CHAPTER 7: GATEWAY TO GREATNESS

UNIVERSITY OF ILLINOIS 1966 – 1984

"Nevertheless, I spent one glorious New Year's Day doing what I suppose I most like to do. The weather was perfect, the scenery glorious and luminous and I spent the whole day bouncing down a rough gravel road from Morelia to Heutamo and finally out to Iguala." from a letter Jack Harlan wrote to Dr. George Beadle, dated January 12, 1972, regarding his first collection trip to Mexico.

General Index Index of expeditions and trips

Something's Got to Give

Dr. Jack Rodney Harlan stood in front of the desk of his friend and co-worker Dr. Wayne Huffine, whose office was next door to Harlan's office in the Agronomy building at Oklahoma State University. Harlan cleared his throat and Huffine looked up from the papers on the desk.

"Yes, Jack," he muttered. Harlan handed him the letter from the new OSU President, Robert B. Kamm.

"What do you think about this thing?" asked Harlan. Huffine glanced at the letter and said,

"Oh, I got one of those last week. Everybody got one."

"So, Wayne, what did you do – what do you think about this thing?"

"Well, I don't know … I guess if it has come to that, it is going to come to that."

"Well, Wayne, I can't sign this oath. I just can't do it. I suppose, it will compromise my freedom of expression or something. No, I'm not going to sign. Something's got to give."

"Come on, Jack, everybody has to sign the oath. It's no big deal."

"Ok, let me see…" and Harlan went back to his office. He got Marlowe Thorne, who was Head of the Agronomy Department at the University of Illinois, on the phone and told him what was going on at OSU. Dr. Thorne did not hesitate one heartbeat.

"Jack, it sounds like that now is your time to come up to the U of I. (They have been talking about this for months now.) I think this is just the break you've been waiting for."

Jack thought about this offer for about one half second and said, "Ok, I think I can do that. When can I start?"

Thorne said, "Well, Jack, this can't happen today or tomorrow. I think it will be best if we shoot for some time at the beginning of the semester, say in September."

Harlan said, "Now, my eldest daughter, Sue, is due to be married on September 10. That will be in Massachusetts, I think. I will be up there. The whole family will be in Massachusetts."

"How does September 15 sound?"

"Marlow, if I am coming to the U of I, I need to bring my partner, Jan de Wet, with me. We have been working together, filling in for each other when one of us is overseas. We are kind of like a team."

Marlow was now a little bit cautious. "I don't know about that, Jack. I will see what I can do. But you will come to the U of I even if I can't do de Wet, too?"

"Well, I really need de Wet." Harlan was the one asking for a job, so his position was not as strong as Thorne's, who was offering the job. There was an anxious pause, while both of them considered how Jack Harlan was now out of a job but also about how much Marlowe Thorne could use him. "I suppose I could come up there, but I really need de Wet." - Pause –

"Ok, Jack, I'll see what I can do."

So, it happened that, rather than sign the loyalty oath, Jack Harlan resigned from OSU. His official reason was that he felt that signing the oath would impinge upon his independence as a scientist. This was the official story that this author heard many times and even in the later conversations he and Dr. Harlan had together in 1990's about this book; that is, that "officially" it was the loyalty oath, but it was known that there were other reasons. This author did not know what those other reasons were. However, upon searching through the archives, this

author ran across Dr. Harlan's letter of resignation to Dr. Kamm at OSU and he lays the blame for his departure squarely on Agronomy Department Chair Frank Gardner and his "injelitance". Injelitance is a term coined by Cyril Northcote Parkinson, which is a combination of incompetence and jealousy as found in his book "Parkinson's Law" which describes how "work expands so as to fill the time available for its completion". Note also, that Dr. Chance Riggins obtained the resignation letter for this author in 2018. At this point in time it is not clear to this author what Dr. Gardner did to earn the accolade "injelitance", but Dr. Harlan seemed to be spreading the blame around amongst his superiors. Anywho, it was time for a change.

Dr. Marlow Thorne, the Chairman of the Department of Agronomy at the University of Illinois offered Jack Harlan a position as Professor of Plant Genetics at the University of Illinois, Urbana and this was a grand opportunity that one could not pass up. In a letter from Dr. Thorne dated July 18, 1966 to Dean Daniel Alpert, Chairman of the University Research Board, Dr. Thorne states that Dr. Harlan was to begin at the University of Illinois on September 15, 1966 and Dr. de Wet would follow him a year later. Dr. Thorne had previously stated in the same letter that salaries and other expenses for both men would be paid for from grants from the Midwest Universities Consortium and that they were both needed "to strengthen teaching, research and graduate training programs in international crop science." In the same paragraph he wrote that "these men will pursue the study of the origin and evolution of cultivated plants both in the United States and in foreign countries." This is exactly what Jack Harlan's professional career was to be about: to go out there and find the origin and evolution of cultivated crops.

In an interesting twist we find the following:

> the (US Supreme) court did not declare loyalty oaths for professors unconstitutional until 1967, in *Keyishian v. Board of Regents.* Harry Keyishian, who taught English at the State University of New York, Buffalo, refused to sign a loyalty oath affirming he was not a member of the Communist Party. In a decision that finally overturned the 1949 Feinberg law, Justice William J. Brennan Jr. wrote that academic freedom is "a special concern of the First Amendment, which does not tolerate laws that cast a pall of orthodoxy over the

classroom." Found in: http://library.cqpress.com/cqresearcher/document.php?id=cqresrre2015050800.

It was during this 12-year sojourn at the University of Illinois that Dr. Jack R. Harlan proved himself to be both a scholar and a pilgrim, as he labored faithfully and fruitfully in this gateway to greatness.

To the Reader

At this point in your reading, if you are still reading this and wish to continue with *A Scholar and a Pilgrim*, it can become self-directed. The rest of this chapter contains too much material for one person to slog through. But explore for yourself the 13 remaining expeditions and 11 extended trips that Dr. Harlan journeyed on, however way you desire to do it. The following is an Index for Chapter 7: a list of expeditions and trips Harlan conducted during his pilgrimage at U of I. The links take you to the place in this chapter where the expedition or visit is briefly described. Once there, the reader can visit the transcript (Trans) or a narrative (Narr) of the expedition to find out more or return to the Index. Depending on the system you are using, the links may or may not work. If you find that the links are not working, you can find all the referenced material in the Appendix but you will have to sort through it just like in the old days of the paper book. Or you, the reader, can just read the text and ignore all the blue underlined hyperlinks and just enjoy the story of a man who could not sit at home watching football, but had to go out there and do something for the good of the world. To skip the Indices, click Begin Reading Chapter 7.

We can see a total of 13 Expeditions during Harlan's pilgrimage at the U of I. He had already taken three before coming to the U of I for a total of 16 Expeditions. He will take one more after retirement for a grand total of 17 expeditions. In addition, he went on 11 extended overseas trips where he did not do any seed collecting. To count as an expedition Dr. Harlan had to do at least a little collecting. If there was no collecting going on, we called it a "trip", and these are numbered separately. These expedition and trips were the only ones this author could find in the piles and piles of residue that Jack Harlan left. The problem with writing this book has been, since the beginning, that there is entirely too much material to go through. This

author had two large boxes of materials at his house. Plus, there were significant stashes of materials, mainly letters, at the University of Illinois library, along with that of his father, Harry V**.** Harlan. In addition to all that, there are the travel journals that Dr. Harlan left and his pocket notebooks which give dates and places where he went. All this author has is a Xerox copy of the travel journals and they were, at times, very difficult to transcribe. The originals were held, without bail, by Dr. Cal Qualset and Dr. Adi Damania at the University of California at Davis. Dr. Qualset had visited this author's home in 2008, three years after Hurricane Katrina had flooded the house. He thought, and I agreed, that it would be good to take the originals of the travel journals to a safer place in California. In transcribing the journal notes, when I reached a section I could not decipher, I could send an email to Dr. Qualset or Dr. Damania and they would go to the original journal where they could help me. Much thanks to them. The journal notes have proved to be a gold mine of information and a window into Jack Harlan's mind and, at times, into his soul. Just take a moment and look at the two Indices which have been prepared. During this part of his life, Jack Harlan was always either going or coming, unpacking or packing - getting ready to go again.

General Index for Chapter 7

INDEX TO JRH OVERSEAS VENTURES DURING THE U OF I YEARS (1966-84)

Just look at all the places this man went (see above Index), one after the other and be amazed.

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Chapter 7: Gateway to Greatness, the U of I Years

Introduction

(Return to "To the Reader") (Return to General Index)

Jack Harlan barely had time to unpack his briefcase at the University of Illinois when he was called upon to go out there into this wide wild world to fulfill his childhood dream and calling. But family came first. Jack's eldest daughter, Sue, was due to be married in Massachusetts in September 1966. Back in Stillwater, Jack's son, Harry, had finished two years at OSU and was doing quite well, grade-wise. He was living off campus in the ATO fraternity house. He had also been accepted to MIT, in Cambridge, Massachusetts, to start in the fall of 1966. Sherry had graduated from High School and had been accepted to Tufts University, also in Cambridge Massachusetts, to begin in the fall of 1966. Richard had one more year of high school at C. E. Donart High School in Stillwater. During the summer they were all living at home, except for Sue. Harry had a summer job working in a neurophysiology lab at OSU. The lab was investigating the **e**ffects of nicotine on the nervous system of the German cockroach. Harry learned how to prepare the cockroaches for the experiments and watched in amazement at what happened to their delicate little nervous systems at the presence of even a very minute amount of nicotine. Their nervous systems went wild and this experience got Harry interested in Neurophysiology as a possible profession. Be it noted that Harry was smoking about a pack and a half of nicotine-infested cigarettes per day at the time. It would be about 10 years before Harry would quit his retched habit. Richard was drum major in the high school band. He learned how to strut around with his head held back and direct the band on the football field and parades. Interestingly, Richard became a neurophysiologist and Harry learned to play several musical instruments in his lifetime.

The Harlan family was about to split up and go off in several directions. Sue was now engaged to Robert Leonard Hughes of Fall River, Massachusetts. They had met at the University of Rhode Island and would be married September 10, 1966. Jean, Harry, Sherry and Rich all drove, in the family station wagon from Stillwater, Oklahoma to the Boston **a**rea, in the early September of 1966. The air was cool and crisp and exhilarating. The leaves were starting to turn to vivid yellow, red and orange. There was an excitement in the air. Harry was dropped off at the ATO house at MIT. Sherry was dropped off at the campus of Tufts University, about 4 miles across town from MIT. A few days later everybody gathered in Fall River, Massachusetts for Sue and Bob's wedding. The wedding was very nice. After driving Harry and Sherry to their respective schools, Rich and Jean drove the car back to Stillwater and Jack drove his VW to Champaign, Illinois. This was the Great Earthquake of 1966. The Harlan family split up and went their separate ways. Jack Harlan was suddenly faced with a bit of a financial squeeze. New tuition bills were due for Harry and Sherry and wedding expenses for Sue. Jack Harlan went through all this without a murmur, as far as anybody could tell. He had a way of making things happen financially without so much as a shrug of the shoulder.

Jack Harlan had published 12 scientific publications and undertook one overseas expedition during his nine years at Woodward. During his 15 years at Stillwater he published 85 papers and conducted two overseas expeditions. This was a good start, but something was still missing. He had been working on grasses for 24 years. This was not what he had been called to do. He was supposed to be discovering the time, place and wild progenitor, i.e. the origin, of domesticated crop plants. He was to follow in the footsteps of Nikolai Vavilov not in the footsteps of the USDA, finding better grasses for the Great Plains. This is what makes the move in 1966 so extraordinary, not only for Jack Harlan, but for the world. Jack Harlan was to now begin his pursuit of his life goals. Back when he was four years old, he heard a calling and a challenge to go out into the world, go out to strange and even inhospitable places to collect seeds, not seeds of grasses, but seeds of wheat and corn and rice and whatever else the people of this world ate from their gardens and surrounding fields. Jack Harlan made 49 years old in 1966.

When he arrived in Champaign the pace of his work accelerated: in the 18 years at the U of I he published 137 papers, conducted 13 expeditions and attended at least 11 extended trips. He became the leader of a team of scientists working on several fronts to try to uncover the secrets of the origins of domesticated crops and to protect the diversity of crop plants across this world. He was called the "American Vavilov". Scott Pelley of 60 minutes called him the "Indiana Jones of plant explorers". He fulfilled all his high dreams of being a well-known and experienced plant geneticist, was sent to travel the world and search for the centers of origin for the world's crops and got to see his four children marry and give him, and his wife, eight grandchildren. More than that, he became one of the early pioneers of crop biodiversity.

Dr. M. J. M. de Wet followed Jack Harlan to the University of Illinois in September 1967. This author is going to propose that the two of them, once they were both settled at the U of I sat down together and had a conversation something like the following:

Jack and Jan (pronounced Yon) de Wet were sitting across a table from one another. Jack thought a moment and cleared his throat and said in his characteristically slow and deliberate cadence, "Jan, I thought we should both sit down and take a few minutes and look at the commissioning we have been given. Here is a copy of a letter which Marlow wrote to Dean Alpert on July 18, 1966. Now, Marlowe was looking for funding for my salary and your salary. But I would like to draw your attention to the first paragraph." He then rapidly reads through the first 2 ½ lines and paused when he gets to the part he wanted Jan to see, then continues with his slow deliberate cadence reading from the letter, 'Two positions are authorized, one of which will be occupied this year by Dr. Jack R. Harlan. We hope to hire Dr. Jan de Wet in 1967 for the other.'" Then Harlan pauses and says, "Now, Jan watch this, 'These men will pursue the study of the origin and evolution of cultivated plants both in the United States and in foreign countries.'

"Now, Jan, we have been given this commission, this mandate to – (Harlan adjusts his glasses and then takes them off to read better) "where was that? Oh, here it is, 'These men will pursue the study of the origin and evolution of cultivated plants (pause) both in the United States and in foreign countries.' What do you think about that? Jan, this is exactly what I have

been called to do. This is my calling since I was four years old – to explore the world, collecting seeds and looking for the origins of domesticated crops. I don't know about you, Jan, but I am delighted by the wording in this letter." Jan de Wet could do nothing but agree with everything Harlan said.

Harlan continued, "Now, Jan, let us do a little planning. What do we need to do to accomplish this mandate?" Jan de Wet thought a minute. Harlan was really asking him to come up with something. Finally, Jan said, "Well, the big four crops in the world are wheat, rice, maize and sorghum. Right? The story of wheat and her relatives is pretty much settled. We know that story. It is in the Neolithic Middle East and it involves Triticum. That was the ancestor. Now, when it comes to rice, that one probably came from China. China is right now closed to the West, so we might as well forget about that one for now. That leaves **m**aize and sorghum."

"Very good, Dr. de Wet, very good", said Harlan. "This is exactly what I have been thinking myself. That leaves maize and sorghum. I really don't know much about either one, so I think the next thing we should do is go to the library and see what we can find on maize and sorghum." Jan agreed and Harlan suggested that he take maize and Jan take sorghum, that they would study for a couple of days and get back together and then they would switch crops and go again.

As they worked in the library, they found out that the prevailing theory about the origins of corn, or maize as it is more officially called, was described by Dr. Paul Mangelsdorf. It was called the "Tripartite Hypothesis" and it involved a now extinct ancestor of maize. As they looked into sorghum, they found that, although, sorghum is grown in many places in the world, it seems that it was most probably originated somewhere in Africa. Africa also seemed to be the birthplace of several indigenous crops, mainly millet and African rice. Africa was, after all, the "Dark Continent" and for good reason; not much is known about it. Vavilov made one trip to Ethiopia, but the rest of this mysterious continent was untouched at this point, as far as plant explorations went.

Thus, the ground was set for Harlan and de Wet to pursue the major crops of Africa and, also, look into the case of maize. To kick off the later of these, they hosted a corn conference in September 1969. Actually, Jack Harlan had already done his homework and had planned to start the African explorations with West Africa in November of 1967; but the above conversation had confirmed in his own mind what he had already concluded – that Africa needed to be explored and there was no time to waste. It looked like the "Savanna Belt", between the Sahara Desert and the equatorial rainforests would be the best place to begin their quest in Africa.

Courses taught by Jack Harlan at the U of I (Return to General Index)

Unfortunately, the U of I "file" on Dr. Harlan has been lost. At least that is what this author was told by the University of Illinois. However, a letter to Dr. R. Dangerfield from Dr. Marlowe Thorne, dated May 23, 1967 states that since Harlan's return from his first trip to India to visit U of I projects there (Exp. No. 4, 1966) he has, among other things, been preparing a new course, "Crops and Man", to be offered in the fall semester of school year 1967-68. He was also "engaged in the preparation of an outline for another course. 'Classical Evolution'." Former students contacted on this matter remember the Crops and Man course, but not the Classical Evolution course. So, we can conclude that Jack Harlan taught a course called "Crops and Man" and the first year may have been 1968 (spring semester). Classes may have been during the week for 2 hours and again on Saturday morning for two hours. The class went on several field trips during the course, including one to the University of Chicago to see Dr. Bob Braidwood and his lab. With all his comings and goings, it is hard to see how Jack Harlan could teach a course, too. (HVH2)

Expedition No. 4 – to India 1966 (Return to Index):

This was Harlan's first expedition from the U of I. To read a full Transcript of this expedition click Trans, or find it in the Appendix. The following is a Summary of Exp. No 4:

Jack Harlan arrived to work at the U of I on September 15, 1966. Marlow Thorne invited him to come to India to visit the various U of I Projects there in November of that year. Dr. Thorne, himself, was serving as a Research Advisor at the Jawaharlal Nehru Agricultural University, in Jabalpur, India from September 6 through December 5, 1966. Harlan went to India by flying west, stopping by OSU, Honolulu, Manila, Hong Kong, where he peered over the border into Communist China and Bangkok, before reaching Delhi. These "stop-offs" received funding from various sources. Marlowe Thorne met him at the airport in Delhi on November 27, 1966 and escorted him around to get him started. Then, Harlan was on his own in India. He had collected there in 1960, so he was familiar with the people and customs. This time he was to visit the various U of I Projects in that beautiful, yet challenging country. This author has a rough Xerox copy of the journal notes for this expedition and had a lot of difficulty transcribing it. The content was almost entirely about meeting people and going out to dinner, that sort of thing. This author does not feel that it would be worth his time to struggle to get the text of this expedition journal completely cleaned up. It appears that Dr. Harlan spent a good deal of his time in India at the Nehru Agricultural University in Jabalpur. He does not mention Dr. Thorne in the passages transcribed. Dr. Harlan was on his own to visit other people and see what they were doing. He was also free to give advice as he went along.

It is of some interest that in a letter dated October 3, 1966, Dr. F. W. Slife, acting Head of the Department of Agronomy at the University of Illinois to Dean George Brinegar of the U of I, Dr. Slife wrote "In Dr. Harlan's case the extra travel is really his research, and I doubt very seriously that he is too interested in sight-seeing since he has been around the world several times." (Dr. Slife was getting a little ahead of himself. Harlan's first trip "around the world" was the subject expedition (Exp. No 4) in 1966 (Nov 8, 1966 – March 28, 1967) and, as the reader will find out, Jack Harlan **did** like to see the sights as he traveled.)

In a proposal by Dr. M. B. Russell (International Travel on AID Contracts) Dr. Russell details a three-part way to divide up payments during an AID expedition with stop-offs. In later expeditions Jack Harlan often went to art museums and that sort of thing. He documented it in

his field notes, which I assume gave him a way to document what he paid for and what the expedition paid for.

Thirty years later (1996), Jack Harlan sat down with his son, this author, and told this story of the 1966 expedition to India from a more relaxed vantage point. Here it is:

> Anyway, I wanted to go by way of the Philippines to see the rice Institute and their work there. And then from there I stopped in Thailand to see some Rockefeller Institute work with rice in Thailand and then on to India where I had my main assignment. It was really about a three-month tour of duty and since I didn't know enough to advise the dean, I spent the time the way I wanted to. One thing that interested me was the dairy industry in India. I made a casual survey of it. Dairy in India is big; this is a very large source of nutrition for the people. People eat milk, yogurt, sorts of cheeses, fermented milk of one kind or another. And this is very important to them. So, I visited a number of dairies and tried to see how they operated. One way to solve the distribution problem, since they had no refrigeration, no way to preserve milk except for fermentation, was to have dairies scattered throughout the city. A city the size of Bombay or Delhi would have, oh, as many as a dozen dairies, I suppose, scattered around so that the distribution routes were short and they could deliver milk to the doorstep fairly efficiently. The dairies generally had about twenty cows; all of the cows were fresh ("a cow in the 2 to 3-month period between the end of lactation and the subsequent calving." (Wikipedia)). Food was brought in for them and so they could not afford to have a dry cow. When a cow went dry, they took her out to the edge of town and brought in a fresh one. At the ends of town, they had reserve cattle and well, there were a few interesting questions. The Hindus were against killing any kind of animal. So, I asked them, "What do you do with the bull calves?" "Well," one of them said, "I don't know. Somehow they die." My interpreter nudged me and said, "that means they don't feed them." Another one said, "We put them in a truck and take them out to the edge of the jungle; there are still some tigers out there." Anyway, they don't kill the animals, but they do see that they are disposed of.

Now, we shall continue with the story of Expedition No. 4: Jack Harlan began an unofficial investigation of the dairy industry and as he traveled around India and learned enough that he was able to advise people there, even on the economics of dairy farming, which was way out of his field of expertise. But he was able to do this after a short investigation of the industry.

On December 11, 1966, while riding a bicycle in Jabalpur, Harlan was sideswiped by a rickshaw and injured his hand. He went to a local hospital where a Sikh doctor gave him five stitches. Undeterred, Harlan continued his mission, cycling to his next destination.

After a period of recuperation Harlan continued to travel to the various projects that the University of Illinois had ongoing in India. He returned to America by continuing his circumnavigation of the globe, stopping in London (the KEW), then back to Germany before flying on to his starting point in Champaign, Illinois, landing on March 28, 1967. This event has been counted as an expedition (No. 4) because Harlan did a little collecting in Hong Kong and India while on the road. To read the transcription of the travel journal for Exp. No. 4 click Trans or you can find it in the Appendix.

The Crop Evolution Laboratory (CEL) (Return to General Index)

When Jan de Wet arrived at the University of Illinois in September 1967 he sat down with Jack Harlan and they talked about their partnership and how the two of them, when they put their heads together on a particular problem would be able to think it through and come up with a better and more innovative solution than if either one of them were to sit there and try to think of something by themselves. So, they talked about their graduate students and the different projects they were working on and after a while de Wet said, "You know what, Jack, this thing keeps coming to my mind and I wanted to talk it over with you. Why don't we combine our grad students together into some kind of discussion group, so that they could help each other with the questions or problems they were having with their research? That would take the load off us and let the students think these things through for themselves." Harlan rested his chin on his right palm and thought about this idea for about 30 long seconds. "That's good, Jan," he finally said. "Why don't we do it like this: we have a scheduled coffee break at, say, 10 AM each day and we all gather around a common table and drink coffee and talk about what we're doing. That's pretty good, de Wet. I think we could just use the coffee room." After the group met a few times, Harlan suggested that they give this meeting a name and he suggested that they call it the "Crop Evolution Laboratory". Thus, the CEL was born sometime

in 1967. It became one of the more outstanding legacies of Jack Harlan at the University of Illinois.

The following is quoted from a letter from Jack Harlan to Dr. Edgar Anderson, curator of Useful Plants, Missouri Botanical Garden, dated June 22, 1967, "You apparently know by the grapevine or other means that Jan de Wet and I are moving to the University of Illinois to establish a laboratory for the study of the origin and evolution of cultivated plants." This is not an official description of the purpose of the CEL, but it does show us the purpose in Jack Harlan's heart. This is something he has wanted to do for some time.

