VI. EARLY KODAK YEARS: SILVER AND PAPER RECOVERY FROM FILM

By early 1925, I was a senior demonstrator at the Royal College of Science. I had been there five years as a teacher, was getting an appallingly small salary, 150 pounds a year, and even in those days it was very difficult to live on that. I had got my gadgetry going on all over the laboratory where I was supposed to be teaching analytical chemistry, and my immediate superior, H. F. Harwood, would come up to me and say, "Hickman, when are you going to move on? Because you're lost here; you haven't found the place you ought to be. You're wasting your talents. Get out before its too late". And one day it suddently occurred to me, my gosh, perhaps old Harwood is right. I'll see if I can get into Eastman Kodak. I made the decision just like that, and that is exactly what I did. I had built up a little photographic business as a consultant. I don't think I helped them a lot, but I did coax money out of them, and I think I brought my income up to about 750 pounds a year. In other words, I multiplied my college salary by five, and I thought I was pretty successful. As long as the college would leave me there, it would be a fine place to stay, just in the same way as I kept puttering around at RIT in the 1970's without realizing it was just no longer the right place to sell what I was trying to sell. But I am afraid this has happened all to often. It's all part of the inventor's business -- let us make the best we can of what we know, instead of trying to get more knowledge or be more adventurous.

One day Dr. Mees, the great photographic scientist who had emigrated to Rochester, New York at Mr. Eastman's behest and had started the photographic research laboratory at Eastman Kodak Co., came over from America and lectured at the college. I was the Chairman of his lecture. I just asked him "casually-seriously" whether he would like me to go out to Kodak. He was conscious of me as one of the few young people doing original research in photography. He thought it might not be a bad idea. He would inquire. Apparently he inquired of two gentlemen, Mr. Eastman himself, and Mr. Lovejoy, who was at that time the acknowledged number three man after Mr. Eastman. The great emulsion baker, Mr. Charles Hutchinson, I think was number two at that time. He inquired of those two gentlemen as to whether I should be invited over. As soon as they heard of the hypo howl, they said, "Oh yes, we need an inventor in the place," and it was the hypo howl that got me my job with Eastman Kodak. I got a letter which said, in effect, "Yes, we will give you a job. We'll have to put you in our laboratory like a loose new stamp in a postage album until we find someplace to fit you in, but, if you're willing to come under those circumstances, come along."

I set out for America in late May, 1925, with my whole family seeing me off on the London boat train. I survived a cold, stormy maiden voyage of a small cabin steamer, the Ascanid, to experience my first sleeping car, on a train from Montreal to Rochester. After being shaken awake by a Customs officer in Malone in the wee morning hours of June 3, I had fallen into a nervous sleep to be awakened by the train squeaking to a halt. Pulling up the blind, I found myself a few feet away from a charming woman in a turquoise dinner dress, her smooth porcelain arm extended towards a smartly pressed tuxedo, occupied by a handsome youth. Nothing moved, neither the figures nor the scene.

A couple of jerks and the train moved on, through the main streets of Syracuse, the store window giving way to slums and brick yards. Later, a tug at the curtains reminded me to get dressed in a long winter woolens; the porter pushed me on to the Rochester platform for a bun and coffee and a long wait until politeness would warrant a taxi ride to the Mees' house on Lake Avenue. My welcome by Dr. and Mrs. Mees was heartwarming, a liability perhaps since it was the hottest recorded June in Rochester, the thermometer at 95°, nudging a hundred each day. Besides the underwear, I was dressed in a tweed shooting outfit and flannel shirt. The Mees were all consternation. "I must, at once," they said, "buy a couple of cool summer suits -- one to wear and one at the cleaners -- and exchange my woolies for cotton BVD's" (very hushed). How I was to acquire these without means of transport was not mentioned. A few nights later, at my first dinner party, also at the Mees' house, I was introduced to a roster of Kodak bigwigs that I seldom saw in subsequent years -- Charles Hutchinson, Marion Folsom, Ted Curtice, to mention three. During a pause at dinner, Mrs. Mees, on whose right I was perched, said to me in a stage whisper, "It's awfully hot, and I don't want to embarrass you, but are you wearing BVD's?" My unmonitored reply, "I don't want to embarrass you, Mrs. Mees, I'm not wearing anything at all!"

When I got there, I interviewed with the man who later became the longest employed top servant at Kodak ever, Dr. Chapman. He bartered with me for the American rights to the tray syphon. "Yes, the Company would be pleased to take it. Now what do you think you need as royalty?" And I being thoroughly inexperienced said, "I don't know, Dr. Chapman whether 25 or 15 or 10 percent would be the right thing to ask." He said, "I think we should settle for 10." So I settled for 10 percent royalty, which incidentally today would be considered a very good royalty indeed. Very often you can't sell a new invention if the inventor demands too high a royalty. But I got 10 percent and for the first few years I got practically nothing out of this, as so often happens. I think the American patent ran for 15 years then and I think it had only 13 years to run after I got to America. But for the last five years, my royalties from the

tray syphon, which became known as the Eastman Tray Syphon, brought me in an amount equal to my salary. They made it out of hard rubber, and it sold rather well.

Another thing I had patented in England was an aerial squeegee for wiping the water off of Kodak film. I tried to sell that to Kodak, too. I can remember Dr. Chapman, who was quite a young chap in those days, came to me and said, "Well, we'd like it. Do you have an American patent?" I said, "No, sir". He replied, "Well, thank god for that! Good morning". And so they had free use of it in America.

