the farmer that the seed was recommended.

HRP: And this would mean that it was recommended for his location, was the idea, maybe?

FGP: To recommend often meant to the grower that it was recommended everywhere. The mere fact that it was certified meant to many growers that it was recommended for his own particular farm, yet nothing could be further from the truth sometimes. If seed was moved from one state to another, it might be totally unrecommended or undesirable in a given situation. It was unfortunate that this confusion grew up with certification. It created one heck of a problem for the industry. Anytime they tried to merchandise certified seed they were in effect merchandising a product that was thought beyond reproach--that meant everything to everybody. There was no room for competition to operate. It is as though merchandisers of washing machines were allowed to merchandise one brand only and that alone. You can imagine the problems in trying to advertise and convince your would-be purchasers that your particular washing machine was better than your competitors' when everybody knew that they were the same product and that each one carried a government label on it. And in a way, the seed certification label was that sacred. It was looked upon as a very official, at least semi-government type label, and too many people thought that merely to buy certified seed was enough, without even worrying about whether it was the

FGP: right variety or that it actually might have more weeds in it than were necessary.

It was during some of these periods that I may have appeared to have aligned myself with friends in the seed industry, because I certainly sympathized with their demands that something be done about this situation.

HRP: What did you do to relieve this problem?

FGP: Mostly it was a matter of education. Extension people, the certifying agencies, and the seed industry did begin to be successful in creating a more understanding image of the blue tag. Seedsmen began to push their own brands of certified seed explaining to farmers that certified seed was not all exactly the same.

PROPRIETARY VARIETIES

AID: Have you mentioned the number of seed growers as they increased over the years? Was there a change in the actual varieties that were included in the seed certification program over the years?

FGP: Yes. This change went on constantly. We have had our basic crops such as wheat, barley, and oats. We have had certified rice for years. We have certified alfalfa and clovers. But the varieties keep changing; they keep being up-dated; they are improved on continually. Not only by the public plant breeders such as we have here at the University of California and the U. S. Department of Agriculture, but by private breeders.

By the 1950s private companies had become more active than they had ever been before in developing plant breeding programs. Perhaps today, 50 percent of the varieties of some crops we certify are privately owned varieties. This was quite a departure. I think this first came up in the mid 1950s when it was proposed one time to approve for certification a hybrid corn. It was privately owned, and there was considerable discussion according to the minutes of that meeting, whether this was proper or not to accept for certification a privately owned, privately controlled variety. Traditionally, seed certification had been limited to publicly developed varieties.

AID: When you say privately owned, you mean mostly by seed companies?

FGP: We refer to them as proprietary varieties, and yes, it does mean owned by seed companies. They have developed the variety; they control it; they have exclusive rights to it through patenting provisions if they wish to have such protection. However, it has been interesting to find that with many crops, private companies have desired to have their varieties certified.

AID: And they are so certified?

FGP: That is right. Of course, certification is in itself an added protection for a proprietary or privately owned variety. In

FGP: California, and I think that this is true elsewhere, the Crop Improvement Association will certify seed of the private variety only for the rightful owner, and should someone try to get a crop of that variety certified that did not have a right to it and had not obtained the planting stock with the knowledge and consent of the rightful owner, the agency would refuse to certify it. There is in seed certification a protection that is valuable to the owner of the variety. I made a talk on this subject at one time at a meeting in Denver pointing out the protection offered by seed certification. This was in the early days of the development of legislation which brought about passage of a federal law known as the Plant Variety Protection Act, which I will be telling about later on.

A NEW ERA--LEARNING TO FLY

FGP: In the 1950s there began an era that perhaps will never be equaled or certainly can't be compared with another era very well. It represented, in California, the peak of our certification work. Many new concepts came into being. There was much streamlining of the certification procedure. I like to think that certification came of age in the 1950s, certainly in California. And I think this is true to some extent throughout the country. With the advent of the 1950s our program had grown to such an extent that it was necessary to employ an additional staff person. It was in 1950 that Burt Ray was hired. His being hired was approved in a California Crop Improvement Association board meeting on May 18, 1950. He went to work on July 1 of that year.

With the hiring of Burt Ray, which was simultaneous with the tremendous early growth of the program--from a situation where we had a fairly small number of growers to that of having many growers and reaching nearly two hundred thousand acres--in fact we passed two hundred thousand acres later in the '50s--it became obvious that there had to be a better way to get around in the inspection of certified seed fields and the other travels that were necessary. It so happened that Burt Ray was a pilot out of World War II, where he had flown a B-29 bomber, and he couldn't see driving up and down the state in an automobile. He thought there was no reason that the Crop Improvement Association couldn't rent an airplane, and we would fly. So this was done. The directors approved renting an airplane, and I had my first ride in a small airplane. I immediately saw that this was the way to go. In 1950, I began to take flying lessons and continued to do so until I got my private certificate to fly airplanes in 1951. Therefore, before very long there were two of us who were able to fly the airplane. This was revolutionary in seed certification circles. No other crop improvement association had two pilots on their staff. It certainly made getting up and down the state much more convenient and made the whole certification process much more efficient. Actually, with the 1950s, had it not been for the fact that Burt and I were

FGP: pilots and had access to a plane, we would have had to set up a branch office, probably in Bakersfield because we had so many growers down there.

AID: What kind of a plane was it?

FGP: We started with a Cessna airplane. It was a Cessna 170, which was an old tail-dragger type airplane, meaning that it landed on two wheels, and there was a small swivel wheel on the tail. In later years most airplanes went to the tricycle landing gear.

HRP: However, you had rented a plane, or planes, for about one year.

FGP: Yes. We rented an airplane from John Patterson who, at that time, was in charge of the University airport west of the campus. Then in May, May 17, 1952, at a California Crop Improvement meeting, it was proposed by Bernell Harlan that the Association should purchase an airplane. Then, in the directors meeting that followed this general meeting, board member Albert Bevis made a motion, which was passed, to purchase a plane. This plane was the Cessna 170 that I just talked about. From that point on the Crop Improvement Association has owned an airplane. The second one was a Cessna 180 which was a tail-dragger too, but it had a larger engine and carried the people that we needed to carry. This is interesting--many people around the University particularly in the agronomy department, expressed a fear of flying in small airplanes or thought that this wasn't for them, but as soon as the Association had an airplane we found that we had more friends than you could believe. Members of the department, or extension agronomists who worked with the department, found ways to fit their schedule to ours and would ask to go along with us. We were always willing to accommodate them. The only requirement was that they flew when we flew and made their trip the same day we did.

AID: How many passengers did you take?

FGP: All of the aircraft that we have had were essentially four-passenger aircraft. The Cessna 170 had difficulty getting off the ground if you had any luggage in addition to the passengers, and this was one reason that we went to the heavier airplane with the larger engine. Then as modernization took place we got into tricycle landing gear type aircraft. The third airplane was a Cessna 182, and it had the tricycle landing gear. After that we decided that we needed a higher performance airplane and bought, in 1959, our first plane with a retractable gear. This was a Piper airplane. We had two different single-engine Pipers. Then, bringing us all the way up to the present day, we have owned two twin-engine aircraft, both Piper planes known as Twin

FGP: Comanches. The plane that California Crop Improvement Association owns today is one of those twin-engine aircraft. This meant that I had to go ahead and get my multi-engine rating, and during some of this I took sufficient training to get instrument rated. At the present time I have well over 3,000 hours of flying time in small aircraft. I can't begin to emphasize enough how important the airplane has been to California Crop Improvement Association and to the farmers and seedsmen that we serve. If it had not been for hiring a pilot, who happened to be Burt Ray, we very likely wouldn't have taken this course.

HRP: May I ask, did that episode of flight failure in the air have anything to do with your getting the twin-engine plane?

FGP: Always, when you are talking about aircraft, you have got to realize that pilots defend vigorously the idea that aircraft are safe, and we are often asked if we have had incidents that shake our faith in airplanes. But with 27 years of flying and thousands of hours between Burt and me, we have had no incidents that were cause for alarm.

There was one in which four of us were aboard. Burt was flying; I was co-pilot, and the engine sputtered and began to run rough over San Bernardino. We were headed for Imperial Valley.

AID: In a single-engine plane?

FGP: This was a single-engine plane. It was a bit more exciting than it might have been otherwise because we were on top of an overcast, and had the engine quit altogether we would have had to glide down through the overcast and find someplace to land. But the engine continued to run, even though rough, and we were able to maintain enough altitude to fly on east through the Beaumont Pass and land at Palm Springs. We have been kidded since then about where we had to have our forced landing, the only one we have ever had, right over Palm Springs. But we landed and the engine quit as soon as we reduced the power. We had to be towed off the runway. We found, when the mechanics went into the engine, that the head of one of the valves had broken off, had gotten on edge and embedded itself in the top of the piston. This is what caused the roughness. The remarkable thing is that the valve head did not go all the way through the head of the piston, get into the engine, and cause the engine to stop completely. It made for a much safer and much less strenuous job of getting the plane down than it would have been if the engine had stopped altogether.

AID: Do you fly in bad weather?



Frank Parsons leaving on trip in Comanche 250, 1959.



Frank Parsons (center) and Arthur Young (right) receiving honorary membership, International Crop Improvement Assn. from Golden Stoker, President, Oct. 1965.

FGP: With instrument ratings which both Burt and I have we are able to fly in weather when the visibility is poor, and when you are in clouds or when you can only be legal by flying on an instrument flight plan. This means that your flight is monitored by the air traffic control people of the Federal Aviation Authority, and you can make landings or takeoffs in what is called "instrument conditions." Yes, we do fly in all kinds of weather. By that I don't mean quite all kinds. Two things that a sensible pilot avoids are conditions where icing can occur (ice forming on the wings when you are flying in clouds) and flying in thunderstorms. No good pilot wants to tangle with either severe icing conditions or thunderstorms.

AID: Flying over the desert you can get some pretty strong winds.

FGP: Yes. This is part of flying. You sometimes have a head wind, and you sometimes have a tail wind. You sometimes have a high crosswind which causes your navigation to be off unless you are alert and are aware the winds are blowing and in what direction.

AID: You have no tricky landings or takeoffs?