From a taped conversation with this author and Jack Harlan in 1996, Harlan made this comment about the CEL, after it had been fully developed. "Ted Hymowitz pointed out that at one time we had the facility of some 19 different languages at the Crop Evolution Lab. Not necessarily 19 different people. They were poly-lingual folks and most of the European languages, some Arab, some African, some Oriental languages were represented. It was sort of a polyglot, an eclectic group which I think enjoyed each other."

In the process of preparing this chapter early in 2018, this author was contacted, via email, by a man named Dr. Chance Riggins who was becoming the curator of the CEL herbarium at the U of I. We corresponded via email and he gave this author the following historical details. This author had thought that the CEL had been disbanded when Dr. Harlan retired in 1984, but Dr. Riggins says that the herbarium of specimens has been limping along, first in the basement of the office building and then escaping the dumpster a couple of times and finally rescued by Dr. Riggins, stored in his personal garage and finally restored to become part of the U of I herbarium collection. The CEL collection is, as of February 2018, in a pretty raw state. There is only a very clumsy and difficult method of finding references for the various specimens and there are great amounts of notes and photos which have yet to be dealt with. Dr. Riggins is hopeful that funding can be found so that everything can be properly digitized and made available to the public. As of November 2019, Dr. Riggins reports that not much has changed with the CEL from what he reported in 2018. In the meantime, the following is what Dr. Riggins has contributed to this portion of the book regarding the CEL:

Dr. Chance Riggins on the CEL

One of the more outstanding accomplishments of Dr. Harlan at the University of Illinois was the founding of the Crop Evolution Laboratory, or CEL, and its associated herbarium collection. Upon accepting the faculty position at Illinois, Harlan was immediately pressed into international service by Marlowe D. Thorne, Head of the Agronomy Department at the University of Illinois (1963-1970) and friend and former colleague at Oklahoma State University. Harlan was asked to become a member of the Research Advisory Team for Jawaharlal Nehru Agricultural University at Jabalpur, India, plus play an active role in connection to the University's other contract locations in India and Sierra Leone. Harlan's arrival coincided perfectly as the Department of Agronomy and University of Illinois were looking to broaden international activities in agriculture, and he didn't waste any time in trying to capitalize on this interest. In a letter to university administrators, Harlan laid out his thoughts and plans for improving competence of the Illinois staff in international agriculture, his impression of whom were by and large "conservative, provincial, and accustomed to thinking in terms of corn-belt agriculture."

In his letter, his suggested plan was to proceed in three phases. Phase 1 was to encourage staff to think in terms of international research and teaching and attempt to "widen horizons, broaden outlooks, and put Illinois agriculture in perspective with world agriculture" through seminars featuring international work, soliciting help and ideas from foreign students, starting an annual "International Agricultural Research Day" to publicize work and promote discussions, develop an Illinois Journal of International Agriculture modeled on *Crops and Soils Magazine*, with short articles by staff and students, arrange for exchange of professors and students, among other possible activities. Phase II was to encourage staff to gain experience in tropical countries, and Phase III offered ways to establish a complete university program in international agriculture. All totally relevant, as Harlan would like to remind people, since the major crops of Illinois are ultimately of tropical origin! In fact, none of the major commercial crops in Illinois, or U. S. for that matter (corn, soybean, cotton, wheat, barley, rice…), are indigenous. The story is similar with major breeds of livestock.

In the same letter Harlan also asked whether "we are really teaching soils when we teach Illinois soils, are we really teaching crops with we teach corn and soybeans are we short-changing our students…" by not exposing them to what's happening internationally? Harlan goes on to suggest the establishment of an interdisciplinary council of researchers and teachers within the College of Agriculture to come up with ideas for seminars featuring international work and start an annual international agriculture research day.

Additional suggestions for promoting the Department's move to embrace international agriculture were captured in a letter to C. M. Brown, which called for a facility of some sort in the tropics where staff and students could become familiar with tropical crops. The latitude of central Illinois limited field research of tropical crops, and greenhouse facilities at the Urbana campus were not satisfactory at the time either. Thus, in order to conduct comprehensive research in genetics and physiology of mainly tropical crops, and perform comparative studies with material grown at Illinois, it was desirable to have a place for students to take short courses in tropical crop production, soils and botany.

Harlan constantly acknowledged the importance of education and embraced any opportunity for passing along his knowledge and experience to his students. For example, one of the first things Harlan did upon setting up the Crop Evolution Lab was to send letters to colleagues around the world politely requesting photographs because he was "looking to assemble a 'rogues gallery' of people who have made outstanding contributions to the field of crop evolution, genetics, anthropology, etc. ". Portraits were requested from Edgar Anderson, Sir Otto Frankel, G. Ledyard Stebbins, Joseph Hutchinson, J. G. Hawkes, the famed anthropologist Robert Braidwood, among others, and of course, portraits of Alphonse de Candolle and family friend, Nikolai Vavilov, were hung in CEL as well. Harlan felt it very important for his students to have more than just a reading acquaintance with those who developed and shaped evolutionary theory.

One of CEL's earliest endeavors was to survey and evaluate the world sorghum collection at request of the Rockefeller Foundation. World germplasm collections at the time largely lacked control or reference specimens, which are essential to verify taxonomic identity,

determine admixtures, cross-reference accession numbers, assess changes over time, etc. In a letter to R. W. Richardson of the Rockefeller Foundation, Harlan expressed serious concerns over the current state of the world sorghum collection and how CEL's contribution with respect to sorghum improvement could be used as a model for other crops as well.

If we were honest, we would have to admit that we don't know what we have, let alone what we don't have in the world collection. At the present time it is a series of numbers – IS numbers, P. I. numbers, Isabella numbers, Purdue numbers, Illinois numbers, and not one of us can say where any number really came from. There is no way of knowing what an accession should be under present conditions. Agronomists have never been instructed in the value of herbarium specimens or other reference materials. There is no place on earth to which one might appeal to answer the question, "Is my IS 5639 really IS 5639 or has it been contaminated, mixed, crossed with something else, mislabeled, the numbers transposed (maybe it is really IS 5693) etc. etc." In a rational world collection, every accession should have a real and verifiable identity. I love this example because it encapsulates the very essence and value of the CEL herbarium, which is the point I keep trying to make to my department and university administrators! (CWR, personal note. He continues with his written report on the CEL…)

Consequently, with support from the Rockefeller Foundation and collaboration with key people involved with sorghum from around the world, a reference collection for sorghum and its wild relatives, including information on the ethnobotany and history of use, was established at the University of Illinois. This collection not only formed the foundation for the current CEL Herbarium, but also served in the development of a sorghum classification system that is still useful to plant breeders today.

With the birth of the Crop Evolution Laboratory and its mission to study the origin and evolution of cultivated plants came the need to house all the plant specimens and associated material being amassed by Harlan and CEL's faculty and students. So, at the very beginning, Harlan formally established the Crop Evolution Laboratory Herbarium and then made it official by registering it in the Index Herbarium with the code CEL. (NOTE: CEL is used in

this chapter to refer to both the lab when active from 1967 to 1985 and the herbarium collection which exists to this day, CWR). Over a span of nearly twenty years, from 1967 to Harlan's and de Wet's retirements in the mid-1980s, the major research emphases of the CEL staff was plant exploration, conservation of crop genetic resources, and the evolution of cultivated Poaceae (grasses) and Fabaceae (legumes). The resulting herbarium as it exists today, although worldwide in scope, is especially rich in collections of cultivated plants and their wild relatives from key agricultural centers of genetic diversity in Mexico, South America, India, Southeast Asia, Australia, Africa, and the Middle East. Particular strengths are in the Poaceae genera *Bothryocloa* (Beardgrass), *Capillipedium* (Asian grass, Scented-tops), *Cynodon* (Bermuda grass), *Eleusine* goosegrass), *Dichanthium* (bluestem grass), *Oryza* (Asian rice), *Panicum* (Panic grass), *Pennisetum* (Fountain grass), *Setaria* (various names, including Foxtail millet), *Sorghum*, *Tripsacum* (a wild relative of maize), and *Zea* (maize or corn) and legume genus *Glycine* (a family of beans, including soybeans). The CEL Herbarium also includes collections of rare endemics, numerous land-races, type specimens (holotypes, isotypes, and many topotypes), collections of ethnobotanical significance, and archaeological material received for study on the origins of crop domestication from numerous sites in the Middle East and Africa. Voucher specimens from extensive cytogenetic studies and documented hybrids are also housed in the collection. Unfortunately, some materials amassed during Harlan's tenure were scattered to the winds in the decades following his retirement, although much of it remains in CEL's holdings. Due to CEL's unique emphasis, the majority of its material is not represented in other herbaria in North America. Furthermore, though there are other herbaria in North America with extensive Poaceae holdings, none combine the strengths of CEL in tropical cultivated species and their wild relatives in a single collection.

Recording ethnographic information about the plants he collected was particularly important to Harlan. During his expeditions, Harlan frequently recorded in his field notebooks his observations of traditional farming practices, the local names of plants in whatever language or regional dialect was used, and other ancillary information pertaining to the crops and customs of the area. In fact, later in life, Harlan expressed his opinions on

the need for more "hybrid" collectors to collect ethnographic as well as agronomic information and regretted that his job was sometimes focused more on "getting the genes in the sack rather than accumulating data from the villagers and cultivators he collected from."

During the early 1980s, the emphasis of the Crop Evolution Lab was changing from analysis of crop diversity and relationships among wild, weedy and cultivated races to more molecular approaches to crop evolution. In a letter to one person inquiring about graduate student opportunities in CEL, Harlan replied, "We are going into the DNA business. We are still interested in more traditional studies, but most financial support comes from grants and the money is now in biochemistry."

Since CEL's inception in 1967 to Harlan's retirement in 1984, CEL activities had brought in hundreds of thousands of dollars (nearly ¾ million dollars) to the university in grants and awards and contributed more than 300 publications to the literature. Field work of staff and students, visiting scientists, involved 45 countries which gave the Agronomy Department high visibility around the world. More information about the CEL herbarium can be found at https://herbarium.inhs.illinois.edu/.

End of Dr. Chance W. Riggins' exposition on the CEL

CROP BIODIVERSITY

Groundwork for Harlan's work on the conservation of Plant Genetic Resources (PGR) at the U of I (Return to General Index)

To tell the next part of the story we need to go back **in** time and go to the other side of the world. There we see the beginnings of a movement for the preservation of plant genetic resources (PGR). A visionary named David Lubin founded the International Institute of Agriculture (IIA) in Rome, with the support of King Victor Emmanuel III of Italy, in May 1908. The Institute's goals were to help farmers share knowledge, produce systematically, establish a cooperative system of rural credit, and have control over the marketing of their products. At the

first gathering 40 nations were represented. The United Nations Food and Agriculture Organization (FAO) was founded after World War II from the remnants of the IIA. The FAO was tasked to find ways to look at the overall picture of food production in the World. It published a report in 1964 entitled: "The State of Food and Agriculture". The Report presented, in very un-dramatic language, the dire state that the "developing countries" were facing to feed themselves. The "developed" world was quite capable of feeding itself; indeed, there were surpluses every year. Getting food to where it was really needed around the world was the problem and it was a complex problem, indeed.

Meanwhile, Otto Frankel was born in Vienna, Austria in 1900. After cobbling together an education at various schools and his own independent study, Otto earned his doctorate in Agriculture from the University of Berlin in 1925. After a brief stay in Palestine he moved to England and then found a position as a wheat breeder in the British colony of New Zealand in 1929. Frankel was successful and during World War II he supplied the allied naval forces with wheat from his farms in New Zealand. Because of his efforts he was knighted by the queen of England in 1966. Thereafter, Sir Otto became a consultant to the United Nation's FAO. He participated in the 1964 report and would impact the life of Jack R. Harlan in many ways.

The Globalism of the 1970's (Return to General Index)

The following document gives an overview of the new Global environment we find ourselves in: "The Global Environmental Agenda: Origins and Prospects", by James Gustave Speth, published around 2002, found in https://environment.yale.edu/publication-series/documents/downloads/o-u/speth.pdf. Under the subtitle: "The Emergence of Global Issues" we read:

> Much as the domestic agenda of the 1970s was forming in the 1960s, the global change agenda was quietly taking shape in the 1970s. Throughout the 1970s, a steady stream of publications with a planetary perspective emerged, calling attention to global-scale concerns. Most were authored by scientists with the goal of taking their findings and those

of other colleagues to a larger audience. A number of these reports were path-breaking, defining the global environmental agenda, but not all of them met with universal acclaim.

Seminal global environmental reports – 1970-1978:

1970 Man's Impact on the Global Environment, Report of the Study of Critical Environmental Problems (a scientific group assembled at MIT)

1971 This Endangered Planet, Richard Falk

1972 Exploring New Ethics for Survival, Garrett Hardin

1972 Only One Earth, Barbara Ward and Rene Dubos

1974 The Limits to Growth, Donella Meadows et al.

1978 The Human Future Revisited, Harrison Brown

1978 The Twenty-Ninth Day, Lester Brown

It was in this growing Global Context that the United Nations became an ideal reality. The nations of the world could sit down together and hash out their common problems. They might even be able to work together to form a common plan for feeding a human population which was growing exponentially with no let-up in sight.

In 1970 Jack's eldest son, this author, got caught away in something called "The Spirit Movement", the visible manifestation of which was the Ecumenical Institute, founded by the World Council of Churches in 1946. The core group which ran the EI was called "the Order Ecumenical", a quasi-Christian organization, which saw itself as a "Third Order" of men, women and families, all working under a common discipline and understanding that they would be "intentional, comprehensive and futuric" and operate within a "global context". Those were great days of idealism and radical commitment to universal ideals.

As we look over this landscape and recall what was written, above, by Dr. Chance Riggins about the early days of the CEL, we can see that Jack Harlan was operating well within the context of the 1970's in that he was getting his students to work together and think together to solve their common problems, rather than competing with one another to get there first.

PGR (Plant Genetic Resources) (Return to General Index)

Otto Frankel was one of the great visionaries of the 1960's and 1970's. He became a consultant to the FAO in the 1960's. Here is his story in his own words:

> As it happened, Ledyard Stebbins – a very distinguished friend of mine and a well-known American evolutionist and taxonomist – took a leading part in the earliest stages of the International Biological Programme, and because he thought I should become interested in what became known as gene pools, he bullied me into taking over that field in the new IBP. So, this is how it all started.
>
> To make a long story short, it got me into the Food and Agriculture Organisation as a temporary consultant to advise on what they ought to be doing about genetic resources, as we later called it. I was one day sitting in my office in FAO when in came Hermann Kuckuck, a German agricultural scientist, younger than I, whom I had known a little. He told me a very interesting story, that extremely important genetic resources in Iran and in Abyssinia (Ethiopia) were disappearing. This was quite new to me and it made an enormous impact, because I had been interested in plant collecting and plant collections for many years, almost from my student days. As I then followed this up and got information about land races – the old peasant varieties which had been selected by farmers and also, very largely, by natural selection, and which had been the real resources of plant breeders ever since plant breeding started – so my interest in genetic conservation grew.

As 1964 turned into 1965 Otto and his visionary friend, Erma Bennett, were working together to form a world-wide conference on the mounting problem of the disappearance of genetic resources. They decided to form a panel of experts, which would guide the organization and development of the conference. It was to consist of 4 people: Otto and Erna and two other people. They thought together and came up with Jack Hawkes, an Englishman who was specializing in the genetics of potatoes. Otto called up Dr. Hawkes and he accepted the appointment readily. As they thought, they could not quite come up with a name for the fourth member of the panel. Two of them, Bennett and Hawkes were from Europe. Frankel was from

Australia. They needed an American to round the thing out. Otto called his friend Ledyard Stebbins in California to see if he could suggest someone. Dr. Stebbins thought for a moment and said, "Why don't you call Jack Harlan? He has been doing some good work at Oklahoma State University and has a couple of collecting expeditions under his belt." Otto found the telephone number and called Dr. Harlan. "Jack, Ledyard Stebbins suggested that you might be interested in helping formulate a worldwide conference on the loss of germ plasm in crop plants. What do you think?" Harlan considered the proposal for about a single heartbeat. "Yes, I think I can do that. When do we start?" This could be a big break into the world stage. He thought to himself, "What took them so long to call?"

The Panel of Experts met several times over the next two years to plan a worldwide meeting of experts on plant genetic resources. A date was set. and a name given for the event. It was to be called the "FAO/International Biological Program (IBP) Technical Conference on the Exploration, Utilization, and Conservation of PGR". It was to be held in Rome for nine days: September 18-26, 1967. As things were getting organized, Otto asked Jack Harlan if he could chair the meeting. Otto Frankel can be pretty persuasive and soon Harlan agreed to bang the gavel for the meeting. I am bringing this up at this time because by the time this volume is being pulled together Dr. Jack R. Harlan is best known <u>not</u> for his expeditions around the world. In 2018 any one of us can visit anywhere in the world with the Internet. Our world has become a virtual world and we can just Google any place and we can go and "visit" there in the comfort of our computer room or even our cellular device. Was Harlan remembered for finding the origins of domestication of the world's food crops? Well, he did his share and found a few, like sorghum and African rice; but he had a lot of help doing that and today that is a real non-issue. What really is important and what we can say where Jack Harlan really did make a contribution is captured by the term "Biodiversity". That is a twenty-first century term that had not been uttered in the 1970's. But Jack Harlan was a real pioneer in Biodiversity and that quest began with this 1967 conference in Rome.

Jack Harlan's efforts to get to this meeting and provide leadership of chairmanship for the meeting are what we have labeled TR-1, Jack Harlan's first extended – non collecting – trip.

Trip No. 1 (TR-1): The FAO/International Biological Program (IBP) Technical Conference on the Exploration, Utilization, and Conservation of PGR. (Return to Index)

This meeting lasted from Sept. 18 through 26, 1967 in Rome We have no notes by Dr. Harlan directly from this conference. We have named this Tr-1 (Trip 1); however, there must have been many "trips" that Jack Harlan went on prior to this particular venture, but we have no record of them. This trip was to a world-wide (global) conference. Harlan was catapulted into the chairmanship with one phone call and it launched him into the Global effort to conserve (save) germplasm throughout the world.

The 1967 World Conference on PGR in Rome went well. Harlan was particularly impressive as Chairman; in that he answered several questions in French or other languages. The Conference was sandwiched between Harlan's expedition to visit the University of Illinois' Agricultural projects in India, from November 1966 to March 1967 (Exp. No. 5) and his first all-African Expedition from November 1967 to March 1968 (Exp. No. 6). Jack Harlan had gotten pretty busy in his first year at the U of I. Later he said that he spent most of his time as Chairman of the Genetic Resources Conference trying to slow down the speakers, so that the translators could keep up and much later, he told this author, that he did not like holding the gavel, because he would rather get involved in the debates that were going on. Frustrating as it was, the conference put Jack Harlan on the Global stage and in the Global spotlight. From that week on, his life would never be quite the same. He had gotten a new global perspective and a new global resume'. His perspective had always been pretty global, but now his early ideas had been confirmed in dramatic ways and he was now at the center of a global movement to conserve crop germplasm. Popper would be proud and Vavilov would be envious.

The panel of experts met every few years after the 1967 meeting. Harlan attended meetings in Rome in 1969, 1970, 1973, 1974 and 1981. What is the impact and import of the 1967 conference? Otto Frankel was disappointed that things did not change immediately, but over the years a few things began to happen. One significant event was the founding of the CGIAR (the Consultative Group on International Agricultural Research) which was formed in 1971 and

has grown into a multi-million dollar program with research and development agencies in many developing countries.

A conference of experts for the CGIAR was convened at Beltsville, USA in 1972 to consider the proposal of the IBP/FAO Panel of Experts for the establishment of a network of regional genetic resource centers plus a coordinating center to recommend priorities and organize training and other activities of the network, which would be associated with FAO. Otto Frankel was invited to present the report of the Beltsville meeting to the Technical Advisory Committee of CGIAR in April 1972.

Ok, so here is the problem: much of the world is suffering from a food shortage. It would not solve the problem if the rich countries were to just give food to the poor countries. This would only serve to keep the poor countries poor and dependent upon the rich countries and the rich countries would get tired of giving all this to the poor countries with no benefit to themselves. What needs to happen, in order to really deal with this problem, is for the plant scientists of the world to work together to develop indigenous crops to feed the indigenous people. So, much research must be done. Local people need to be trained in local universities and local research facilities need to be established all over the world to conduct research into local crops, soils, water availability, use of fertilizers and so on, to develop food sources adequate for a growing population. One of the first steps is to develop a network of germplasm centers so that germplasm can become a readily available resource to be drawn upon by researchers around the world. Who will manage these germplasm centers and how will all this be funded? These are questions which must be solved in order for this idea to become reality. But, the first steps must be made to get this started and that is to go out into these countries, find people willing to get something started in their neighborhood and begin to get some germplasm centers started. The following is a report on this effort as seen from the 1990's:

Scientists, Plants and Politics: A History of the Plant Genetic Resources By Robin Pistorius:

Review: How plant genetic resources conservation became a global issue; The 1967 FAO/IBP technical conference: ex situ conservation takes the lead; Breeding strategies

and conservation strategies: some connections; Establishing a global ex situ conservation network; Conservation and use of genetic resources in two political arenas; in situ and ex situ. Conservation strategies in the 1980s and early 1990s.

To get an idea as to what "in situ" and "ex situ" is all about visit In situ or ex situ?

A photo of the Conference on the Exploration, Utilization, and Conservation of Plant Germplasm Resources (PGR), 1967; where it all got started.

Above: Left to right, sitting: Dr. B.P. Pal, Dr. J. Vallega, Sir Otto Frankel, Prof. J.R. Harlan; Standing: Miss Erna Bennett, Ing. A. Marzocca, Dr. J.L. Creech, Mr. R.J. Pichel, Prof. J.G. Hawkes, Dr. W.K. Able, Dr. J. León, Prof. H. Ross

In the early 1970's Jack Harlan conducted a series of expeditions/trips in which he was, according to his notes, promoting the establishment of Germ Plasm Resource Centers in Ethiopia and other countries. We have no proof, but this author believes that the impetus for this effort originated, somehow, with his association with the FAO. It is doubtful that Harlan

would set out on his own to start Germ Plasm Resource Centers. He seemed to be sent by, and funded, by some group. It is the belief of this author that this came out of his meeting with the FAO Panel of Experts and he volunteered to talk to some people he knew in Ethiopia about establishing a Regional Germ Plasm Resource Center. We can trace this effort to Expedition No. 7. However, on Exp. No. 7, in 1969, Harlan, while in Uganda, came in contact with a Ken Rachie who had already started a Gene Resource Center there. Harlan toured the center but was not particularly impressed. Then in Exp. No. 8 (1970) Harlan went to Ethiopia specifically to talk to some of the people he had met there previously and get them to start a Germ Plasm Resources Center in Ethiopia. This is two years before the 1972 FAO Panel of Experts meeting mentioned above, so Harlan must have gotten the assignment to go to Ethiopia with the intention of establishing a Germ Plasm Resources Center from some group (probably the Panel of Experts he was involved with) in 1969 or 1970.

In June 1972 Otto unexpectedly found himself given an opportunity to address the United Nations Conference for the Human Environment, in Stockholm, on genetic resources. He had been asked by FAO to prepare a background paper on this subject for the conference, with recommendations. Several delegates moved the adoption of these recommendations, and another requested that Otto be allowed to address the conference. He relished the opportunity. His recommendations were adopted in “Recommendations 39-45” of the Report on the United Nations Conference on Human Environment, Stockholm, June 5-16, 1972, also known as the Stockholm Report. The world's news media carried his message. Sir Otto became a cult figure at the Stockholm Conference and genetic resources became an international issue, requiring consideration by national governments and inviting the concern of public interest groups. The genetic conservation wave began to roll, fourteen years before the term 'biodiversity' was coined. A pdf text of the Stockholm Report can be found on-line.