I want to say here that I had no possible idea of how such an invention should be marketed. When I talk about patents later, I want to get across the idea that merely getting a patent or having a patent is useless, unless you have a well developed plan for using the patent. I never sold many automatic tray siphons on my own, but Kodak knew exactly what to do, and it sold very successfully when handled by them.

I should, of course, have tried to make an arrangement with Kodak to share more directly in the rewards of my inventions, but I was too dumb. I had no experience with this at all. Mees was starting a new laboratory. They hadn't set up any system for adequate reward of inventors. Mees had a wonderful system. He hired thirty men. One makes an invention. He didn't get any more than the others. After all, this is an average business, one of the others could do it tomorrow. It took about six years to establish a reputation for turning them out. There is a little station where the railway goes through near where the Distallation Products lab was built on Ridge Road West. The station was known as Uptonville. I learned afterwards that I was known as "the Wizard of Upton" because I was turning out these things. There is no doubt at all I never got rewarded for the things that I did for Kodak in any adequate way. But, my fault was that I did not know how to comport myself well under such conditions. Instead of behaving as a disgruntled employee and as an underdog, I should have said simply "I think I've come here under false pretenses. I will have to leave." If anybody said "Oh, don't go, we still need you." I could have said, "Well, let's arrange some terms." This was never done.

I might interject that in the family trend, I was supposed to make a fortune. I was supposed to get myself up to an economic standard equal to that of the famous grandfather who had made his fortune in a grand way, so that I could marry a woman of station and give her all that was necessary. The idea that I should be just a little demonstrator who would marry one of the young ladies in an apron in the laboratory was simply unthinkable. While still at the Royal College of Science, I was always hunting for a quickie

invention which would lead to something, but in fact ended up doing a lot of research which I couldn't put to commercial usefulness.

When I got to Kodak, I suddenly found a place where inventions could be used. Wherever I looked, they needed something invented. I embarked on the process of invention for Kodak with a missionary zeal which I have never equalled at any time. Kodak hadn't the faintest notion of what I was doing. I was treated as the crackpot inventor by all the people to whose advantage it was to assume that I was a crackpot so that they had to come and make a success of things and claim, if not the credit, at least, the reward. The greatest inventing period of my life was the first 15 years with Kodak, and my inventions there made four fortunes, three of them large ones. I am not claiming credit for that. It was the collective genius of Kodak that made the money. At the same time they have had few inventors who would provide the seed for as much growth by that genius as I did.

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COMMENTARIES

Dr. Roger Loveland:

Dr. Mees ran his laboratories very differently than Kodak runs them now, or than any other laboratory, except the early General Electric laboratory. Dr. Mees, in his Story of Research, tells about it, and as a former Department Head I can state he got it from GE. After Eastman brought him over from England, Mees visited the GE laboratory and got the advice that no one knows where the opportunities are better than the scientists who are doing the work. If you try to give them their program, it will not work as well as if you give them as much freedom as possible. Let them make the decisions insofar as possible. Mees did that. That doesn't mean to say he wouldn't get interested in something and breathe down your back, or suggest certain things, or ask, will you do this job? -- and then you'd go do it. But there was great freedom in the research labs. So it wasn't really unique that Hickman was given almost complete freedom to look around for problems needing solution. When he proved he was good at it, he was given even more freedom. But all the department heads under Mees were given far more freedom than they are today. Mees started the laboratory with men he brought from England -- Shepard, Capstaff, and Crabtree. Hickman probably first reported to Capstaff when he came to Kodak.

Capstaff was a character, and very hard to work for. Both Hickman and he were English. He was very English.

When I came in 1922, Capstaff had just devised a new color process called Kodachrome -- which had nothing to do with the present Kodachrome. It was a two-color process. Capstaff apparently started working on color very soon and worked out this process which applied to still pictures. But Kodak's real money makers were motion pictures, in those days particularly, and so Capstaff then developed Kodachrome as a motion picture process, which is an anecdote in itself. When I came there it had just been perfected; I saw it and it was good -- the two-color process. At the time, two MIT professors were working on a process. They bought all their film materials and supplies from Kodak and went to Kodak for advice, and they called theirs Technicolor. I saw the Technicolor pictures in our labs side by side with Capstaff's -- there was no comparison, Capstaff's was so much better. But down at the corporate office, they made the decision to shelve Capstaff's project and get behind Technicolor. I believe some people made a lot of money on that. I can't swear that various people actually put a lot of money behind Technicolor, but it appears that some got in on it early knowing that Kodak was not going to bring out a better process. Technicolor was a separate company, a good customer -- they would buy their film base from Kodak, and most chemicals. Technicolor was a professional motion picture film from the first. It nearly broke Cappy up of course, but he stayed there, mostly in motion picture films. The two-color process they called red and green; the word cyan -- blue-green -- hadn't been invented then, but actually the colors were cyan and magenta. You'd be surprised how you can get most colors from these two, it really is very good. Cappy knew enough to make excellent face tones -- he made excellent flesh tones. The other people made the best neutral tones they could -- they might have been better than Capstaff's -- but their flesh tones were horrible, and you notice them more than other tones. Cappy's department became the color department. There was no official name, but if you wanted to work in color you had to work with Cappy. He also brought out Cine Kodak, and that was black and white.

