

WESTERN FOREST ENTOMOLOGY HISTORY:

An Interview with Dr. Frank C. Craighead, Sr.

by

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Elwood R. Maunder (ERM): This is Elwood R. Maunder speaking from Estero Woods Village in March 1977.<sup>1</sup>

Frank C. Craighead (FCC): It's near the town of Estero. All this country through here is called Estero. The post office is about two miles north of here.

ERM: And this is about fifteen miles south of Fort Myers.

FCC: To get to Fort Myers Beach either way, it's about fifteen miles.

ERM: I'm here today to talk to Dr. Frank C. Craighead, Sr., about his career in forest entomology. I'd like to start off, Dr. Craighead, by asking you a few questions about your origins. Tell me where and when you were born, and a little of your family background.

FCC: I was born in Pennsylvania in a little town called Craighead Station in Cumberland County, near Carlisle.

ERM: Carlisle?

FCC: Yes. There used to be an Indian school there. My forebears...I was the seventh generation...settled on a grant from William Penn in South Middleton Township along the Yellow Breeches Creek. I really think the name got twisted around a bit. The Indian name was Yellow Beeches because of the number of beeches along the creek and the yellow fall color of the leaves. But it's on all the recent maps as Breeches. I don't know which is correct.

ERM: So your family goes back in American history to colonial times?

FCC: To about 1720 or 1730. Recent studies (1976 centennial) refer to the Craighead settlement (four brothers) as the history of South Middleton Township. My son Frank has a book on Craighead genealogy that carries the families to the present, to my brother and sisters.

ERM: Were your forebears farmers?

FCC: All three generations were farmers on this land, and about half of them were preachers. Four brothers, I think, were the first settlers.

ERM: What denomination were they?

FCC: Presbyterian.

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<sup>1</sup> The transcript of the taped interview was edited by Malcolm M. Furniss in 2011 and photos were added to the final copy. All words within parentheses or brackets are mine. (Malcolm M. Furniss, Moscow, ID).

ERM: So, then, when were you born?

FCC: October 9<sup>th</sup>, 1890. I'm eighty-six now.

ERM: Well you are a good hale and hearty and active eighty-six, I must say.

FCC: I've slowed down an awful lot this past summer; had heat prostration. But I have a regular job keeping up with all my work these last few years. I do lots of field work and I have canoed most of the rivers in South Florida to the headwaters and then across the saw grass marshes and then down. I survey plant communities by canoe, and I am often out several days to a week.

ERM: Where did you go to school and what turned your life in the direction it took professionally?

FCC: Of course, as a child, I was interested in insects and birds' eggs. I was alone on my grandfather's farm. I hadn't any playmates and I just ran around the countryside since there wasn't enough farm work to do. I met some entomologists from the Pennsylvania Department of Agriculture, once when I was in the mountains about two miles from home. They wanted to find and collect a certain plant when it was in bloom. I knew where the plant was growing and took them there. That started a lasting friendship that really shaped my life, because I was in contact with them on many weekends for years, until I went to college. During high school, I often spent Saturdays in their Harrisburg, Pa., office and picked up much knowledge on insects and natural history.

ERM: So this meeting happened when you were just a boy.

FCC: Yes, I would say about seven years old. I remember I was going to the little red brick schoolhouse we had then about ½ mile from home. There were about twenty-five pupils in one room and a teacher, Mr. Stuart, I believe, encouraged me. When I got to Penn State in 1908, I had an extensive knowledge of entomology. Of course, I registered for forestry. I graduated in 1912.

ERM: Were there teachers at Penn State who influenced you?

FCC: Dr. Baker was the head of the school then, but most of my contact was with the head of the Zoology Department. He gave me and a pal of mine, Doug Spencer, who was later a famous M.D., the run of the laboratory. We could even work there at nights. So I took all the courses in zoology, as well as forestry courses and botany. Dr. Buckhout, head of botany, was a great inspiration. At that time you registered in the Forestry school where you had to have certain courses in forestry, wood technology, silviculture, and management, but the rest of the time I was permitted to take anything I wanted. I took mostly zoology and botany. Later at George Washington University, in Washington, D.C., plant physiology and geology were emphasized. I also attended John Hopkins for two years.

ERM: Were there other fellow forestry students?

FCC: I was alone. They all called me "Bugs."

ERM: Is that what your nickname is?

FCC: George Drake started it...do you know him? We tramped the surrounding countryside many weekends, often with Doug Spencer.

ERM: I know George very well.

FCC: Well, he and I were college roommates for three years. We hitchhiked to Oregon in 1909 or 1910 after our freshman year. We arrived broke, and walked nearly a hundred miles. There weren't any jobs for us then. Is there a town called Salem?

ERM: Salem, Oregon.

FCC: Yes, well a headquarters of a forestry group was there. They said there were no vacancies on the survey crews, but we could work on a trail gang. We had to walk up the McKenzie River, between seventy-five and a hundred miles. Anyway, it took us three days to join up with this trail crew. Then later in the summer they called us for jobs on the timber surveys. We were running lines, taking the height and diameter of trees. We'd go out on a week's packing trip. George and I were always paired together in all that work. He was like I was...inquisitive, always seeking more information. He liked the outdoors and hiking trips. Bear Meadows was a famous cold swamp where northern plants grew, and we'd often go over there. I had a great friend in George.