FGP: I suppose all pilots have some tricky landings, particularly if landing in a situation where the turbulence is very bad all the way down to the ground and a strong wind at an angle to the runway. You just don't land in a situation where the only runway has the wind blowing across it at right angles at considerable velocity. No aircraft can handle a safe landing under those situations. You had better go to some airport that has a runway into the wind.

HRP: Well, you used to land on farmers' strips because it would be close to the fields. The one that I was thinking about was when the cattle needed a rubbing post.

FGP: We used to land at farmers' strips quite often with a single-engine aircraft. These smaller aircraft we used to fly are better suited to short dirt strips. Sometimes you can find crop duster strips, or many of the large farmers in the San Joaquin Valley have their own airplanes with landing strips on their farms. Sometimes it is very convenient to use these. We haven't had a lot of need for that because we were always going out with a farm advisor and would land at the airport closest to the city where the farm advisor had his office. He picks us up with his car and takes us wherever we want to go. Or we use a well established airport that is near wherever we want to go. We had very few incidents of any great moment in using strips of that sort.

FGP: The time that you mentioned, we did land on this strip in what amounted to a pasture near the farm where we wanted to go. When we came back to the airplane we found that there were some cattle in the pasture, and some of them had been rubbing their backs on the trailing edges of the wings. This wrinkled up one of the ailerons a bit which didn't ruin its ability to fly. We took off and flew the aircraft home, but when we went to get this aileron replaced it got rather amusing as we tried to explain to the insurance agent how the damage was caused.

HRP: And later, we were back in Oklahoma near a state park at a convention, almost that same year, and there were buffalo running loose near where we parked the plane. We weren't sure whether the buffalo could get to where the airplane was parked or not. If they could we would have had a hard time explaining any damage done.

FGP: Yes. That was an ICIA meeting at the Western Hills Lodge east of Tulsa, and I guess that it was in part a game refuge. Fortunately, the airstrip there was a well maintained, adequate airstrip and was not where the buffalo could get at it, I guess. You know we could go on for a long time telling stories about flying, but what started this discussion was the growth of certification and the need for a better way to get around.

THE 1950S--A PERIOD OF CHANGE AND GROWTH

AID: Frank, what was it that caused this tremendous increase and participation in the early 1950s?

FGP: The tremendous increase in the 1950s was due, in part, just to the expanded interest in using certified seed across the country. We had various things going for us in those days. One was the ever-increasing acceptance of certified seed for planting, by California farmers, of such things as rice, wheat, and barley. But we had an expanding business with the certification of beans, which were planted both in California and for shipment to New York or elsewhere in the Northeast.

We had a considerable expansion in the production of Ladino Clover which was primarily for out-of-state use. The fact that the price support on Ladino Clover was something in the nature of \$2 a pound, or over, excited a lot of interest in that crop. Then the acceptance of California certified alfalfa seed was a big thing. At the peak of our alfalfa seed production, in 1954, we reached a 40,000,000 pound production of certified alfalfa seed in California. In 1957, we had 128,000 acres of alfalfa alone, certified alfalfa that is, and virtually all of this was for export to eastern states. This is why I say that in the 1950s seed certification really came of age. It was being accepted by the seed industry, which wanted to supply this demand from customers. The people in the alfalfa-using areas had come to depend upon California seed, and they knew that to get what they really wanted, it had to be certified.

Despite expanded interest by the farmer who wanted to plant certified seed, the growth in seed certification would not have been possible without acceptance by industry, which required change. We had to be flexible. We had to forget some tradition. We needed to become innovative and adopt new approaches. Let's discuss some of these, like blending, bulk handling, simplification in collecting fees, processor approval, initiation of pretagging, the handler's test program, and the recognition of what we call accredited processors.



Frank Parsons and Dan Best in field of certified Ranger alfalfa near Woodland, 1950.



Frank Parsons and Bernell Harlan in field of certified red clover near Woodland in mid 1950s.

FGP: Blending was authorized early in the 1950s. One of the complaints by the seed trade was that certification didn't permit enough flexibility to fit in with normal practice of processing seed. It was contended that if different lots of certified seed could be blended to make the finished product more uniform this would be desirable. In certification, however, there had long been the idea that the integrity, or the identity, of the individual lot should be maintained. It was very difficult to accept the idea of blending. Nevertheless, I think in 1950, we authorized blending of different lots of the same variety of seed if only a germination problem was involved. By this, I mean that if you had a lot of seed which germinated 70 percent, and you had another lot of seed that germinated 90 percent, and the certification standard required 80 percent, you could blend equal quantities of these two lots of seed and come out with a product that met the standards. This brought up one lot of seed into certification by bringing down the lot with which it was blended. You can see from this why there were arguments against the practice. Of course, it meant oftentimes using one grower's high germinating lot of seed to bring up a lot of seed from another grower that was a low germinating lot. And this sounds distasteful, but actually, from the standpoint of all concerned, it probably isn't as bad as it sounds.

By the 1950s, we found ourselves working more and more with seed handlers or processors who dealt rather heavily in certified seed and handled it on a large scale. We decided to simplify our collection of certification fees by billing handlers for these fees and letting the handler collect from the grower. The source of funds for the operation of the certification program generally depends rather heavily on income from certification fees, based on the seed that finally gets certified. It was in 1951 that we started making the charges to the seed handlers. It was much simpler than billing the growers. We could collect from a few sources the certification fee on seed that came from many growers. This cooperation by the handlers was very helpful to certification.

HRP: Was collection of fees in this manner well received by handlers and growers?

FGP: Certainly the growers didn't care. They knew they would have to pay the certification fee one way or another. The handlers, once they got used to it, understood that it was a service both to grower and California Crop Improvement Association and were glad to do it. I think it enhanced their relationship with growers.

In 1951 or 1952, steps were taken for the first time to recog-

FGP: nize certified seed handled in bulk. Up to this time certified seed was thought of as being handled almost solely in bags or sacks--sometimes burlap sacks, sometimes sacks made out of cotton, and not too far in the future, we found that paper sacks were available for this purpose. However, with seed like grain, more and more farmers in California preferred to go to the place where the certified seed was stored and take it directly in bulk in their trucks to their farms. We had thought up until this time that it was difficult to maintain the identity of seed handled in that manner, but we decided that if adequate precautions were taken this could be done. So we developed what we called a bulk handling certificate and used these certificates on seed even though the seed was in a huge tank or bin and not contained in small packages at all. This was quite a step forward.

HRP: How did you handle seeing to it that there was not contamination?

FGP: Throughout the certification process we rely on faith to some extent, even though we do use official supervision in varying degrees--like in harvesting and cleaning. Bulk handling can not be used except where the seed is going direct to the farmer who is going to plant it. Certainly, there is a chance for trouble but probably no more than with sacks. We never have checked the farmer's planting equipment, but generally he understands that he is responsible for it being clean.

In 1952, the concept of approving processors was adopted. Up until that time most anyone who had cleaning equipment or processing equipment could handle certified seed, but it was decided that we should have some sort of program that would recognize certain processors if specified restraints and standards were met. It was in that year, 1952, that we started designating what we called approved processors. The provisions were not so difficult as to prevent anyone from complying, but it did require that the processor be approved by the county agricultural commissioner and, in turn, be approved by us.

AID: What did he have to do to be approved?

FGP: He had to agree to cooperate with the agricultural commissioner at all times, abide by the rules and regulations of the Crop Improvement Association insofar as handling certified seed was concerned, agree to maintain the identity of the certified seed, and to clean out all equipment before processing certified seed. It was requirements of this sort that were stated on an agreement form which the processor had to sign and which, in turn, was signed by the agricultural commissioner and by the Crop

FGP: Improvement Association. Incidentally, the certificates that we issued, stating that the seed handler or processor was approved, were frequently found framed and hanging on the wall somewhere on the premises. These were a pretty fancy sort of certificate, on heavy paper with an attractive border and nice lettering. They were prized rather highly. We would renew these each year if the processor continued to live up to the requirements of the program.

HRP: Did you ever have to rescind your approval of a processor?

FGP: Yes, once in a long while--and then only temporarily. It happened very seldom, but when it did we got the processor's attention right away. It was too valuable a privilege to lose.

Pretagging, as we called it, or allowing the certified seed tag to be attached before certification is complete, was begun in this period.

Certification, of course, is not complete until the sample is tested and it has been found to meet the standards. If attachment of the certification tag is delayed until after the seed is tested an enormous problem arises where seed is in sacks piled high in the warehouse. It is almost impossible to get at, for attachment of tags, short of tearing the pile down. Of course, one can say hold the tags, and attach them at the time the seed is shipped out. In actual practice though, there is too little time and too much inconvenience connected with doing it that way. It is much easier to attach the certification tag at the time the seed is cleaned and processed. But this means placing a certain amount of trust in the handler because the seed still is not certified when the sample is drawn, and if the handler elected to sell it or ship it he might do so if he were dishonest. So we had to trust the seed handler to permit this pretagging and devise provisions for his agreeing to hold the seed until certification was complete with the agricultural commissioner helping us to enforce that provision. It again represents our willingness to attempt to accommodate problems that the seed industry had in handling certified seed. This became very important when we began to get into large scale handling of certified seed. The seed industry could handle it like they did any other seed and not be inconvenienced by it.

HRP: Did you have trouble with anyone moving seed after pretagging but before certification was complete?

FGP: Not with any intent to get away with something. Occasionally, someone slipped and let seed move before the certificate was issued, but we were always able to catch the seed before it had

FGP: gone far. So often the seed passed certification anyhow and no harm was done. We never treated such things lightly, however, and were pretty stern with a processor getting careless. The real risk, of course, was with a lot failing to pass certification. If it were pretagged and allowed to get away before the tags were removed, we really would have had a problem. I don't recall this happening where the seed was not caught. We are talking about something that just didn't occur very often.

Then the handler's test program came about in 1953, and this represented another important step. It consisted of recognizing the handler's own test. After all, we had been having great difficulty getting samples tested fast enough to satisfy the industry. In spite of everything that we and the State Department of Agriculture could do, it just simply took a long time to get the certification tests back to the seedsmen handling the seed. They pleaded to be permitted to run their own test, assuring us they were capable of assuming this responsibility. So with a few misgivings, we decided to permit this, and to assure compliance a \$500 bond was required of the applicant. Anyone desiring to use his own test on which to label certified seed would post this \$500 bond and sign an agreement, then was free to sample and test the certified seed. Our test would follow along later. If there was anything wrong, we would cause an investigation to be made, and if we found that something was willful in this respect, the \$500 bond would have to be forfeited.