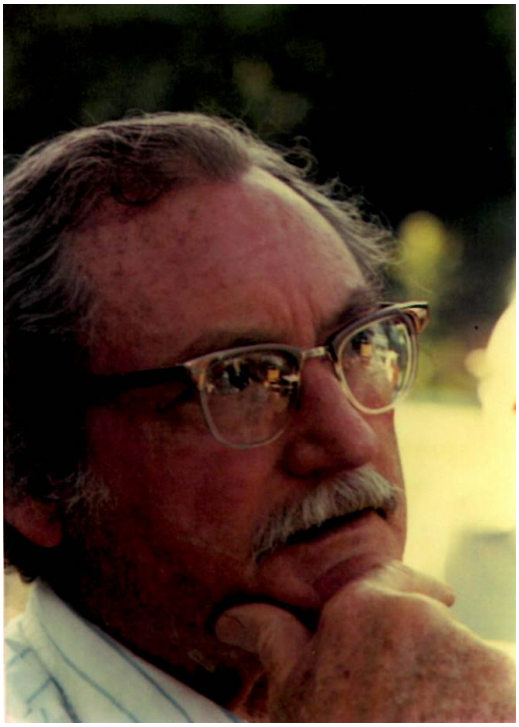
As the years rolled on the resolutions to protect PGR became more and more binding and approached that of international treaties. It should be noted that Jack Harlan’s father, Harry V. Harlan, was one of the first to raise a red flag about the disappearance of indigenous PGR. In a

publication appearing in the USDA Yearbook of Agriculture for 1936, Harry Harlan and his assistant Mary Martini wrote:

> In the hinterlands of Asia there were probably barley fields when man was young.
>
> The progenies of these fields with all their surviving variations constitute the world's priceless reservoir of germ plasm. It has waited through long centuries. Unfortunately, from the breeder's standpoint, it is now being imperiled.
>
> When new barleys replace those grown by the farmers of Ethiopia or Tibet, the world will have lost something irreplaceable. When that day comes our collections, constituting as they do but a small fraction of the world's barleys, will assume an importance now hard to visualize.

To be sure, Harry Harlan's warnings were not headed, being buried deep inside a government report. However, in contemporary internet posts of 2018 we see his name as one of the earliest scientists to issue this kind of dark warning – tragically, all in retrospect. Not only have unknown varieties of crop plants and their wild and weedy relatives been replaced by high yield varieties, but in recent years genetically modified organisms (GMO's) have replaced even the best "high yield" (HY) varieties and the world's vast germ plasm resources are being destroyed by monster plants owned by monster corporations such as Monsanto.

For a more contemporary (2019) report on PGR see this USDA Plant Germplasm website.



JRH, in the 1970's

The Harlan Expeditions from the U of I (Return to General Index)

Returning to the saga of the 13 expeditions and 11 extended trips that Dr. Harlan conducted from the University of Illinois. To count as an expedition Harlan had to do some seed collecting while he was in the field. We shall refer to visits to far-away places to attend meetings, visit experimental facilities or attempt to persuade some people to start a germ plasm center as "trips".

It would be too tedious to document each expedition and trip here; however, each one will be mentioned in turn and some highlight of the expedition or trip will be lifted up. Links will also be offered to allow the reader to link to either a more detailed summary of the expedition in question (Narr) or directly to the transcript (Trans) of Jack Harlan's field notes (journals) which this author has endeavored to transcribe from Harlan's sometimes faint and scribbled notes. At times the effort to transcribe meeting notes got to be too much for this author

to bear, because they simply documented where he had lunch, etc., and short summaries of each day were made in the "trans" versions. The more important collection expeditions were carefully transcribed and checked for accuracy by several people who helped in the transcription process. This author would like to applaud Kanti Rawal, one of Jack Harlan's former students at OSU and then U of I, who lives in California and helped this author transcribe the more difficult technical passages of several of the expeditions. He drove to Davis California to view the original journals which are in safe keeping at the University of California at Davis, under the care of Dr. Adi Damania, who also helped in the transcription process. If the links in this chapter fail to work the transcripts and/or narratives of the various expeditions and trips can be found in the Appendix.

But it is enough to say that Jack Harlan was away from home on average about one third of the time during those 18 years at the University of Illinois. Traveling became a great part of his life. He became an experienced traveler. It seemed as if he were coming or going overseas all the time. He told this author many years ago that the only luggage he took on these expeditions was his briefcase, which he could use as "carry-on" luggage, because he could not trust the regular airline luggage system. The briefcase was packed with a change of clothes, which he would wash in his hotel room at night, as needed. He had a cardboard tube, from a paper towel roll in which he kept his socks. He would stuff them in this roll and after wearing a pair, he would stuff them back in one end and take a clean pair out of the other end. When dirty socks started coming out of the clean end, he knew it was time to wash socks.

Soon after his arrival at the University of Illinois Harlan started looking to Africa as an untapped source of genetic resources and very soon conducted three back to back expeditions – between 1967 and 1970 – to explore the savanna belt across Africa, searching for centers of origin for the main indigenous African crops: sorghum, millet and African rice. His search was unsuccessful, in that he could not find a Vavilovian-type "center" for these crops; however, his failure was turned to success in that he decided that what he was looking at was what he called "noncenters" of origin. These were larger, more dispersed, areas where domestication took place. He documented his findings in "Agricultural origins: Centers and noncenters", (Science

174: 468-474, 1971) and mentioned them in many other publications, including two of his books (Crops and Man and the Living Fields). The "noncenter" idea illustrates an aspect of Jack Harlan which should be pointed out: he had the ability to look at a particular situation from a completely new perspective; a perspective which no one else had seen before. This happened time and again.

As this author has been conducting on-line research in connection with the writing of this volume, he has discovered that there are quite a few contemporary scientific publications which are stating that our crop plants did not originate in clearly defined places and times such as we had once thought. They developed over larger areas and in longer spaces of time. These contemporary authors do not generally reference Harlan's work on noncenters of origin; however, it does seem that his intuitions were coming into fruition long after his death. Harlan's thinking on the role of weeds is another example of his ability to look at a given situation in a totally new and unique angle.

In about the same time as the African Expeditions, Harlan became interested in the origins of maize. (See above and below) It was clear that maize, or corn, was first domesticated in southern Mexico or Central America. Three big questions remained: what was its wild progenitor, when and how was it domesticated? In September 1969 Harlan and Jan de Wet organized a corn conference at the University of Illinois, in which the greatest experts on maize were invited. This will be discussed in full, below.

In August, 1972, following his three African expeditions, Harlan organized and chaired a "World Exposition of the Origin of African Crops" in Austria, to cap off and summarize his African findings along with the knowledge of many other experts on Africa and her crops. This would be Trip No. 5. It will be discussed more fully later in this chapter. Immediately following the end of the Symposium on the origins of African crops, on August 27, 1972, Harlan flew back to Champaign, kissed his wife hello and then goodbye and headed out in his VW to Mexico in search of the origins of Maize. He was gone on that expedition for a little over 3 months. And so it went. Between his first and second African expedition, he attended the Twelfth International Congress on Genetics in Tokyo, August 19-28, 1968 (**TR-2**). Harlan's sparse notes on this

conference were taken from his pocket notebook. After his return from Tokyo he spent three weeks at home before launching out on his second African expedition (Exp. No. 6), September 20 – December 22, 1968.

Harlan took a trip to Jamaica from August 25-29, 1969 (**TR-3**) to visit people and tour facilities. We have nothing to help us with this trip except some notes written on a 4" x 6" notebook handed out for the Plant Breeding Symposium at Iowa State University in Ames, Iowa, March 1-5, 1965. It would appear that Dr. Harlan attended this meeting in 1965 and returned with an extra notebook, which he subsequently used to record notes for his 1969 meeting to Jamaica. The contents of this notebook consist of names of people and places – nothing resembling meeting notes or collection notes. The purpose of this trip is obscure at this point. Shortly after his return Harlan hosted the above mentioned "Corn Conference" at the University of Illinois in September 1969, (see Maize Phase, below). (Return to Index).

Then, in March 1970, just days after his third African expedition, Harlan attended an 8-day meeting in Puerto Rico on sorghum and to view the world sorghum collection (TR-4). We have nothing on this meeting. Then in October of that year he left for his eighth expedition, this time to Turkey and Ethiopia. This venture was different from his others. He was sent to Ethiopia to follow up on some contacts he had made to try to start a Germ Plasm Resources Center (GPRC) in that country. Ethiopia is a truly extraordinary center of diversity for many crops. Ethiopia would be in an ideal place for a GPRC in terms of putting together a worldwide network of germ plasm centers for collectors to deposit their seeds and where they could be grown out and studied. These would be living centers of diversity. The records left by Dr. Harlan say nothing about the success of his 1970 venture to Ethiopia, but this author found, on-line, in 2017, evidence that a Germ Plasm Resource Center was established in Ethiopia. In fact, there seem to be several such institutions, but they all seem to arise from a GPRC started in Ethiopia in 1976. This could very well be fruit from the seeds Harlan planted in 1970. He returned from Ethiopia to Champaign on December 21, 1970. (Return to Index).

The African Expeditions (Return to General Index)

This author believes that it will be helpful, at this point, to relate in some detail the three African expeditions (Exp. No. 5, 6 & 7), in that Dr. Harlan encountered some challenges which he had not experienced on other expeditions or trips before or after. In doing this we can get into Harlan's mind and personality a bit better than at other times. Let us begin with a short history of Africa. This is also being done because this author has visited West Africa on two occasions (1971 & 1997). The first visit was the honeymoon with this author's first wife. It was inspired by his father's three visits to Africa in 1967, 68 & 70. The second visit (1997) was as a Christian preacher. This author was blessed to preach in Africa on two occasions during this trip. This author has spent a number of years (since 1992) in a Black Baptist church in New Orleans, Louisiana, with its associated community, has married an African American woman (2ND wife after a suitable divorce from the first wife) , with her extended family and taught, for 20 years, a course in "Black Theology" at Christian Bible College of Louisiana, a predominantly black institution and has, therefore, studied African History, and the continuation of that saga in America, for many years. He has also written a textbook (**So Great Salvation**, unpublished) to be used at Christian Bible College on the history of American Black Theology. As he is writing these lines this author is living with his wife and father-in-law, who is 101 years old (he passed away in April 2019), in a predominately black community in New Orleans. Therefore, this author would dare to write about Africa, the European influence thereupon and the saga of Africans in America.

Before we attempt to describe Harlan's journeys into sub-Saharan Africa, we need to put the situation into the historical context of the times. His African travels were from 1967 to 1970. It was during the 1960's that many African nations gained their independence from their European colonizing powers and things were still a bit unstable, as people on both sides were still adjusting to the new reality of independent African states. Jack Harlan found the going in Africa rough going, compared to the nations he had visited previously. Many of the countries Harlan would visit on his African expeditions were former French colonies and most people he would meet spoke French. Since he knew some French from his childhood, he was able to

struggle through the language barrier fairly well and he got better at it as he went along. The problems he encountered had to do with the cultural expectations of both parties for the other party. But first, let me put this situation in its historical context.

A Short History of West Africa (Return to General Index)

The history of Africa is very complex with several main players: first were the original Africans; then came the Muslims with a combination of conversion and slavery. Then came the European Christians, first with an even larger slave trade, followed by colonization or colonialization (a harsher form of colonization). Finally, came the spirit of independence, in which much of the original African land mass was returned to the Africans, although much had changed over the centuries. In this entire process, which took at least fifteen hundred years, African society was transformed from a collection of localized tribes, living together in an uneasy peace, to a group of much larger "nation states" with strict boundaries and national governments, aligned together through international treaties and competing with other more established nations. The new African nations were composed of the remnant of the original African groups, sometimes fractured due to the arbitrary colonial boundary lines which remained after statehood. In some cases, the larger tribe within a nation would inflict heavy oppression on the weaker tribes. Different men would rise to power, only to be overthrown by their rivals. In short, the peoples and their leaders did not know how to govern nor participate in the running of a "modern" European-style "nation", which resulted in a very dynamic political/societal situation in the late 1960's and early 1970's.

Most of the new African nations had adopted some form of democracy as their political system (as opposed to a kingship system, for instance). Most began their journey as a modern nation with an election of a president (or prime minister) and some kind of representative parliament. The key to having a successful nation is for the people, from the president on down to the local people to be committed to the success of the nation and to place their primary allegiance with that nation. This means that tribal identification has to take a back seat to nationalism. Long-standing feuds had to be set aside in favor of the success of the new nation.

The final transition from European colonies to independent nations took place in the 1950's and 60's and for the most part the participating people, from the president on down to the common farmers, were not prepared for what it would be required of them to make the new nation work.

The Muslims had swept through northern Africa in the 7th and 8th centuries. Converts were made – some by persuasion and some by force. Mosques were erected. Arabic was taught in new schools. Caliphates were established. Over the ensuing centuries Islam filtered down into the great West African Empires of Ghana (300-1200 AD), Mali (1230-1600 AD) and Songhai (1375-1591), as well as the many other smaller kingdoms of West Africa. To what extent the Empire of Ghana became Islamized is a controversy today. Its succeeding kingdom, Mali, was no doubt more Muslim than Ghana and the final kingdom, Songhai, was nearly completely Muslim.

Islam came to Africa from the north and, as a result, most West African nations, today, have an Islamic north and a Christian/traditionalist south. Islam established trade routes across the Sahara Desert and off the eastern coasts of Africa, bringing gold, ivory, spices and slaves for sale in the markets of the Mediterranean and the Middle East. The Islamic slave trade continued well into the 20th Century (See: https://en.wikipedia.org/wiki/History_of_slavery_in_the_Muslim_world). The total number of Africans thus deported is estimated by this author to be in excess of 10 million people.

Meanwhile, the European Christians discovered a sea route to West Africa, along the Atlantic coast, in the 15th Century. Soon European traders appeared on the African coasts and began dealing in the same commerce that the Muslims had established centuries before. This blossomed into what would be known as the Atlantic Slave Trade, which deported over 12 million Africans to the New World as slaves. No accurate number of casualties caused by this enterprise is possible, but this author would estimate that the number of Africans who died in the operation is in the order of 20 million – over a four-hundred-year period of time. The American part of the Atlantic Slave Trade ended with the end of the American Civil War in 1865, but the practice continued in other nations, especially Portuguese Brazil, until the 1880's.

By that time European nations found themselves strong enough militarily to begin a systematic conquest of African lands. A conference was held in Berlin late in 1884 and early 1885 in which Africa was – quite arbitrarily – divided up by several European countries for the purpose of colonization of the continent. Each participating European nation was given rule over certain colonies based on their then-current influence. Thus the "Scramble for Africa" was begun. The colonizing nations not only ruled their colonies, but they plundered them of their natural resources. In many cases African laborers were forced into involuntary servitude to extract the riches of their own land to give to the Europeans. This was a very grim business. The colonial period ended with the African independence movement of the 1950's & 60's. The plundering aspect was not mentioned by the above article on the Scramble for Africa. And that just shows the lingering racism on the part of the west. This author looks at the fabulous wealth displayed by England and France, for starters, in their great cities adorned with enormous museums with vast African collections and I just have to shake my head in shame because I am from European stock. The European peoples sought to take over the world. They were partially successful and they did leave a very deep imprint on the world, in terms of the Nation-State model of political divisions, for peace and for war, and technological advancements leading to the digital world that we all endure today. It is tragic that this was gained at the expense of the loss of endemic peoples and their societies in Africa, Asia and the Americas

The legacy of European occupation of Africa consisted of, firstly, a system of arbitrary boundaries circumscribing the various colonies, soon to become "nations". The Europeans also gave the African peoples European languages which were then spoken by much of the populations. The Europeans tried to overlay the European model of the Nation-State over the dynamic system of tribes which the African's had been enjoying for millennia. Many of the new nations attempted to form democratic systems with parliaments and prime ministers or presidents. Most of the African countries adopted European style educational systems, including colleges and universities, some with significant research facilities. The road was bumpy, however, and full of potholes, detours and dead ends. The typical journey of a newly freed African nation was that after 2 or 3 years it would be found that the president or prime minister would be mired in corruption and a *coup d'état* would follow. The coup may or may

not be tribally motivated. Nevertheless, the resulting military or civilian rule was often much more harsh than the corruption which it replaced. Keep in mind that there was no one living in the countries who had graduated from the Harvard School of Political Science or the Oxford Department of Economics - really very few people had any experience in any western university or European form of government. And yet, they were expected to participate alongside other nations who were well trained in the fine arts of politics and economics.

To top it off, the example of "national government" set by the European overlords was that the ruling entity would plunder the natural resources of the land for its own benefit. This is what the colonial governments did, and this is the example they set. Now, when it came to "self-government" of the new African nations they simply followed the European model and continued the plundering of the land. At one point the entire "Belgian Congo" was the personal property of King Leopold of Belgian. How do you think that the European capitals were able to build such grand and expensive buildings for their governments and lavish museums full of art and artifacts from Africa, India and other places they touched with their hand of greed? And why do you think that the African nations have had so much difficulty establishing stable and lasting governments and economies? Was it not the lingering effects of European colonialization?

In the economic front, following the end of colonialization, the European nations maintained a stranglehold on their old African colonies. Many of the major corporations still operating in the former colonies had direct ties to European companies and much of the wealth still flowed from Africa to Europe – even after national independence. When I visited Ghana on my honeymoon in 1971, we were told that almost all the gold of the old "Gold Coast" was gone. A British company still owned most of the remaining gold fields, but they were now reduced to mass grading and digging the dirt and filtering out the last remaining gold flecks from the soil all of which went to the European company.

In ending this diversion into West African history, we need to point out that in the late 1960's many Europeans and some Americans were still living and working in Africa, especially the remnant scientific communities. Harlan, therefore, was able to deal with these people to a

great extent in his travels through Africa. What was Jack Harlan's view of Africans? He had a good heart and probably viewed them as beautiful people. What they lacked was education. He believed in education – especially, higher education. He felt that all people suffered from a lack of education and if you just gave them education then they would know better, to do better. So, he was always apt to teach a person a little lesson on something that would help them. But as we shall see in the next three expeditions – all to Africa – Jack Harlan could also get a little short tempered with people who seemed to be slow to understand him or what he wanted to do. He was also a realist and understood that man – of all stripes – was apt to folly. In fact, tales of the folly of proud men were some of his favorites. Harlan was particularly drawn to African art, especially the wooden carvings. He purchased several of them on his journeys.

So, when Jack Harlan, intrepid plant explorer, ventured into West Africa in 1967, he was setting foot into a land which was really a series of newly formed "modern" "nations", each bearing the scars of European oppression along with the expected resentment towards travelers with European complexion. Along with this and just below the surface, if not on the surface, was the presence of Islam with its rigid expectations of personal behavior (certain dress for the women and prayer to Allah three times a day, for instance).

The rains had been plentiful across the African Sahel during the 1950's and 60's, but had lessened significantly in the early 1970's. This would be the beginning of a prolonged dry period lasting some 30 years. Agricultural production suffered during this dry period, but Jack Harlan was just catching the first of the dry spell and it would not really affect him very much.

Expedition No. 5: West Africa, November 25, 1967 – March 15, 1968; 3 months and 19 days in the field. (Trans) (End of Exp. No. 5) (Return to Index)

Harlan's first African expedition was into West Africa. We have a memorandum outlining the objectives of expeditions to Africa (the tropics) which gives a fairly detailed itinerary for the first one (Exp. No.5). It is undated, but a sentence on page 2 says, "The initial study proposed here should take approximately four months: February-May 1968 inclusive". This would indicate that it was written in 1967. It appears to have been written by Dr. Harlan (it uses such

Harlan expressions as "Both crops (sorghum & rice) are grown over enormous ranges…" It gives reasons for entering French speaking countries and says, "Before useful studies on the origin and evolution of these crops can be made, an adequate collection must be assembled." Then on the second page: "The sorghum collection will be grown out in Puerto Rico; the location for rice studies has not yet been decided."

Below is listed the various countries Harlan visited on his first African expedition, the dates he visited, and then a word about how their independence went, the dominant tribe and a word about the stability of the government when Harlan made his visit. The list, below, follows fairly closely the proposed itinerary of the written proposal. The country name contains a hyperlink to a Wikipedia article on that country.

Sénégal (Nov. 24 – Dec. 8, 1967) - Independence April 4, 1960, from France, Wolof, fairly stable

Mali (Dec. 9 - 22, 1967) – Independence from France Sept 22, 1960, socialist pres. Modibo Keïta, stable

Upper Volta (Burkina Faso) (Dec. 23 – 29, 1967) - Ind. from France Aug. 5, 1960, Mossi, stable

Niger (Dec. 30, 1967 – Jan. 5, 1968) - Independence from France Dec. 18, 1958, Muslim, stable

Togo then to Dahomey (Benin) (Jan. 6 – 9, 1968) – Ind. from France April 27, 1960/Aug. 1, 1960, both stable

Nigeria (Jan. 10 – 21, 1968) – Ind. from England Oct. 1, 1960, Hausa, Igbo and Yoruba plus many other smaller groups; coup 1966, civil war (Biafra) 1967-70

Côte d'Ivoire (Jan. 22 – 31, 1968) - Independence from France Aug. 7, 1960, mixed, stable

Sierra Leone (Feb. 1 – 13, 1968) – Ind. from England April 27, 1961, coup 3/21/67; counter coup 4/18/68 (Note that Harlan visits Sierra Leone between coups.)

As the reader can see, politically, West Africa was still in flux in the late 1960's. The ex-French countries seemed to be more stable than the ex-British nations. Jack Harlan did not mention any of this in his field notes, except for prized museum pieces not on display in the museums and a curfew at certain times in Nigeria, due to the Biafran war.

Six of the eight countries visited by Jack Harlan in 1967-68 were former French colonies and the common spoken language was French. Nigeria and Sierra Leone were former British colonies. France had conducted a referendum in 1958 in which French citizens voted to adopt a new constitution. French colonies could also vote on their continued association with France. Every colony voted for its own independence from France and this came about country by country in 1960, without a hitch. Following is a more detailed description of the two former British colonies, Nigeria and Sierra Leone.

Nigeria: During the colonial period, the British allowed the Nigerians to govern themselves as far as internal functions go. The three regions (Muslim North, Yoruba Southwest and Igbo Southeast) had very different internal governing procedures from one another. All external "protection" and international relations were handled by the British overlords.

Independence came on October 1, 1960 and elections held. After a transitional period, the Republic of Nigeria was established in 1963. Typical of some other new African nations, a military coup came within a few years of independence. It happened in 1966, followed by a countercoup. The result was that the country of Nigeria was run by the military when Jack Harlan arrived January 10, 1968. The Igbo area had seceded on May 30, 1967, forming the nation of Biafra. Biafra was able to exist – although at war with the country of Nigeria - until January of 1970. During much of that war time, the people, and especially the children of the Igbo, suffered starvation at the hands of the Nigerian government, which was dominated by the northern region. Harlan managed to avoid the war zone as he traveled in Nigeria.