ERM: Do you still keep in touch with him?

FCC: Yes, we write a couple times a year.

ERM: Good.

FCC: He's been in here several times after he went to Simpson Logging.

ERM: Yes, he went there after he'd been in the Forest Service for a few years. After he retired from Simpson he went into private consulting for awhile.

FCC: Well he came here while I was wintering in Florida, three or four times. I can't remember the years, or what he was doing at the time, or whether he was just taking Christmas vacation.

ERM: He worked for awhile on a consultant basis for Battelle Institute on some forestry research, as I remember.

FCC: That's a wonderful organization.

ERM: He was with us. He was an officer of the Forest History Society for awhile.

ERM: Well, I want to ask how you got into the profession of entomology.

FCC: Through the Pennsylvania Department of Agriculture entomologists that I knew, I had been building up a collection of immature stages of insects, as a hobby. I had reared hundreds of insects and associated the adults with the larvae even before I went to college. Occasionally I would write Dr. Hopkins and send in specimens. They were also studying the immature stages, and could recognize them before they would have emerged. I had a lot of correspondence with them. The next two summers, while I was going to college, he put me on his staff as a temporary collaborator and I went out to Oregon and California. Then, before I graduated, I had an appointment with him as a specialist in Cerambycidae. The Cerambycidae are a group of insects that are wood borers. They do a lot of damage to saw logs and fallen timber. After college he sent me out west on several details. We had a very small organization -- Burke and Miller and Edmonston and Snyder—in fact, I don't think there were more than a dozen of us.

ERM: Are you acquainted with H.E. Burkes *My Recollections of the First Years in Forest Entomology*?

FCC: I have seen it, but I can't remember much about it.

ERM: I have been given one of the rare copies. I put my lifeblood on the line to get it.

FCC: Yes, I saw this before I retired. Didn't this come out in... yes, in 1946. He was a specialist on Buprestidae. We had a lot in common. This is when Miller had charge of the California Station.

ERM: There is a picture of you in here on the summit of Elkhorn Mountain, in Oregon [Fig. 1 ].



Fig. 1. Recruise of bark beetle control area, July 1911. On summit of Elkhorn Mountain, Oregon, are F.C. Craighead, George Hofer, and P.D. Sergent. (Burke 1946)

ERM: That's P.D. Sergent over there [in the photo].

FCC: And George Hofer in the middle, with the gun. He came over from Switzerland. A very good woodsman and naturalist. They all carried guns then, in insect work. I don't know why.

ERM: See, this is one of the benefits we get from this kind of work. We learn facts and identifications, because people like you can provide them. Now, I want to clarify something else with regard to these *Recollections*<sup>2</sup> by H.E. Burke. In the foreword, he writes as follows, "Not long ago, I was requested by Paul Keen and John Miller, who are preparing a summary of investigations of the western pine beetle, to write up an account of the first attempt at western pine beetle control on the Northeastern Oregon Project in 1910. In doing this it seemed pertinent to include other material connected with the early development of forest entomology in the west. In order to keep the story from becoming too long and involved, it was decided to limit it to my own recollections of the projects and the men connected with this work during the years when the Division of Forest Insect Investigations was directed by its first chief, Dr. A.D. Hopkins. This period covers the years from about 1901 to 1923." However, this was written, I would imagine, at the request of Miller and Keen.

ERM: According to other testimony I've had, Burke's manuscript was sent to Washington and the first chapter, which dealt with the history, was cut out. I just wonder whether maybe Burke didn't write the chapter and maybe they thought it was too subjective.

FCC: I don't recall anything about that, but I know he'd have done it. I knew Burke only while he was in Washington State and we were on that same Oregon project. I worked with Miller also. I don't think Keen was there.

ERM: No, Keen came later, I think. [1915]

FCC: Miller, Hofer, Edmondston, and there were a couple others. Hofer and Edmondston were sort of rangers. Miller had a technical man by the name of [George R.] Struble, but I'm not sure he was there then.

ERM: He came later [ca 1929]. Here are some [photos of] people from the Washington office in 1904 and 1906, which was before your time. Fiske, Wood, Hopkins. [ Fig. 2-3 ]

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<sup>2</sup> Burke, H. E. 1946. My recollections of the first years of forest entomology. Bureau of Entomology and Plant Quarantine, Berkeley, California. Unpublished report.



Fig. 2. The first office occupied by the forest entomologists in the old insectary, USDA, Washington, D.C. December 1902. (Burke 1946)



Fig. 3. The Washington office, 1904-1906. In 1903, Hopkins moved his office from the insectary to these quarters in a private building at 904 B Street S.W. Practically all of the work on Hopkins' bulletins on *Dendroctonus* and *Pissodes* beetles was done in this office. This room was occupied until 1906. Left to right are Fisk, special agent for the southern states; Wood, clerk and stenographer; Hopkins; Webb, special agent for the Rocky Mountain states; Strauss, artist; and Burke, special agent for Pacific Coast states. (Burke 1946)

FCC: Wood I knew. He was a stenographer.