When I came to the lab in 1922, there were about 50 scientific personnel, and we all knew each other very well. As to why Kenneth reported to Capstaff, there weren't too many choices of departments. He wouldn't go into Trevelley's department, nor the Physics Division. He could have gone with Crabtree -- but he was a very applied person. Crabtree was not a person who had any great respect for theory. In Trevelley's department, where I worked, our main object at the time was photo-theory investigations, and I was doing a great deal of work in size frequency. The girls sat and

measured grain size by the hour to indicate whether or not Silverstein's theory was true. He got mad at me because I happened to be the person who worked out that it probably wasn't true without a few changes. Crabtree used to wander around and try to bait me, saying "Well, do you think you're ever going to be of any use to Kodak? After all, do they need to know how many grains there are?". So I can easily see why Mees didn't put Kenneth with Crabtree. The only places left to put him would have been with Fernald in photographic arts or Capstaff -- they weren't going to set up a separate department for him at that point. Capstaff was the inventor, devisor supreme. It was the logical place for Hickman. Eventually, of course, he was responsible to Dr. Mees directly. I remember Mees once saying to me something to the effect of, "You and Hickman both cost money, but you seem to be worth it."

Dr. Arnold Weissberger:

Dr. C. E. Kenneth Mees was with the company of Wratten and Wainwright before coming to Kodak. Eastman went to England to offer him the job to build up a research laboratory at Kodak. Mees said, "I'm greatly honored. I would like to accept it, but I can't because I have just become a director of Wratten and Wainwright, and it would be disloyal." Mees went on to a business trip in Hungary, where he received a telegram "Difficulty removed. Have bought Wratten and Waingright. Eastman". Mees told me that story.

C. E. Kenneth Mees was the rare combination of a man with a scientific instinct and judgment, and a first class businessman. He could be very informal. I came to know him well because he was interested in my history, he hired me, and during the war he was so worried about England that on occasion he cried. He was really scared of Hitler, and that was another thing we had in common. I wrote two chapters and collaborated on a third chapter with him for his book The Theory of the Photographic Process, which was a pioneering work at the time.

Mees was average size, medium, not particularly tall or small. He created the whole research laboratory. He was very involved in the things I was working on, color photography. He had no hesitation to contact anybody in the lab and talk with him about things.

His son, Graham, was put together with Hickman later on to handle the business end of Distallation Products. I think Hickman had great admiration for C.E.K. Mees, but he clashed with him because Mees wanted to create a niche for his son.

Dennis Wratten:

Wratten and Wainwright was my father's and grandfather's company. My grandfather developed a dry plate process, where the plates were dry, and started a factory. He was the first manufacturer of dry plates, as opposed to wet plates. He was also the first, I think pretty much anywhere in the world, to have the idea of industrial research -- actual research. For that reason, they got hold of Dr. Mees and he pulled the company up like mad; all the Wratten Filters and all the rest of it were really Dr. Mees' ideas, they were not my father's or my grandfather's. My grandfather by that time anyway had lost interest.

Mr. Eastman came over and wanted to have Dr. Mees join him, and Dr. Mees said "no go". He didn't even want to go, really, but in the end in order to put Mr. Eastman off, he said, "I'll only go if you take Wratten and Wainwright with you too." Much to our horror! It was only a tiddley little company anyway. So Mr. Eastman bought Wratten and Wainwright, and that's really how I happened to be in Kodak in a sense. My father went with the company, and became head of the developments department. The sale took place in 1912, and it was about 1913 or so that Dr. Mees went to the United States and started the Research Labs. It was absolutely astonishing in those days, because nobody had ever thought of doing research of that sort in industry. And of course, as far as the Eastman Kodak Company was concerned, this was also horrifying, especially to the emulsion makers who were really alchemists rather than chemists. People used to dangle a watch chain in the emulsion soup because they thought it made some slight difference to the results -- it's quite true! All that sort of thing. So they rather resented Dr. Mees and his research labs, and that particular feeling of resentment was still there when Hickman came and joined the research labs.

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KENNETH HICKMAN

When I came over here, Dr. Mees had been running his laboratory twelve years. He still did not have a proper laboratory; his people were stuck around in Building Three, and one or two little cubby holes around Kodak.

They told me that I could have a little room and putter around and do anything that I could see that looked as though it might be useful. Well, I had led a very active life, and finding myself with

practically nothing to do here, What should I do next? There was no organized research of the highly disciplined sort that is done today at Kodak. That is something that has grown up with experience over the years. Also, my interest in photography as a pure science began to flag pretty soon after I got in Kodak. Eventually, Mees said, "Look, I have made arrangements that you may have a pass to the plant. Just go where you like and see how you can make yourself useful." Well, I want to tell you that that was one of the greatest adventures. You can have two types of explorer and you want to know what type of explorer you are. Let's suppose there's a soldier on a troop ship, and the troop ship is wrecked. He clings to a spar and he gets up on a rocky shore in the tropics and he walks into the jungle and by gosh there is a Malayan temple. Now, is he a great explorer archeologist? No, he's a stranded soldier and he comes back and says, this is what I saw. But to find out what the temple is about, you have to send a trained archeologist. Now I was in the position of a partly trained archeologist, but I was also the soldier stranded in the Kodak plant running around wondering how to make myself useful.

Well, Dr. Capstaff and his people were working in those days on a reversal process for black and white 16mm film. They had permanganate bleach for the reversal process, and this permanganate bleach would dissolve out a lot of silver. I don't think anybody wanted the silver too much, but it was not good to have acid permanganate going down the drain. What to do about it? I asked that question. I asked most of the questions in my career at Kodak. The first thing I did was to go over to the engineering department to find out how many iron and brass turnings were available. I found a tremendous number. So we got these brass and iron turnings and dumped them in, which immediately reduced the permanganate to manganate salts and this colorless material ran down the drain. After a week or two we shoveled out the turnings and these were sent away to the refiners and a considerable amount of silver was saved.