Sierra Leone: Sierra Leone became independent from the United Kingdom on 27 April 1961, led by Sir Milton Margai, who became the country's first Prime Minister. The current constitution of Sierra Leone was adopted in 1991, though it has been amended several times. Since independence, Sierra Leonean politics has been dominated by two major political parties**:** the Sierra Leone People's Party (SLPP) and the All People's Congress (APC), though the military had seized power through coup d'état six times since independence in 1961. (Wikipedia)

We begin Jack Harlan's Expedition No**.** 5, to West Africa. The following is a summary. To read Harlan's transcript click Trans:

Senegal (November 24 through December 8, 1967)

Harlan flew from Champaign, Illinois to French speaking Dakar, Senegal on November 24, 1967. He began collecting on the 27th and met with a M. Maubaussin. (The French custom is to use the "M" to mean "Monsieur", equivalent to the English "Mr." for "Mister"). M. Maubaussin showed him much hospitality because he had attended the International Genetics Congress in Rome two month's previously, in September 1967, which Harlan had chaired. The next day Harlan began a road trip with a M. Merlier, the botanist, into the interior of Senegal, collecting Pennisetum (millet), but also looking for sorghum. Harlan is struggling with his French. He can understand it, even if spoken rapidly, but is quite a bit slower when attempting to speak it. They go on to Mbacke', capital of the Diourbel region and 190 km east of Dakar. He noted possibly two weed sorghum locations. On December 1 it is off to Baba Garage, St. Louis, Senegal (200 km north of Dakar), along with Richard Toll (100 km to the northeast of St. Louis) & with M. Sapin to Guede' (100 km east of Richard Toll). "Little to collect", he would write in his notebook for that day. He continues: "St. Louis is an island refreshed by cool sea breezes, but dying since capital was moved to Dakar … Sapins had us for dinner – excellent as usual. This French cooking will kill me." To see a Google map of this journey click: Northeastern Senegal

In his journal entry for December 2, 1967 Harlan lets us in on his thinking about what he is seeing in the various varieties of African rice:

> went out to a water hole & grabbed some rice seeds from the mud & then spent morning touring dikes between rice fields from Richard Toll to Boundown – about 50-60 km down river & evidence of introgression. It never looks to me like the O. *perermmis* should produce a seedy annual race in the wild which was the one selected for domestication. This led to glaberrima & much introgression. At R. toll it looks like the perennial is also introgressing with either the weed or the O. *sativa* or both. May not have enough collections of the perennial to produce that, but scads of the weed annual with great

variation. (Author's note: the various varieties of African rice are all in the Genus Oryza, which is abbreviated "O". "Perermmis" is the species. O. sativa is the major species of African rice.)

Dr. Harlan will take these initial observations and put them together with other evidence he is collecting in Africa to come up with a theory about the origins of African rice.

Gambia and Mali: Preliminary comments

Over the next few days Harlan's journey takes him to Gambia and then Mali. His stomach is starting to act up. He met up with Hubbard and they had a little party one night, but his stomach is getting worse. By December 10 he is in Bamako, the capital of Mali**,** in a hotel, but he is now really sick: sore throat, fever, nose run. He hiked around in morning & evening to try to drive off the illness. The mosquitoes and bats were a big a problem that night. The next day he spent the entire day fighting with paperwork. One bureaucrat told him that his Visa was only good for one week. Later Harlan would write: "I think the Mali embassy in Wash. did that on purpose." Later, back at the hotel, he called a M. Borno, who sent a car for him. They talked in the car and Harlan was sent to see a M. Zanga Koulibaly, who had some sway in Mali and the confusion over the Visa was finally worked out. Then, December 12, he went to the U. S. Embassy to get his Visa straightened out on that end. He managed to get in a little collecting while he waited and finally at 5:45 that evening he got his new Visa. Then he went to a pharmacy to get something for his sore throat and what they gave him was a suppository. He used his very best French to explain to the Pharmacist that what they gave him was for the wrong end. The Pharmacist insisted that this was the correct medicine for his sore throat and the label seemed to verify it. "Well the anus was very tender from the diarrhea anyway, so I got the medicine. The anus cleared up right away but a miserable night." He got a large insect light and for the first time was not bothered by mosquitoes.

Mali

On December 14 Harlan flew on to Gao (Mali), with stops in Mopti and Timbuktu and hiked along the Niger River. This was not the season for rice, so there was nothing to collect.

From His journal: "Dec 15: could not find anyone. Hiked around and found 'Chef du Cercle' an imposing man: acting like a king. He didn't want to help me & told me I should first register with police." This Harlan did and surrendered his passport. Then he went to Service de l'Agriculture, but there was no one there to help him. He hiked all over the place, collecting a little. Finally, he returned to the hotel "washed a shirt & to bed". Dec 16: "Went back to the area he was at the day before, but with camera. On way back got caught taking a picture of main street & ducked back through side streets to hotel to hide the camera. They'll never get tourists that way … Found a good place to collect. Met a man who helped me, for 400 francs." Harlan traveled on with a man named Bono for Kogoni. He made it to the Office du Niger project station at Kogoni, some distance from the Niger River. The Office du Niger was a quasi-governmental organization of the Mali government which was coordinating projects to improve crops.

Notice that throughout this phase of the West African expedition Harlan seems to be on his own to find his way to points of interest. His French is coming back, and he is able to find a few people to help him, but his early training in self-reliance is his greatest helper.

December 22: "On to Ségou (Mali) and to rice area. It is a crue' cultivation and the crue' this year was so great the whole area was a total loss and not even harvested." Crue' and d'crue' mean, in French, flooding and de-flooding. In two papers he would publish in 1969 on this expedition, Harlan will say that the agricultural methods he observed here were totally aboriginal and not influenced by any modern farming methods. He collected a few seeds, packed them and drove back to Bamako, the capital city. There he went to the US Embassy on December 22, "where the INCIDENT took place. One of the most bizarre experiences I ever had." In his notes Jack does not give the details, except to say that there was a "drunk & crazy customs agent." At any rate, it seems that the customs agent, who was known for erratic behavior, started acting out and spilled some of the seeds that Jack was trying to get processed to send back to the states. After the mention of the incident Harlan says that they had a "big feast at the aquarium". For map of the Mali part of this expedition click: Mali Part.

On Saturday, December 23, 1967 Harlan flew to Ouagadougou, Upper Volta. Note that Upper Volta suffered the first of many coup d'états in 1966 and was under military rule when Harlan arrived. (The country was renamed Burkina Faso in 1984.) The next day Harlan rented a bike and peddled several miles on the road to Niamey (Niger) where he saw some familiar plants. He cycled back, returned the bike, stopped at a cathedral and went to midnight mass, "which was held out under the stars with drumming, etc. very nice." The next day he went to the U. S. Embassy at Niamey and got directions to IRAT (Institut de Recherches Agronomiques Tropicales), which has some facilities in the area. He could find no one to help him (This is Saturday, after all, and just before Christmas), so he rented a boat and went out to a rice field and "spent some hours paddling around in the mud of harvested rice fields & got a little seed of the wild and weed rices."

Niger

On December 28 Dumont finally showed up and they went to Komboinse station in Niger. For the next two days Harlan was inspecting almost dry watering holes for certain grasses, but not getting much in seed. He now had enough seeds, however, to spend some time in the hotel room sorting and packing them. On December 30 he wrote: "Dumont said he would look me up but never showed. I packed early and wasted some time around the pool." Then at 10:00 am Harlan went to the airport with his bags of seeds and other luggage and flew off to Niamey (Niger). There he found a hotel with "the WC down the hall, but it does have seats & sometimes paper." WC (water closet) is a British term for public toilet. The next day he rented a pirogue & paddled across the Niger River. "The Current was very swift. River in flood - impressive. Nothing on the banks but found some stuff in seed on an island. Got a few samples. Back at hotel, got some pipe tobacco." That night he found a restaurant specializing in French food. He ate a lamb chop and some other items which were new to him. Something he ate disagreed with his, already tender, stomach and he "walked the hall several times during the night. I don't know what was in it, but it was potent."

Sunday, December 31: "Slept until nearly 8:00; feeling weak and shaky as usual when the dysentery strikes. Skipped breakfast & hiked to market." One way to cure the dysentery is to

hike it off. This seems like a pretty risky cure, in that you may be far away from a WC when one is needed, but Harlan uses the hike on almost every expedition, when his digestive system reacts to the new and exotic foods, he puts in it. The market was "Very colorful & active. Must bring camera next time. Then to National Museum. Very well done. A sort of habitat display out of doors. Some animals in pens, different types of houses, displays in building show costumes, tools, utensils, etc. & art of different tribes & villages. A very good idea. Loudspeakers play native drumming & songs, etc. Impressive. Other African countries should do the same. Bought some more canned water & back to hotel by 11. WC & pills."

The next day was January 1, New Year's Day, 1968, and everything was closed. Harlan ambled down to the museum and the market. "Dysentery about licked." On January 2, 1968 he wrote in his journal: "Well, all set for day's activity. Nope. It's the end of Ramadan and even the market is closed. He hiked around outside the city and did not see anything but wild sorghum. In the afternoon he rented a pirogue and paddled out into the River where he found some sorghum. Later, he wrote: "Very shatter resistant and hard to thresh. Might be bird resistant, too."

During the next several days Harlan was trying to get out of Niger, but the flights were few and far between. Boredom set in and that disease was worse than the dysentery. Days passed and nothing to do. He found a French movie to kill some time. Finally, the plane arrived and there was the usual hassle over paperwork. It finally took off and brought him to Lomé, Togo and on to Cotonou, Dahomey, where he found a hotel.

Dahomey

January 8: Harlan called M. Werts at IRAT. He sent a car for Jack and they talked all morning. Later, he would write: "Werts seems to understand the problems (both agricultural & social). On the agricultural side the soil in the southern areas, where most people live, is being destroyed by 'corn, corn, corn until the yields are near zero.' They need to alternate with other

crops that would replenish the soil. If you increase production of the corn by adding fertilizer, the price falls and you can't pay for the fertilizer."

Nigeria

"Jan. 10: A horrible day." Stomach problems started at night and continued during the day. Harlan found out he goofed and lost a lot of good pictures of Dahomey. He then flew to Lagos, Nigeria, and had a big fight at customs. Finally gave up after 2 hours and gave a cabbie $10 to take him to Lagos, but the cabbie "dumped me off at Yaba." (about a half mile from downtown Lagos, Google Earth, HVH2)

Harlan had considerable difficulty getting around Lagos, but he did get his seeds packed and sent off and met with Dr. Hemchand R. Chheda, his former student at OSU from India, who had a position as a professor at the University of Ibadan, in Nigeria. Chheda showed him around the campus and the Botanical Gardens, then showed off his lab. Harlan suggested that Chheda start a satellite Crop Evolution Laboratory, but Chheda wanted Harlan to help him get back to the United States. The two of them took a short seed collecting expedition in the northern area of Nigeria. They did some collecting and made it to the Badeggi Rice Station, but they could get but few seeds. Harlan noted that there were very few weedy varieties of rice around the fields, indicating that this was not a center of origin. They pressed on west to Bida, then north to Zungeru, Tegina and Kontagora. Harlan noted in his journal, "Much uncult. Savanna. Wild millet populations. New types of both sorghum & millet appeared by Tegina – the (Harlan drew a small seed-shaped object) shaped millet and as a very small seeded sorghum reminding me of the thing I thought to be half-wild in Sénégal and Bamoko (Mali). This definitely cultivated. Again, nice rest houses & dusty trip." To visit a Google map of this trip click Nigeria exp.

Back in Lagos, Harlan writes in his journal for January 21: "Bad night but hiked all around next morning. Went to museum but the Benin & Ife art had been put away because of the War. (This is the Biafran secession of 6 July 1967 – 15 January 1970). Hiked back to hotel. Tied string

around suitcase. Hope it holds. Looks like I'll have to take the @# X! taxi tomorrow. Dulled out the eve; the pimps and hard-sell guys make life on the streets of Lagos miserable."

Côte d'Ivoire

Harlan now traveled to Côte d'Ivoire (Ivory Coast). His first stop was Abidjan, the coastal capital, and wrote in his journal: "Jan. 22: Got to Abidjan after some interesting situations at the Lagos airport. Abidjan most impressive & a real contrast with Lagos. Abidjan is clean, sparkling, things are painted & swept, the stores shine, no slums in sight downtown, at least. Lots of French, lots of cars – not as bustling as Lagos but far nicer. Hiked about for 2 hours in the eve; not a panhandler, not a pimp, no hard sell – that is, unless you show an interest in the sidewalk merchandise. A wonderful relief from the tensions of Nigeria. In some ways the French have definitely done a better job than the British. Sat a while at a sidewalk café over une bierre pression (a draft beer) and watched the huge fruit bats fly across the darkening sky. Peace! It's wonderful."

When this author visited Abidjan in 1971, on his honeymoon, we were told, by a European, that every morning the police clean the beggars off the streets of the city and take them out to the outskirts to be dumped. The city leaders are trying very hard to keep Abidjan clean and they call it "the African Riviera". The beach is very nice, and a lot of European and African tourists go there for the 4-star hotels and excellent beaches. In Senegal, a former French colony, we saw lepers and blind beggars everywhere (in the market). The poverty was appalling; but in Ghana, a former British colony, there were no beggars. Everyone was working and even singing songs. It was an amazing difference. We were told that the French, in their colonies, tried to make the native people like 'little Frenchmen' and they liked to have sidewalk cafés, but the British pretty much left the local people alone. The lesson here is that one should not make sweeping generalizations based on one or two samples. Perhaps we can say that the French did better in Côte d'Ivoirie than Senegal and the British did better in Ghana than Nigeria. HVH2

This discussion also brings up a point about Jack Harlan and his ventures into faraway lands. He went to these countries in search of certain plants. His interest was not with the people and their culture. When my wife and I went to West Africa on our honeymoon we were interested in the people we met and their culture. Plants were of no interest to us. This is not too much of a good thing to say about Jack Harlan, but it seems that his singlemindedness towards his objective in these countries, regarding plants, got in the way of appreciating where he was and the diversity of people around him.

Because of the hotel situation Harlan decided to take a two-day excursion to the city of Man with Michel Jacquot, international expert on rice & especially African rice. He was working with IRAT. On January 25 Harlan wrote in his journal: "Checked out by 7:00, in IRAT car, breakfast at Jacquot's then off with M. & Mme & son, Thierry." Man, Côte d'Ivoire, is some 563 km (350 miles) to the northwest, into the dry Savannah region of northern Côte d'Ivoire. Harlan continues: "Saw Sorghum all the way. No rice at all. Heavy forest over quite a bit of the route & rest cut-over forest. A curious pattern is emerging that cannot be denied – wild sorghum in West Africa is a forest species and wild rice, either annual or perennial, are essentially savanna species! Strange, but that's the way it shapes up. Stayed at a small hotel at Man with drunken proprietor."

> Jan. 26: Went out to a little research station where IRAT has some work. Found no wild rice. Lots of wild sorghum. Took off for Baoule'. Passed through some artificial savanna and some adaptive Savanna. No wild rice and just a little wild sorghum in creek bottoms. Passed through an area that was too dry for wild sorghum and too wet for wild rice!! No cult. sorghum seed at all. Crops are maize, rice, tubers, cotton, bananas, peanuts, etc. Back to hotel in Man.

Back in Abidjan three days later, Harlan wrote in his journal: "Jan. 29: Monday & chance for action." This author believes there was great loneliness of isolation the day before for Dr. Harlan, having to find something to do and yet all by himself. This is one of the trials of the profession he is in: there are times of great excitement and other times of complete solitude and that can be very lonely and un-nerving. Harlan called ORSTOM (Office Recherche Scientifique

et Technique Outre – Mer) to see if he could come out for a visit. He inquired about transportation and the receptionist said that they would call at 4 PM. He went to the market in Treichville and bought some cloth. Then he went to a hotel and bought a mask and was now wondering how he was going to get all this in his suitcase. The mask looked like it was from the Guere' in the Man region, "where human sacrifices were practiced until very recently."

Sierra Leone

On February 1, 1968 Harlan flew to Freetown, Sierra Leone, another former British colony. Sierra Leone had a rather rough launching as an independent country. It gained its freedom from England in 1961. The native-born Sierra Leonean, Sir Milton Margai led his country to independence from Great Britain and became the country's first Prime Minister, on April 27, 1961. His term as Prime Minister was one of relative peace. Sir Milton was a man of humility and honesty. Unfortunately, he died suddenly in 1964. His office was filled by his half-brother Sir Albert Margai, who soon turned into a corrupt dictator. By 1967 the nation was in an uproar over Sir Albert's policies and blatant corruption. A military coup took place on March 21, 1967 and then another coup took place two days later. This coup was to oust a man named Siaka Stevens, whose design was to seize the power and become a dictator in his own right. After the two coups the military was now in control, but they seemed to want to return the country to civilian rule. Things did not go well and there was a countercoup on April 18, 1968 to restore Stevens to the office of Prime Minister. Jack Harlan slipped into Sierra Leone and out again between the last two coups (February 1 – 13, 1968). Intent on his objectives Harlan seems to be completely oblivious to the political unrest all around him.

Again, Harlan is venting his frustration in his journal for February 1, 1968:

> Ghana plane about an hour late but that was expected. What wasn't expected was that when I got to Freetown, I had no bags. Gone! All the things I've bought, the photos I've taken, the seeds from Côte d'Ivoire, the trousers to my suit, etc. etc. Well, they may show up and meanwhile I have all I need. Most annoying. The hot trousers giving me prickly heat. I'll be happy to move on to Europe. The airport is a remarkable distance from

Freetown – long bus & ferry ride ends at Paramount Hotel where I got an expensive room, took shower & cooled a whiskey. Change $5.00 cash at hotel & $3.00 cash at airport.

The next day, February 2, 1968, he wrote in his journal:

About 3:30 a man called & said the bags were in & I had better hurry because customs closes at 4:00. I hurried. Turns out they arrived in the morning and no one had the courtesy to call. Customs is a mess. First, they charged over $2.00 'import duty' on two rolls of film I had declared. This made me mad. Then he said I'd have lots of trouble taking any African art out of the country, so I finally left it all with him & he is supposed to get it delivered to the plane. Hope it works. I'd hate to lose it now. After I got back to hotel – about 20 minutes after – they called & said I was to call a certain number, but everyone had gone home now. If the hotel had given me the message when I came in, I'd have gotten through. Probably from the Embassy about a ride to Njala. The whole place is hopeless as far as communications are concerned. Hiked up the hill in eve & the view of the city is very nice.

During his stay in Sierra Leone, Harlan wrote in his journal: "Feb. 4: Hiked to King Tom Power Station and collected a little volunteer Sorghum and that's about all. Contacted Roger Browne who will take me to Njala. Had lunch with some fish scientists who were in town studying tuna." "Njala" refers to the Njala University College, which had been founded in 1964 by the government of Sierra Leone and "served as a major centre for training middle level agricultural extension workers and teachers at secondary school level." Njala University Website can be found at: http://njala.edu.sl/

For a little history of Njala University see: https://ace.illinois.edu/sierraleone/history

On February 8 Harlan finally got off to Njala to begin a very arduous week. He wrote in his journal that they were up early and departed in a: "huge ponderous & rattly Chevrolet Carryall and make it to Port Loko. Arrive before noon and met a Dr. Will, a Sierra Leonean & acting director. Nice chap but I'm afraid he lives in a dream world. Full of all sorts of impractical suggestions." Following this journal entry is a long saga about how the staff was saying that he could find various plants here and there, but they always seemed to be wrong.

Harlan was probably getting frustrated, but he ended that day's journal entry with the following: "Aside from being completely misled, it was a delightful trip down the river; lovely landscapes, people harvesting, stacking, threshing, winnowing. 'Witches-off' signs in fields etc."

Over the next three days Dr. Harlan had little to do. On February 12 he wrote: "Another slow day, just getting ready to depart … enforced idleness makes me nervous. I'd like to get on with the job or learn how to loaf." He spent a great deal of time trying to get his samples secured and shipped ahead, but in the end, he just had to trust some unknown people to get them there.

Paris

Leaving Africa on February 14 1968, Harlan flew to Paris, met some people, checked out the shipments, went to museums and ate in restaurants, apparently alone. He remained in Paris for six days, during which time he went to the Jardin des Plantes Herbarium for two days identifying the millets and sorghum he had collected in Africa. He was having a difficult time and mentioned in his notes that he should have done this before the expedition.

On February 19 he met with "M. Roland Porterès who had lived 20 years in Africa and 20 years in Paris, traveling extensively, about setting up a Crop Evolution Laboratory at Versailles, where he will have plots and fields, greenhouses and labs." M. Porterès has identified four origins of domestication for Pearl Millet in Africa (West Africa, Tchad, Upper Nile (Sudan) and East Africa (Kenya and Tanganyika). He has already discovered much about the complex history of African rice. M. Roland Porterès (Professor at the Musee *national d'histoire naturelle* de *Paris)* has studied and written on the agricultural revolution in Africa. (Wikipedia)

From Harlan's journal we read the following from his meeting with Dr. Porterès:

> The sorghum picture is very complex & he isn't saying much about it. He says you always get a genetic nucleus of primitive forms that is very stable & hard to crack genetically. Pristine populations are related & integrated and stable as populations. They are molded & modified by specific human cultures often through semi-religious beliefs & practices.

Will study all the millets incl. pennisetum collecting all the tropical crops in Nouvelle Calédonie for a serious study on their Taro, yams, etc.

Return Home from Exp. No. 5: Brussels, Florence, Paris, London and Champaign, Ill. (Return to Index)

On February 21, 1968 Harlan had a very comfortable train ride from Paris to Brussels, where he spent 2 ½ days in the African Herbarium. Note that the former European colonial powers all have extensive herbariums of African plants.

Then on February 24 he traveled to Florence by night train, "very cold now," he reported.

"Feb. 27: Still in Florence, hiked to Herbarium, but afternoon closed. It might be Mardi Gras. Anyway, went straight to Uffizi (A Renaissance Art Museum in Florence) and was completely absorbed & overwhelmed for 2 hours. Tremendous! Simply tremendous!" He spent the next few days at the Herbarium and the museums in Florence then on to Geneva and the herbarium there on March 1. He is getting a sore throat now and on March 2, he takes the train back to Paris with the sore throat getting worse. The next day he flew to London where he found his suitcase zipper broken again and some things were missing; $150 cash, a pin for Jean and a box of Dutch cigars. "It was foolish of me to leave money in the bag, but I'd done it so many times I was caught off guard this time."

Note, he went all over in Africa, but he got looted when he got to civilized Europe. When Dr. Ardeshir (Adi) Damania of University of California at Davis reviewed this chapter, he noted: "London Heathrow airport is notorious for bag looters." (HVH2)

There were so many great things to do in London, mainly at the Kew, going over his collection of sorghums and Oryza, he decided to stay an extra week. On March 6 he finished Oryza & started sorghum. "What a collection!", he wrote in his journal. "I obviously cannot do a good job this week & since Rockefeller doesn't want me next week, perhaps I should stay over. Must decide." A few days later he booked a flight to Boston for March 12; but over the next week he is getting bored again. The day of departure finally came, and he went to the Kew to thank everyone and say good-by and he flew to Boston on March 12/13. He visited with Sue and then with Harry in Boston and flew to Chicago and then to Champaign. "Foul weather forced a landing in Decatur and a taxi ride to Champaign." He arrived home

about 9 PM on March 15, 1968. Thus, ended Jack R. Harlan's first collection expedition to West Africa, which began on November 24, 1967 and ended 3 months and 19 days later, having visited eight West African countries and three European countries, having fought paperwork, lost luggage, sore throats and dysentery, bats and huge mosquitoes; all in the name of science. (Return to Index)

TR-2, Twelfth International Congress on Genetics Tokyo, 1968

After returning from his first African expedition Jack Harlan remained at home for about 7 months and then attended the Twelfth International Congress on Genetics Tokyo, August 19-28, 1968. We have almost nothing about this trip, but we have numbered it He departed again on November 20, 1968, for his second African expedition. This one was a grand sweep of the African savanna from East to West. As West Africa had been dominated by the French, East Africa was dominated by the British; however, there were several former French colonies in the East, which Harlan visited.

Expedition No. 6: East to West Africa (Narr), (Trans), If these links don't work, the documents can be found in the Appendix. (Return to Index), (End of Exp. No 6) Note: the description given here of Exp. 6 is considerably shorter than for Exp. 5.

History of Egypt, Sudan and Chad

We all know a little of the history of Egypt. Egypt was an ancient country with a highly developed society. The leader of the nation was called Pharaoh and the ancient Egyptians built a lot of giant pyramids and temples, as well as the Sphinx. The history of Sudan is intertwined with that of Egypt to such an extent that they need to be considered together. After millennia of conquest and subjugation by various Christian and Islamic groups we come into the "modern" era. Britain gained control over Egypt and the Sudan after some conflict with Belgium and France. The British and the Egyptians, jointly, ruled the Sudan from 1896 to 1955. England made most of the decisions and gained most of the wealth in this "condominium" relationship. "In international law, a condominium is a political territory (state or border area) in or over which multiple sovereign powers formally agree to share equal *dominium* (in the sense of sovereignty)

and exercise their rights jointly, without dividing it into "national" zones." (Wikipedia). During the colonial period Britain ruled an almost continuous strip of African nations on the east side of Africa, from Egypt down to South Africa, except for German East Africa, the future Tanzania. There were also a number of French "possessions" on the east side.