ERM: And here is Webb, and Strauss who was an artist.

ERM: And here is Burke. Down here is Van Horn. [Fig. 4]



Fig. 4. On the grounds of the National Museum are seated (from left) Strauss, Webb, and Burke. Standing are Van Horn and Wood. (Burke 1946)

FCC: Van Horn is the one who disappeared.

ERM: They think he drowned in the Potomac.

FCC: Yes. Well, that's the explanation but nobody knows for sure. He was spending a day or two at a recreation center that was called the Biologist's Club on the Potomac River. I almost went with him, and then something happened so I couldn't go. No one ever saw him again. He was a brilliant young fellow, but very peculiar, a moody sort of person. All those people were still there when I came, I guess, in 1911.

ERM: Then you knew Dr. A.D. Hopkins well?

FCC: Very well, yes.

ERM: How would you describe him?

FCC: He was a very independent person and had very strong convictions about his work. He wanted his men to support him in every detail. But he was very good to his men and a tremendous worker, of course. He'd work at nights, and a lot of us worked in the National Museum, where our offices were, sometimes until twelve o'clock or two o'clock at night. We'd eat our dinner along about suppertime at a place called Sam's, where we'd get a great big beef sandwich and a beer, then go back and work all evening on our collections. I took charge of the collections of immature stages shortly after I came there. That was after

Burke and Edmondston went West. During the eight years our office was in the U.S. National Museum, I became acquainted with many of the specialists who built up various collections. I would bring material in to them from my various travels over the U.S. and they always welcomed the specimens and explained their habits and characteristics. Offhand I recall Drs. Swartz, Coleoptera; Cushman, Foraminifera; Bassler, Bryozoa; (I took two years of courses on sedimentary geology under him at Johns Hopkins University); Clark, seashore animals; Mary Rathburn, crayfish; Schmitt, marine animals; Dr. Barutch, mollusks; Dr. Pilsbry, mollusks. These contacts greatly stimulated me and tended to broaden my education and approach to entomological problems.

ERM: Was your work at that time related wholly to forest insects or did it cover other insects?

FCC: Only forest insects.

ERM: Not ornamental tree insects?

FCC: Well, yes. We often got into that, but only trees, I should say. We were all grouped together in a big office in the National Museum when Burke and the others moved west.

ERM: Is that museum the same as the Smithsonian?

FCC: Yes. Well, it started out as the National Museum and then gradually, because of Smithson's gift, to put up the first building, became the Smithsonian. Have you ever been in Washington?

ERM: Oh, yes. Been to the Smithsonian many times.

FCC: Remember the old building with the tower on it?

ERM: That's where you had your offices?

FCC: No, we had them at the beginning of the main building on the edge of the mall.

ERM: Hopkins was the first chief of the Division of Forest Insect Investigations?

FCC: Yes.

ERM: And directed this work in the Bureau of Entomology from 1902 to 1923. But entomological work had been done by the federal government as early as the 1860s, I understand.

FCC: In entomology, but not in forests. Dr. Hopkins was a professor at the University of West Virginia. He specialized in bark beetles and wrote a number of valuable publications prior to his taking charge of the unit. I think when I went in they had only these men we've been mentioning, and an appropriation of \$50,000 plus \$75 each per month. We all started at that, supposedly a good salary in those days. I went

to Canada in 1920 and spent three years with the head of the forest insect unit, Dr. J.W. Swaine. I studied the spruce budworm, which was destroying the pulpwood stands up there.

ERM: Where was that? At Ottawa?

FCC: I was headquartered at Ottawa, but I covered all the eastern provinces in both summer and winter. We traveled with dogs and sleds all winter, with temperatures twenty below. We'd set up our tent right on top of the snow.

ERM: Were you there strictly as your own choice? Or were you on leave from the Bureau?

FCC: It was leave, in a way, although I was requested by Dr. Swaine to come up. I asked Dr. Hopkins and he said, "Well, you can go if you come back." Before I returned, he had retired, and Dr. Howard, who was in charge of entomology, asked me if I would take the position as head of the Bureau. I was enjoying my work in Canada. It was a great country---everything new. But I came down after three years and took the job. Dr. Hopkins was a very aggressive man and was always having trouble with the Forest Service and with forest pathology. The heads of those two units would hardly speak to each other. I enjoyed working with some of the men under Dr. Metcalf in forest pathology. Up until two years ago, when one of the men who headed that division died, I kept in touch with their.

ERM: When Hopkins retired in 1922, and you came back from Canada, there was a considerable amount of competition, I would imagine, for the top spot. How did you come to be chosen?

FCC: It was entirely Dr. Howard. I didn't know about any competition until I got back.

ERM: He had hand-picked you to be the new Bureau chief.

[An abrupt transition in subject matter occurred here, dealing with some evident misuse of his reports]

FCC: I used to do quite a bit of work while I was living in Homestead, here in Currier County and on Sanibel Island, and prepared a lot of reports for the Currier County Conservancy and the county government. Those reports were sent to a professor at the University of Miami who later came out with a publication of all my work. I hadn't intended that the reports be published. I've always contributed all my work here in Florida but as a rule, I got my expenses paid. Even Disney...three years I worked up there...they never paid me a penny.