Well, the next question was how much silver does Kodak use? That was 1925, and I was told confidentially, two tons a week of silver was used. I said, "Don't you realize that silver is the red corpuscle in Kodak's veins. Now red corpuscles in our own veins are regenerated every time they go through the lungs. We ought to have a regeneration system for silver." The only possible way would be through electrolisis. No one had ever been able to get silver out of the old fixing baths by electricity, because the silver precipitated as the sulphide at the cathode. You take two electrodes and dip them into a beaker of silver-bearing hypo. On the anode nothing happens. On the cathode great dirty streaks of silver sulphide fall away. Well, the scientists can go away and

read all of this in a book, and know better than to try it. But I didn't know all the science, and I have always used a hands on experimental approach. I found that if I waggled the anode and nothing happens, but if I waggled the cathode sufficiently vigorously and stirred the solution vigorously that this need not happen, and I could plate-out beautiful sheets of silver.

What had happened, of course, was that if I stirred it sufficiently, the reduction was not to sulphide but to hyposulphite, which was a completely different matter, because the sulphite got in the hypo, and oxidized to sulfate, helping to reduce this back again, so that I rejuvenated both the hypo and got back the silver. Well, it didn't take long to interest the engineering department into letting me design a silver recovery cell. It took me some years to perfect this method and design large-scale machinery. The cells were instantly successful and the greatest lark I ever had was going out to Hollywood with the testing parts of this with the fellow who had done the work with me, Walter Wyatts. We drove out in a 1931 Buick, having a gorgeous journey, and set up a silver recovery unit for the Metro-Goldwyn-Meyer studios. Unfortunately, in the middle of this, two things happened. First of all, there was the sudden frenzy to convert to sound. None of the engineering staff were available to me. They were tearing down the old studios and putting in the sound lines. Then Walter Wyatts was taken with kidney stones that nearly killed him and was taken off to the hospital. I was left out there with this half installed apparatus, with Rochester saying, "Here, you're not on a summer holiday. When are you going to come back?" "Well, I said, I don't know what I should do." Well, we stayed, Walter Wyatts recovered, and we got this thing in. This was 1931. In 1933, I went out to see how this was getting on, and they took me into a vault, about the size of a large doorway, and four or five feet deep, and there were silver bars piled up from floor to ceiling.

I was very encouraged by all of this and when I came back to Rochester, I began to study the rest of the silver cycle, and concluded that photographic waste paper was wasting much more than silver. Photographic paper is coated in enormous quantitites. The edges are trimmed off, and there is other waste when the paper is cut to commercial sizes. In those days, the scrap was burned, and the silver reclaimed from the ashes -- with perhaps a 10% yield. I thought to myself, why can't we fix the paper in a counter current fixing machine so that the hypo you have to use will be progressively washed back to where the paper is coming in, and then electrolize the hypo continuously, and we will save both the paper and the film? We devised a long skinny machine with a layer of stair carpeting in it which went around rollers underneath the machine and came back around again. They made a hole in the ceiling

above this and put in a lot of old ladies with nothing better to do than chop up paper, and the paper kept coming down and would go into the bath. There were claws that would push the paper under the solution. The fixing solution would be electrolized to remove the silver and pumped around again. The treated paper, instead of being burned, was repulped and turned back into paper. Dollarwise, this may have been my most important invention at Kodak, for it recovered the greatest amount of silver and recovered all the paper. This must have effected a multimillion dollar annual saving. I got a small annual raise, but at least I was now on the team.

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COMMENTARIES

Roger Loveland:

Kenneth and I got thrown together very, very early -- within days of his arrival. I enjoyed walking at noon; he enjoyed walking at noon; so we got together very quickly. I remember that it was an unusually hot early June. Since I hadn't known him, I decided he was very red faced simply because that was the way he was. I suddenly realized that he was not usually florid because he was saying how kind Mrs. Mees was. She had said to him, "You know, Kenneth, in America we don't wear our long underwear all year. Go out and get some BVD's." A light dawned, I should have diagnosed it as intelligently as Mrs. Mees had.

We took long walks at noon over lunch, a habit we enjoyed very much until he left Kodak. He had an erect, almost backwards leaning carriage, due to a motorcycle accident in England, from which he had fully recovered. He apparently had rounded a bend in the road at high speed and found that the road was being oiled, with no warning signs posted. The motorcycle skidded and spilled, and he was run over by a horse drawn cart with metal rimmed wooden wheels. He was taken to hospital so covered with road tar that the doctors at first thought he was negroid. Traces of black tar remained embedded in the skin by one eye for the rest of his life. He had also knocked out one of his front teeth.

I joined Kodak in August 1922 and became a licensed bacteriologist -- the only one who could make up certain formulations for a while. Kodak needed a bacteriologist because of work in emulsions. I made a film of the Yellow Fever Mosquito for Dr. Blaine Jones, who was head of the bacteriology department, and

then he was kind enough to assign me some rooms and let me make one on bacteria. I was able to show him the first flagella on moving living bacteria he had ever seen, and he was at that time President of the American Bacteriological Association. A chap in Germany did a similar thing just a few months before I did, which I found out just as I was finishing. Part of this time I was on loan from the Research Labs to Eastman Teaching Films. Then they asked me to come back to head the Photomicrography Department, where I was housed just down the hall from Kenneth.

Kenneth and I were the only two roomers at Mrs. Doyle's on Alemeda Street, just west of Dewey Avenue, below Seneca Parkway. This was in the 1920's. Usually we walked to work together. We didn't walk back together too much, because both of us were independent and had things to do afterwards quite often. Then I left Mrs. Doyle's to be married in 1927. I remember many years later when he was introduced to his future wife he told me, "I think there's a conspiracy being set up to trap me". Fortunately, it was successful. I told him then that marriage is a pleasant state.