After World War II the British moved to grant Sudan independence, but favored the northern areas at the expense of the southern areas. The northern areas were Muslim and spoke Arabic. The southern areas were Christian and traditional African religions and spoke English and other native languages. The British were preparing to give the northern area independence as Sudan and keep the southern area as their colony. Independence to greater Sudan came in 1955 but was soon followed by civil war between the North and the South. The war dragged on until 1972. It was during this time (1968 & 69) that Jack Harlan entered Sudan searching for the center of origin of domesticated sorghum.

Chad (or Tchad in 1968) gained its independence from France on August 11, 1960. Its first president was François Tombalbaye. One of the most prominent aspects of Tombalbaye's rule to prove itself was his authoritarianism and distrust of democracy. Already in January 1962 he banned all political parties except his own PPT ("Parti Progressiste Tchadien" or "Chadian Progressive Party") and started immediately concentrating all power in his own hands. His treatment of opponents, real or imagined, was extremely harsh, filling the prisons with thousands of political prisoners.

In 1968 Tchad was starting to rebel against the authoritarian rule of Tombalbaye, which ended in a civil war in 1975 in which Tombalbaye was killed during a coup. Thus, when Jack Harlan entered Tchad on October 8, 1968, the country was fairly stable, but the people were starting to rebel against their authoritarian government. Harlan traveled in Tchad for 11 days, exiting on October 19, 1968.

Cameroon

Harlan spent one day in Douala, Cameroon, October 19, 1968. The history of Cameroon is particularly complicated but does not really concern us due to the shortness of his stay.

Nigeria (Oct. 21 – Nov. 7, 1968: 18 days)

Jack Harlan was back in Nigeria during the military-led period between the first and second republics. The Biafran independence war was in progress in the southeastern areas of Nigeria during the time of his visit. Note that Harlan had visited Nigeria the previous year. See Expedition No. 5.

As we said, above, for Expedition No. 5, the history of Africa was such that the European Colonial Powers simply let them go with a minimal amount of preparation. Democracy was the key criteria, they thought. The emerging nations were anxious to get started but they were woefully unprepared to operate as a modern 20th century nation-state. The Europeans thought that if the new nations could just have "free" elections for the highest office in the land (President or Prime Minister) and some kind of legislative body, then they could probably work things out for themselves. After all, that's the way the United States got its start. So, that seemed to be the main criterion: that they could hold elections; then they would be on their own. In the following we will see Jack Harlan venting his frustration in his travel journal. It is the opinion of this author that both sides had an inadequate view of the other side and that caused a lot of problems that Jack Harlan was facing. Harlan assumed that the Africans could behave themselves like the Europeans did and the Africans, seeing the European complexion of Dr. Harlan, assumed that he was up to no good. Also, it is the belief of this author that Dr. Harlan vented his frustration in his travel journals, so that he could get it out of his system and be basically very patient with the people with whom he had to deal.

After traveling through Sudan and Tchad, Harlan arrived in Lagos, Nigeria on October 21, 1968. He stayed in Lagos for two days, visiting the museum (the Benin Bronzes were back) and then flew about 900 km northeast to Kaduna, Nigeria in the Northern district. On October 24 he met the acting Director of the Institute of Agricultural Research (IAR), John H. Davies from Kansas State University. He wrote in his journal, "The 'Institute of Agricultural Research' is relatively old (30 years?) & the University new. Tour of facilities & plant impressive."

From the Website on IAR:

*The Institute for Agricultural Research (IAR), Samaru was establish 1922 as the research division of the Department of Agriculture for the defunt Northern region of Nigeria. IAR was formally transferred by law to the later established Ahmadu Bello University (ABU) on October 14, 1962. With the Federation of the University in 1975, the IAR was affiliated in accordance with statue 14 of the University. IAR has been the bedrock of crop research and improvement in the savanna region of Nigeria. The re-organization of the National Agricultural Research Institution in 1987 mandated IAR to conduct research and provide service. (*http://iar.abu.edu.ng/*)*

By October 25, 1968 Harlan is getting sidetracked by the concerns of the experiment station staff. He is taking notes on several publications about beef production. Harlan is really studying up on this. He met Dr. Hagga, Director of Sluka Station, and then he gives a general picture of the station and their experiments with the use of fertilizer on forage crops to increase beef production. He lists some range grasses to feed the cows: "Friesian X Fulani hybrids. Demand for milk v. large. $40 million heard of beef cattle in the north alone great potential for beef export." And, then he lists some forage grasses that would be good to use in these circumstances.

Harlan's primary objective of finding centers of origin of endemic African crops seems to have been put on hold once again, while he deals with the local issues of the farmers and ranchers. The fadama area is described as follows by Wikipedia:

***Fadama** is a Hausa name for irrigatable land which are flood plains and low-lying plains underlined with shallow aquifer found along Nigeria's river system. The basic phenomenon is the ease of accessibility of shallow ground water and or surface water for agricultural production (Edo ADP, 2000). (Jun 17, 2014)*

The fadama area of northern Nigeria was seen by the British during the colonial period as a potentially fertile area suitable for the growing of crops**,** and they established a research institute in the area. When independence came in 1960 the research effort was continued under the Nigerian government and the Northern Region. Following the military coup in 1966 the research continued, and Dr. Harlan was impressed by what he saw in 1968.

Harlan continues to document findings of other people and is learning about the local techniques of rice farming. This is not exactly why he came to Africa, but it seems to be what the

local farmers and researchers are dealing with, so he adjusts his scope of work and rapidly becomes an expert on rice farming in West Africa.

On October 28, 1968 after a full day of traveling, observing and collecting, he comes to a conclusion and asks a question: "Obviously, Northern Nigeria is no center of origin of either sorghum or millet and probably not rice. Sorghum is derived, uniform, neither wild nor weed forms present. Millet hardly there, very advanced & we saw little 'chibra' (not sure what this is, HVH2) until reaching Niger, where it became abundant – weed millet not noticeable. Is sorghum East African?" One thing is clear: even with all the distractions of the local problems, Jack Harlan was able to make some significant observations about a possible center of origin for rice and millet in Nigeria. It might also be that, at this moment, he decided to make East Africa the subject of his third African expedition – to search for the origins of sorghum.

Niger & Nigeria

The next day Harlan met with M. J. Mocquand and they discussed the research program in Niger and the following day, October 30, he set out for Maradi, 146 miles west of Zinder, Niger. From there he will re-enter Nigeria and go to Kano and Samaru. His attention has now turned to soils and the specific problems local farmers were having growing their crops. He drove from Samaru, Nigeria to Lagos, then up to Ibadan, where he visited his former student, Chheda, now teaching at the University of Ibadan and then back to Lagos over a week's time (Nov. 1-7, 1968). The following is from his field notebook for November 2, 1968: "Towards the farm discussing diseases, pests & problems, then climbed the plateau of Jos in central Nigeria. Much acha (an ancient West African crop) and transplanted millet on top. Soils have a poor look & production looked very low for all that rainfall. Rock close to surface & much yellow soil instead of red. Visited some official or other at Jos, had a beer & took off for Samaru (Samaru School of Agriculture), arriving maybe 7:00 & then to a big benefit bar-be-q & all that at the ABU club. Decorations superb. Food so-so. We left at 1:00 AM and the party was just getting started. 4 long days in a row." The next day, Harlan continues to drive from village to village in Nigeria, collecting as he goes and making notes in his diary.

Cote d'Ivoirie (Ivory Coast) (Nov. 8 – 12, 1968: 5 days)

On November 7 Harlan is trying to fly from Lagos, Nigeria to Abidjan, Côte d'Ivoire. Once again, he has no local person to help him. The following is what he wrote in his journal:

7XI [November 7] Well, it wasn't all that easy. Settled bill & went down to Kingsway to spend the rest of the Nigerian money. Bought a book & some trinkets. Back to hotel, check out, cab to airport. Every annoying trick known to man employed by all the Nigerians. Bribed & tipped my way through the stupid line and arrived on the other side with enough money for one Star & one small Heineken. Just right except I waited 5 hours for the plane that didn't show. The Air Afrique man did give me sandwiches & beer for lunch which helped. Finally, he put me on a Ghana Airways flight & I left Lagos 6 hours after arriving at the airport. Arriving in **Abidjan** late is a problem & many hotels tried before a room located at Peryols Pora one night only. Cab fare 35.00 francs or $14! The place nice enough but miles from town. Very cute garden restaurant & the barmaid not bad either. Fairly reasonable but too far out. Will try again tomorrow.

Harlan's experience in Sudan and Tchad was smooth compared with what he had experienced in West Africa. Harlan entered the Ivory Coast (Cote d'Ivoirie) to begin his mission on November 8, 1967 and went straight to the embassy in Abidjan to check on any mail that might have come on ahead of him. On November 11 he writes in his journal while in Abidjan:

We saw great gobs of genetic studies & I can't remember very much – being in considerable misery with my first major stomach upset – a very long day completed only with determination & will power." Now, over the next few days Harlan's notebook contains what appears to be notes on the genetics of various plants. One would think that he is copying this from some publication. This author does not believe that he could derive this information from field observations. For instance on 9XI [Nov. 9] he writes, "Panicum maximum 6x (48) rather different from 4x (32), but 5x (40) resemble the 4x very closely – West African material v. uniform, but Kenya – Tanzania variable & one 2x found there (very long & resembling local 4x) One large pop of 2n=40 & a small pop of 2n=38 in it

near Ghana border ½ way up. A few 6x in I. C. (48). P. max the only group w x=8, other spp. x=9. The 6x mostly concentrated in one region.

He goes on like this for several pages. This may be important for someone really up on all this. See Appendix or click transcript of Expedition No. 6.

On November 12, 1968 Harlan wrote the following: "Exhausted & rocky with bad stomach, so took it easy – walked to Treichville & bought some cloth, etc. bought lion's claw[1], etc. saw a movie: good but a bit murky on symbolism."

His last country to explore on this leg of the journey is Sierra Leone and this experience was even worse than the previous one a year before on Expedition No. 5.

Sierra Leone (Nov. 13 – Dec. 21, 1968: 39 days)

Jack Harlan had been hired by NUC (Njala University College) to work there for 5 weeks on a report or something. He never quite understood what they wanted him to do, got bogged down and fell into a great depression. Following are some little details of this ordeal.

On November 13 Harlan flew to Freetown, Sierra Leone. There he visited Njala University and, working with Mr. Karnes and a Dr. Karr at the university, formulated a practical plan to develop the rice industry in Sierra Leone. Njala University had been started in 1964 with the help of the University of Illinois and had become one of the premier agricultural universities in Sierra Leone. Harlan worked with Dr. Karnes for several days and on November 15 he posted in his Notebook a five-step plan for helping Sierra Leone develop her agriculture program.

He was given a trailer to stay in to do his work. It had a bed, WC and a writing desk. Harlan has a hard time getting started, but once he did, the writing came pretty easy. He was all alone and, after a few days, things were beginning to grind to a crawl for Jack Harlan. More and more, he found himself in the trailer with nothing to do. He started working on something he

[1] I had this claw for a number of years, but it got lost in Hurricane Katrina, HVH2

called "Organic Revolution No. 1." He worked up a seminar with that title and gave it at Njala University, then wrote up a publication on it. He keeps writing in his Notebook "must get on my project." On November 20 he goes to the library and works up a memo to Mr. Karnes outlining what he could do. That evening he also wrote in his Notebook, which is now becoming his personal diary: "To club in eve. A big zero." A deep frustration is setting in. Jack Harlan has always been a man of action. In his mind, his purpose in life is to be out there doing something good for the world. He has come a long way to be in Sierra Leone and suffered many things, but at this point, on this expedition, it seems as though all his efforts were going nowhere.

However, the plan he gave to Karnes may have given a needed boost to the Njala rice program. Eventually, after many trials, the effort bore fruit in the form of Dr. Monte Jones, a native of Sierra Leone and chief rice breeder at Njala University, who was awarded the World Food Prize in 2004 for his work in developing superior strains of African rice, by crossing them with Asian rice to produce the New Rice for Africa (NERICA). I do not want to claim something that is not ours, and it would be difficult to establish a clear link, but this author would like to think that Jack Harlan and Dr. Karnes' efforts in some way helped to set in motion the movement to genetically improve African rice, using the expertise and influence of Njala University, eventually resulted in Dr. Monte Jones' work.

Enter a man named Emji - an expert on yams. On November 21, 1968 Harlan wrote in his journal: "Hiked through the wildwood looking for wild yams – don't think I saw any. The bush is really messy. More likely ride on the river in late aft. Very pleasant. This will be a big waste of time if I don't get on my project. But visitors this weekend. Tomorrow date w. Emji, seminar in eve for staff and students." And then in the next day's entry he wrote: "Met Emji last night at the club, so did not need to meet him today. More library work. Did seminar in evening 'Agricultural Revolution No. 1'. Seemed to go well. West Africans resent not having more domesticates from West Africa." The following day he went with Emji to a yam field. Harlan was now beginning to learn about yams. He was learning a lot from Emji and from his own

library work, as well as from the field trips. The yam is an African domesticate and has been a traditional source of food in Africa for thousands of years.

On November 25, 1968 he wrote: "Emji was to take me to bush to see wild yams but begged off. Gave seminar in aft about research. Don't know if anyone listened or not. Guess I'll write it down for the record anyway. Felt rather discouraged." The next day he wrote: "Went with Emji to the bush to find wild yams; need to return to get photos. Dean Neil Worker's birthday this eve. So, everybody trouped in & drank his booze, but he seemed to enjoy it." And on the 27th he wrote: "Spent the day in the library researching and writing up the 'bush fallow' thing. At least I'm learning something, but I might as well not have come, as far as everyone is concerned. Advice is cheap but thankless & probably about as it should be." Jack Harlan is sinking into a greater depression of discouragement. He continues to work on his report in the library by himself. November 28 is Thanksgiving Day. Jack writes: "Just a workday here. Library again & started to put something on paper if aft. Still feel that I'm the only one interested in learning. The rest could not care less." On November 29 he ended his notebook entry with: "To club in eve. as usual & no one there but me." He spent the next two days in the library finishing up his paper, which he felt would be "round-filed" when it was done. On November 30 he wrote: "Feel in a very strange position, expressing alarm over soils problems, when the soils guys are goofing it up."

Having finished with his, seemingly futile, library and writing project he "Hiked to farm they wanted to clear for income-farming. Went up in boat & hiked through village & beyond. It started out looking very good. Soil fairly deep & well drained, grass *P. subaugustium* & not much bush. Then we hit it. *Imperata cylindrica* (cogon grass) by the acre. The villagers can't handle it & avoid it. They are using bush & there is good bush there. 1 yr. rice & 1 yr. cassava & then back to bush. Somebody goofed & farmed too long, so in came the cogon grass. Still, it's a nice farm & if we knew how to handle the soil, it could be developed for mechanized farming (I think). Maybe I saved them a headache and maybe not. Took laundry over to Karnes in eve to leave for Kawa. Had several drinks & was invited to dinner. Very nice."

Finally, on December 3, 1968 Harlan got out of this rut and it was off to Freetown where he did some shopping. There he bought a Benin Bronze, a man's head, which he felt was authentic. It is illegal to take Benin Bronzes out of Nigeria, but he bought this one in Freetown, Sierra Leone. It had a crack at the base of the neck and Harlan felt that this was the reason it was available for purchase. It could be hundreds of years old. No one knows how old it is. This author has this piece in his home.

Benin Bronze purchased in Sierra Leone, by Jack Harlan,
Dec. 3, 1968. It is now in this author's office at home.

On December 7, 1968 Harlan finished his suggestions on rice production and reviewed what he called his "Opus" and found it to be pretty good. Then he got into a Joseph Conrad book and commented. "Had forgotten how gripping a storyteller he was. Tremendous."

It was December 10 and getting close to the time for Harlan to begin to return home, but he visited some farms in which the workers were attempting to replicate American farming techniques. He has his doubts but saw some areas that might be farmable by machine. Some of the wetter areas were called Bolilands. Upon seeing "vast quantities of tractors, discs & etc. never used & never will be," Harlan concluded, "a hopeless mess." The next day he reviewed a project which had a better chance of success. He writes in his journal:

> In aft to a pseudo-bali near Mano. They are thinking of plowing for the farmers. A 4-chiefdom adventure. The farmers to put up 7 Le/acre for a turnkey job of plowing & planting. Soil wet but not necessarily flooded in the rains. Still wet, grey, poor drainage. Enormous stand of *Chasmopodium candatum* & some *Imperata*. No bush & looks farmable. The most farmable piece of land I've seen,

Beginning on December 12, Dr. Harlan toured an "area about 10,000 acres plowed & harvested by machinery." To flash forward 50 years, visit https://sewafarm.com/.

On December 17 Harlan took another field trip to Bolilands. After reviewing what they were doing and what they were up against he concluded: "At any rate the Bolilands look machinable."

December 20, 1968 and now Jack was preparing to finish his African odyssey and return to the states. That night he wrote:

> Got two pillowcases and made two more packages at the hotel; one for reports & books, etc. and the other for field clothes. Took them to the Embassy and after some fiddle they actually took them for the pouch! Also, went up to Fourah Bay before noon got off at library & found Institute of African Studies. To Hyde's residence. Not there. Will phone later. Back to Land Flats a magnificent view. Great camaraderie as the beer flowed and flowed and flowed. Gerry Karr showed. The Hodges were there. Several S. L's – can't remember names, except one named Jarret (sp.) fired from Njala and now, seemingly in good political position in Fourah Bay. He wants to start his own Agric. Extension Program,

much to the disgust of many at Njala. Various others in math, etc. Called Hyde on phone. He eventually showed, but could not expect anything to come of it. He does know Prof. Dolby & latter does have a student there. Hiked down through botanical gardens. Wringing wet. Couple of whiskeys in room and slight snooze. Then to Tropicana in eve. Not nearly so posh as I had expected. Food passable. No entertainment & so to bed.

Fourah Bay College is a public university in the neighborhood of Mount Aureol in Freetown, Sierra Leone. Founded on 18 February 1827, is the oldest university in West Africa and the first western-style university built in West Africa. (Wikipedia). See http://www.blackpast.org/gah/fourah-bay-college-1827 for good piece on college.

Return home from Exp. No. 6

Dec. 21: Stating home today! Woke early but managed to stay in bed until 7:30. Then good breakfast & then hiked the curio shops to see if there was something I couldn't resist. No problem. Resistance easy. Check UTA nothing new on ticket so back to hotel, packed, showered put on clean clothes all around & checked out. Sitting in lobby saw Larry Innan & wife, Marilyn, just arrived; also, small daughter. Bill & Anne Hodges & Tommy (Gerry not in sight). Gifford and Aldine Zimmerman, Gene Brams (Pat left yesterday to have a baby somewhere else), Dan Chaytor & maybe that's all.

He did not say in his notebook, but his pocket calendar indicates that he arrived back in Champaign on December 22, 1968. (Trans for Exp. 6), If this link does not work the documents can be found in the Appendix. (Return to Index)

Champaign

After returning on December 22, 1968 Jack Harlan was at home for only 3 months and 10 days before he left again on his third African expedition, this time to East Africa: Exp. # 7, (November 1, 1969 – January 13, 1970). Even this time at home was interrupted by numerous trips for meetings, of which we have no record, except for a 10-day trip to Puerto Rico, March 5 – 15, 1969 to inspect the sorghum fields which had been planted. He went again to Puerto Rico

from August 25 – 29, 1969 (**TR-4**) and hosted a very volatile Corn Conference at the University of Illinois in September 1969 which included Paul Mangelsdorf and George Beadle who had a running feud about the origins of Maize. See Maize Phase, below. After only 7 months and 11 days at home, and after completing Exp. # 7, he attended another sorghum meeting in Puerto Rico, March 5 - 13, 1970. The pace did not let up in 1970; but we need continue on the three African expeditions for the sake of continuity of the story. Following is a greatly abbreviated description of Expedition number 7:

Expedition No. 7 – East Africa (his third and final African seed-collecting expedition), November 1, 1969 – January 16, 1970; (London, Egypt, Sudan, Uganda, Kenya, Ethiopia, Spain, Puerto Rico for Sorghum Conference) (Return to Index)

Jack Harlan set out for East Africa to find the center of origin of the fourth most important crop in the world: sorghum. His first stop was the Kew in London where he spent 4 days learning as much as he could about his subject. This expedition would be Harlan's first visit to Egypt, his second visit to Sudan in two years and his second to Ethiopia. Harlan only spent 2 days in Egypt and most of that time was in the museums. On Exp. # 7 he entered Sudan on November 9, 1968. He is looking for sorghum and what he finds in Sudan is some very unusual varieties, both wild and domesticated, and interesting crossings going on between them. He left Sudan and entered Uganda, just to the south of Sudan, on November 14. Uganda did not seem to have a great amount of sorghum and Harlan concluded that there is no center of origin in this area. Although he found some wild and weedy sorghum in Kenya, again it does not really qualify as a center of origin. The last country on his hit list was Ethiopia. While in Uganda he met Dr. Ken Rachie who was working with the Rockefeller Foundation. Dr. Rachie went to great lengths to present his case to Dr. Harlan that the center of origin of sorghum was to be found in Ethiopia. When he got to Ethiopia, Harlan investigated this theory and found that certainly there were some interesting and outstanding wild and weedy forms of sorghum in Ethiopia; but he was not convinced that what he was seeing was a center of origin.

While in Ethiopia Harlan had some fruitful conversations with an Ato Melak of the Haramaya University at Alemaya. He also received word on December 10, 1969, while still in

Nairobi, that his first grandchild, a son, named Mark Hughes, had been born on the 7th of December in Ft. Knox, Kentucky where his father, Robert L. Hughes, the husband of Sue Harlan, was serving in the U. S. Army. To read more about Exp No. 7 click (Narr) or (Trans) or see Appendix. (Return to General Index), (Return to Index)

On January 6, 1970 Harlan flew out of Africa and went to Spain where he prowled the museums waiting for his flight to Puerto Rico for a conference on sorghum. This author has tried in vain to find anything on-line about the Puerto Rico meeting in 1970 and cannot. The Journal notes from this conference are pretty sketchy and pretty technical. All we can say at this point is that Jack Harlan, along with Jan de Wet and some others, attended a meeting on Sorghum in San Juan, Puerto Rico from January 13 through 15 or 16, 1970. It does not seem that Harlan presented a publication at the meeting. But it does show his interest in sorghum and its origins and that he may have been considered some kind of expert on this subject at that time. Harlan departed Puerto Rico on January 16, 1970 and flew home to Champaign, Illinois.

Jack Harlan had now reached his stride and committed himself to the task set before him into the wonderful, marvelous, well – interesting 1970's. At the same time, his efforts were directed in several directions. He had completed his study of the origins of African agriculture and was planning a world-wide conference to discuss the results and write up a book on the subject. At the same time, Harlan's interest was being diverted to the study of the origins of maize. He hosted a world conference on maize at the University of Illinois in 1969 (See Maize Phase). And, along with all this, the issues involving germplasm resources was expanding and he was in the middle of that. All this was happening simultaneously, but we have to report each in turn. This we will attempt to do as follows:

Harlan returned from Puerto Rico to Champaign on January 16, 1970. Jean was home, Sue was married and living in Massachusetts. Harry was at home, working in a lab and taking a couple of courses at the U of I. Sherry was living at home. Richard was a Junior at Northwestern University in Evanston Illinois, majoring in Far Eastern Studies. Jack settled in his office at the University of Illinois. There was a pile of mail on Jack's desk. He had two Graduate Students. Liwayway M. Engle was working on her PhD Degree under Dr. Harlan; and Phillip Busey was

working on his Master's Degree under Dr. Harlan. Harlan had just finished his three expeditions to Africa and there was a whole lot to go over and digest.