ERM: No consulting fees at all? You could very well have charged them that, I think. That would have been perfectly all right.

FCC: Disney got into some problems with their wetlands. I had been specializing in wetlands here and a man from their California office spent a day with me and then asked if I would take a position on their conservation Committee. I assume no one was paid on it.... Allbright of the Park Service was a member. Do you know him?

ERM: Sure, Horace Allbright. I know him well.

FCC: Well, he was on that committee and also a prominent biologist who headed up some big organization in Washington was on it and others. I didn't enter much into their overall problems. I worked primarily with the man who headed up local conservation activities about handling their wetlands and pine lands.

ERM: Did they do a pretty good job up there?

FCC: Well, yes, but they were money-oriented all the way through. It finally got to be a pretty strenuous trip for me. No quick transportation at the airport. Airplanes wouldn't connect very well and I'd have to drive up. Sometimes it would take a week on each trip.

ERM: Yes, that gets to be pretty hectic.

FCC: I just finally had to, after three years, give it up. They had a wonderful place and a wonderful opportunity. I laid out plans for a conservation area there, featuring alligators and bird rookeries.

ERM: You know, in an interview I had with Ralph Hall, he mentioned his relationship with you. I asked him how you had come to know each other and he said that he was in charge of the Central States Regional Forest Insect Laboratory, with responsibility for research and service on insect problems in the Central States. He said his major research problem was on the locust borer. And, he said, "Dr. Frank C. Craighead was my boss." I asked him about your relationship and he told me, "I always had a real favorable relationship with Craighead. I felt that he was a strict disciplinarian but a very fair person. I always highly respected him. I know that MacAloney particularly had a deep regard for Craighead." "Dorothy and I got to know the Craigheads real well when I was temporarily assigned to the Washington office in 1932 for a six months' detail. We also got well acquainted with the Craighead's twin boys, Frank and John, on some coon hunts along the Potomac," Hall told me.

FCC: Yes, he and I chased around a lot together. Our whole family, since the time the children could walk almost, lived out of doors and canoed and camped. At that time the Potomac River was just as wild as any place in the United States. Moonshine setups all along. I knew every foot for a stretch of ten miles, and all the good fishing holes. Ralph would go up on weekends almost invariably. He liked to do the same sort of things we did.

ERM: He told me that, when you took over the Bureau, the cooperative relationships with the Forest Service were not all that great. Hopkins had problems.

FCC: Yes, that's right. I never did. In fact, I always felt we should be a part of the Forest Experiment Station.

ERM: Was there a personality clash in the Forest Service relationship?

FCC: That's it.

ERM: And things did improve under your directorship. How you would describe what was happening at that time? What was going on vis-à-vis the Forest Service and entomology?

FCC: Well, while Hopkins was in charge he would hardly speak to a forester, for no reason that I understood. Of course, the Forest Service never thought much of his idea that bark beetle control was an important part of forest management. They never came to a common understanding. He didn't want any of us to be working with the foresters. When I came back, everything was smoother because I knew lots of the Washington people, especially in the forest research and the forest experiment stations. I worked with them on many angles; we were almost a part of the Forest Service.

ERM: What was the attitude of the profession of forestry in 1923-1924 towards entomology?

FCC: I would say there was bitterness all the way through, until I took over. I never could understand what the trouble was. That entered into my decision to go to Canada. I couldn't even talk to Hopkins about trying to join in an experiment with any of the forest experiment stations. That would have been treason.

ERM: He was hostile to that suggestion.

FCC: Yes.

ERM: So you felt shut off from your colleagues.

FCC: Well, I was, except on a personal basis, after official hours. All of our men were in the same situation.

ERM: So the Father of Forest Entomology was a little bit narrow in his outlook?

FCC: Well, he was certainly a very dominant person and he had, I'd say, a hostile attitude towards forest pathology. I think the head of forest pathology, Dr. Metcalf, felt the same toward Hopkins. So we could never work with those fellows. When I put out that paper showing that it was the blue stains introduced by bark beetles that discolored the wood and cut off the conducting tissue, Keen and Evenden and others called me a traitor and said that I was disillusioning people about the importance of forest insects. It was a symbiotic relationship between the blue stain fungus and the bark beetles. Then, we and the forest products laboratory paid for a mycologist, [Caroline T.] Rumbold who found that there was a different blue stain for each bark beetle. She also found that each fungus developed normally only in the host species.

They were accusing me of selling out to the pathologists. Dr. Hartley, a brilliant man who followed my studies over that year, often suggested good ideas.

ERM: Now that article appeared in the *Journal of Forestry* in November, 1928.

FCC: That early, was it?

ERM: About four years after you became chief.

FCC: I had a lot of these ideas before I went to Canada, but I couldn't mention them, even to Hopkins or to many of our men. Keen and Evenden were much opposed... Miller encouraged me and, I think, favored my attitude, but Keen was very much opposed. Looking back, many of those entomologists who headed up various divisions were brilliant, but very peculiar men. My wife has many stories.