We took our meals at Mrs. Doyle's, and she ran a fabulous table. Kenneth and I were both much amused by her retired plumber husband, because we couldn't see that he ever did anything except sit by the fire and read the Times Union newspaper. She was probably younger than he, but she was very energetic and he was completely lethargic. We must have had breakfast there, but I don't remember them. We had rooms next to each other upstairs. It was a very pleasant time of life for me, particularly when I became engaged and spent my social time with my future wife. Neither of us had a car -- in those days there weren't cars all over the place. We didn't think we could afford a car, and we managed well enough without one. My girl lived all the way across town. I got there by street car and trolley. The result was that I didn't have much extra time. As research workers we were both awfully busy. I suppose we saw more of each other at lunch, and over dinner, than actually at our rooms. I don't remember too much about Kenneth's social life -- I don't think he had as active a time there as I did. Soon after I got married and left Mrs. Doyle's he moved to apartments on University Avenue with Dennis Wratten.

I remember several stories from those early days when Kenneth was working on the silver recovery process. Don Heinman was hired by Kenneth in the lab at Building 3, where they were working on hypo recovery and other types of things. One thing I always admired was Kenneth's skill with glass blowing -- he was really a superb glass blower. My work required many late evenings in those early days before I was married. The other person who was there late was Don Heinman. I wandered into his lab late one night and asked what he

was up to. He said, "Well, Dr. Hickman doesn't think anybody's worth his salt if he can't blow glass, and I've got to learn how to do it."

Another story which amuses me is characteristic of Kenneth's good sense of humor. He had to go several times to Hollywood to install his silver recovery apparatus, and would pile his car full of apparatus for these trips. Walt Wyerts was his assistant at that time. Walt was a delightful person. He later became a chess champion, was very interested in geology and the study of rocks, and was a very capable person. But he was a very mild mannered, rather shy person, and here he was travelling with his boss to California. All the way across the country, they stopped in restaurants and each time Kenneth would be the first to order his meal, then turn to Walt to see what he would have. Walt wasn't sure what he ought to do, so he always said he would take the same thing. Kenneth was amused at this, but after 26 such meals in a row, he was determined that it was not going to happen again. They got up on the final morning of their trip and set out before breakfast with only a short drive into Hollywood. Finally Kenneth saw a roadside restaurant advertising fresh strawberries. He pulled in and, I am sure with something of a twinkle in his eye, ordered a strawberry omelet smothered in onions. Apparently Wyerts turned absolutely ashen, and finally said to the waitress, "I don't think I'm hungry this morning." He then sat through the meal watching Kenneth push the onions - which he hated - to one side and separate the berries and eggs before eating his breakfast.

Dr. Hickman was both interested and competent in the theories and science of what he was working on. With the great spotlight on his applied work, we shouldn't forget things like the Hickman theory of the function of silversulfides in photography, which was important at that stage. He published his work on the action of the silver sulfides. The action itself was already worked out independently of him, but then with Shepard discovering the silver sulfide spectrum and the fact that there must be such spectrums, Hickman had his theory of why it worked. All the way along he was interested in the theoretical aspects, entirely outside of his mundane work in the laboratory, with interest in phototheory -- a field in which I was working. But he kept track of what was going on throughout the area of photography.

Glenn E. Matthews:

I started at Kodak on a permanent basis in July, 1921, working for Mr. Crabtree in the Photographic Chemistry Department. The principal function of that department was to do research of a practical nature on the various processing methods for developing,

fixing and other chemical treatments of photographic film and paper. We were located in old Building 3, which has since been torn down. When Hickman came, he had an office on the same floor of that building, and I used to drop in on his lab quite frequently.

At the period Hickman was in Building 3 he worked on many different things. He had such a creative mind that things were constantly occurring to him. He would sometimes have time to investigate them and sometimes all he would do is make a few notes and hopefully be able to investigate later. He once made the statement to me, "If I can't come up with at least one good idea every day of my life I feel the day is wasted." He filed many hundreds of sketch sheets. Of course, they didn't all become patents, but a great many patents were issued to him. I think he eventually accumulated nearly 200 patents and wrote over 100 articles.

I got him to write a couple of articles myself. He was fairly active for a short period of time in the Society of Motion Picture Engineers. The Society started in 1916 snd began to grow fairly rapidly. It was devoted entirely to engineering and practical people, not the artistic side of motion pictures, but scientists who were attempting to improve the techniques and apparatus. I suppose Kenneth joined the Society because we all were members, we all were close together on the same floor of Building 3, and we would all talk together. He knew Mr. Capstaff very well, and Crabtree, and was very closely associated with Dr. Mees and a man named Otto Cook whose lab was only a few doors from Kenneth's. Cook was working on the Kodachrome process under Capstaff's supervision (the old two color process, not the present three color one), and Hickman was working on a lot of chemical problems that would come up from time to time in the laboratory. Sometimes he would solve a major thing; sometimes he would work a while and put them on one side, but he was constantly working on various chemical problems.

He was an expert glass blower. He was able to do things with glass that I've never seen any other man do, in my limited education in that field. But I've watched him blow glass many times, and he would show me things that he had done, which was always very interesting. He would be trying to do something with an apparatus, and in order to do it, he would have to do this glass work -- it would require some kind of special glass work that he couldn't buy on the market, so he would make it. He never stopped in an idea -- if he had an idea to do he would work it out some way and get a result.

In the early days he worked alone as a young research chemist, for at least a year or two. Then several fellows began to join in

with him. Sanford and Wyerts were two of the fellows who started to work for him quite early. Sanford eventually became the head of the emulsion coating department at Kodak Park, which is one of the largest departments there.