Actually, the program worked very well. We did permit some tolerance in the observance of the certification standards. That is for example, should an 85 percent germination be required and our test showed up with an 83 or 84, we would recognize this as normal variation between samples and would take no action. The California approach to a matter such as this has always been one of faith that the seed industry and those companies or persons handling certified seed are basically honest. To make a program successful there has to be a considerable element of trust. The certification program had grown so large by the 1950s that it would have been utterly impossible to handle every facet of the program strictly by hard supervision. Eventually, our laboratory was able to keep up with the testing load so we discontinued the handler's test. However, it was the forerunner to putting more responsibility for certification detail onto the handler.

Late in the 1950s, it was obvious that several seed handlers were handling certified seed on a large enough volume so that they should be able to assume considerable responsibility for operating according to certification rules without a great deal

FGP: of supervision. With this in mind, the accredited processor program was formulated and put into practice. This consisted of permitting those who handled a great deal of certified seed and with whom a large percentage of their business was in certified seed to do their own sampling, clean up their own equipment, inspect the equipment, and maintain records showing that all of this had been done. Any firm or handler qualifying under the accredited category was required to appoint a person known as a certification representative. That individual was responsible for cleaning up equipment, drawing samples, keeping records, and being responsible for this to the agricultural commissioner. The agricultural commissioner could make spot checks whenever it was felt necessary, but for the most part did permit the accredited processor to operate without supervision. This was a great step forward in streamlining the certification procedure in California.

In 1957, it was obvious that the program had grown to such an extent that more help was needed in the seed certification office, so Robert Ball was hired. Incidentally, he is one of the individuals who had received some of his training or experience under Luther Jones by virtue of funds which California Crop Improvement Association had provided for Luther Jones's research in seed production. With the addition of Bob Ball to the staff, this made three of us, with Burt Ray and me. In addition, there was Warren Johnson with the State Department of Agriculture, thus making a force of four of us that could go into the field and make field inspections if necessary. Then, too we employed a number of people on a part-time basis during the heaviest need for field inspection. Most of these were farm advisors working for a week or two each. This was vacation time they were using, and it always interested me that the several farm advisors who did this looked on it as something more than just a way to make a few extra dollars. They enjoyed the opportunity to get acquainted with agriculture in counties other than the one where they lived. We do not allow them to inspect fields in their own counties. In addition to farm advisors we have had two or three high school teachers who inspect fields every summer.

In 1957, the acreage reached its all-time peak, 185,000 acres in the certification program, 128,000 of which was alfalfa. The program leveled off and began to decline a little from that point but remained in a healthy enough state, though not as large as it was in 1957. Actually, there was an overgrowth that peaked out in that year. We had too much certified seed of alfalfa. In addition to the staff already mentioned, there were as many as five women in a clerical or secretarial capacity employed in the office. Also, additional people were hired during field inspection to take care of that portion of the

FGP: work. With the size of the program it was more important than ever to become as efficient as possible and to create the most effective means of operating certification.

Certification did meet the challenge in California and throughout the United States. The late Ken Christiansen, in talking to me not long before his death, paid a very high compliment to leaders in seed certification. His words were about as follows:

"Had it not been for the vision of a few individuals who understood the problems and were willing to try solving them, seed certification would not have survived, at least to grow to its present stature. There was a time when it was in balance. Had it not adapted to industry's needs, industry would have gone on without it."

THE COUNTY AGRICULTURAL COMMISSIONER

AID: You have mentioned the county agricultural commissioner frequently. I gather that this office is rather important to the California seed certification program.

FGP: It certainly is. We could not function nearly so efficiently nor effectively without their help. The agricultural commissioner is a great asset to seed certification in California. No other state has the county agricultural commissioner system, and from the time that I arrived in California it seemed to me that these people who were already located in the county engaged in enforcing seed law, quarantine, standardization, and the other parts of the agricultural code that they enforce, could be very worthwhile in a seed certification program. From the very beginning of the reorganization in seed certification that I brought about in California, there was an effort to engage the services of the commissioner.

The agricultural commissioner and his role have been carefully spelled out in all of the standards and regulations developed for seed certification in the state. The agricultural commissioners supervise harvest; they supervise processing; they draw samples, and otherwise do those things that make the program operate as well as it does without us at the central office having to do it. With the tremendous increase in the program during the 1950s, it became obvious that to make full use of the agricultural commissioner, it would be wise to have someone at the state level to coordinate their activities. With this in mind the California Crop Improvement Association decided to support a position with the Department of Agriculture, and the person filling this position would work with the agricultural commissioners, assist in the certification program throughout the state, and his salary would be funded by the Association. The person was to be attached to the Department of Agriculture, later known as the Department of Food and Agriculture. The first person engaged for this duty was Warren (Bud) Johnson. He served in this capacity for a few years and then was offered a better job within the department. Then a man by the name of

FGP: Larry Shacker was employed, also out of Crop Improvement Association funds. Support of a position in the Department of Agriculture continued for several years.

AID: Are the counties reimbursed for this service by the agricultural commissioners?

FGP: During the 1940s they were not. It was considered a type of activity which would fit right into the other tax supported work done. However, the inspection and supervisory demands of seed certification in the '50s became so great in some counties that we began to compensate those counties. Since then other counties have been required by their supervisors or county administrative officer to charge for seed certification services. The state agricultural code permits such charges if made on the basis of actual cost and approved by the director of the Department of Food and Agriculture.

AID: What do these costs amount to on the average?

FGP: It varies considerably from county to county, depending on salaries, mileage involved, number of growers, number of processors, and various other factors. By 1976, our total annual cost for the commissioner assistance hadn't gone over \$25,000. This is rather reasonable compared to what it would cost us to send out an equivalent amount of supervisory personnel from the central office. The commissioners are making more and more use of the accredited principle, that is having growers and processors take on greater responsibility. This will hold costs down.

HRP: Why were these other states and countries incapable of producing their own seed?

FGP: The problem in producing red clover seed or alfalfa seed in the Midwest and north central and eastern states is in the weather. Sure, they produce corn and soybeans and items of that kind very easily. But when it comes to forage crops where seed production is an indeterminate process, that is seed being set over a long period of time, it is a different proposition. Rainfall can occur anytime during the summer in the Midwest and can ruin a lot of seed. There are diseases and insects that inhibit the production of seed, and for various reasons of this sort, there simply is little seed produced. If that area had to rely on itself to produce its own seed, forage legumes and some of the grasses would just not be grown to the extent they are. There were similar problems in Europe.

NATIONAL FOUNDATION SEED PROJECT

FGP: The realization that it required outside help to provide an adequate supply of foundation planting stock, that is for an area incapable of producing seed on its own, led to the creation of the National Foundation Seed Project. Theoretically, it ought to be possible for a state like Iowa, if it developed a new red clover variety and one of their plant breeders had created a small amount of breeder or foundation seed, this could be sent to a western state where seed production was rather easy and the progeny, or production from this planting could be sent back to the state where it was needed.

In practice, however, this was nearly impossible. You could get a grower lined up maybe to plant a small amount of breeder seed in the West, and by working with his certifying agency he could see that genetic purity was maintained, but the problem arose in the purchase of seed produced and the financing of the operation. To create a satisfactory supply of foundation seed there really needed to be an organization or some entity that would stockpile or store it, which meant putting up the money to purchase it and having the money tied up in the investment of seed over a period of maybe several years.

HRP: You mean that the farmer would take this seed that the breeder had sent to him, and he would plant it, but it wasn't going to be sold all at once. The breeder wasn't going to buy it back from him. The farmer was going to have to let it go through regular channels or something, and he couldn't afford to hold it himself, is that the idea?

FGP: Yes, that was the problem. You could make arrangements for this first increase for a small amount of seed, but when it got to be an item of commerce, you had to have all these people lined up at the buying and selling end. It would be very easy if some large seed company would be designated to finance and maintain this operation, but that would have been considered a conflict of interest or monopolistic situation and wouldn't have worked at all. So, it was rather logical to think of the federal

FGP: government, because the Agricultural Research Service in the U. S. Department of Agriculture had the people who were involved with the breeding of forage varieties and who worked across the United States and who could provide the technical know-how. Furthermore, and even more important, in the federal government we have the Commodity Credit Corporation that developed during World War II and which was in effect a banking division of the national government. The CCC as it was called bought all sorts of commodities, with the expenditure of millions and billions of dollars. It stored such commodities, sold or gave them away or whatever was required. It was natural to think of the Commodity Credit Corporation as a financing agency for a foundation seed program that affected more than one state.

It was in the late 1940s that the National Foundation Seed Project was developed with C. S. Garrison in charge, and a plan was worked out whereby any foundation seed produced under this project would be purchased by the Commodity Credit Corporation and stored for whatever length of time it was necessary to carry out the objectives of the program.

HRP: Which were to keep a steady supply of the needed seed for use whenever the need should arise?

FGP: That is right. One of the early commodities was Ranger alfalfa. It was in the National Foundation Seed Project and so was Kenland Red Clover and several other varieties.

HRP: These were varieties that were developed for more or less a narrow area, and this area couldn't produce its own seed, but it needed to use the seed; it needed to have it for planting. The seed could be grown other places, and then it would be sold back into this area.

FGP: Yes, and with many of these forage varieties, more than one state was involved. Often the U. S. Department of Agriculture was involved, so it was an interagency type of undertaking in the beginning, and certainly the National Foundation Seed Project got some of these varieties off the ground which never would have made it otherwise. By producing (in the West) fairly substantial volumes of foundation seed which would be available to anyone in the area needing such seed, a great service was performed for agriculture.

I think the program was of considerable significance to California. We grew some fairly large quantities of seed for the National Foundation Seed Project. The reputation that our growers developed for doing a good job built a recognition in other states and countries that California was the place to go

FGP: for producing foundation seed. California got a lot of favorable publicity during the early days of the National Foundation Seed Project. The National Foundation Seed Planning Conference, a group of persons appointed to be advisory to the Project, made two or three trips into the seed producing areas of the West including California. These people were seedsmen and agronomists from all over the United States. What they saw in California--the way our growers could produce high yields of excellent quality seed--impressed them very much.