ERM: You wrote a number of articles for the *Journal of Forestry*---one in October 1924, and the one I want to draw your especial attention to appeared in April 1925. In your conclusion, you wrote as follows: "I have attempted to present these problems of the *Dendroctonus* bark-beetles in such a light that they can be more readily appreciated by foresters, and to show that they are not purely entomological but essentially problems of silviculture and management. Their solution is just as essential in the production of future timber as is that of other problems of forest research. Such extremely complicated problems can be solved only by the cooperation of entomologists, foresters, and other specialists." How well do you feel this article communicated your ideas to foresters? Did you get any positive response?

FCC: Yes, we got excellent response from all the forest experiment stations and their research work. Of course, as I remember, both Keen and Jim Evenden in Idaho opposed my making that statement. Miller agreed with me and I went ahead and published it. Then, gradually, all our offices or field stations became tied in with the forest experiment stations. When I retired, the Forest Service had made prior arrangements that I knew about, but many of our men didn't want the arrangements to go through until I did retire. We were much better off under the Forest Service than we were in the Bureau of Entomology, where we were a stepchild, you might say. [The Bureau of Entomology and Plant Quarantine was disbanded in 1953 and the Division of Forest Insect Investigations was transferred to the Forest Service, Craighead had retired in 1950]

ERM: In that article's conclusion you also said: "Rabbits, squirrels, porcupines, mice and birds all are receiving consideration in the forest complex, while the forester's attitude toward the most important of all biotic factors, the insects, is frequently apathetic. The strictly entomological studies have been largely completed and it is now time to widen the scope of the investigations and to attack these problems from ecological and silvicultural standpoints. Constructive suggestions from the foresters, plant physiologists, and others having contact with these problems will be appreciated." You did get good response especially

from the Forest Service Research Stations, from people who, like you, were scientists. What factors caused the profession of forestry to show more concern for studying the influence of, for example, wildlife than the influence of insects on the forests?

FCC: I think that was a result of Hopkins' opposition. You see, this was written only a couple of years after I came back. Also, many foresters were of the timber estimator's style and did not know what research was. Hopkins wouldn't even accept a report from a forester who had seen a bark-beetle outbreak. He wouldn't believe it, and he'd send one of his own men out to make a duplicate study.

ERM: That alienated the people in Forest Service and foresters in general?

FCC: Yes. They were supposed not to have any knowledge whatever of insects and to take all reports to Hopkins for his answer. Do you remember Ralph Hopping?

ERM: Hopping, yes.

FCC: Well he knew a lot about entomology. He had a rough time with Hopkins but we took him on our staff after I got back. Ralph Hopping, yes, was an excellent forest entomologist.

ERM: Let me refer you to another part of this article entitled "The Dendroctonus Problems." It mentions on pages 344-345 the results of control work: "During the last fifteen years the Forest Service, cooperating with the Bureau of Entomology, has conducted a great amount of control work. Messrs. Ralph Hopping, Miller, Keen and Patterson have directed the entomological features and analyzed the results. Approximately \$300,000 has been spent in the treatment of 75 million feet of infested timber. First, the percentage theory of control was advocated and tested, later the treatment of all infested trees was attempted, and finally, this thorough initial work was followed up by maintenance control. Some projects gave excellent results the following year, though, in a few instances, an increase in infestation occurred. The great disparity in the results obtained certainly indicates that some other factors have more effect on the infestation than direct control operations."

Now that's a pretty strong position you took. Is that where Keen got on end, because he was in favor of continued direct control operations and the funding thereof, and you were casting some doubt?

FCC: Yes, but this was long after that. You see, when Keen came in and tried to defend himself, they wanted to transfer him to another place in the Department of Agriculture. I spoke up and saved him. No, he wouldn't have agreed with that, but Miller did.

ERM: Do you have any regrets for not letting Keen go to another position in the Department of Agriculture? Wasn't he a thorn in your side? I mean, we are now trying to grapple with the reality in history, and I know that the nuances of personalities do enter in. After all, we don't understand the history of politics except as we understand the conflicts that exist between this president and that Senator or Congressman.

FCC: Well, after they put that proposition to me while Keen was there, and I said I'd consider it, I talked to him about it. I said if he worked like the other men in our unit, I would take a chance and keep him. He agreed, but many times afterwards he worked with people in the forests opposing my ideas. I never published anything that wasn't read by all three of them—Keen, Miller, and Hopping.

ERM: I couldn't imagine that Keen would agree with the others.

FCC: No, he didn't. But when Miller did, I went ahead and published it. As far as I hear, even today they are not getting good results in bark-beetle control. They've even tried to go in and spray trees with DDT. We've never developed a really satisfactory method of control. What is being done today in forest entomology was totally inconceivable by entomologists of my day, except possibly at the Gipsy Moth Lab. We developed a fine research laboratory at Asheville, North Carolina, with both pathologists and physiologists on the staff. I employed Dr. Krause, head of plant physiology at the University of Wisconsin, for several summers. As long as the conditions were right for bark-beetles to develop and lowered moisture content in the sapwood could support the growth of the fungi, an infestation would occur. Why, we even tried girdling the trees immediately after an attack and injecting chemicals in to them; at Asheville we did a lot of that. We even put canvas over hundreds of feet of soil and we'd dry it out, and the bark-beetles would try to bore in. Then we tried to get water back in, or solutions in to kill the fungi. What's the attitude of scientists today? Do you know? I haven't any correspondence.