Also, Don Heinman worked for him. He became an assistant Vice President of the company in charge of motion pictures and retired in that capacity. He was in the laboratory for quite a few years, and I think he probably started to work for Kenneth before he worked for anybody else.

Hickman had long been interested in the subject of the washing of photographic materials, films and prints, and he continued to do quite a few experiments when he came to America. After he got here wrote a paper on the washing of film, and one on silver recovery. He got interested in that subject and he worked pretty closely with Mr. Crabtree on that, because Crabtree had done some work on that, and a man named John Ross published the first paper from the photographic chemistry department. Then when Hickman came he began to work on a number of things and among them was this subject of washing, then he got interested in silver recovery apparently because he was so close to Crabtree. They did quite a few experiements on silver recovery. Hickman's first paper on silver recovery appeared in 1928, two years after the one by Ross and Crabtree. The 1928 paper was on the regeneration of Hypo, and there is another paper in 1931 on the electrolytic regeneration of fixing baths to recover the silver -- so that's three years between his papers on silver. He eventually published a number of papers in the American Chemical Society Journals.

Kenneth had a real sense of humor. It was often a very subtle sense or humor. You wouldn't think he was going to be funny about something and all of a sudden he would come through with a witty punchline or pun. He had a front tooth that he could slide in and out and wiggle around when he felt like it, and when that tooth started to wiggle that was a clue that he was going to come out with something funny.

It was sometimes a bit strange talking to him. He would start with that little twinkle in his eye that he used to get when he was very interested in something, but then it would seem as though the enthusiasm was a little bit less, and a little bit less, until finally you had the feeling that you were taking his time and should terminate the conversation or he would. I guess something would go through his mind that he was anxious to get at and do, and everything else must give way to that. I think his impatience was a

result of his feeling that he had something to accomplish. He was right in his element and was most happy when he was in the midst of experimentation.

Dennis Wratten:

I was sent over from England in 1924 to work for Dr. Mees, who originally worked for Wratten and Wainwright, and who was my godfather. I was eighteen. Dr. Mees thought I should go on to University, and an industrial relations chap who took me in hand while Dr. Mees was in Europe suggested Saint Lawrence University, so I was shot up there. It didn't take very well at all. My father thought I was going to the equivalent of Oxford, and I got quite a lot of money all the time, which nobody up there had in those days. I had a motor car, which nobody else had. I used to go out a lot, and eventually we got into the bootlegging game. I would go up to Canada and come back with tanks under the car full of gin. We were actually shot at once; it was quite exciting. However, the Dean and I decided that college was not for me. I came back and explained all to Dr. Mees, who was quite disappointed, but he gave up after a while. I went back into the Research Labs and got mixed up with the early Cine Kodak process, the early amateur movies, and I've been in motion picture film ever since, except that I went into films for professional use.

When Kenneth Hickman came over, Dr. Mees passed me over to him -- or passed him over to me, actually, for the momemt -- so that I could tell him how to do things. He got a room on Alemeda Street and I had a room on another street just on the other side of Lake Avenue. He and I used to foregather, by command, at Dr. Mees' place which was also down on Lake Avenue at the time. We were called "the boys". One of the jokes that Kenneth and I had was when we arrived at the Meeserie, which used to happen about every Sunday, Dr. Mees would open the door and shout up the stairs, "Mummy, the boys are here!" You can imagine how Kenneth and I reacted to that. We used to eat stale buns and warmed up seconds, but we had quite an amusing time together.

Kenneth was quite literally dropped into the Research Labs with the instruction "look around and find something useful to do". There was no particular big project awaiting him. I remember that very clearly. I was terribly junior to Kenneth, so all I could be was a listening box, as it were. When he wanted to complain about things I would listen, quite happily. That was one of the things he was peeved about, because they said, now you're here, what do you want to do? Do it! That's when he got into silver recovery. It didn't take him long to get into that. He was interested in

hydraulics. Actually at the moment he arrived he was interested in a silent lavoratory flushes. He really was. We made one which didn't work very well. We installed it in the research labs, and Dr. Mees went in. We waited and there was an awful noise when it didn't work, so we left rather hurriedly. It was an early model, but I don't think he went very much further with it.

Really, the first thing he did was electrolytic silver recovery, and that was an enormous success. It didn't take him long to do it, considering the amount of work. He went at terrifically high speed. He wasn't really a team man in a way. He did it all himself. He bought some tanks. He set them up in a room in building 3 -- one small tank. He fiddled about with it. He cut stuff up himself, made the plates himself, did all the electrical work himself. That is what it was. Real, honest individual research. No help. As it began to bear results, it evolved into development work, with other people bought in, but he also took a big part in that. When it moved on to manufacturing, he took a smaller part, starting the first installations, but that was the end of it, except that if anything went wrong, they would come back to him.

In these early days the whole research group was quite small. In terms of the current situation, it was tiny. There might have been fifty people in total, perhaps a few more. A lot of English people were there. There were only ten or twelve really top men, and perhaps you can reduce that to seven or eight. Let's see. There was L.A. Jones, Capstaff, Crabtree, S. E. Shepard, who in my view was the more brilliant man of the lot, and a couple of others. But that's all it was. Hickman fit in there rather well, as they all liked him, even before he really got going. And of course he really did revolutionize things. They had projects going on in other buildings where various film activities were taking place, but it was done in a true, honest to God research type of operation of the old style, where there wasn't any collossal group of engineering people doing your work for you -- you did your own. You blew your own glass, for example. Incidentally, Kenneth was the best glass blower I ever met in my life. Amazing. He impressed everybody like mad, right off from the beginning.