HRP: I remember your talking about how little seed it took, when the breeder seed was scarce, to plant an acre.

FGP: That's true. We had growers who, when the occasion called for it, could go down to extremely small amounts with precision planting. When I wanted to go to maybe as little as four ounces per acre with alfalfa, I would get in touch with Dompe Brothers at Crows Landing. They could be counted on to produce a crop with an absolute minimum of seed planted. There were a number of such growers in California, who made quite a contribution to the agriculture of the nation by cooperating with the National Foundation Seed Project.



National Foundation Seed Planning Conference visiting certified alfalfa field in California, 1950. Left to right: Keller Beeson, Larry Graber, (?), William Myers, Arnold Dahl, Stanley Folsom.



Cleaning certified alfalfa seed, Tehachapi, Calif. Left to right: Don Carroll, Harold Loomis, J. C. Jacobsen, 1951.

SEED INDUSTRY CONFERENCES

FGP: Seed certification personnel seems to have always been involved in side issues so one wonders if the title of this history is broad enough. Anyhow, we have been active in what has become known as the Seed Industry Conference.

During the 1950s when so much seed was being produced and considerable attention was being focused on processing problems, there began a long running association between the seed industry and the University of California, the like of which may never have been equaled anywhere else. The first conference, called Seed Processor's Conference, was held February 9 and 10 in 1956. These conferences have continued to this day and with such success as to make one wonder if they might go on indefinitely. A committee composed entirely of people out of the University planned the program for the first conference. The trade was then invited to attend.

HRP: You were nearly always involved with the committee which planned these conferences, maybe chairman most of the time?

FGP: I was involved in every one, that is for sure. Co-chairman is a better word because almost immediately it became a joint seed trade/University committee. I should point out that University people participating in the conferences came from the Departments of Agronomy and Range Science, Agricultural Engineering, Vegetable Crops, and the Agricultural Extension Service.

HRP: Wasn't there a name change in the conference after it began?

FGP: Yes. We soon found that there were many topics to consider other than those having to do with processing. I think here is a good place to quote what was printed on the 1970 program.

"The 1970 Seed Industry Conference is the eleventh of its kind held in California. The first such event, called the Seed Processor's Conference, took place in 1956. Seed processing problems were the primary

Quote from program: interest. It was soon decided, however, that other areas of the seed business also deserved attention in the annual conference. Thus in 1958, we find physiology of seeds, production of seeds, and packaging being discussed. In 1959, there were 'refresher courses' featured. These included plant breeding, plant diseases, hybrid crops, and seed analysis. The name of the conference was changed to Seed Industry Conference.

"The diversification trend continued. An intriguing topic in 1960 was 'Experiments on Rodents with Sound.' Someone in the 1962 program talked on the subject 'Hot Rain' and its effects on plants and seeds. From 1956 through 1962, the conference was held annually, but it was becoming obvious the purpose of such a conference could as well be served by meeting every two years. Therefore, 1963 was skipped and a conference held in 1964. The 'Workshop' approach then received an enthusiastic response and has been an integral part of the conference since, in the years 1966 and 1968. The 1970 conference will again feature workshops on the second day. The program for the opening day, April 9, is composed of general topics presented by excellent speakers well known in industry and research."

HRP: And that format is still being followed, is it not?

FGP: We still find that it works, and we are getting excellent attendance, approximately two hundred people.

HRP: Many people attending those conferences that I have been to seem to be those who don't show up much at the California Seed Association conventions.

FGP: That is true. It tends to be more management people you see at the conventions. Our conferences draw field men or field service people as they are now called, seed technologists, processors, and plant breeders. The fact is that these workshops were specifically designed for this group. Another thing that we have going for us is that the cost for attending these conferences has always been kept low. Hardly anyone has to be away from the job more than two days with only a single night's lodging away from home. Registration for the 1976 conference was \$3. The social hour and buffet dinner was provided for \$5. This social hour and dinner is a big attraction. Not only is the price right but everyone has an opportunity to get better acquainted with his or her counterpart from other companies. We used to think after each conference that it was the best, that we wouldn't equal it again, but that hasn't been the case. The

FGP: interest in the conference remains constant at a high level.

HRP: I like the big blue tag they hung around your neck one year.

FGP: That has to be a recognition I treasure as much as any that has come my way. It took place during the little program following the dinner at the 1966 conference. This tag is about four feet long and bears the following inscription:

CALIFORNIA CERTIFIED HARD SEED

This special true blue tag, when properly sealed onto the lower posterior of the individual named below, is evidence of certification by the Hard Seed Certification Committee of the California Seed Association.

This non-profit, non-insured, non-official certifying agency makes no representations or warranties concerning anything. We certify only that after 26 years of searching, sampling, screening, and screaming, the committee finds the bearer of this tag to be thoroughly obstinate, unfailingly opinionated, persistently stubborn, consistently unyielding, constantly contrary, and unreasonably tenacious in his dictatorial administration of the affairs of the California Crop Improvement Association.

All efforts to penetrate his thick hide having failed, it is hereby certified that

FRANK G. PARSONS

is a high purity, low germinating, California Hard Seed.

Presented by the California Seed Association in sincere appreciation for extraordinary performance of official duties and for the substantial contribution to agriculture which has been achieved.

Presented at the University of California, Davis, Thursday and Friday, March 31 and April 1, 1966, at the 1966 Seed Industry Conference.

True Blue Tag No. 1

LAWSUIT

FGP: The question is asked sometimes, "Do seed certifying agencies ever get involved in lawsuits?" The thought, of course, is with all the value resting on perhaps a single lot of seed there must be people who would incline to sue if their seed was refused certification, regardless of why. In 1955, there was a suit filed by a grower against the California Rice Research Foundation, along with its directors, and the University of California. This grower alleged that he had sustained various losses from planting foundation rice seed he obtained and planted in 1953. The Rice Research Foundation naturally was involved because it produces foundation rice seed in California, and the University supervises the production through the foundation seed project, which involved me. I was going to be singled out one way or another as a witness, anyhow, in my dual role of being in both foundation seed and seed certification. It wasn't long before I was named John Doe, defendant No. 1, by virtue of my Crop Improvement Association affiliation. I was destined to be appearing as a witness for the University and at the same time defending the California Crop Improvement Association for any possible responsibility it had in the matter. For the first time in our existence we had to retain an attorney. As it turned out he was a good one, though the perception of the judge who listened to the case was the most important single factor operating in our favor.

There were hundreds of pages of testimony taken in court and in depositions prior to the trial. It was an interesting experience for me. Boiling it all down the points made by the plaintiff were these:

1. That the foundation seed, by our own test which was brought in as evidence, contained 0.11 percent watergrass seed, which was over the 0.10 permitted in certified seed.
2. That he had never had watergrass before in this field. He had never even grown rice before, and he considered it virgin land.

FGP: 3. The watergrass showed up in rows which proved it was in the seed which had been planted with a grain drill, not flown on as is normally done.

4. That he had sustained loss as a result of getting watergrass and from losing his certification, too.

Rebuttal by the defendants took the following course:

1. Admission that the seed in fact by test did contain 0.11 percent watergrass, but that this was not in violation of certification standards because there were no standards for foundation seed. Standards at that time applied only to the registered and certified classes.

2. That there was watergrass and always had been in that area where the plaintiff had planted the rice. And in fact, the very field he was testifying about had contained watergrass, as testified to by other farmers.

3. That watergrass is likely to show up in rows due to the washing action and to a more favorable environment in the bottom of the little furrows made by planting with a grain drill. In any event there would be this tendency for watergrass to appear as if it was in rows. Further, none of the plaintiff's testimony brought out whether watergrass might not also have been between the rows.

4. That the method the plaintiff used to plant his rice and to establish a crop was the very worst way he could have done it. Seeding in dry ground as he did with a grain drill, and also very early in the season, March, with the idea that rains might bring up the crop, was in itself an invitation for watergrass to take over the field, if there were any watergrass seeds present at all. Then finally, delaying flooding the field until May, and then not more than three or four inches deep, certainly gave every encouragement to watergrass. It was felt by the witnesses testifying in this regard that the grower had used the very worst practice if he had hoped to control watergrass.

Things dragged on and on, as is often true. In 1956, a judgment of nonsuit and dismissal was made on behalf of the California Crop Improvement Association. Our counsel requested the court for such dismissal, the plaintiff's counsel agreed to it, and in June, 1956, the nonsuit dismissal was granted. It was in 1958, however, before the final judgment was handed down, and this makes for very interesting reading. The opinion and judgment handed down by the court was 38 pages in length. It reveals an awareness and knowledge of the situation that is almost fantas-

FGP: tic. Obviously, the judge had studied the testimony for many hours and had taken many days to prepare his statement.

The essence of his opinion is that a certification agency is needed on behalf of the public; it has a job to do for agriculture, and that its performance should not be hindered by the type of action brought by the plaintiff. Further, that farmers have ample opportunity to learn what is involved in the growing of certified seed and to know something of the risks that may be involved in trying to produce registered or certified seed. He made the point many times that the grower had had adequate opportunity to understand the situation, that certified seed standards should not apply necessarily to foundation, and that the grower himself did have a responsibility in the whole program. One thing, for example, which the plaintiff might have done, but apparently had never entered his mind, would have been to get out and rogue the watergrass out of the field. Often times growers who plant foundation seed do just that. The plaintiff apparently had done nothing whatsoever to help himself in the control of the watergrass problem, regardless of where it might have originated.

We in the California Crop Improvement Association have for years gone along with much the same philosophy expressed by this judge, namely that certification has a job to do and if we are to be continually subject to the harassment of lawsuits, we can be driven out of business--which would not be in the best interest of the agricultural public.

VARIETY ELIGIBILITY FOR CERTIFICATION

FGP: The 1960s can be distinguished as a period of learning to live with the innovations and tremendous growth of the '50s. It was a period of catching up and improving on what had been sort of roughed out in the decade before. Much of what will be talked about has to do with national and international developments in seed certification--less about California, but of vital importance to California.