World Exposition on the Origins of African crops. (Return to General Index)

Tr-5 (Trip No. 5): As a follow-up to his three African expeditions, Jack Harlan organized and pushed through the "World Exposition of the Origin of African Crops", hosted by the Wenner-Gren Foundation and held at the **Burg Wartenstein Castle** in Austria the week of August 19-27, 1972. It was attended by a stellar group of scientists. Harlan arrived at London five days before the conference was to begin in Austria. We do not know what he did during those five days, but he probably went to the Castle and helped set up the stage for the exposition, as well as visiting some of the museums in the area. (Return to General Index) (Return to Index)

What do we do with all these seeds?

By 1970, Jack Harlan had made a name for himself as a seed collector. But collecting seeds, in vast quantities, raises another question: what do we do with all these seeds? To whom do they belong? How do we get them to where they are most needed and what does it mean to "need" seeds? Some people are chronically facing hunger and starvation because they have no seeds to plant. That is an issue; however, it is not hard to see that the world has plenty of seeds already and food readily available to feed the hungry. The seeds (or, rather, the foods that they can produce) are just not getting to every hungry mouth, largely due to political problems and – well – ownership questions. So, that is one "need" that we have: we need seeds to help feed the hungry people of this world.

Another "need" is for all these many varieties of seeds of food crops that we have collected to be placed in facilities where they can be grown out, crossed, back-crossed and so on to 1) see what we really have here and 2) scientifically plan a program, procedure or protocol

whereby the various varieties (some of which are invaluable) would actually be used to make improvements in our crop plants in various places around the world. If there is no use for the seeds then why go to all this trouble to collect them? So, this is another "need" for the seeds: we need the seeds to further research to improve our crops. One could also talk about the seed banks and their "need" for seeds. A seek bank is just a temporary storage facility for these precious seeds. Something has to take place with the seeds besides storing them. What do we need to do with all these seeds? It should be obvious to the reader that the few sacks of seeds that Jack Harlan brought back from his world travels could do nothing directly to alleviate world hunger. If they were ground up and converted to food, they might feed a family for a month and then they would be gone. The precious treasure of genetic diversity contained within those bags of seeds has an astronomical value towards feeding the world compared to their actual food value.

Vavilov sent out hundreds of workers around the world to collect seeds. These seeds were brought back to the Soviet Union and stored. Those seeds were for the Russians. Not for the Russians to eat directly, but for the Russian scientists to grow out, cross and backcross in order to develop better crops for their people. Did the collectors purchase them from the thousands of small-time farmers from which they were taken? I suspect that some were paid; however, it is my impression, from reading Jack Harlan's travel journals, that he quite often did not pay anybody for the seeds that he took. Usually, there was no one in sight to collect a fee. The seeds were just there, and he only took a small sample. Often times he collected seeds from the weeds around the fields or introgressive hybridizing varieties he found on the edge of the fields. So, the question of ownership did not come up, or if it did, he could solve it with a handful of currency he had in his pocket. Years later, the issue of "intellectual property rights" for the seeds would arise and change the way people were dealing with seeds.

Think back to the very beginning of agriculture. A certain woman in a certain group of people found out that seeds taken from a certain part of the field made better gruel than seeds taken from the other parts of the field. This knowledge was intellectual property. She "owned" this knowledge and she could use it to find favor among her family members, or whatever. In

today's world of big agri-business and big legal issues, ownership has become a prime factor; but in the days of Jack Harlan, stopping his jeep in some remote mountain pass to collect a small sample of indigenous variety of wheat that he spotted which was a little bit different from the others he had seen and collected, ownership was a non-issue. Now, the issue which was beginning to arise in the 1970's was who really owns the vast collection of seeds collected and how can the seeds be used for the betterment of - whom? That is, who should benefit from this wonderful treasure? The whole world is a good answer, but how in the world do we get this precious treasure to the whole world?

In the 1970's the Ecumenical Institute (aka Institute of Cultural Affairs) had as its primary social vision a series of statements. I am going from memory now. I think there were five of them:

All the earth belongs to all the people

All the resources belong to all the people

All the decisions belong to all the people

etc.

That is all that this author can remember right now; but you get the picture. This was the 1970's - the age of idealism. What the EI was saying was that it is one thing to have a "Global Vision" (and that is good), but it is quite another thing to have a set of concrete strategies and tactics that people can implement, in a Global Context which, when implemented, will move the entire world toward a better outcome. This author knows that Jack Harlan attended several meetings of the EI during the early 1970's. How much impact did the EI have on the thinking of Jack Harlan is not known now. This author is pretty sure that Jack Harlan was especially interested in their strategies and tactics in a Global Context for decision making.

At any rate, ("Anywho", as Jack Harlan would say) it was this sort of Global Context that appears to be guiding the formation of the next phase in the development of the infrastructure to make this incredible resource of the world's seeds available to the world. A lot of the discussion that went on, as these concepts developed, has been lost. All we have to go by is

what has been preserved in writing and in names of places and organizations. This author will now attempt to piece together the bits and pieces he has from his research as all this has to do with Jack Harlan.

The next phase after collecting vast quantities of seeds would be to establish seed (Germplasm) Research Centers at different strategic locations around the world where seeds could be deposited, and scientists could begin to work with them. The germplasm centers would need to be networked together and somehow, somewhere decisions would be made. It is this second step that Jack Harlan was now in a position to make a little difference.

Background for the Global Seed Germplasm Research Centers Movement

We need to refer to a book entitled: "Scientist, Plants and Politics – a History of the Plant Genetic resources Movement", by Robin Pistorius (A Vavilov-Frankel Fellow), published in 1997. This author found a pdf of the book on-line. It has a total of 134 pages. A great deal of research has been done. The book has a lot of information and I will try to glean what I can. One thing it says is that the 1967 Technical conference in Rome (which Jack Harlan chaired) had a very great impact on the Genetic Resources movement. From the above book we read:

> The 1967 Conference resulted in a very important handbook: Genetic Resources in Plants: Their Exploration and Conservation, edited by Otto Frankel and Erna Bennett in association with R. D. Brock, A. H. Bunting, J. R. Harlan, and E. Schreiner. It was first published in 1970 and set the parameters for much of the discussions and work on the conservation and use of plant genetic resources in the 1970's and 1980's. (Preface, page vii).

Pistorius' book goes on to say that the 1973 IBP Technical Conference on Plant Genetic Resources in Rome (March 13-16) was the next important step that was taken. During this event a more-or-less practical plan was presented from the 1967 Conference.

> The 1967 FAO/IBP Technical conference generated some important guidelines for the establishment of a global network for long-term conservation *ex situ*. In retrospect, the conversion of these guidelines into practical action took place surprisingly quickly. The

first is the effective collaboration of a small group of leading geneticists and breeders representing key institutions., which became known as the Panel of Experts on Plant Exploration and Introduction. Their ideas led to a plan of action presented during the 1973 FAO/IBP Technical Conference of Plant Genetic Resources, held 12 to 16 March in Rome. The second reason was increased public and institutional attention to the dangers of genetic erosion both within the agricultural realm and the environmental realm as emerged in the 1972 United Nations Conference on Human Environment (UNCHE) in Stockholm, "The Stockholm Conference". The third stimulating factor was the support from the Consultative Group on International Agricultural Research (CGIAR) and its donors for establishing a world network of collections coordinated by the International Board for Plant Genetic Resources (IBPGR). In order to galvanize the contributions from some CGIAR institutes to the development of food crops (particularly maize and rice), many scientists had started to think of an international network that could secure a constant supply of genetic material to breed new varieties. These developments had considerable consequences for the position of FAO in international genetic resources conservation work.

The most important members of the Panel of Experts, both in terms of expertise and active involvement, Erna Bennett of the FAO, Jack R. Harlan of the Crop Evolution Laboratory of the University of Illinois, Jack G. Hawkes of the University of Birmingham, John L Creech of the United States Department of Agriculture (USDA) and Sir Otto Frankel of the Commonwealth Scientific and Industrial Research Organization (CSIRO), Canberra, Australia. [page 48]

Starting on page 49 of the subject document, Pistorius lists the most important achievements of the Panel in formulating the basic arguments for the conservation of plant genetic material 1) that genetic material be made immediately available to breeders who need it & 2) genetic variability must be maintained. They also outlined areas for additional exploration and proposed a network of germ plasm centers. Pistorius does not say when these proposals came into being, but he says that after the 66 & 67meetings, the Penal met in 1969, 70, 73 & 75. This author is going to say that it was at one of these meetings that Jack Harlan volunteered to go back to Ethiopia and then Turkey to see about developing those two Germplasm Resource

Centers. This expedition (Exp. No. 8) was early (1970), so the meeting was probably the 1969 meeting. If he did not volunteer, then Otto Frankel appointed him to go to Ethiopia and Turkey in 1970 (Exp. 8) and again to Ethiopia in 1971 (Exp. 9) to see what he could do to implement a global strategy of placing plant Germplasm Research Centers in strategic locations around the world. Ethiopia and Turkey were both very strategic locations. (Return to General Index), (Return to Index)

Back at the office

Harlan issued some publications following his investigations of gene centers:

Harlan, J.R. and E. James. 1971. ***Crop Research and Introduction Center, Izmir, Turkey: Report of Review Mission***. FAO, Rome AGP: SF/TUR 8

And he is doing some thinking on what is being discussed in the Panel of Experts meetings. The following are some of the more "earthshattering" publications of Jack R. Harlan:

Harlan, J.R. 1972. ***Breeding success brings a peril***. Crops and Soils 72: 5-6.

Harlan, J.R. 1972. ***Genetic conservation of plants that feed the world.*** Environmental Journal 46: 15-17.

Harlan, J.R. 1972. ***Genetics of disaster.*** Journal of Environmental Quality 1: 212-215.

Harlan, J.R. 1975. ***Our vanishing genetic resources.*** Science 188: 618-621

Significant students and co-workers in the early 1970's (Return to General Index)

Kanti Rawal, from Gujarat, India received his PhD degree under Dr. Harlan in **1969**.

Kanti was one of Dr. Harlan's more successful students. This author remembers him from the OSU days and was able to contact him while researching this book. Kanti sent him the following email describing, not only his own journey, but also some details of the field work at OSU.

Harry: 10-24-2013

I started as a Ph.D. student at OSU in January 1966. By the beginning of summer, everybody knew that Dr. Harlan was moving to U of I. His great friend and admirer, Dr. Marlow Thorne (who used to be Head, Dept of Agronomy at OSU) was the Head of Agronomy Dept at U of I. Dr. Thorne certainly wanted to build a prestigious department. Dr. Harlan was already famous amongst Agronomists; he had been elected a fellow of the Agronomy Society of America as well as being selected **President** of the Crop Science Society of America.

Anyway, Dr. Harlan asked me if I wanted to go to Illinois with him. I did not hesitate for a moment. I had come specifically to study under him and did not want to be left at OSU. There was nobody of his stature. Although I was a research assistant in the Dept of Agronomy, I worked in Dr. J.M.J.de wet's lab in the Botany dept. All of Dr. Harlan's students worked in de wet's lab.

I learned to count chromosomes under the microscope on the grass genera Andropogon, Bothriochloa, Cymbopogon & Dichanthium- commonly known as Blue Stem grasses. That project was on its final stages. Bermuda Grass (Cynodon and related species) was the new project. Bill Richardson had made a whole bunch of interspecific crosses and they were all planted in the farm at the (OSU) Experiment Station. We used to go every morning around 8 am to collect morphological data and samples of young inflorescences to study meiosis. Sometimes Dr. Harlan will drive us and sometimes we will go with Dr. de Wet. But all of us will spend some time together in the field learning from Dr. Harlan. Dr. Harlan will show us the parents involved in these crosses and then indicate the characteristics of each parent expressed in these crosses. He will also tell us about the numerical ease or difficulty with which Bill Richardson was able to hybridize these. Quite often Bill will also be present along with Bob Ahring (Physiologist in charge of seed germination and planting).

I stayed for the fall semester at OSU (1966) and then transferred to U of I. Dr. Harlan (or his secretary Mrs. Dorothy Tipton) had done all the work of filing application for me. I received the correspondence regarding my admission and appointment as half-time Research Assistant in the Dept of Agronomy at U of I before I left Stillwater in early January 1967.

I graduated (from the U of I) in October 1969 and continued as Post-Doc until June 1970.

Regards

Kanti

Here is another email from Kanti, dated November 22, 2020 about the Little Red Book.

Hi Harry:

Dr Harlan returned from his annual escape to the tropics trip some time in Feb-March 1969. I do not have any memory of where he went; it's likely he went to the Rockefeller Foundation's informal get together in West Indies (Kingston?) after spending some time in Puerto Rico where his collection of Sorghum and Pearl Millet was planted for evaluation.

I had passed my qualifying exam in late 1968 and had completed research work for my thesis. However, I had not started putting anything down on paper. When JRH asked me the reason for my stalling I said something to the effect that I really lacked inspiration.

A couple of hop seminars later JRH gave me the Little Red Book and said "Now go home and start reading this- 600 million Chinese go to work every day inspired by the sayings of Mao."

I went to my dorm room and for 3 days and 3 nights I kept on reading this Little Red Book in search of inspiration; I took a break just to go and eat at the Mess Hall for meals.

Finally, it dawned on me that reading this collection of garbled words by an uneducated egotist was a waste of my time. I should concentrate on writing my thesis!!! Eureka!!! Quotations of Chairman Mao did inspire me. I returned the book to Dr. Harlan and told him about my Eureka moment and he just laughed!!

Well, when I finally finished writing my thesis (Dr. Harlan helped me a lot for I lacked the skills to report the results and discussion part- objectively), in the Acknowledgement part preceding the chapters of my thesis, I thanked Chairman Mao and wrote about how I got inspired (!!) to start writing!

Dr Harlan liked it- he had a great sense of humor and Ted Hymowitz found it just plain hilarious. He kept on telling everyone: "This Hippie from India (I had shoulder long dark black hair and a full beard) thanks the Chairman of China for his dissertation to a University in America!! How cosmopolitan is that?"

Any way other members of my Advisory Committee insisted I remove that story - they were afraid the news media will miss out on the humor and distort the story. All of America was up against the Chinese and the Vietcong they were backing. Jane Fonda and the Chicago-7 were among the very few who called the Communists Freedom Fighters.

Ultimately the Committee members prevailed, and the story of Chairman Mao's Little Red Book was never mentioned in my thesis.

I saw Ted a couple of years back when he came to Davis to give a seminar and he remembered that story - we chuckled!!

Kind regards
Kanti

To see Kanti's life after school see Dr. Kanti. This is a book about Kanti by called "Ripe"

Theodore Hymowitz

Theodore (Ted) Hymowitz had transferred from OSU to the U of I in March 1967, following his mentor, Jack Harlan; but it was not quite that simple. In his unpublished autobiography Hymowitz wrote, regarding his relationship with Jack Harlan at OSU, "Although Professor Matlock was my dissertation advisor, it was very obvious at least to me, that my intellectual guru at Oklahoma State University was Professor Jack R. Harlan. It was through Harlan's courses on evolution and our many conversations that I began to appreciate the value of germplasm collections and the immense diversity of genotypes provided by nature. In addition, Dr. Harlan's interest in nature, differing cultures, languages, music, and books appeared to parallel my concerns." This was copied from page 7 of "Theodore Hymowitz, A soybean Saga", his shortened autobiography.

Ted Hymowitz had originally begun his graduate studies at Oklahoma State University in 1959 and did his PhD dissertation on the Guar plant. He had done everything he needed to do for his PhD, except the dissertation defense, when a great opportunity appeared for him to work in India under a Fulbright scholarship. The dissertation was locked in a safe while Hymowitz went to India for 1962-63, to study and to collect Guar. When he returned, the

dissertation was brought out of the safe, Hymowitz successfully defended it and was granted a PhD. After receiving his PhD in August 1963, Hymowitz was a PhD without a position. After working in a few unprofessional jobs for about a year, he contacted Dr. Jack Harlan who then wrote a letter which got Hymowitz a position in Brazil, working for the IRI Research Institute, New York and paid for by the U. S. Agency for International Development, (USAID). "I accepted the position and in late 1964 moved to Campinas located about 60 miles north and west of the city of Sao Paulo (Brazil)." ("Theodore Hymowitz, A soybean Saga", page 8)

Hymowitz continues with his bio:

> In late 1966, towards the end of my 2-year contract, I was asked to stay in Brazil and continue with my research activities, however, I would have to move to the capital, Brazilia [Brasília]. After much thought, I decided to turn down the excellent salary, prestige and administrative perks and return to the United States to find a position in academia.
>
> About two months prior to my departure from Brazil, I wrote a letter to Dr. Marlowe D. Thorne … Head of the Department of Agronomy, University of Illinois. In the letter, I asked Dr. Thorne to check the job opening aboard in the forthcoming American Society of Agronomy meeting. I found it difficult from Brazil to look for a position in the United States. Dr. Thorne never responded to my letter.
>
> A few days after New Year's in 1967, I called up Dr. Thorne from the East Coast and asked him why he had not responded to my letter. He quickly cooled me down by revealing that the Soybean Processor Association had given a grant to the University of Illinois to establish a new position in the Department of Agronomy and it appeared to him that I was the perfect candidate for the position. Thus, in March 1967, I joined the faculty of the University of Illinois and became the first full time state supported soybean geneticist in the United States. In addition, I was reunited with Dr. Jack Harlan my intellectual guru from Oklahoma State.

After Hymowitz began at the U of I, he was invited by Drs. Harlan and de Wet to join the CEL.

A Scientific Pilgrimage at the University of Illinois

If ever there was a man who was **called** to a certain calling, it was Jack Harlan. He first made a life-long commitment to become a seed explorer at the age of four (see Chapter 2). He went after that calling with a quiet passion and determination that knew no obstacles. As he pursued his life goal, he became more and more persuaded that this was the right thing for him to do and that involved a lot of traveling and dealing with difficult situations. But this is what he did. This is what his life was about. We will now attempt to present the rest of his professional life. A lot of things happened, and it would be impossible to include descriptions of everything. We will hold off on his quest for the origins of corn, or maize, for a little while longer. This story will be told in a section called "The Maize Phase". We will begin with short descriptions of the remaining expeditions from the U of I and refer the reader to the narratives and transcripts, such as they are. At this point Jack Harlan was known for his ability to go to underdeveloped countries and find his way around, collect seeds, attend meetings and see whomever he needed to see and return in one piece. He was now being called upon more and more to do all that.

Summary of Expedition No. 8: Turkey and Ethiopia, October 24 - December 21, 1970 (Return to Index). To read the actual transcript of his travel journal click (Trans) or you can find it in the Appendix.

Jack Harlan made his 8th expedition – first to the Kew, then Rome, Ethiopia, Rome, Turkey & back to Rome. On this trip Harlan is trying to start a Germ Plasm Resources Center in Ethiopia and to visit something similar in Turkey. During his previous expedition in 1969-70 he had some very promising conversations with Ato Melak of Haramaya University (AKA Alemaya University) in Dira Dawa, about starting a germ plasm center in Ethiopia. See Exp. 7, his second Ethiopian Collection Trip (Dec. 20-24, 1969). Exp. 8 was his third trip to Ethiopia. Another goal of the Expedition No. 8 was to visit & evaluate the gene research center in the Mediterranean region which was started in Turkey in 1964. The idea for this center was first promoted in 1957-58 and Harlan was sent to see what its current status and ongoing work entailed. Jack Harlan was not playing his strong suit: to go sell someone on an idea to start a

new program at their university. Before, after and between visits to Ethiopia and Turkey he attended meetings in Rome with the FAO. He did a little collecting at a market in Ethiopia on Exp. No. 8, and so this will qualify this venture as an expedition and not just a trip. The objective of this expedition was not to collect seeds, but to do something about the next step in the process of feeding the world with the seeds collected, not only by him but by all the seed collectors. Please see the section: "What do we do with all these seeds?" To read more about Exp. 8 click Trans, or look for it in the Appendix. (Return to Index) Also note that the groundwork for all this was laid down in the above section PGR (Plant Genetic Resources).

Meanwhile, the flow of publications continued. To see the publications for 1970, go to the Appendix. There is a total of 16 publications in 1970: 8 on *Cynodon*, 2 on the process of domestication, 2 on sorghum, 1 on the grass species *Dichanthium*, 1 on the grass genus Bothriochloa, and 2 on Zea-maize.

1971

Jack Harlan was given the Crop Science Research Award from the Crop Science Society of America in 1971.

Ten months after returning home from Exp. No. 8, Harlan set out on another expedition. **Expedition No. 9 –** Kew, Belgium, Rome, Ethiopia, India, West Africa and Mexico; October thru December 1971; 2 months & 18 days in field & 8 months home. Jean was with him in part of the Mexico phase. Note that he traveled in four continents, outside North America on this expedition and also that he is starting to bring Jean with him on various parts of his ventures, after seeing many other men in his position bringing their wives along with them. When he gets back to Ethiopia, we find him attempting to follow up on his previous effort to establish a Germ Plasm Resources Center. Some of the comments he makes in his notebook seem to point to some limited success in getting this started. He seems to be taking orders from Rome (FAO: Panel of Experts) as well as the U of I. To examine in detail Exp. No 9 click Trans, or see Appendix. (Return to Index). If these links do not work you can find what you are looking for in the Appendix.

Meanwhile back at the ranch, 1971:

On February 6, 1971 Jack Harlan attended the wedding of his son, Harry (this author), who married Kathleen Alice Sebastian in Shreveport, Louisiana. They honeymooned in West Africa, traveling to Senegal, Côte d'Ivoire and Ghana. They visited some of the same countries that Jack Harlan visited later in that year. It is too bad that they could not have coordinated their trips any better. It would have been a great experience for them to all get together in Côte d'Ivoire, for instance. When the couple returned, they moved to New Orleans, La. This is where Kathy wanted to live. Harry had taken the beginning course in the Ecumenical Institute, RS-1, in May of 1970 while living at home in Champaign, Illinois. Immediately afterward he had begun to attend the weekly meeting of the Champaign-Urbana Metro Cadre, a group of people loosely associated with the EI which met every Thursday at the Religious House. After Harry left home and married in February 1971, Jack began attending the weekly Cadre Meetings in Champaign. According to his pocket notebook for 1971 he attended the Cadre meetings three times in March 1971. This was news to this author until he found the note: "cadre lesson" written in his father's pocket notebook starting March 4, 1971. The EI was a radical existential quasi-Christian organization with Metro Cadres all over the world, all working towards a common goal. They used a workshop methodology of "brainstorm and gestalt" to put the thoughts of each individual in the group on the black board and then group them together into common themes. In the following years of the life and work of Jack Harlan he (Jack) found himself in key positions to influence the course of human events and it is the feeling of this author that he really appreciated the work the EI was doing and followed it for some time in the early 1970's. Jack Harlan, himself, was dealing with small groups of people, trying to make a big difference in the world. He was fascinated by what the EI was doing and how they were doing it.

Jack's youngest child and second son, Richard Harlan, graduated from Northwestern University in June 1971 with a bachelor's degree in East Asian History. He wrote a short biographical sketch for this book:

> I wanted to teach high school, but there were no opportunities in the Chicago area at that time. So, after working for a while, I decided that I really wanted to go into scientific research, studying the nervous system. I went back to school at the University of Illinois, Chicago, and received a certificate in biology in August 1973. I then went on to get a PhD in Neuroscience from the University of California, Los Angeles, in 1977 (Personal correspondence).

Richard was, no doubt, inspired by his father and grandfather, but directed to Neurophysiology by the general movement of the times towards personal enlightenment. This author also wanted to go into neurophysiology but was unsuccessful.