Really, I hardly worked with him much at all. We were friends, but I was no good at research, so I went into the motion picture side, purely as a technician to start with. I went around the world processing films. When they produced the Cine Kodak amateur movie film process, it was very popular. The cruise ships were so full of people, that we would set up a processing station, say, in Singapore which could take 50,000 rolls of film a year and along would come a cruise ship and give them a year's work to do in a night. So we

decided to put some of these processing departments on ships, and I was the one who started them. I had a lovely time going around the world.

Thus I had very little to do with Kenneth professionally. We were very good friends, and shared an apartment at 517 University Avenue, due principally to him, as he paid more than half. I wasn't earning anything like as much as he was at that time. We had loads and loads of fun together. We went on a trip to New England, very pleasant going up the mountains and so forth. Coming down one mountain we passed a sign post saying Bromley. Kenneth said, "That's my home town", and swung the car around suddenly to follow the road to Bromley. Well, some wit had swung the sign around to point over the side of the mountain; so we went over the side of the mountain. This is true. Fortunately, it was an open car, a Buick, I think. I was thrown out instantly, and he was thrown out a fraction of a second later, and the car went on down into a riverbed. The lights were still on for a long while under water. We clambered back up to the top. There were a lot of people there, out-of-workers, squater types, and they all came around and said, "Why don't you set fire to it? Come on!" They would get a bit of the rake off the insurance, that was their idea. Well, we didn't do that. We found someone to take us down to Manchester, which was just down the road. We found the garage proprietor, eventually in a speakeasy, and got him out. He put us up in a hotel for the night, and early the next morning, about six o'clock, he took us back up the hill, armed with all sorts of blocks and tackles and things, and using trees to hold the blocks and tackles, he pulled that car back up onto the road minus windscreen, minus everything, except it ran after he had worked on it a bit. He had to put a new battery in and dry it out a bit, and we drove it all the way back to Rochester minus the windscreen. That was one of our adventures. We had several more, but that was the most exciting one.

I remember we were both members of the Corner Club, but we shouldn't have been for some reason. It was made up of, shall we say, "intellectuals", a small group of them. "Elite intellectuals," ha, ha. It was on Grove Street. We had suppers and talked about anything. If it was esoteric enough, you were in; if it wasn't, you were out. I managed to go along by keeping my mouth shut, most of the time. I knew how to make the right kind of cracks.

Hickman's was a mercurial temperament. He went through patches where he enjoyed life, and patches where he didn't enjoy life at all. That could be over night. I knew that because I shared the apartment with him. But he was never, ever, other than basically a kindly chap, terribly reserved. He could say cruel things, but at a

later stage he woud always retract, he was quite good at that. But he was extremely kindly, I miss him a lot.

His colleagues soon found he wasn't always the easiest person to work with. There were days when he would tell you one thing, and the next he would tell you exactly the opposite, with no recollection that he was contradicting himself. There were people who would be his best friend today, and the next he would say, "I don't think that chap likes me". He was a little eratic when it came to saying who was his friend and who wasn't; he did change his mind at high speed. And he was impatient -- a high speed chap. I was always staggered by his mind. When he had an idea and would explain it, I would try to understand it, and before I could think about it at all, he would have fifteen derivations of the same theme. Absolutely outstanding. He did change his ideas about people. People at work basically adapted to it. He was such a brilliant chap that people assumed that this was a mild eccentricity. They didn't dislike him for it. I hadn't known anybody, who did it, frankly. If he had been an ordinary chap, people probably would have disliked him. He really did say some awfully nasty things about people at times. I had to go round and patch up things for him once or twice, but it was all very petty stuff. I suppose it's the other side of a very good sense of humor. If you have a very quick and sharp wit, you can turn it and use it for extremely effective sarcasm and cutting comments. You see right into the person's weakness, but the moment you've spoken you can't pull it back and retract it.

When he came over, he had had a love affair in England, and had decided against marriage, or the girl didn't want to marry him, one of the two. He wasn't terribly keen on madly dashing about with "les girls" or anything like that, although he did like nice people. He knew a group of girls in Rochester and they were very friendly to him. He kind of took turns taking them out. He started with Dorothy Schwartz, and then he moved on to Amy Oldpenny, and then he dated Lilly Grahms who was eight years younger. He sometimes took all three out together, in the roadster. It was really an amusing time. He had a number of amorous affairs, but they didn't come to anything. He used to come home sometimes terribly depressed, and other times highly elated. He wasn't a womanizer -- he really wasn't. He did have these little affairs, but they were tiny little things, often wrapped in a sort of Gallant Knight and Ladies in Waiting, romantic sort of thing. Entirely romantic. If he did anything that wasn't romantic -- a little more earthy -- it really depressed him. That happened rarely; I remember it only twice or once. He had all the natural urges, and I suppose in a sense he was ashamed of them. He had a sort of fictionalized idea of romance always at the back of his mind; there is no doubt

about that. He did very little of going out on the town, or anything like that. Also, he wasn't a drinker or hang around the bar type, so he wouldn't spend time like that.

Our relationship as roommates was very good. He went his way and I went mine, and that was quite good sense. We did eat once in a while together, but that was mostly out of tins -- canned food -- and things like that. Most of the time we ate out. We used to have breakfast together. Weekends, we used to sometimes go for very long walks. In fact, I remember walking from University Avenue to Lake Ontario and back, which is a hell of a long way (almost twenty miles round trip). I was young and thinner than now, and I could walk in those days. He adored walking. We would chat about this and that all the way down.