A very basic consideration in seed certification that began to receive serious attention about 1960 is variety eligibility requirements. We were coming to realize that in all of our development of uniform standards we really were not complying with the most fundamental requirements, and that had to do with how a variety gets into certification. There was sort of a hands-off attitude. It was assumed that it took care of itself, at the point where the variety was developed. There was this philosophy that any experiment station was capable of producing satisfactory foundation seed of varieties to be certified. This wasn't altogether true, however. Agencies were certifying varieties that had been around for years and for which foundation seed had not really been adequately maintained. Varieties were being accepted into certification merely on the say-so of the breeder, and while we don't like to admit it, there were varieties that were hardly in decent enough shape to warrant certification. This somewhat untouchable subject began to come up more and more in our conversation.

HRP: In other words it might not have been one true variety, it might have been a mixture?

FGP: Well, varieties were accepted with very minimal requirements as to purity, as to novelty, and as to whether they were adequately reproducible.

HRP: What do you mean novelty?

FGP: We have discussed this elsewhere, but novelty means that the

FGP: variety is different from an existing variety. The whole idea of turning out a new variety is to have one that is first different--it is novel; it is unique. There is no point in duplicating a variety that has already been released. Suppose one state in the Corn Belt has a variety of soybeans, and it is a good variety. A plant breeder in another state gets hold of some seed of the variety, grows it for a few years and decides that he has discovered a new variety, when in fact it isn't a new variety at all. There is no purpose in producing varieties with new names unless they are indeed different. That is what the term novelty means.

It was in the late '40s that the ICIA made its first effort to develop what was called "eligibility requirements for varieties entering certification." Prior to that time, the standards had merely said that the variety must have been approved by, or had met the approval of, the state agricultural experiment station. This was thought adequate, but beginning in the late '40s was the establishment of eligibility requirements spelling out such things as that the variety should be unique, or have novelty, that it be adequately tested, meaning that it be tested adequately to support whatever claims were to be made for the variety. If disease resistance was one of the variety features, or if insect tolerance was involved, then there should be adequate data to support claims for such characteristics.

HRP: Could just greater yield be sufficient to merit calling a variety novel?

FGP: Often greater yield was sufficient to cause a variety to merit certification, and if so, the yield data should be satisfactory. There is nothing hard and fast about this, but generally when you are referring to adequate data, you are referring to tests at more than one location over a period of more than one year. There are always arguments about whether three year's test data are necessary, or whether sometimes two years or even one year is adequate. However, these eligibility requirements have done considerable to standardize the release of varieties, in spite of a slowness among certifying agencies to comply. By the 1960s, that increasing awareness of the necessity for more uniformity had a lot to do with the inception of variety review boards.

CERTIFIED VARIETY REVIEW BOARDS

FGP: In 1960, there was a Joint Alfalfa Work Conference convened in Chicago. Representatives from industry, USDA, state experiment stations, and seed certification attended. This led to the creation of the first certified variety review board, which was for alfalfa. The board got underway early in the 1960s and thereafter, all varieties of alfalfa being submitted into certification, whether by a state or federal worker, or private company, have had to be screened and accepted by the National Certified Alfalfa Variety Review Board. Other variety review boards have been created. We now have a Small Grains Variety Review Board, also one for soybeans, another for grasses, and one for clovers.

HRP: Now did this not happen until 1960?

FGP: Yes. The spelling out of eligibility requirements had preceded by some years the actual formation of the first certified variety review board.

HRP: Who composes these boards?

FGP: Well, these boards are made up of representatives from industry, from the state experiment stations, from the USDA. There is an Association of Commercial Plant Breeders which is involved, and there are certification officials on such boards. It is a composite of those representatives involved with a particular crop, and representing important concerned agencies. The board members are appointed by the Association of Official Seed Certifying Agencies.

PLANT VARIETY PROTECTION

FGP: During all of this period that we have been talking about, there was continuing discussion of possible breeders' rights programs. In Europe for many years, there has been recognition that the breeder of a crop variety needs some sort of protection for his invention--the variety he has developed. Much of the plant breeding in Europe is done by private concerns and the need for protection of breeders' rights was apparent at an earlier stage there, where official breeders' rights schemes were first evolved.

HRP: Was there any breeding done by commercial companies, in the agronomic crops to amount to anything in the 1940s and 1950s, maybe even early 1960s, here in the United States?

FGP: The seed handler or seed merchant, up to the period that you are talking about, had been mostly handling existing varieties, which meant varieties that might have come from anywhere, many from land-grant college programs. But there hadn't been much development of varieties, excepting corn, by private companies--that is of agronomic crops. There had been much more activity in this regard with vegetable crops and flowers. With the '40s, and definitely in the '50s, there began to emerge breeding departments in large companies handling agronomic crops. The release of varieties definitely became a recognized activity. This of course stimulated more and more interest in the breeders' rights program here in the United States.

Seed certification officials became involved in these discussions, and I have given talks on the use of certification as a means of providing breeders' rights. Certainly by getting a variety certified, if the certifying agency agrees to certify only for the owner of the variety, or an agent of the owner--in other words certify only for those parties who have a right to the variety, a breeders' rights program is assured. A private company develops a new variety, decides to sell only certified seed of that variety; the certification agency certifies only for the rightful owner, or his agent. This makes it impossible

FGP: for anyone else to get certified seed of that variety. And a type of breeders' rights is provided. There is a problem though, and that is someone could take the variety and merchandise it as noncertified, claiming it to be just as good as certified seed. This could be a continual problem to the rightful owner. So, you can say that certification wasn't the complete answer. About to emerge, however, was a development that I think was a complete answer. I have reference to the Plant Variety Protection Act which was debated and discussed over a period of a considerable number of years. The Plant Variety Protection Act was passed in 1970. It is a plant patenting act.

HRP: Was passed by whom?

FGP: This is a federal act, passed by the federal Congress. It provides for the patenting of sexually produced crops. One must keep in mind that there had been, in effect for a number of years, a Plant Patent Act which provides for the patenting of asexually produced crops, like rose bushes, fruit trees, or other plants that were propagated asexually.

HRP: Without use of seed.

FGP: Right. They propagate vegetatively, by means of rootstock, grafting material, budding material, and other vegetative means of propagation. There was no federal legislation protecting seed--propagated, meaning sexually propagated, plants.

The seed industry was concerned that any breeders' rights program in the United States must be somewhat different from the programs in Europe. Acceptance at the national level in Europe, that is acceptance under those breeders' rights programs, involved testing by the government over a period of at least three years. The government then decided if the variety merited acceptance, and if so granted exclusive sale of that variety to the company filing for its acceptance. The applicant was in a state of limbo, not knowing where he stood for at least three years. The U. S. seedsmen did not want any part of that type of program. The contention was that if the applicant established novelty this was adequate and that merit was a matter strictly up to the applicant. It was the applicant's problem whether the variety was adapted to any particular region, whether it was superior, or anything else so long as it was novel. The seed trade's contention was that the U. S. Government should have provision for assuring 1) that the variety was novel, and 2) that the applicant had exclusive rights to it. This is nothing more than a patent law. It permits the owner of a variety to take civil action in the courts against anyone infringing, meaning anyone selling that variety without permission of the

FGP: rightful owner. However, in addition to the novelty feature, and novelty alone, which our seedsmen were able to convince the U. S. Department of Agriculture people on, there began to be talk about putting into the law a very unique feature which provided for recognizing certified seed of the variety being patented, if the applicant so desired.

There are two parts to the law as it finally was adopted and passed by Congress. The Plant Variety Protection Act, once a variety is accepted on the basis of novelty, provides the applicant with both a patent and, under a section known as Title V, that the applicant shall merchandise the variety only as a class of certified seed (if the applicant applies for Title V coverage, which is not mandatory). This means that the variety cannot be sold, at least by variety name, unless it is certified. This gives the applicant, or owner of the variety, a two-barreled approach to protection of his variety. There is the protection which would be defended in courts by civil action, whereby the owner of the variety could sue anyone who stole the variety or infringed, plus that of the Federal Seed Act which enforces Title V of the Plant Variety Protection Act. Federal agents would take action against anyone merchandising the variety by the variety name unless it was in fact certified. This makes the U. S. Plant Variety Protection Act unique in the world as far as breeders' rights protection is concerned.

I have always been intrigued with that feature of our Plant Variety Protection Act and have been very active in trying to work out the details of certification as to how it might fit into a breeders' rights program, or what finally became our Plant Variety Protection Act.

The seed industry, I think, today, does appreciate the fact that we have, in this country, a desirable form of plant variety protection and that there is considerable merit to opting for Title V, as well as for the basic protection provided under the Plant Variety Protection. More and more agronomic crops are being filed on, not only for plant variety protection, but for coverage by Title V as well. Possibly, even some of the vegetable crops people will be seeking Title V type of protection as they file for plant variety protection. This will be a dramatic change of pace because traditionally the vegetable people have been adamantly opposed to seed certification of vegetable varieties, contending that certification is not necessary with those crops.

COMPLIANCE WITH CERTIFICATION STANDARDS

FGP: We have been talking about federal legislation so we may as well continue with more of it. During most of the 1960s, there was not only discussion about such things as Plant Variety Protection, but what could be done about certification agencies that were not really complying with the International Crop Improvement Association standards. There was continual complaint that in spite of our uniform standards there was not all that much uniformity. We discussed many ways of policing ourselves. I think that we might well have created within the International Crop Improvement Association, (which included Canada) a branch organization under the name of U. S. Crop Improvement Association. It would have been a consolidation of the states of the United States, and maintaining membership in such a subdivision would be contingent on an agency complying with the minimum standards. Despite any merit to such a plan, there began to emerge more talk of federal legislation in the United States, containing minimum standards for seed certification. This is the direction we went, that is promulgation and development of standards and regulations to be contained in the Federal Seed Act. Those standards and regulations did become incorporated into the Federal Seed Act. This is the means that finally emerged to enforce uniform certified seed standards in the United States.

This led to other complications, one of which was the name International Crop Improvement Association. We were told by the federal people, that as far as the recognition of the standards of the International Crop Improvement Association were concerned in any federal legislation, they could not recognize standards of any agency containing the word International. Some other name would have to be devised. This brought about eventually the change of name from International Crop Improvement Association to Association of Official Seed Certifying Agencies, usually just called AOSCA. The last meeting of International Crop Improvement Association was held in Billings, Montana, July 28 through August 1, 1968.

ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES

FGP: Henceforth, we will be talking about AOSCA, rather than ICIA. The tempo of activity on the part of seed certification people was stepping up very rapidly in the late 1960s. I was very active in the organization of AOSCA. I felt that if we were ever going to get anywhere in consolidating our position in the United States, certainly with regard to the seed industry, this was the time to get it done. Relations with the seed trade and acceptance on the part of the trade of certified seed was reaching new and higher levels each year. Likewise, problems in handling certification, problems in arriving at certification standards, and other matters were becoming greater bones of contention. We had had, for many years, what was known as the Committee on Cooperation. This was an ICIA committee and then became an AOSCA committee. I had been chairman for a number of years, and the primary role of this committee was liaison with the seed industry. It provided a means where parties from both sides could sit down and talk about mutual concerns, then hopefully convince both agencies, AOSCA and the American Seed Trade Association, that there should be acceptance of recommendations from the Committee on Cooperation.

This committee is an important link between AOSCA and ASTA, but it became obvious that there was a need for a more prestigious, more representative body, so there developed the idea that AOSCA should have an advisory committee with representation from a broader spectrum.

The committee to be called the AOSCA Advisory Committee, was composed of representatives from the following:

- Association of Official Seed Certifying Agencies
- United States Department of Agriculture
- Canadian Department of Agriculture
- American Seed Trade Association
- Canadian Seed Trade Association
- Agricultural Experiment Stations of the U. S.
- Agricultural Experiment Stations of Canada

FGP: National Council of Commercial Plant Breeders
 Association of Seed Control Officials
 Foundation Seed Stocks Organizations

The function of the committee, which I chaired for the first several years of its existence can be taken directly from the AOSCA Handbook as follows:

1. Review certification standards and procedures submitted to them for their consideration, keeping in mind that seed moving under certification may move internationally as well as domestically.
2. Provide an avenue of communication between AOSCA, the producers, and farmer users of certified seed and other interested parties.
3. Advise the Board of Directors on any other matters as may be referred to them.

The creation of this Advisory Committee did more to establish a communications center for all interested parties than anything ever done before by ICIA or AOSCA. The committee was extremely valuable as legislation governing seed certification in the United States was introduced and finally passed.

THE FEDERAL SEED ACT AND SEED CERTIFICATION--GENETIC PURITY
VERSUS MECHANICAL PURITY

FGP: With the passage of the legislation putting standards for genetic purity in the Federal Seed Act there came a greater need for recognition that there are definitely two considerations involved in seed certification. First, and basic, is what relates to genetic purity, and this is the only part of the standards contained in the Federal Seed Act. But we must remember that many agencies had continued to have requirements regarding the mechanical purity. Now had come the time to make a separation of these two considerations. AOSCA came out with the first publication early in the 1970s containing genetic purity standards in one section and what were known as commodity standards in another section. The commodity standards dealt with factors not affecting genetic purity, meaning weed seeds, other crop content, germination--that sort of thing. Genetic standards dealt with those things affecting genetic purity.

HRP: In other words, you were back to the same old problem that you had early in the 1940s of whether the tag should carry all this information or whether it should be a part of the seed handler's control.

FGP: That is true. There has been this vein of discontent, or running argument, associated with these two facets of seed certification. A few states in the Midwest (Ohio, Indiana, Iowa, and Illinois) have totally separated genetic purity from mechanical purity. Their standards are only genetic in nature, and this is referred to as "genetic purity only" type of certification. For several years now these few states have been engaging in this type of certification. Indications are that it is going to work. This leaves the level of mechanical purity totally up to the handler of the seed. If that party elects to handle seed that, even though completely certified for genetic purity, germinated only 10 percent or has 50 percent weeds, such seed could be handled, theoretically. However, the states engaging in this type of certification claim there is no problem. The producers and sellers of certified seed have maintained a fairly high

FGP: level of mechanical purity. California has made some compromise in this direction, and certainly, I have always contended that it is ridiculous to eliminate a lot of otherwise genetically pure seed just because it was a point or two low in germination. I think it is foolish to have seed that is 100 percent genetically pure and which is needed badly by the farmers, but is kept out of certification because it fails to germinate by a few percent or has a few weeds in it.

There are solutions though, other than just eliminating quality standards in certification. Blending is one means, and California has permitted this for years. You can take higher germinating seed and blend with the lower germinating seed thus bringing the germination of the finished product to an acceptable level. We have not permitted blending to reduce weed seed content, but we have made another provision which is sort of having your cake and eating it too. At the handler's request we can permit certification of seed which contains more than our mechanical standards permit of such things as weeds and other crop mixtures or is low in germination. When we do this, the handler makes the request; we consider it; and if it seems to be something that does not jeopardize the reputation of certified seed the handler is permitted to certify the seed, and on our label we will state "differs from quality standards on account of . . ." whatever the factor is. If it is low germination, it will say "on account of low germination." If it is on account of weeds, we would say "weeds."

HRP: Now, are these tags different colored, or is there any reason that this isn't just the fine print?

FGP: No. They are our regular certification tags, with the information printed on in readable sized type. Some people used to say the farmer never reads labels, anyhow, so what difference does it make. But I think there is an awareness all over the country of what certified seed ought to be. Farmers are no longer unread, if they ever were. They are able to discern the difference between good and bad seed. They understand basically that they need to know what the seed contains, as well as its just being genetically pure. They may not always read the label because they have confidence in the people from whom they purchased the seed. Handlers won't request the sub-standard route if the seed is very badly off. Furthermore, we have not permitted the use of this sub-standard category, or whatever you want to call it, in the case of noxious weeds. You might say, well, suppose you have a lot of alfalfa seed that is going to be sold in Minnesota, and that seed contains Johnsongrass, which is a secondary noxious weed in California. The Minnesotans couldn't care less about Johnsongrass because it will not survive in that

FGP: climate. This is a theoretical situation and doesn't often arise. If it were a problem, I am sure that the approach there would be to enter into some sort of an interagency certification and certify it on the basis of its being shipped only to Minnesota.

Then there is dodder in alfalfa. Dodder is considered a noxious weed in virtually every state in this country. If the seed contains dodder that is just too bad. At least in California, it would not be certified under any provision. In the states where they practice certification for genetic purity only, the same holds true really. Theoretically, the handler could go right ahead and have certified seed which contained a noxious weed such as dodder, but that party knows that he would be in trouble if it became known that he was deliberately handling certified seed containing noxious weeds.

Putting the seedsman on his honor is sort of what is involved with certification for genetic purity only. Probably this is a greater deterrent to allowing noxious weeds to creep in than the conventional methods of certification. In spite of all of the change that has occurred over the years, there is still the philosophy that the blue tag, or certified seed, means a superior type of seed.

A SELF-POLICING ROLE FOR SEED CERTIFICATION

FGP: This brings me to the situation the certifying agencies here in the United States found themselves in once the genetic purity standards were contained in the Federal Seed Act and became effective in 1973. The hearings conducted in developing the legislation contained testimony throughout to the effect that these standards would not be something enforced by Federal Seed Act agents altogether. There was implicit in all of the hearings and in the legislation itself that the act would be self-enforcing or self-policed by the certifying agencies themselves, or you might say by AOSCA members. This has led to some very interesting developments. There was a natural tendency on the part of the "feds" as we call them, the Federal Seed Act people, to look on this legislation as a new thing they had to enforce. And there was a great deal of discussion about this self-enforcing situation. Members of AOSCA were adamant, were determined, and downright vehement on their right to see that certification standards were self-policed, because they believed that this was implicit in the legislation. Many discussions ensued. I was quite a moderator at times in such discussions. It seemed to me that if we in AOSCA were to maintain any reputation with the Federal Seed Act people, we had to aggressively pursue this self-policing role and get our house in order. I got myself appointed to a committee to develop a handbook of procedures whereby the members of AOSCA could examine their standards to determine compliance with the Federal Seed Act provisions for certification.

Despite forty-some years of talking about the need to be uniform in seed certification, the agencies had never really gotten down to talking about how certification is carried out or what is expected of growers and seedsmen actually growing and handling certified seed. Clyde Edwards who was responsible for the enforcement of the Federal Seed Act was greatly concerned that anyone involved with certified seed had to have records attesting to or showing what had transpired. Such things as what seed went into the ground to produce certified seed, that the seed was taken to a certain place, and that there was a certain

FGP: poundage of it, and all that. He became insistent that there be some clarification as to who was responsible. Some certification agencies insisted that it was none of his business or anybody else's, so long as the finished product met the test which it had been doing satisfactorily--or at least so contented.

Many representatives from certifying agencies said our certified seed has never been in trouble, and we are getting the job done which is the important thing. Nevertheless, an inspection team, or review team, of certification officials was appointed to actually go into the various states and check standards, ask questions about how certification was performed, and to check compliance with the handbook of procedures which had been developed by this sub-committee I mentioned earlier.

We have four people on the review team, each responsible for one region of the U. S. in the checking of certification standards for the various member agencies. The findings are reported to the Executive Committee of AOSCA, and if discrepancies arise these will be reported to the Federal Seed Act people. In actual practice any discrepancy or lack of compliance with the Federal Seed Act, once pointed out to an agency, is immediately corrected or promise made that it will be corrected. It appears now that this self-policing role is one that members can handle, and a happy accommodation of all the principles involved has been reached. Hopefully, the U. S. Department of Agriculture Federal Seed Act people are going to be satisfied that provisions of the seed law are being met and done so on a self-policing or self-enforcing basis.

I like to think that I played a fairly strong part in developing the procedure for this self-enforcing policy. I certainly took an active part in the negotiations that went on between AOSCA and the Federal Seed Act representatives. It all goes to show, I think, that when people of good faith get together on something, objectives can be accomplished without a great deal of controversy and a minimum of red tape. In spite of my earlier belief that another approach might have been better in this creating uniformity among the states, I think that this final solution is going to work. California seed certification has come a long way in the nearly forty years of affiliation with national and international organizations engaged in sorting out and solving the problems.

CCIA SUPPORT OF RESEARCH

HRP: Throughout your story there seems to be this close affiliation with the University of California. You have referred to support of research for alfalfa. Doesn't the Crop Improvement Association have a fairly large budget for research?