The Maize Phase (Return to General Index) (Return to Index)

Mixed in with all of the above, Jack Harlan began his quest to find the origins of corn, or more officially called "maize". His quest for the origins of maize ended his efforts to establish a network of Germplasm Research Centers around the world (one man can only do so much with the time given him). His attention was now shifting to the amazing Central American crop we call maize. As we speculated at the beginning of this chapter, it seems that Harlan and de Wet both began studying the maize puzzle shortly after de Wet arrived at the University of Illinois in 1967. No physical studies were done and no publications written; but Jack and Jan did a fair amount of library work and then called a **Corn Conference** at the University of Illinois in September, 1969 with the top experts in the field to discuss the questions and problems involving the origins of such an extraordinary food crop. They invited Paul Mangelsdorf, George Beadle, Hugh Iltis and a number of other experts on maize. They met in the room which the CEL would normally meet for their daily coffee breaks and they had simple open-ended informal discussions. No formal papers were presented. No reports were written on the proceedings; however, the final effect was of global significance. Hugh Iltis and Paul Mangelsdorf engaged in heated debates. Jack Harlan's student Kanti Rawal attended the meetings, as a graduate student. He stood against the wall and took mental notes. Fifty-one years later, in August 2018, Kanti was able to send this author an email describing what took place.

Dr. Harlan organized an informal symposium to discuss origin and evolution of maize. I believe he was awarded a grant from the Centennial Program for this. The meeting was for 3 days (September 11-13, 1969) and luminaries like G. W. Beadle (Nobel Laureate), Paul Mangelsdorf (Prof at Harvard), George F. Sprague (Iowa State), Dave Timothy and Major Goodman (NC State), W. L. Brown (President, Pioneer Hybrid), Hugh Iltis (U of Wisc. discovered teosinte in Mexico), Walter Galinat (Waltham, MA) , Hernandez X (UNAM) Mexico). Garrison Wilkes (Harvard Ph.D. faculty at Tulane) gathered and discussed all aspects of the Genetics, Evolution and Origin of maize. The attendees were eminently qualified in this field. (This author asked Kanti what Hernandez X's last name was and he emailed that it was too complicated and he just went by Hernandez X.) In addition to the students at Crop Evolution Lab, several faculty members (D. E. Alexander, John Dudley, Bob Lambert, Floyd Patterson - all maize breeders at U of I) attended the symposium.

A couple of interesting observations:

1. Dr. Harlan had never done any germplasm collection work in Mexico, Central and So. America; but he was a keen listener to what everyone said during these deliberations. Harlan and de Wet provided insights into their own experimental work with Maize X Tripsacum Cytogenetics. As far as I recall, they had no experience with teosinte.

2. Bill Brown, Major Goodman and Hernandez X had traveled extensively all over central and So. America to collect races of cultivated maize. Hernandez X had collected Tripsacum and Teosinte (two relatives of maize) as well. Hugh Iltis had been studying teosinte for quite a few years. And he flatly rejected Mangelsdorf"s tripartite theory of origin of maize.

3. George Sprague, Dave Timothy and to a lesser extent Walter Galinat had used the germplasm accessions of maize in their breeding programs. Bill Brown worked with Henry Wallace at Pioneer and developed several breeding populations of maize which became the corner stone of Pioneer Hybrid's success worldwide.

We listened to the heated debates especially between Mangelsdorf who believed that the progenitor of maize is extinct and Hugh Iltis who said that Teosinte is the most likely progenitor.

We were invited to evening dinners at de Wet's and Harlan homes and the discussions continued into the night. I was in the midst of writing my dissertation and was hoping to find post-doctoral fellowship somewhere. So, I was on my good behavior.

(End of Kanti's description)

This author had heard that George Beadle was Mangelsdorf''s main opponent, but Kanti said that Beadle was very quiet during these debates. It was Iltis who was the most vocal opponent of Paul Mangelsdorf.

As this author was writing these pages, in August of 2018, he happened to be talking with his younger sister, Sherry, who was living in Oregon at the time, and he mentioned this gathering. Sherry then said that she remembered meeting George Beadle at our house in September of 1969. This author does not remember that, himself, but he will say that he was probably there and met all these great men but cannot remember it now. Let it be said at this point that the Illinois Corn Conference of 1969 is a good demonstration of Jack Harlan as the "peacemaker". This may be a reflection of his Quaker roots, but anyway, he oftentimes acted in ways, among his family and coworkers, which would bring about a peaceful settlement of disputes through mutual respect and understanding of the various parties.

Harvard University held a similar meeting in June of 1972, which became much more noted as an historic gathering of maize experts. See "George Beadle's Other Hypothesis: One-Gene, One-Trait", by John Doebley, published in GENETICS *June 1, 2001 vol. 158 no. 2 487-493,* found on line at: http://www.genetics.org/content/158/2/487

This author has copies of some letters regarding this event copied from documents found at the University of Illinois archives. It seems that Jack Harlan was instrumental in providing impetus toward the Harvard Corn Conference. One is a letter dated January 12, 1972, some time

before the conference, from Jack Harlan and addressed to George W. Beadle. In this letter Harlan wrote, "Now, if what is in Mexico is the leftovers (and I get that impression, too, comparing what I saw with published photographs) it becomes very important for us to take a look at Harvard." In the next paragraph he writes: "Perhaps one of the first things to do would be for some of us to visit Harvard. I would suggest de Wet and I, yourself, Flannery and Ford from Michigan and Walt Galinat. Harvard might insist on Mangelsdorf being present, but otherwise I don't know if it makes a lot of difference whether he is or not… Would you be interested in arranging this?"

There is a letter dated May 22, 1972, from Richard Evans Schultes, Professor of Biology, Director, Botanical Museum at Harvard University and addressed to Jack R. Harlan at the University of Illinois. This letter was sent to a number of people, but evidently, Jack Harlan was an afterthought**,** because his name and address at the head of the letter is in a different type from the rest of the letter and it appears that his name was added to the list of invitees at the bottom of the letter, again in a different type. Note that he did not appear in the photo below, but the caption said that those shown in the photo were "Some of the participants" to the meeting. The next to the last paragraph in the subject letter lists the invitees, as follows: "in addition to Prof. Mangelsdorf, the following: Galinat, Wilkes, Randolph, Barghoorn, Beadle, de wet, Iltis, Doctors Tantravahi, McNeish, Banerjee, Harlan." Again, Harlan was in a different type, indicating that his name was added later. Since de Wet was on the original list, this author suspects that de Wet received his invitation and read it over, only to see that Harlan's name had been omitted. He then called Dr. Schultes and called his attention to the omission. Harlan's name was then added to the list.

Some of the participants in the 1972 corn conference at Harvard University. From the left: Ramana Tantravahi, H. Garrison Wilkes, Paul Mangelsdorf, William Davis, George Beadle, Umesh Banerjee, Elso Barghoorn, and Walton Galinat. This is perhaps the only time that these two adversaries shook hands. Photo by Hugh Iltis. (Photo and caption from the above website.)

A check of Jack Harlan's pocket notebook for 1972 has a note penned in for Tuesday, June 13, "to Harvard. Bot. Museum, 9:00". So, it looks like he made it to the meeting. This is the only source this author could find which actually put a date on this meeting.

Following is a single paragraph from the subject website about the Harvard Corn Conference, which mentions the 1969 meeting at the University of Illinois.

> The Beadle-Mangelsdorf debate was not carried out just on the dry pages of professional journals but was played out face-to-face at several small conferences convened to discuss the origin of maize. There was one at the University of Illinois in 1969 and another at Harvard in 1972, and Beadle and Mangelsdorf confronted each other at both. The list of attendees varied from one meeting to the next and included people on both sides of the issue. I am told by Hugh Iltis, who was at both of these meetings, that the discussion was intense and nerves raw, and it is hard to imagine that it could have been otherwise. The outcome was, however, decisive. In part because of Beadle's renewed efforts and in part because there had always been a lingering disbelief in the tripartite hypothesis, the 1970s and early 1980s witnessed a tide of publications from a broad spectrum of plant scientists supporting the teosinte hypothesis (see BENNETZEN*et al.* 2001). Most notably as a direct result of Beadle's influence, the teosinte hypothesis was at last being discussed and the tripartite hypothesis challenged in the archaeological literature (Quoted from *George Beadle's Other Hypothesis: One-Gene, One-Trait*, by John Doebley, found in Genetics June 1, 2001 vol. 158 no. 2 487-493. See FLANNERY 1973).

If one looks at all this, one will see that Jack Harlan played a significant role in solving the origins of maize puzzle, however, he was not one of the principal players. He was working in the background making things happen, getting the principals together and serving the coffee.

Pilgrimage to Mexico 1972 and 1973 (Expeditions No. 10 & 11) (Return to General Index) (Return to Index)

The morning the World Exposition in Austria on the Origins of African crops ended, August 27, 1972, Dr. Harlan was on the plane heading back to the US. Because he was traveling in a westerly direction, he was helped by the time-zone shifts and made it back home the same day as he left. He had but two days to rest up and gather what he needed to begin his VW car trip from Champaign, Illinois into Mexico for a total of 96 days to search for the origins of maize. He entered Mexico on Friday September 1, 1972 and drove to Saltillo and exited Mexico on December 4 of that year. Jean joined him and they went to Peru for a few days towards the end of the expedition. We have numbered this as Expedition No. 10. He spent 3 months and 5

days in the field followed by 9 months & one week at home. (Trans) (Return to General Index) (Return to Index.)

In the 1996 taped conversations Dr. Harlan said the following about these expeditions:

> In 1972 I bought me a new bug and drove it down to Mexico to collect. Our interest at the time was the relationship between Tripsacum and corn (maize). These are very different kinds of plants, with different chromosome numbers and so on, but they are close enough they can be crossed. This was discovered many years ago. We thought we'd like to explore this to see if Tripsacum had anything to do with the origins of maize, which is still something of a puzzle. And, if possible, if we could make the cross using Tripsacum as the female and get a maize with Tripsacum cytoplasm. (In almost all sexual reproduction on planet Earth, the female "egg" provides the cytoplasm, including various organelles, like mitochondria, etc. as well as a ½ set of chromosomes, while the male provides only his ½ set of chromosomes. HVH2). Well, we spent 20 years doing that and found that we could not complete a viable cross. The cytoplasm and the chromosomes in that cross simply do not compute. Maize has 10 chromosomes, 10 pairs and Tripsacum has either 18 or 36. And you can make the cross using Tripsacum as female; you back cross and back cross and back cross, but as you approach 10 chromosomes, everything goes completely sterile and you can't go any farther. The cytoplasm and the chromosomes just don't get along. So, that didn't work out. We got some very strange looking plants out of this. Tripsacum and maize don't look … well, they're completely different things.

Harry: Why did you think they might be related?

(To the reader: some of the upcoming is pretty technical in nature and if you do not comprehend what is being said, welcome to the club. This author has only an elementary understanding of what Dr. Harlan is saying.)

> Jack: Well, the cross had been made before. Mangelsdorf and Reeves were the first to make the cross between Tripsacum and corn (Mangelsdorf, P. C., and R. G. Reeves. 1938. The origin of maize. Proc. Natl. Acad. Sci. U.S.A. 24:303-312). And there were some other people working with it. We thought this might be interesting from a crop

evolution view and could be useful if we could find ways of extracting characteristics from Tripsacum to put into maize, and so on.

Well, now the Indians did an outstanding job. We don't know quite how they did it because the wild form doesn't really look much like our corn. The ears are 2-rowed, 2-ranked spikes, maybe eight or ten fruit cases at maturity, fall to the ground and are distributed one way or another. Doesn't look like corn at all. The plant does. Particularly the tassel looks very much like corn. Then little, short fruit cases; there's a hard rachis and embedded in the rachis is the flower. The rachis is the stem of an inflorescence, the stem of a fruiting body. This is, in the case of corn, and teosinte, a very hard woody thing. Embedded into the rachis is the flower. In this part of the grass family, the flowers come in pairs; one is female fertile, the other is often reduced to a scale. There's one female fertile flower in this, embedded in the rachis and enclosed by a very hard glume, a structure that is typical of grass flowers. But teosinte is very hard, woody and so when the rachis breaks up, these fruit cases with a single seed in each one. The stigmas stick out between the glume and the rachis and get fertilized by wind-blown pollen. Well, that's the normal situation.

One thing can be concluded at this point is that Jack Harlan's early training starting with his PhD work on Bromus grass, and then at Woodward and Stillwater as a grass breeder gave him an excellent foundation to tackle the complexities of the maize puzzle. Harlan continues with the taped conversation:

That (teosinte) was the wild thing and somehow something happened, and I think we now know, or have evidence to suggest, that it was a radical mutation. One of my students, Chet de Wald, had worked with a mutation that was found in Tripsacum in Kansas, two different locations in Kansas, different counties, far apart. But here was this strange gene that would convert, well it would feminize male flowers and did all kinds of things. Just the one gene would change the configuration of the flowering parts very radically. So, we think something like that happened to Teosinte and it got a mutation like that and just boom – it produced corn … We are saying that we have a gene that could do that if we could get this gene transferred from Tripsacum to teosinte. I don't know how hard Chet is

looking at this. I think he could make quite a name for himself if he could transfer this gene to teosinte.

H – From Tripsacum?

J – From Tripsacum to teosinte.

H – We're trying to think about where corn came from.

J – Corn came from teosinte.

H – But, you haven't really told how …

J – No, but this gene is very suggestive.

H – It's just a model for how it might happen. You haven't seen it.

J – No. I hope that Chet is working on transferring that gene to teosinte.

H – What is that going to tell us?

J – Well, if you got that gene into there, you should be able to see teosinte turn into corn with one gene. But you've got to transfer that gene. And it may not be easy. I don't know what the problems are.

H – The Indians must have had a higher technology than I thought if that's the way they did it.

J – I don't think it was done on purpose. But I think it happened. And the question is why would anybody be fooling with teosinte in the first place as it is not really a grain crop. Corn is a grain crop. Teosinte is not going to fill the belly. Why were they messing with it? Well, I don't know. I've speculated on that quite often. But many times I'm out in a field of teosinte in Mexico on a hot day and take off an immature ear shoot and stuff it in my mouth: It's wet, it's cool. Well, you know Chinese often put little baby ears of corn in their dishes. If you get them young, they're sweet and tender – and easy to chew. And I suspect people were doing this to slake their thirst and refresh themselves and so on. And they may have decided to grow these in a garden just so that could have this … I don't know.

H – You're saying they may have cultivated teosinte before … just as you say, to get a snack, kind of and then in their cultivated …

J – Somewhere in the garden, boom!

H – Why couldn't that happen in the wild?

J – Well, wild corn doesn't reproduce itself. It wouldn't persist.

H – So, you're telling me that in order to get corn, corn has to cultivated. Even the early form?

J – Yes

H – It's a fully domesticated plant. It can't survive by itself.

J – That's correct. Teosinte can but it is a very different structure of the female inflorescence. Yah, it's speculation. I'm guessing that somebody was growing teosinte in a garden just for the taste of the immature inflorescence and then something happened.

H – How do you make another generation of corn? What do you have to do?

J – Well, you extract seed from the seed case. The seed is covered with a husk and you have to peel off the husk and get the seed off and then plant it.

H – Why can't that happen in the wild?

J – Who's going to peel the husk off?

H – It doesn't shatter or anything. It doesn't just come off?

J – Well, the stalk will probably rot and fall to the ground and there are some varieties of corn which are quite resistant to molds and fungi. I grew some Indian varieties one time in Champaign. They were almost uniformly very weak stalked – and at maturity would fall flat on the ground. But – the ears were highly resistant to the rots and molds. So that would look bright and shiny after lying on the ground for weeks.

H – And do you think this was true for the earliest form, the first form that popped into the garden? You would have to go over and peel that thing back and plant some of those seeds.

J – Right.

H – And then do that every time for the next thousand years.

J – Every generation, right. Corn needs human assistance. It can't survive without it. So, Indians were ready, willing and able to grow the stuff.

H – They would not only have to see the advantage of it over teosinte but know what to do with it.

J – Right.

H – Seems like a pretty big leap there. Indians were pretty smart.

J – Yah, don't underestimate them. I wouldn't underestimate those guys. They were pretty smart.

H – We can't really say that this is a common mutation because we haven't seen it yet. And it only happened one time. And it hasn't happened since.

J – Well, maybe … we don't know.

H – You don't know what is going on out there in the wild. But you guys have been looking for it and haven't been able to see it occurring naturally.

J – Well, that's right.

H – So, it's not real common.

J – No.

H – What did they do to the plant after it was discovered?

J – This guy comes running in and says, "I've got a new plant in the garden; look at this! Eat it. And I'm going to plant some and see what we get."

H – Do you think it spread from one epicenter or were there more than one?

J – I don't know. It's pretty obscure. There's some evidence to suggest there might have been two origins, one in South America and one in southern Mexico. But we don't know. Well, Indians were growing other things as well and I think they could recognize this as a grain to be treated as a grain. And as you pound it or grind it or you reduce it somehow, cook it, bake it.

H – They may have also understood that God gave them that –

J – Oh, yes … a lot of myths about origins. Yah, well, not only God but there was this one story about a black ant that took the grain, gave it to somebody to grow. Folklore is fairly rich in that sort of thing.

H – So, you guys have come up with another myth about the garden.

J – Yah, right.

H – And this guy comes running in and says, "Look what I found in the garden." Somehow or another it happened. Whatever happened it wasn't not really, you know, man-made. It was something that just happened.

J – Well a variety of accidents could occur. There was found archaeologically some pop teosinte in some cave or other.

H – What is that?

J – Like popcorn. And that might have been the first entry. Put it over the fire and it pops and then you eat it.

H – So, the cavemen were sitting around making popcorn.

J – Okay, you gotta munch on something.

H – While they were drawing these pictures on the walls.

J – Well, it would be an easy way to process.

The conversation went on for a while after this but let us end it there. Getting back to the story of Dr. Jack R. Harlan at the University of Illinois:

Liwayway M. Engle received her PhD Degree under Harlan at the spring graduation ceremony in 1972.

Harlan was elected to membership in the prestigious U.S. National Academy of Sciences in 1972.

Expedition No. 11 -

Harlan' grueling schedule of seed collecting expeditions continued. Less than ten months after returning to his home from Exp. No. 10 (Mexico by car – Aug. 30 – Dec. 4, 1972) he was off again on Expedition No. 11. This was another car trip to Mexico and Guatemala (Sept. 11 – Dec.

17, 1973) for a total of 13,077 miles in 67 days in his VW bug. (Trans) or see Appendix. (Return to Index)

Jack Harlan kept pushing himself and pushing himself. This is what he was born to do. This is what his father did. This is what Vavilov did. This is what a significant life was all about, being an intrepid scientific explorer. He did not see what kind of burden all this was putting on his wife. Sometime during this period Jean Harlan wrote a short story about the loneliness of a woman whose husband was away all the time. She showed it to this author. It was clearly autobiographical. A traveling salesman could be gone Monday through Friday as he travels around, but he would be home on the weekends. Jack Harlan was away from home for months at a time and Jean would have to come home to an empty house every night, cook her dinner, smoke her cigarettes, maybe have a drink or two and then go to bed in a cold, cold bed; while Jack was galivanting all over the world, doing his thing. She remained faithful to Jack and Jack remained faithful to her, but the burden on her was great. Jean had friends and she had her church, but nothing, nothing, nothing could fill that bleeding hole in her heart. Jack was largely unaware of the hardship his wife was going through. Things were going well at the University of Illinois and his expeditions. This was his focus and his mission. Jean was helping him and that was great. His children were getting married and having children of their own. He was hitting his stride. Life was great!

Meanwhile back at the ranch, 1972

Jack's second daughter, Sherry, was married to Mark V. Wilson, a good friend of Harry from MIT, on April 1, 1972 in California. Harry and his wife, Kathy, joined the Order Ecumenical, the core group behind the Ecumenical Institute in February 1972. They moved into the Religious House in Uptown New Orleans to begin their intern year. On April 8, 1972, one week after Sherry's wedding, Harry and Kathy were sent to Memphis to spend the day recruiting for the EI programs and on the way, they were involved in an automobile accident which almost killed Harry. Kathy was also injured, but Harry spent 20 days in Methodist Hospital in Memphis, Tennessee suffering from a severe brain concussion. Jack and Jean rushed to the hospital in Memphis from Champaign, as did Kathy's mother, who flew in from

Shreveport. Jack could only stay a few days, but Jean stayed in Memphis for about two weeks. When she first saw her son, she could not recognize him, his head was so swollen. During her stay in Memphis Jean spent her time at Harry's bedside and, despite the presence of Kathy and her Mother she felt a sense of helplessness in the city of Memphis where she knew no one.

When she returned to Champaign, Jean started a ministry at McKinley Presbyterian Church to help people who had to come to the Champaign/Urbana area and had to stay for an extended period of time in order to care for loved-ones who are in local hospitals. The system expanded to involve several local churches in the Champaign/Urbana area. It was tested sometime later when a whole family from out of town was involved in an automobile accident and every member of the family was in the hospital**,** except for a young boy. A family from one of the local churches in Champaign was able to take the boy into their home and care for him both physically and spiritually until the adult members of the family were able to take over his care. Also, when Jean had her heart attack in 1982, but before she passed away, her four children and their families all came to Champaign, when she was still in the hospital. They were housed with various families from the local churches in Champaign/Urbana while they were in town.

Getting back to the car wreck incident, one Jack Harlan pocket Notebook (PN) entry is of some interest: "Sat. April 29, 1972 Mid City Hotel, Shreveport." Did Jack and Jean Harlan come to visit their son on April 29 in Shreveport? This author has no personal memory of this, but his parents could very well have driven to Memphis, picked up Harry and Kathy and driven them to Shreveport on April 29, 21 days after the wreck. At any rate Harry and Kathy spent some time at Kathy's family home in Shreveport before returning to the Religious House in New Orleans. During this time Harry's eyesight was greatly impaired. He was suffering from double vision; and his walking was also impaired. However, he improved fairly quickly; except the double vision is still a problem, as of this writing. Jack was now experiencing the conflict of his family with that of his life's work. Somehow, he got it all done.

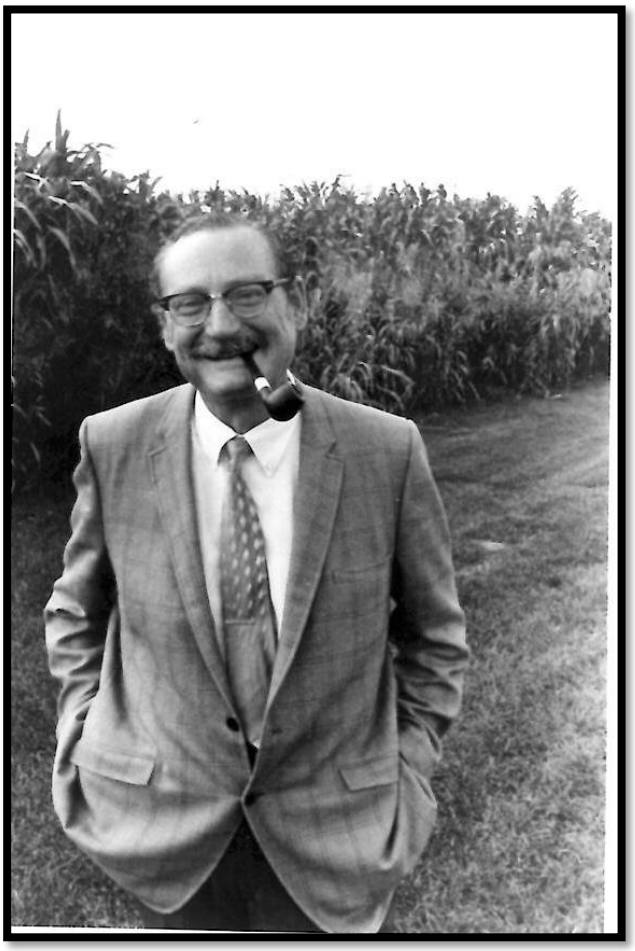
Another event in the life of Jack Harlan in 1972 was the birth of his second grandson, Chris Hughes, son of Sue & Bob, who was born in Fitchburg, Massachusetts on August 18, 1972.