Bryan: I remember his remarking just a year or so before he died, while he was still fit to hike about, that he'd love to take a holiday one last time to hike and roam the moors in Devonshire, dressed in a slicker, with the wind and rain against his face.

Wratten: He always was in the British sense, class conscious. He may have professed a feeling of being a foreigner and not quite established in America, but he was conscious that he was quite a good class type, and he reacted to other people in that way. Particularly in that era. He was a very close friend of Tim Shepard, and Eva Shepard, who had the right connections around the town. So it worked out very well for him.

He did have one anecdote along these lines. Mr. Eastman used to "receive" weekly -- his soirees were quite famous, and Kenneth was not normally included, but very occasionally he would be. One evening he was at a party, I believe it was at the Mulligans, and some lady hustled up to him and rather haughtilly said to him, "Why is it that I never see you at Mr. Eastman's?" Mrs. Mulligan stepped up at that moment and saved the situation by saying, "You know, Mr. Eastman tries to be very English when he draws up his guest lists, but he drops his H's."

I used to do to the Sunday evening soirees, where an orchestra played and Mr. Eastman's house was opened to a few very selected friends, and so did Kenneth. He turned out there several times. We weren't invited all the times. There was a steady core group who came all the time, and then there were others who came once or twice when invited. Actually, Kenneth was a rather steady one. You see -- and I put myself in this was well, because it's only fair -- Hickman and I were terrible snobs. We really were. It was out fault, but basically it was a defense mechanism, to some extent. It isn't easy to change countries, to just step from one to another and

adopt its customs and it culture, even if the language is more or less the same. Automatically you tend to throw up defense mechanisms.

Even more so with Kenneth. If you want to analyze his character, you have to go back to his childhood and the fact that he was ill as a boy. Therefore at ages twelve through eighteen, when most boys are involved in the rough and tumble of dealing with other boys, getting teased and kicked around, and learning all the give and take -- he missed all that. Here you have a chap who didn't have the advantages of a normal upbringing -- if those are advantages -- he didn't have it, anyways, so he had something missing. He was terribly sensitive in some areas. If he thought he had been slighted, he would react a thousand times more than anyone else would, by saying sarcastic things about other people. And because he thought sometimes they didn't think much of him, just as he didn't think much of them, he would make it even more sarcastic as a form of protection. Basically, he was the kindest of human beings, he really was. Also, he hardly learned anything until he was about sixteen, after which he picked up like lightening -- which leads me to the idea that maybe it's OK to leave people's minds in abeyance for a while. He didn't have any of the traumas or problems of the ordinary young kid -- in other words, being bashed about and so forth -- so he was very sensitive.

He was also impeccably honest, very. Absolutely. That was one of the things I took for granted. But it was almost dangerous for him at times. He almost imposed his morality on everybody, even though not everybody could live up to it -- and they sometimes wondered whether he was living up to it, so it worked both ways. He was on an operation that you couldn't win on sometimes. Nevertheless, I think in those years, those very early years, I knew him really honestly as well as anybody did. He couldn't have been more kind to me, couldn't have if he had been my brother.

There were periods of time when he would be so depressed that he would threaten to take his own life, sort of thing. I even consulted with somebody on this, and they said that anybody who talks about it isn't going to do it. That made me feel better about it. But he did go through a period, and I don't know to this day what caused him to feel this particular frightful depression. I think he felt he wasn't getting anywhere suddenly. I do remember that. I was terribly worried for a little while. Not very long,

I think he had a picture of himself which he tried to live up to, and if it wasn't working too well at that point in time, he really did get depressed about it. He was much better off when he had the full flow of ideas going, developing something quickly; then

he was on top of his form and he stayed that way until it had faded out and he was waiting for something else to take its place. He did have a desperate urge to achieve. It affected him in various ways; one of the ways was that he got so depressed at times, when things were going aginast him slightly. Fire in your belly is a good thing to have, however.

One last thing I should mention: when he came over to America, he asked Dr. Mees if he could bring over dear Douglas Spenser, who was his assistant or partner over at London University. Dr. Mees wouldn't have him under any circumstances. I remember Kenneth spending hours telling me what a fine chap Spenser was, and what a shame it was not to hire him, and so on and so forth. Spenser left the University and was running a company called Color Photographs, Ltd., which had a marvelous new photographic process, and they did it marvellously well, but when the war started the thing closed down because they were being supplied out of America and couldn't get things anymore. So he was taken on by Kodak Limited in their Research Labs in England. Spenser rose to be Managing Director of Kodak Limited. There was a lovely relationship, if I may say so, too! Part of the time Hickman adored old Spenser, and part of the time he absolutely hated him. It was very difficult to know which particular phase you were in.

Bryan: I have got some of their letters, back and forth, and I think you are right. Half of them are either accusing or apologizing, and the other half are full of great good humor.

Wratten: Spenser could be just as difficult as Kenneth, so I wouldn't put all the blame on just one of them. They used to become instantly suspicious of one another for no good reason at all.

Bryan: Perhaps that has something to do with the scientific mind. Dad was suspicious of everything and everybody. We would go to the cottage and when couldn't find the shovel, he would say, "Somebody has stolen it. You can't trust the local hicks; they'll come up here and take anything!" Ten minutes later he would trip over the shovel right where he left it the week before, and the incident would be forgotten, until played out again. We never had anything stolen from there in forty years, even though the cellar and barn had no locks. But that same suspiciousness and tendency to hypothesize about minor every day events were probably related to his curiosity and creativity. His mind was never at rest, not even at night. Many of his inventions or solutions to problems came to him in dreams or waking hours in the middle of the night.