ERM: What the contemporary view of the situation is, I would defer to Ralph Hall to provide an answer. I would guess that they have come around to recognize that the problem is much more complicated than they ever imagined, and that some of their solutions were cast in too firm a concrete.

FCC: All influenced by a man who couldn't believe he was wrong in any detail.

ERM: Right. That's the trouble with a lot of scientists, isn't it?

FCC: Absolutely. They hate to admit mistakes. I spent ten years here in south Florida trying to understand this peculiar land and even after 27 years, there are still many unknowns.

ERM: They get so passionately committed to their thesis that they can't bear the thought that it might be wrong. Or that it hasn't taken some factors into account that might have been.

ERM: You wrote also in this article on bark-beetles: "The large Klamath Lakes control project directed by Mr. Keen has shown some peculiar discrepancies. The reduction following control bears no correlation to the percentage of infestation treated, and the summer infestation of 1924 has exceeded that of previous years even on some areas where the most intensive work was done. Fall control work on this project gave uniformly better results than spring work, although the latter was just as thoroughly carried out. A partial explanation may be that the late burning just before the spring flight attracted beetles from

surrounding territory.” And you go on in that vein. Weren’t the industry people in the Klamath Falls and McCloud River areas working closely with Keen?

FCC: Yes, and Keen followed the policy of percentage reduction. You see, they got the money for this control work by lobbying in Washington and when we’d get appropriations it was spent locally. They only worked part of the year to cut, peel, and burn, then they wanted us to carry those men the rest of the year. Finally I fought to the finish just before I got out. I said, “These monies are appropriated to us for forest insect investigations. I’m not going to authorize spending it to retain men in their organization when they weren’t employed by the lumber companies.” Which is what they wanted us to do, you see. We spent an awful lot of money putting off-season men on insect surveys before I got the Chief of our Bureau to stand firm.

ERM: Did these people have more political muscle in Washington than others?

FCC: If there is a specific appropriation and a small bureau like ours—we had fifty professional men in my unit—they can pretty much say how the money is to be spent. But just afterwards, when we developed aerial spraying, our appropriation jumped to two and a half million. We got into trouble with DDT because we knew it was dangerous, but we hadn’t anything else we could use. Then we got these fish kills and other kills and DDT dropped out of use.

We got the first batch of DDT that came into this country and tested it. We found that, when spread on a log, DDT would keep the beetles from attacking, through the following year or even two years. On termite stakes it’s been proven to be effective as much as twenty-five years. But then we hadn’t any idea how much to use in sprays, so we started out with heavy doses, as much as ten pounds per acre.

In cooperation with the Fish and Wildlife Service and the gypsy moth control in Pennsylvania, we killed every living creature in those forests; we even suspected some mortality in deer and birds. We came down to five pounds and that wasn’t much better. Then we came down to a pound per acre, which killed the insects, with very little danger to other life, except in ponds and streams. There the DDT killed eels, turtles, and all pond life. But that work was suppressed by the Department of Agriculture until Rachel Carson discovered it. She came in as a librarian for the Fish and Wildlife Service, and wrote the book *Silent Spring*.

ERM: Well, now, you were conducting these original DDT field tests in Pennsylvania, on what I would imagine were limited plots?

FCC: Hundred-acre plots. We carried those tests on three or four years before we started using DDT in the West, but there are records on all that.

ERM: Were the tests all carried out by the Bureau of Entomology and the Forest Service?

FCC: Yes, and the Fish and Wildlife Service of the Interior Department. We always worked very closely with both of those organizations.

ERM: You got an over kill situation with the ten-pound and the five-pound treatments and even, to some extent, with the one-pound treatment. But wasn't it almost necessary to perform the tests to find out?

FCC: Oh, yes. What I'm trying to say is that we had no idea how deadly to wildlife the material was. We had developed the fact that it was a deadly poison to all wildlife but we weren't permitted to publish that because of the wonderful results the farmers were getting with it on their crops.

ERM: I see.

FCC: The Department of Agriculture didn't want to have any contrary information published.

ERM: Dr. Craighead, is that a cover up?

FCC: In what way?

ERM: When a department of the government that conducts research on behalf of the people of the United States learns information that it deliberately suppresses, isn't that a cover up?

FCC: At the time we thought maybe DDT wasn't that dangerous on the fields and on the crops. We didn't fight to have our results published, except to pass the reports around to other interested agencies.

ERM: I should have thought the Fish and Wildlife people would have been standing on their ears.

FCC: Well, yes, they had no idea how dangerous a poison it was. The Fish and Wildlife people are continuing to study DDT's persistence and buildup chain in wildlife. But I don't think our reports were ever published.