FGP: Over the years the directors of the California Crop Improvement Association had felt that the organization did have an obligation to the University since so much of the certification activity revolved around varieties coming from that institution. By the 1950s with the much greater volume of seed being certified, the financial resources of the Association became such that thought could be given to assisting research. It was in 1952 that the directors voted to make \$5,000 annually available to Luther Jones to assist in the valuable seed production work he was doing. We have talked about his research before. All by himself he could do the work of two ordinary people it seemed. The fact that he was known as "Mr. Alfalfa" up and down California was well deserved. His down-to-earth, practical approach to production research was monumental in its impact on certified seed production, not only with alfalfa but on other seed crops such as Ladino clover and sudangrass. Despite his ability to accomplish a lot by himself, it became obvious that he could use another pair of hands. It seemed only natural that CCIA come to his assistance. So the first money allocated for research was to Luther Jones. This \$5,000 grant to him was continued through 1966 when he retired.

Beginning in 1954, the directors decided to fund an assistantship for a graduate research assistant. \$8,000 was granted to the University to cover the expenses necessary during the three years that such an assistant would require in obtaining a degree. This support of a graduate research assistantship continued for a good many years. At various times additional grants were made for special purposes. For example, in 1964, there was a special grant of \$3,500 to study alfalfa isolation.

At the annual meeting in June, 1967, a total of \$14,500 was

FGP: granted to research. \$2,500 was earmarked for off-station testing of small grain, and \$7,500 was granted to help support the new cereal position which was being created. This was for the hiring of Dr. C. O. Qualset. It is interesting in reading the minutes of that meeting that a statement was made by Dr. Charles Schaller to the effect that this new cereal position probably could not have been filled if it had not been for the support of the Crop Improvement Association. Further, that the off-station testing of cereals would have had to be discontinued.

In addition to the \$10,000 granted for small grains research and off-station testing, an amount of \$3,500 was granted for alfalfa research and \$1,000 for safflower research. All of this research support was coming out of the reserve funds with no special assessments being made. However, by 1970, it began to be obvious that support of research by the Association could be placed on a more permanent basis. Therefore, a \$.03 hundredweight assessment on small grains was decided upon. This gave the researchers something definite to count on. As certification of grain expanded there would be more money coming in for research. The assessment was raised to \$.05 hundredweight at the annual meeting in 1972. And in that year, the Association directors granted in excess of \$25,000 to small grains research.

Support for alfalfa research continued to come out of reserve funds, and no separate assessment was made to support alfalfa research. Part of this philosophy is due to the fact that there was in existence a marketing order on alfalfa seed which took care of the needs of that crop to some extent. Support by CCIA was supplementary to that. There was, for a short time, a \$.05 hundredweight assessment to support some special research on Ladino clover. Also, in 1969, \$3,000 was turned over to the department to purchase a digital integrator, a piece of equipment that was very necessary in research involved with oil seed crops. Another special item funded, in 1973 for \$5,000, was for the purchase of a controlled environment chamber. That same year, additional funds were granted to extension specialists for helping to hire a laboratory technician.

The Crop Improvement Association has, over the years, been very sympathetic with research support of many kinds. Efforts have been made to assist wherever possible other groups that were trying to develop funds for research. The California Dry Bean Research Council was formed by a group of interested bean handlers in order to develop funds for supporting bean research. This was successful for only a few years, and ultimately, the problem was solved by the inclusion of all beans in a bean marketing order. Previously, there had been a lima bean market-

FGP: ing order involving only lima beans, but changing it to a bean marketing order made it possible to include all of the beans as well as blackeye peas. During the existence of the Dry Bean Research Council the CCIA directors had offered to cooperate in any way possible such as banking funds.

For a time there was a "Cereal Research Foundation," a group of growers and grain seed handlers who voluntarily attempted to support research. Over a three or four year period a fairly large sum of money was raised. But, as is the case too often with voluntary efforts, the enthusiasm waned, and the effort was abandoned. For a short period of time, there was a cereal research marketing agreement. Organized under the provisions of the State Department of Food and Agriculture, a marketing agreement is similar to a marketing order except that participation is voluntary. This effort was doomed to a short life, however, and expired after two or three years. As far as small grains research support in the University is concerned, it seems that the California Crop Improvement Association is destined to be the principal supporter, except for state supplied funds.

FOUNDATION SEED AND PLANT MATERIALS SERVICE

FGP: Thinking that I wanted to retire before reaching age 65, I began checking with the University Personnel Office in 1974 to try to arrive at a termination date which would be favorable. First, I considered mid 1974, maybe July 1 when I would have just turned 64. As one should know, however, I found that by staying on a few months longer, at least until Harriet reached her next birthday, in February, the retirement benefit would be considerably better. Thus, I arrived at the decision that it would be April 1, 1975. However, I changed my mind.

Sometime in December, 1974, Dean James Lyons approached me with the request that I chair a committee to develop a proposition for combining all foundation seed and plant materials activities on campus. The committee appointed, in addition to myself, was composed of chairmen from the departments involved which are Agronomy and Range Science, Pomology, Viticulture and Enology, Vegetable Crops, Environmental Horticulture, and Plant Pathology. Contrary to what might be expected, none of the committee objected to the idea of a combination or consolidation. It was not a new thing. Efforts had been made a few years before to bring about some coordination at least. Apparently, now its time had come. Therefore, we had some excellent discussion with positive recommendations emerging.

There wasn't any question about where the committee thought we ought to go. Everyone agreed that there should be one program. It was decided that it ought to be called Foundation Seed and Plant Materials Service. It should be headquartered with the Seed Certification Office in Hunt Hall, administratively responsible to the dean's office. It was recommended that Frank Parsons be the director for the entire program, including seed certification. These recommendations went to the dean in February, 1975, with the further recommendation that the formal consolidation take place July 1, of that year.

It was obvious that there was no objection either from the dean or from the vice president's office. However, things dragged

FGP: along, and it was September 1, 1975 before the green light was given. I was assured that I would be asked to direct the program. Therefore, I decided to postpone retirement until September 1, 1976. The new assignment seemed to be more of a challenge than I could resist, so I told Dean Lyons that I would direct FSPMS for one year to get it organized and going. Meanwhile, Burt Ray had been made manager of California Crop Improvement Association and, actually, was doing all of the work connected with that program. He later was to take over the entire thing, including Foundation Seed and Plant Materials as well as being Executive Secretary of the California Crop Improvement Association.

HRP: What crops or plants are involved in the Foundation Seed and Plant Materials Service?

FGP: We combined those of the Foundation Seed Project with the ones in the Foundation Plant Materials Service. The field crops include all we have been talking about in seed certification, like alfalfa, clovers, small grains, rice, and others of the agronomic type. We provide foundation asparagus seed also. In the plant materials area, where the purpose is as much to maintain disease free stock as it is to keep varieties pure, we have all of the deciduous tree fruits (peaches, pears, apples, plums, cherries, apricots, etc.) and grapes. Almonds are included and olives. Then there are roses. We maintain a couple of plants each of two or three hundred roses. FSPMS has garlic now and is propagating disease free material. We are getting into potatoes and sweet potatoes. There are a few ornamentals, too. About the only crop involving UC Davis researchers that we don't handle is strawberries. There is a special arrangement that foundation strawberry plants are turned over to the strawberry marketing order board. Few, if any, such programs as that of the University of California Foundation Seed and Plant Materials Service provide so many species and varieties of agronomic and horticultural plants.



California Crop Improvement Assn. Board of Directors, May 1976. Standing, left to right: Ward Waterman, Russell Richards, Robert Skaggs, Glenn Peterson, Gil Weathers, Robert Ball, James Harrington, Vern Marble, Robert Maulhardt, Herbert Chandler, Archie Dessert. Seated, left to right: Frank Parsons, Jack Jones, J. C. Jacobsen, Burt Ray.



Frank and Harriet Parsons receiving California Seed Assn. award, La Costa, California, March 15, 1977.

CALIFORNIA SEED CERTIFICATION--YESTERDAY, TODAY, AND TOMORROW

FGP: Finally, I think that in a story such as we have been telling, one needs to take a look at how things were in the beginning and how they are now. After more than thirty years of my believing that there should be uniformity among states in the United States as far as certification is concerned, how did California stack up once the Federal Seed Act provisions for certification became effective? This is an interesting question to think about. We need to analyze not only where we were but where we had been. If one goes back to 1938, I don't think there could have been a more provincial certification anywhere. It was designed to serve a local need--local in the sense that only the needs of California were considered. Extremely high standards prevailed. Primarily, the program was designed for small grains--wheat, barley, and oats. Not even the word certified was being used.

When I came to California, late in 1937, fresh out of an active Midwest certification program that was concerned not only with its own show but was involved with other states, I just naturally thought that every state ought to have a similar philosophy. It took a while to understand that things really were different in California--that it was a different land, agriculturally; that the Sierra Mountains and the great southwest desert made a vast separation from the East and midwestern United States.

Did it really matter that California was different? Was there any need for similarity between California seed certification and the rest of the United States? It is fun to speculate what might have happened in the thirty years if, instead of me, Ben Madson had hired a good California native who had never been out of the state. I suspect that we would have wound up much the same as we are now, because in spite of little need at the time for concern what with mostly grain certification, there were straws in the wind involving other crops. Ladino clover and red kidney beans were coming into the picture. Then, in the late '40s, with a sudden crash, alfalfa seed production in Califor-

FGP: nia for export elsewhere came into prominence. The isolationist position simply could not have lasted.

The rest of the country began to look to California for growing all sorts of seeds--red clover, trefoil, crown vetch, beans, sudangrass, and cowpeas to name only a few of them. The great wheat variety revolution, brought about in the tremendous research program instituted by the Rockefellers in Mexico, soon affected California. We began to use those varieties all over the state and became very dependent upon this source of germ plasm. California simply had to become part of the rest of the world. When this happened, what became of its high standards that were so much in vogue in the beginning? They were modified. As always, when this sort of interplay occurs, there is compromise. It comes about, not because of those who make standards compromising as much as it does because of seed merchandising--that is commerce in seeds. In selling seed outside of the state, the California seedsman has to meet the competition from other areas selling in the same market. If certified standards are not realistic, the seedsmen come back on to the Crop Improvement Association insisting that standards be changed so that they are realistic. This interplay works both ways. I said earlier that California believed in extremely high standards. This did teach the eastern consumer, in the case of such items as red kidney beans and alfalfa seed, that it was possible to get good quality seed that was bright in color, high in germination, and nearly free of weeds. Thus, the farmer benefitted from this compromise. He began to get better seed than he had ever seen before, but at the same time California was forced to back off some on the perfection like standards which had been in use earlier.