This was the day before the start of the "World Exposition of the Origin of African Crops" in Austria. "Grampy Jack" was at the Burg Wartenstein Castle in Austria Burg Wartenstein Castle in Austria Burg Wartenstein Castle in Austria Burg Wartenstein Castle in Austria, setting up for the World Exposition when Chris was born. Note that Harry and Kathy gave birth to their first son, Teilhard Ignatius Harlan, on October 1, 1973 in Memphis. Little Teilhard was born 4 months prematurely and died shortly after birth.

Trip to China, 1974 (TR-6) (Return to General Index) (Return to Index)

In the early 1970's U. S. President Richard Nixon sought to thaw relations with Communist China. One aspect was the so-called "Ping Pong Diplomacy". To read an excellent description of the various events which followed one after another beginning in 1971, click PPD. As relations between China and the US began to thaw, exchanges of scientists began to take place. Jack Harlan was among the first group of American scientists chosen to visit Red China.

Trip to PRC (Peoples Republic of China) and Asia & Pacifica afterwards, (August 20 - November 3, 1974), 2 months and 2 days away from home. Trans. He did not return home from China before setting out on the next expedition. **Expedition No. 12**: Colombia to collect Maize, 1974. (See below.) (Return to Index)



Jack Harlan at the U of I

Expedition No. 12: to Colombia (Nov. 3 – 29, 1974); 3 months and 9 days continually on the road, followed by 7 months and 3 days at home. Jean met him in Colombia. Why did he go to Colombia? We have a clue: In his book, *Crops & Man*, Second Edition, page 223, Harlan discusses a specimen recorded in difficult handwritten Latin by Jose Celestino Mutis in a diary entry of 7 Nov. 1777 describing …

> … an inflorescence brought to him by a friend who had just been for a walk. They both recognize it as some kind of maize, but different from the cultivated kind. Mutis called it Maicillo Cimarron (Zea Silvestris). He was living at the time at Las Minas del Sapo, near

Ibague', Colombia. A month later, he wrote a brief Latin description, which is on file at the Jardin Botanico in Madrid. The handwriting, spelling, and Latin are all difficult. There is no specimen. The fact that the terminal inflorescence had only male flowers would seem to indicate the plant was, indeed, a Zea and not Tripsacum. On two visits to Ibague' I was unable to find any such plant. I visited the Jardin Botanico to photograph the original description in Mutis' handwriting. But firm conclusions are difficult to reach. Mutis was the most prominent botanist in South America at the time, and one is inclined to believe he could tell wild maize from domesticated maize.

We can conclude from all this that Harlan went to Ibague', Colombia, to look for this plant. Here we have a true Plant Explorer, an Indiana Jones, slogging through the swamps in search of a rare plant that a great botanist had described almost 200 years previously, which would help solve the origins of maize puzzle. Following is the Journal entry of 15XI (Nov. 15) 1974:

off by about 2:30 in an elegant dugout w/outboard. The river very high & over its banks, swift in middle so we skimmed one shore & then the other riding v. low & shipping water continually. Still raining & swollen river seemed ominous, but vegetation fascinating & much to see. After about an hour reached village of Samurindo' upstream. On the bank, partially covered by the flood was small populations of chucociño maize. (not sure of the spelling of this plant, HVH2). Off season and very green but being harvested already for snacks. Looked like maize to me although slender and depauperate because of growing conditions. ("Depauperate" means "lacking in numbers or variety of species." Harlan's daily crossword puzzle habit is paying off.)

Jack Harlan returned home on November 29, 1974 after having departed August 20 of that same year and traveling to China and ending up in Colombia.

The Jack Harlan Story 1975-79 (Return to General Index)

Satish C. Gupta and Tom Stalker continued working on their PhD's under Harlan in 1975.

One of Harlan's chief achievements for 1975 was the publication of his book *Crops and Man*. This book has since become a classic and a treasured resource for plant breeders all over the world. It was actually published by the American Society of Agronomy (ASA) and the Crop Science Society of America. He once told this author that he never got one cent from the sales of that book. In 2018, while writing the current volume, this author was in contact with one of Dr. Harlan's former students who said that he was updating the book in cooperation with the ASA. At first, I wondered if he could just do that without my permission, then I looked at the copyright information in the book and saw that it was, in fact, copyrighted by the ASA and the CSSA and they could authorize someone to update it. As I reflected on this, I was glad to see that one of Harlan's students could and would update this great book. I believe that of the advent of 2020 the new edition has been completed. (HVH2)

Awards for 1975:

Jack Harlan was made a fellow of the American Academy for Arts and Sciences in 1975.

Harlan delivered the Wilhelmina Key American Genetic Association Distinguished Lecture in 1975. This Key Lecture series is made possible by a bequest to the AGA from Dr. Wilhelmina Key in support of the implementation of genetics for human welfare and improvement. Dr. Key earned her PhD from the University of Chicago in 1901 and taught at New Mexico Normal University and Belmont College before joining the faculty of Lombard College.

After his trip to China in 1974, Jack Harlan was now one of the very few Americans to visit Communist China and we see him delivering many talks and reports on his visit. This author had joined the EI and was living with his wife at their headquarters in Chicago. He invited his father to speak at their Sunday Lord's Supper service on February 16, 1975 to talk

about his trip to China. Jack Harlan also gave a report of his China trip to the Soils Seminar at the U of I on February 28, 1975. These were just two examples.

TR-7: Trip to USSR: June 23 (or July 4) – July 10, 1975. We are not sure the purpose of this visit nor do we have any notes. There are a few sketchy clues in Harlan's pocket notebook for 1975 indicating that he was in the USSR, returning from Leningrad July 10, 1975. (Return to Index)

One of Harlan's most important publication came out in 1975. It was *Our Vanishing Genetic Resources*, published in Science Magazine. In this publication Jack Harlan is sounding a warning against haphazard "improvement" of crop yields at the expense of the elimination of indigenous varieties of crop plants.

Jack Harlan's fourth grandchild, Leo Vaughn Harlan, son of Harry and Kathy Harlan was born on October 20, 1975 in Chicago. Harry and Kathy were in the Order Ecumenical, serving at their international headquarters in Chicago when Leo was born.

Satish C. Gupta and Tom Stalker were working on their PhD's under Harlan in 1976.

To view Harlan's publications for 1976, see Appendix. In 1976 Jack Harlan, along with Jan de Wet and Ann Stemler, one of Harlan's students, published a book: *The Origins of African Plant Domestication*, the report on the 1972 "World Exposition of the Origin of African Crops". During the research into the current volume, Ann Stemler contacted me by email. Dr. Stemler gave this author her copy of this book after a few emails. Ann Stemler passed away before this current volume could be published. Dr. Stemler wrote an interesting tribute to Desmond Clark on his passing in 2002. It includes a little perspective on the 1972 Symposium. "Stemler on Clark" can be found in the Appendix.

There is a short series of notes in Jack Harlan's pocket notebook indicating that he took a short trip to India in September and October 1976.

In 1976 Harlan was awarded the International Service in Agronomy Award by the American Society of Agronomy for "outstanding contributions in research, teaching, extension,

or administration made outside of the United States by a current agronomist. The award consists of a certificate and $2000 honorarium" (at least that is what it is now, see www.agronomy.org/awards/view/44.)

Jack and Jean Harlan's fifth grandchild, Susannah Caryl Hughes, was born to Sue and Bob Hughes on May 24, 1976 in Macon Georgia. The Hughes family was moving around quite a bit in those days, too.

In 1977 Jack Harlan was invited to Jordan to participate in an archaeological dig near Wadi Kerak in central Jordan, where he identified plant seed fragments being unearthed. We have called his **Expedition No. 13**, (May 14 – June 27, 1977). From Harlan's field notes we find that, before the excavation got under way, he was taken up by the question of why there was so little land devoted to agriculture in this part of Jordan compared to previous times. He did extensive research into rainfall records and wadi flows to see if he could find an answer. It is not clear from his journal notes if he ever came to a definite conclusion and no publication on that topic could be found in the Jack Harlan collection. Once the mission to Jordan was over, Harlan continued his travels. Pursuing his interest in the origins of maize, he traveled to Colombia and Mexico: his **Expedition No. 14** (August 5 – 28, 1977). Perhaps Jean accompanied him on this portion of the trip. To read a transcript of this expedition click (trans13) and (trans14) or see them in the Appendix. (Return to Index).

Satish C. Gupta and Tom Stalker received their PhD Degrees under Jack Harlan in the Spring of 1977.

TR-8: Harlan attended the International Genetics Conference in Moscow, August 21 – September 3, 1978. Jack gave a presentation on the last day of the Congress. Otto Frankel was Chairman of that session and gave him a great review at the end. Jack & Otto spent much time at the Congress running around Moscow. Jack also saw Barry Cohn in action, interviewing everyone he could find who knew NIV (Nikolai Ivanovich Vavilov). Barry introduced Jack to Yurey Vavilov, one of the last remaining descendants of NIV. Cohn would later write several biographies of Nikolai Vavilov, both in book form and magazine article form. To read the

transcript of Tr-8, click trans. This trip involved some controversy. Please see "Boycot of IGC Moscow 1978" or find it in the Appendix. (Return to Index)

Mark Widrlechner began his master's Work under Harlan in the Fall of 1978.

Exp. No. 15: ICRISAT Review in Senegal and India (September 20 – October 30, 1978). In September 1978 Jack Harlan was sent to Senegal and then India to take part in the quinquennial (every five years) review of the work of ICRISAT. This author is pretty sure Jack Harlan did not dream up this kind of overseas excursion, but somebody (the U of I?) sent him. He was, by this time, an expert on many topics and an experienced world traveler. It would be very easy for someone to say, "Let's send Jack Harlan to look into this," and it would be done (HVH2). ICRISAT is the International Crops Research Institute for the Semi-Arid Tropics. To further learn what ICRISAT is all about visit: ICRISAT. (trans) (Return to Index)

This author would like to point out that during the period of the late 1970's Jack Harlan was publishing many articles on the relationship between Tripsacum and maize. There was, about this time, a broiling controversy about the origins of maize. One group of scientists favored teosinte as the wild progenitor and others Tripsacum. It is now generally agreed that teosinte was the real progenitor. Jack Harlan published more than 20 papers on Tripsacum and only about 2 or 3 on teosinte. Was Harlan betting on the losing horse? Teosinte emerged as the consensus ancestor. I do not know and I am no expert on the origins of maize. It is the belief of this author that Jack Harlan investigated, in depth, the Tripartite hypothesis and the possible link between maize and Tripsacum, while others were establishing the positive link to teosinte. Please see the extensive taped conversation this author had with Dr. Harlan in the section of this chapter called the Maize Phase.

On September 19, 1978 David Patrick Harlan was born to Harry and Kathy Harlan, who were now living in New Orleans. He was Jack and Jeans' sixth grandchild.

Mark Widrlechner continued his master's work under Dr. Harlan in 1979.

Exp No. 16: East Asia and Jordan (May 1 - June 22, 1979) (Return to Index)

Harlan's notes do not state any objective for his visit. He simply goes to a lot of places, attends some meetings, taking technical notes and meets a bunch of people and takes more notes. He gives a few lectures. He went to Australia, Singapore, and finally Jordan on the way home. Trans. Three months later we see him traveling, with Jean, to Japan for a two month stay, lecturing at a university. See below.

TR-9: Teaching Trip Jack & Jean made to Japan (September 22 – December 24, 1979) Trans, (Return to Index) (To End of TR9 to Japan). If the links do not work, the documents can be found in the Appendix.

Brief summary of the 1979 trip to Japan:

Jack & Jean Harlan departed Champaign on September 22, 1979 and flew to Tokyo, then took a train to Nagoya. He was to teach at the University of Nagoya; however, they found out that his class would not start until October 22. Thus, they had one month to tour Japan and be subjected to these lovely people and their wonderful ideas of hospitality. So, Jack and Jean did a lot of shopping and visiting museums and various temples. Jean departed on October 20 and Jack went right to work preparing for his course. The first day he delivered his lecture very slowly, but he could not determine if there had been any reaction with the students. He then decided to prepare a written lesson every day to hand out to his students. This seemed to work better but the time it took to compose a lesson each night soon interfered with all the partying that his hosts wanted him to do.

He was taking notes on his activities. On November 14, 1979 he wrote: "Have done a poor job with notes of late – settled into a routine, I guess. Much time in writing out lectures.

He gave a 'Mexican' party at the apartment on Sunday Nov. 18", and then he named some people who came and said it was not too bad.

Mon. Nov. 19, 1979: "Lecture on O (Origins) of Maize", etc.

Tues Nov 20: "Tried to get to the Univ. by bus but goofed it up and had to come back & try again." Following this is a long rambling description of several parties he went to.

Wed. Nov 21: "After breakfast had chat with man with financial problems at Univ." JRH wants to help. "After hot box (literally) lunch + eventually to the lecture. Half slept through; half came half-way though. Kind of a mess & little discussion." He made some comments on the Biotron facilities: "Tremendous equipment but few experiments." What follows in Harlan's notes is some **Tech Talk**, then a lab party with lots of booze. It finally broke up and "Osamu Hirota (the poet) took me to the hotel by taxi. We settled the bill with their money & I was left alone (at last). Still, they are beautiful people, so kind and thoughtful. I'll be off in the morning for sight-seeing with Miss Takeda."

It looks like the class he was teaching was basically over. The rest of his entries have him going out to eat in the evenings at various peoples' houses. Starting December 15, his pocket notebook mentions a symposium which lasts for several days. On December 21 there was a student party for Dr. Harlan, with, as usual, a lot of drinking. (**End of TR9 to Japan**) (to Index)

Jean and Jack in Japan, 1979

He returned to the states on December 24, 1979 and made it to Macon Georgia in time to spend Christmas with his daughter, Sue and her family. He stayed at Sue and Bob's house through a New Year's Eve party. It is of some interest that Jack and Jean's son, Richard and his wife visited Japan in February 1980. This was not inspired by his parent's recent visit, but a stopover on a trip to Australia to attend a scientific meeting.

Jack and Jean's younger daughter, Sherry, had married Harry's friend from MIT, Mark Wilson, and they had their only child, Tyner, who was born in Sayre Pennsylvania on June 25, 1979. Tyner was named after McCoy Tyner, the jazz pianist. Mark was in graduate school at Cornell, University in Ithaca, NY, but they could not find a decent place in Ithaca to have their

baby, so they drove 38 miles to the south to Sayre, PA and found a nurse-midwife who could help them with the delivery.

Jack and Jean's eighth and last grandchild, Lydia Maxine Shivers Harlan, was born August 28, 1980 in New York City. Richard had married Brenda Shivers and they were both working as researchers in Neurophysiology at the Rockefeller University in New York City when Lydia was born.

Harlan Family Reunions (Return to General Index)

Jack and Jean Harlan invited their children and their families to attend a family reunion in Mexico City during the Christmas holidays in 1975. This would be the first of eleven family reunions, held every two years (on odd-numbered years) in which the elder Harlans would pay most of the expenses for their children, spouses and grandchildren. In Mexico City they attended an opera and saw some of the nearby Aztec ruins. The 1977 reunion was held in Champaign, IL and then each Harlan child took a turn hosting a family reunion. Sue Harlan Hughes hosted the 1979 reunion in Macon, Georgia. Harry Harlan hosted the 1981 reunion in New Orleans**.** Jean Harlan suffered a massive heart attack in October 1982 and the entire Harlan family gathered in Champaign at her bedside to say good-by. The family came back together, during Christmas time 1982, in Champaign to comfort Jack. A few months later they gathered again in Champaign, as Jack Harlan gave away almost all that he owned. Sherry Harlan hosted the 1983 Harlan family reunion in Corvallis Oregon and Dr. Richard E. Harlan hosted the 1985 reunion, again in New Orleans where he lived. The family reunion in 1987 was in Ashville, North Carolina and in 1989 Jack Harlan flew his entire family to Rome for the next family reunion. Uncle Bill helped with the cost of this one. The family reunion for 1991 was in Banff, Canada and the reunion for 1993 was in Spain. The 1995 reunion was in Taos/Santa Fe NM. The last reunion in the series was held at Ashville North Carolina in 1996. Most of the reunions were

held during the Christmas holidays, when most school children and working adults had some time off to attend.

The following is the only publication by Jack Harlan in 1979:

Hilu, K. W., J.M.J. de Wet and **J.R. Harlan**. 1979. Archaeobotanical studies of *Eleusine coracana* ssp. *coracana* (finger millet). American Journal of Botany 66: 330-333.

The Last Years of the U of I Pilgrimage (1980-84) (Return to General Index)

Mark Widrlechner completed his master's work under Harlan in Spring 1980.

One Harlan publication from 1980 was "Crop monoculture and the future of American agriculture". This author was unable to obtain a copy of this publication, but it seems to be another warning about new crop varieties obliterating ancient varieties with all their precious genome.

Tr-10: Trip to India and Bangladesh to Evaluate Jute Industry (3/15/82 – 4/23/82) trans, (Return to Index), or view them in the Appendix.

Jean Harlan suffered a massive heart attack and passed away on October 11, 1982 in Champaign, Illinois. As she lingered in the hospital for a few days, her children were all able to come to Champaign, from all over the country, in time to say good-by and thank their mother before she passed. Many students from the University of Illinois came to the funeral. She was well liked and was missed by many. Jack was really on his own, now. He faithfully came to work and continued his campaign to uncover the mysteries of cultivated plants, although his pace slowed. Jack and Jean had been planning their retirement. They would buy a recreational vehicle and travel around the country. All that got plowed under with the death of his beloved wife. My mother was a truly wonderful person and had about as much influence on my life as my father – maybe more. Jack Harlan was a great inspiration and an ideal I could never live up to. But Jean Harlan showed me how to live my life and be who I am and enjoy every bit of it. Thank you, God for giving me Jean Y. Harlan as my mother. (HVH2)

Tr-11: Trip to USSR, (September 3 – unknown, 1983). Harlan was attending some kind of meeting in Tashkent, but he does not tell us, in his pocket notebook, what the meeting was

about, nor when it ended. This is his last official "trip", although he did quite a bit of roaming around in his retirement years. See Chapter 8. (Return to Index)

JRH near the end of his career

Harlan was awarded the Wilhelmine E. Key Lecturer in Genetics and the Nilsson-Ehle Lecture for 1984 (Sweden).

Jack Harlan retired on November 30, 1984. His duties at the U of I were now over, but he continued to read, write, teach and travel and even go on expeditions.

Awards granted to Dr. Jack R. Harlan (partial list) (Return to General Index)

During his professional career Jack Harlan received many honors and awards. He was a member of Phi Beta Kappa, Phi Kappa Phi, and Sigma Xi. Harlan was awarded a John Simon Guggenheim Memorial Fellowship (1959), the American Grassland Council Merit Award (1962), the Frank N. Meyer Memorial Medal (1971), Crop Science Award (1971), and the

International Service in Agronomy Award (1976). He received the 1985 Distinguished Economic Botanist Award from the Society for Economic Botany. He was a fellow of the American Association for the Advancement of Science (1956), American Society of Agronomy (1962), Crop Science Society of America (1985), and the American Academy of Arts and Sciences (1975). In 1972 he was elected to membership in the National Academy of Sciences. He served as president of the Crop Science Society of America in 1965–66. (Return to Index)

The New Millennium

Jack Harlan died in 1998, just a few years before the new Millennium of our modern calendar. As we look back on his work on discovering the origins of domesticated crops and look at the work being done today (2019) we are simply amazed at the progress that has been made. In Jack Harlan's day one had to pack one's brief case with a change of clothes, wait for the plane to take off and simply go over to those far-flung places and look for signs of a center of origin, look for unusual varieties of crop plants and their wild and weedy relatives, collect samples of seeds, store them in envelopes, label the envelopes and send them back to the university from where one came. The seeds were then grown out and crossed, etc. From the results of all this one can piece together a theory about the centers of origin of the subject crop plants. That's the way it was done back in the old days.

Today we can find many, many scientific publications written about the genetic evidence of the ancient and mighty struggle to domesticate wild grasses into edible and usable crop plants. For the most part the genetic evidence seems to validate the physical evidence gathered in the previous millennium.

One thing that is evident from these genetic studies is that a model utilizing a narrow center of origin does not seem to fit the case very well. Researchers are calling for a larger, more diverse area for the "center" of origin. In the publications which this author has read the current authors do not mention Jack Harlan's "noncenter of origin". His idea was based more on a hunch than actual evidence. He could not find a "center" for sorghum in Africa, for instance, so

he devised a "noncenter". This author wants to say that Jack Harlan's "noncenter of origin" has been confirmed, in a general way, using the genetic tools of the new Millennium.

The Harlan Scattering Phenomena (Return to General Index)

Three of the four Harlan children (Sue, Harry & Rich) were born in Woodward Oklahoma and all grew up in Stillwater, Oklahoma. Sherry was born in Washington DC, while Jack was on his first expedition – to turkey, in 1948 and also grew up in Stillwater. When each one came of age, they all left Stillwater and went their separate ways. Jack used to say, "Oklahoma is a great place to be from." There seems to be something in the Harlan DNA to propel them to move on to other areas to live far away from the land of their origin.

The spouses are scattered all over the map.

Sue married Bob Hughes from Fall River, MA.

Harry married & divorced Kathy Sebastian from Shreveport, LA. Wife No. 2: Gloriadean Martin from New Orleans, LA

Sherry married Mark Wilson from San Mateo, CA.

Rich married & divorced Brenda Shivers from Coffeeville, KS, Wife No. 2: Meredith Garcia from Winchester, MA.

Now for the 8 grandchildren and their offspring:

1. **Mark Hughes** was born to Sue and Bob Hughes in Ft. Knox, KY on Dec. 7, 1969. He became a Ramp Manager at Southwest Airlines, living with his wife and two sons (Jack & Conner) in two places in Georgia.

2. **Chris Hughes** was born to Sue and Bob Hughes in Fitchburg, MA. on August 18, 1972. He became an Executive Chef living, unmarried, in Atlanta, GA.

3. **Teilhard Harlan** was born to Harry and Kathy Harlan in Memphis, TN on October 1, 1973. He died shortly after birth.

4. **Leo Harlan** was born to Harry and Kathy Harlan in Chicago, IL on October 20, 1975. He became a high school Teacher and soccer Coach, living with his wife, Casey, and their three children (Henry V., Eddie and Alice Jean) in Birmingham, AL.

5. **Susannah Hughes** was born to Sue and Bob Hughes in Macon, GA on May 24, 1976. She became a Soccer Mom living with her husband, Brian Eatz, and three children (Grace, Josh and Allie) in Roswell, GA.

6. **David Harlan** was born to Harry and Kathy Harlan in New Orleans, LA on September 19, 1978. He became an Archaeologist and Web Designer living with his wife, Raynie and their two children (Dylan & Brady) in Baton Rouge, LA.

7. **Tyner Wilson** was born to Sherry and Mark Wilson in Sayre, PA on June 25, 1979. He became a Healthcare Economist living with his wife, Kirsten, and two children from his previous marriage to Victoria (Oliver & Elliot) in San Diego, CA.

8. **Lydia Harlan**, was born to Rich and Brenda Shivers Harlan in New York City, NY on August 28, 1980. She became a librarian living with her husband, Andrew, and 2 children (Edwin & Evie) in Eugene, OR.

To summarize: Jack and Jean Harlan had 4 children, 8 grandchildren and 14 great grandchildren. This family is scattered all over the continental United States.

Retirement: 1984 – 1998 (Return to General Index)

Jack Harlan retired from the University of Illinois in 1984. In retirement he continued a life of adventure. He sold his house, gave most of his possessions away, bought a sailboat in Florida and moved on-board. He continued to write and speak, occasionally sailing from port to port. Eventually he lost the boat in a storm and settled down (sort of) in New Orleans. See Chapter 8 for more details.