ERM: Until Rachel Carson dug them out.

FCC: And there they were, published in a very effective way, but the actual examples and accounts of work done were never published.

ERM: Was Rachel Carson perhaps overstating the case?

FCC: I don't think she was, when you see what the situation is now, DDT contaminating our waters and killing the fish and the osprey and eagles that feed on that fish. DDT undoubtedly was the most marvelous insecticide that's ever been developed.

ERM: It certainly helped battle malaria and all the other diseases we were confronted with during the war.

FCC: Oh, yes. Apparently they still use it for those purposes.

ERM: I suppose one man's meat is another man's poison, isn't it?

FCC: That's true and equates it. Now they are finding other insecticides that are just as dangerous, parathion, for example. Here in Dade County, where I lived twenty years, maybe twenty people were killed with parathion and nothing was said.

ERM: Is it a field chemical?

FCC: Yes, but it's so dangerous...just a drop of the commercial concentrate on your skin will kill you. It was mostly Negroes and laborers who were working with it who were killed. I often urged the entomologists at the agricultural experiment stations to write up the history of parathion and the deaths caused by it. But our government...there's a lot of bureaucracy at work that shouldn't be.

ERM: But of course doesn't that go against the whole purpose of scientific research?

FCC: Yes, it does.

ERM: Because the merit of research is that it be known and accessible. When we treat research in secretive ways, it inevitably works to our detriment and to the detriment of the scientist who has been involved.

FCC: There's a forester at a Penn State who was in on all those spray tests as a member of the Fish and Wildlife Service, John George. I don't know if you know him.

ERM: Did you write anything with him?

FCC: I don't think so. He married my daughter Jean, and they were divorced some time later. I hadn't kept in touch with him since then. If you went up to Penn State I don't know if he would talk about it, or if you went to Patuxent Wildlife to get more information on that particular aspect of DDT.

ERM: I'm interested in anybody who can talk about it.

FCC: For the present, at least, it is best to let dead men lie. The government is full of bureaucracy. You can't always accuse those men because at the time the research had not been sufficient.

ERM: They were acting in good faith.

FCC: Yes.

ERM: I don't question that. I think that a lot of scientific inquiry is certainly done in the very best of faith, but without much thought to what the spin off results of the research may be. And, I suppose anyone

could say, we can't be sure of these things, so we have to go on doing our work and take certain chances. I guess there's nothing certain except death and taxes. Isn't that right?

FCC: Yes, a good example would be the thousands of deaths from sulfa drugs when they were first introduced. And the same is going on today. In Collier County, where I lived for five years before I moved over here, a big developer in 1964 got permission from the county commissioners to develop a piece of a big cypress swamp that was about twenty miles by twenty miles. The swamp was under water about six months out of the year, but they dug big canals and laid out roads and sold it to over fifty thousand people all over the world as building sites. I spent a good part of the first year I was over here examining the area and I wrote a four-page report that just shocked everyone. The land was all cut up with roads and then burned over. Because of the drainage there was wetland. All this was going on with the permission of the county commissioners, but the public knew nothing about it. I've been backed up ever since, and now they are trying to contact buyers in Australia, Japan, England; they had sales offices all over the world.

ERM: You mean people bought this property without ever looking at it?

FCC: Yes, thinking they could build homes on it. You can't even find the properties. Not even the county officials know where the lots are that were sold in two -to ten-acre plots. And some of those buyers subdivided their ten acres into acre lots and sold them. One of the hearings that I attended a year ago, which was trying to get information and straighten it out, concluded there were probably sixty thousand purchasers still paying into this company. So far, no construction has taken place.

ERM: They can't build. It's absolutely untenable to build on, except for small high areas.

FCC: And the same situation is going on all around Disneyland. It's just horrible, the lack of land standards here in Florida, because of the rotten local government.

ERM: But the people sitting on the county board at that time were culpable. Can't they be prosecuted?

FCC: They just overlook it down here. It's the damndest thing I ever saw.

ERM: What do you mean they just overlook it?

FCC: A committee was set up to try and make some arrangements to transfer ownership of the unbuildable land to higher land the company owns in other parts of the county.

ERM: What I can't understand is, if there were fifty or sixty thousand purchasers, there ought to be a few thousand of them jumping up and down and brining suit for losses. Why aren't they taking the people who swindled them to court?

FCC: I don't know. Supposedly many of them have stopped paying taxes.

ERM: I'll tell you I'd stop paying taxes from day one if I got into anything like that.

FCC: But the buyers didn't know until they would drift in here to see their land and couldn't find it. There were more and more complaints, and that's when these fellows got me involved. No one in the county, I guess, who knew about the situation had the guts to put it down in writing or publish it.

ERM: Don't you have a county surveyor here?

FCC: That land's never been surveyed officially. You don't know where any section lines or township lines are. But the company did have it on paper, is the way I understand it.

ERM: Wow, that's a scandal. It certainly is.

FCC: It's impossible here in Florida.

ERM: I presume you are going to be around here all winter.

FCC: Yes. I have an apartment here.

ERM: I may come back again later in the winter and, if I do, I'd like to come by and visit you again. I'll probably have a little more time to look around the place and see what you are doing.