Acceptance of certified seed in the 1970s is greater than ever before. Not all farmers buy certified seed, but certified pretty much sets the pace for certain farm crop seeds. It would be a guess, but a third to one half of the small grain acreage is planted with certified seed in California. This compares to 5 or 10 percent during the early days. With rice, the percentage planted to certified today is half to two thirds, up from maybe one fourth through the late 1940s and in the 1950s. With beans, the percentage planted to certified has always been rather low, probably under 25 percent. With corn, sugarbeets and some of the other farm crops, certified seed has not been a factor. The same is true with grain sorghums. This is because these seeds are in the control of a comparatively few handlers and are hybrid in nature, which makes the use of certified less important.

The important thing is the impact that seed certification has on

FGP: what is planted, irrespective of the actual volume of certified seed planted. Certification established the philosophy a long time ago that good seed pays, that genetic purity counts, that if you are going to have variety improvement by plant breeders, seed of the improved varieties must be planted by farmers. Certification made this a realistic objective at a time in history when the distribution system for such seeds as wheat and barley was rather primitive.

The question can be asked, why is there any need for certification today? Why can't the seedsmen carry on without it? They could and are with such field crops as corn. However, there has developed a sort of partnership, a working relationship, and a useful role for certification beyond what necessity dictates. I refer to the fact that seed companies find that in getting their seed certified it saves them money and effort by its doing things during the growing and processing that certification can do better and more effectively--irrespective of whether the certification tag finally goes on the seed. Such things as field inspection provided by the certifying agency performs a task that saves the seed company money in the form of time that their fieldmen would have to take otherwise. Having the certifying agency look over the shoulder of the grower while the seed is being produced is considered a very worthwhile function by many of the seed companies.

Looking ahead, I think this role for seed certification is going to continue, and maybe expand. The future of certification is assured for that alone, even if the varieties of the future are all proprietary, which just might be. Added to that, the provisions of plant variety protection, that pertains to certified seed, creates an even more important role for certification. It makes a very easy way of providing breeders' rights.

There probably won't be any truly public varieties in another fifteen years. I don't think, however, that this means the public breeder is going out of business, nor is any less competent than the private breeder. It means that the company which hires the private breeder, and which sells the seed after all to the farmer, is going to sell its own variety because there is more money to be made by so doing. This power of certification to influence the quality of the seed planted will hang over things very definitely. There will be an enhancement of the relationship between the public plant breeder and industry. There will be a clarification of the separate roles. Industry and private plant breeding will lean very heavily on public institutions for basic germ plasm of new and exotic material. The sophisticated techniques and equipment in the public institutions make them much better qualified to do the more basic

FGP: type of research. Further, it is going to be necessary to have the institutions to train the commercial plant breeders. The team approach becomes more important than ever.

As far as management of seed certification here in California is concerned and its relationship with the University of California, I see a very bright future. Competent staff persons, two of whose salaries are funded 50 percent by the University, are now operating the total program of Foundation Seed and Plant Materials and seed certification. Each, the University and the California Crop Improvement Association, needs the support of the other. Recognition of this by the department chairpersons involved and the dean of the College of Agricultural and Applied Sciences assures a continuance of this relationship.

MEMBERS

State Approved Seed Committee 1936-44

California Crop Improvement Association Board of Directors 1944-76

John Alesso	1958-59	
Walter S. Ball	1942-62	President 1945-62
John P. Benson	1949-51	
P. C. Berryman	1964---	
Ernest Bevan	1936-38	
Albert Bevis	1952-64	President 1963-64
Stanley Bradbury	1960-63	
Iver Brand	1949-50	
Fred N. Briggs	1936-53	
James P. Brown	1941-46	
Floyd E. Buffum	1947-48	
Elmer E. Cady	1946-47, 1965-66	
Don Campbell	1950-52	
Herbert W. Chandler	1964---	
Ken Christensen	1952-56	
Carl C. Coulsen	1970-76	
Harold Crane	1936-42	
Herbert Dalton	1954-62	
Forrest H. Darby	1961-64	
Glen Davis	1941-58	
Gulius C. Deubner	1949-54	
Archie M. Dessert	1965-69, 1971---	
Dan Dieter	1948-49	
Francis B. DuBois	1959---	President 1964-69
William J. Duffy	1938-41	
William B. Early	1941-43	
Charles Emery	1959-63	
Gordon Erstad	1956-57	
Ray Freeman	1950-52	
C. A. Garnier	1944-45	
Charles M. Gordon	1950-59	
W. L. Goss	1936-40	
Murray Gow	1947-48	
H. E. Grether	1946-47	
Charles Hardy	1944-47	
James F. Harrington	1959---	
L. C. Hawk	1938-55	
J. C. Jacobsen, Jr.	1951---	President 1969-76
L. M. Jeffers	1941-42	
Alex Johnson	1939-49	
Burle J. Jones	1936-47	
Jack D. Jones	1959---	President 1976-78

Leslie Kahl	1936-42
Harry Kinder	1963-64
John Kluber	1949-51
P. F. Knowles	1970-75
John Knox	1949-51
Allen B. Lemmon	1963-70
R. Merton Love	1959-70
Richard Lyng	1956-59
John M. Lyons	1967-69
Ben A. Madson	1936-38
A. E. Mahoney	1947-50
Vern L. Marble	1959---
Leo Marihart	1962-66
Robert L. Maulhardt	1969---
Leon T. Miller	1969-71
Milton D. Miller	1947-50, 1958-59
J. L. Mullaly	1937-43
Victor P. Osterli	1950-57
Frank G. Parsons	1944-76
Robert C. Pearl	1957-58
William C. Peters	1964-70
Glen J. Peterson	1956---
Maurice L. Peterson	1953-59
Albert A. Peukert	1948-54
C. A. Qualset	1975---
Walter Reed	1949-56
C. A. Renaud	1951-52
Russell D. Richards	1969---
J. M. Robinson	1936-45
Fred Rohnert	1952-64
Ed Searl	1936-38
Robert E. Skaggs	1970---
Francis L. Smith	1941-45
Otto Speckert	1949-50
L. L. Stanley	1948-49
L. M. Stone	1938-41
Coit A. Suneson	1936-38
Frelten F. Swim	1959-61
Dean Terry	1952-59
Walter Titcomb	1966-68
Phil Titsworth	1957-64
Julius G. Trescony	1947-50
Robert Walker	1955-56
Ward C. Waterman	1964---
Gilbert Weathers	1976---
Waldo W. Weeth	1945-49
George W. White	1936-46
George Wilson	1936-37
Arthur W. Worledge	1951-53

Acreage
California Crops Certified
1935-75

	<u>1935</u>	<u>1940</u>	<u>1945</u>	<u>1950</u>	<u>1955</u>	<u>1960</u>	<u>1965</u>	<u>1970</u>	<u>1975</u>
Alfalfa	---	---	5	13,977	119,407	102,284	52,418	55,096	32,035
Barley	1,997	1,342	2,010	11,502	4,818	8,692	13,267	9,597	11,985
Wheat	4,034	5,703	3,446	4,027	2,075	937	1,826	722	17,957
Oats	196	955	421	2,076	428	571	1,847	783	1,001
Beans	288	1,680	6,082	8,056	10,188	10,036	15,115	9,211	8,372
Cowpeas	30	92	492	1,771	5,417	3,291	2,737	2,803	1,588
Rice	---	385	1,654	3,636	3,811	7,005	8,870	11,731	20,754
Sudangrass	---	2,220	997	3,345	3,431	6,933	6,432	3,421	1,247
Milo	689	777	425	1,470	553	---	279	15	---
Safflower	---	---	---	---	---	143	2,457	837	1,323
Flax	---	1,355	2,342	1,227	565	619	164	---	80
Ladino Clover	---	1,613	852	13,412	11,677	15,242	11,606	14,679	11,449
Red Clover	---	---	---	---	2,408	3,205	1,295	1,630	---
Trefoil	---	---	---	---	152	1,927	220	223	145
Pasture grasses	---	---	---	320	1,159	635	524	10	---
Miscellaneous *	---	---	33	50	96	623	391	435	160
Total	7,234	16,122	18,759	64,869	155,675	162,143	119,248	111,193	108,096

* Includes such crops as vetch, berseem clover, corn, peanuts, rye, strawberry clover, rose clover, burnet, Merion bluegrass, popcorn, and cotton.

Brief Biography of Frank G. Parsons

Born June 14, 1910 (Flag Day) on a farm near Benton City, Missouri, the first of ten children (six boys and four girls).

Mother, Hila Finuf Parsons, born May 14, 1892, still living.

Father, George F. Parsons, born September 10, 1884, died 1967.

At age 5½ moved to farm near Winfield, Kansas. Learned to ride horses, handle all farm equipment, do milking, etc. at a very early age.

Educated through ninth grade in country school.

Attended high school Winfield, Kansas, graduating in 1928.

Attended Kansas State University 1931-35. Made own way entirely, working in Agronomy Dept., graduated with B.S. in Agronomy 1935.

Employed as an assistant in the Agronomy Dept., Kansas State University 1935-37. Working with Mr. A. L. Clapp in what was called Cooperative Experiments, consisting of crop trials all over the state. Also assisted in seed certification, Kansas Crop Improvement Assn. (Mr. Clapp, Manager).

Married Harriet Reed July 21, 1934.

Has three children, Robert Alan, Elizabeth Ann, and Lawrence Reed.

Moved to California and started employment with UCD on December 1, 1937, taking charge of foundation seed program and seed certification.

Retirement in 1976.

Awards and Recognitions

October 20, 1965	Honorary Membership, International Crop Improvement Assn.
September 4, 1974	California Rice Research Foundation Plaque reading: "In grateful appreciation for his outstanding service to California rice growers in helping to develop and expand a highly beneficial rice seed certification program."
September 28, 1976	California State Assembly Resolution of commendation for outstanding contributions to agriculture and seed industry.
December 9, 1976	Honorary Life Membership, California Agricultural Commissioners Assn.
March 15, 1977	California Seed Assn. Plaque reading: "For long and distinguished service. . . .and outstanding assistance to the seed industry."
May 23, 1977	Pacific Seedsmen's Association, Man of the Year Award.