FCC: This is the kind of report the developers have to prepare for handling their land.

ERM: What is that? An environmental impact study?

FCC: Yes. This is a report for a tract that I helped the planners zone. But it has become so technical down here that practically none of the state or county officers can understand a report like that.

ERM: Isn't it almost deliberately so?

FCC: Well, they keep wanting more material. These people are really fussy. They told me this report costs \$40,000.

ERM: I don't doubt it a bit. Wouldn't surprise me if it costs more than that.

FCC: It's one of the best development plans that I've seen here in Florida since I've been interested in that. Now, I've never contacted the company at all. I don't know anything about the landowners, but I worked with this planner. The landowners finally gave in to saving the mangroves and the beach. About a third of the acreage will be turned over to the state.

ERM: You mentioned a little while ago that you discovered a number of insects in this area that had never been recorded before.

FCC: Because nobody had ever collected here.

ERM: Why has this area been so long neglected?

FCC: It's just impossible to get around. There are no roads, nothing but going up and down the rivers in boats and canoes. The million acres the Park Service has—Everglades National Park—has only twenty miles of road but there are half a dozen big rivers whose tributaries connect in marshes some 10-20 miles inland.

ERM: Foresters and others in research have never let wilderness or trackless mountain areas stop them from getting in and doing their research.

FCC: They have mosquitoes and snakes in this area.

ERM: Now I'm just wondering why this country has been so neglected.

FCC: I brought that very question up with the Forest Service Station just outside of Fort Myers. They have been studying control burning, and I asked that very question: "Why have your foresters ignored all this country down here, like Fakahatchee, with the finest cypress swamp and stand in all the United States, twenty miles long and five miles wide, many of the trees one hundred feet high and six feet in diameter?" Well, they say there is no... interest in anything but real estate. I don't know what the answer is. The botanists have practically described all the plants down here, but insects are little known. My first two years here I sent in to the National Museum over 20 new species and genera.

ERM: What so amazes me is, the botanists have been so turned on about the tropical growth of the Everglades area, then why haven't the entomologists been just as interested in this area for study? I would imagine the variety and species of insects must be enormous.

FCC: It is, and hasn't been touched, hardly. But it is a very different growth area. You might compare it with the old days in the West when you had to take a pack horse and go out for a week to do what you could do now in a half a day. I'd be out again and again in a canoe for a week. In fact, I covered all of Florida Bay in a canoe. I went to a hundred and twenty-five islands studying the character of the vegetation when I was with the Park Service. [Fig. 5] It is a most fascinating country, and I think it has tremendous value from a forestry standpoint. These trees right around my shop are about fifteen years old. They start thinning them for pulpwood at twenty years, and yet the value of the land from a real estate speculation is two to five thousand dollars an acre. That may have a lot to do with forestry people coming in here. Of course, just north of here some of that cheaper grazing land has been bought up and planted by the big lumber companies.



Fig. 5. Frank C. Craighead (front) working in the Everglades about 1960. (Provided to M.M. Furniss by his daughter, Jean Craighead George, in 1990)

ERM: Yes, that's got to be a big source of pulpwood for St. Regis, Hudson, and other big companies. Aren't they doing a fairly good job of managing and developing those timber resources?

FCC: Little is being done in this so-called sub-tropical Florida, south of Lake Okeechobee. The local Forest Experimental Station tells me that many acres of 18-20-year-old plantations are now being cleared and planted to citrus, some on sites. The Forest Experimental Station at Leigh Acres occasionally calls me and takes me out on some insect problem. I always enjoy these contacts. There used to be wonderful pine forests here. Occasionally you can find a piece that was somehow skipped and trees that are about 12 to 20" DBH, some slash pine, about seventy-five feet high and two feet in diameter. During the Second World War they came in here and most of the uncut stands were harvested. The Fakahatchee Strand was cleaned up then. I came down a couple of times on insect problems during that time and the Big Cypress logging was done in water waist deep. We used to run motorboats out and hook a towline onto these big cypress trees. Previously the girdled them so that they dried out over a season so they'd float, then they'd draw them onto a tram road they had built through the swamp, and put them on flat cars. This stand (pine and hardwoods) was wiped out in just a few years. Nothing has been done about restoring it because everybody only thinks of the speculative value of this land for development of homesites. I think they paid two thousand an acre for the strip they just bought here recently. The Big Cypress Purchase by the federal government is going to be a good influence. They are paying an average of \$300 per acre. Some of the adjoining land was sold for \$2000, so you can see such land has no place in forestry. However, the pendulum may be swinging the other way. The Park Service should have a competent forester who can manage and restore the timber stands and practice land management. I'd say here it's as bad as Arizona and Southern California. Oh, it's just too bad that the almighty dollar has to dominate everything.

ERM: Have you got the feeling that it does pretty much down here?

FCC: Oh, absolutely.



Fig. 6. Frank Cooper Craighead, Sr. (1890 - 1982) ca 1950. (Photo provided to M.M. Furniss by Doris Bugbee Bourgeois who was his secretary during 1947-1950)