MEMORIES OF NEW BERN

DR. WILLIAM H. BELL

INTERVIEW NO.504

This is Dr. Francis P. King interviewing Dr. William H. Bell at his home on Pollock Street on January 5, 1993. I am representing the Memories of New Bern Committee. My number is 500. This is interview number 504.

Dr. King: Bill, can you tell me when you were born?

Dr. Bell: March 30, 1923.

Dr. King: It's William Harrison Bell as I recall. Is that right?

Dr. Bell: Yes, I've carried Jr. By the time my father died, we'd both signed so many things locally that it was simpler that way.

Dr. King: You were born in Newport.

Dr. Bell: Newport, North Carolina.

Dr. King: And your parents name.

Dr. Bell: William H. Bell and Leah Garner Bell.

Dr. King: And you were the only child.

Dr. Bell: I was the only child, right.

Dr. King: Was anyone else living in the home with you at that time?

Dr. Bell: (laughter) Yes. Much of my life my aunt, Mrs. Wilson, lived with my mother. They had no children, she and her husband.

Dr. King: Was that Tuby?

Dr. Bell: That was Tuby. (pronounced Tibby)

Dr. King: Not living in New Bern, I don't believe we'll go into all the childhood memories. Anything particular that you have to record?

Dr. Bell: No. Tuby's husband was related to the Oxleys in New

Bern and we used to come up when I was small to the firemen's shows and that sort of thing. They lived out on Rhem Avenue. Miss Minnie ran a children's shop and Miss Georgia ran a photography shop and Bill Oxley was in the Navy.

Dr. King: Then you went to school in Newport?

Dr. Bell: I went to school in Newport, right.

Dr. King: Did they have a high school there then?

Dr. Bell: Yes, the Newport Consolidated School which included the high school.

Dr. King: How many were in your class?

Dr. Bell: I think nineteen in our graduating class.

Dr. King: Then your college.

Dr. Bell: I went to Carolina as you know.

Dr. King: That's the University of North Carolina.

Dr. Bell: The University of North Carolina. I went there in 1940.

Dr. King: Chapel Hill.

Dr. Bell: Chapel Hill. We transferred over to the medical school in March of '43.

Dr. King: As I recall, you were a member of Phi Beta Kappa.

Dr. Bell: Yeah.

Dr. King: You were the President.

Dr. Bell: That's right. In September of '44 we all scattered and I went to Cornell University Medical College in New York where I graduated in March of 1946. From there I went to Vanderbilt University

Hospital for my internship which continued to July 1, 1947.

Dr. King: Then you went in the service?

Dr. Bell: I didn't go in the service until September. You know we went in in relays. I got my orders, I think I still remember, September 27 in San Antonio, Texas, and it was still hot down there.

Dr. King: Where were you stationed after that?

Dr. Bell: I was stationed at Fort Jackson, South Carolina the entire time.

Dr. King: What did you do there?

Dr. Bell: I ended up running the out-patient clinic. I took care of the children and wives mainly. I was the, I suppose you'd say, regimental surgeon for the WAC detachment.

Dr. King: Well, that was interesting. (laughter)

Dr. Bell: There were about 50 or 60 WAC's at that time.

Dr. King: That's the Women Army Corps.

Dr. Bell: Women Army Corps, right.

Dr. King: Then you went back in radiology.

Dr. Bell: Then I went to Baltimore. I was getting out in September. I had missed the July class. They had an affiliation with the Veteran's Hospital at Ft. Howard which is in Baltimore. I went there for the first year, then we did a year with the tumor clinic, and then the third year I was at Hopkins Hospital.

Dr. King: You were at that time able to get your certification boards in diagnostic radiology and also therapeutic radiology.

Dr. Bell: Yeah. Actually, anything short of radiology was

considered limited certification. Some people did get it in therapy and some got it in diagnosis, but the certification itself was in both. The saying at that time is that you spent eighty percent of your time working in therapy and got eighty percent of your income from diagnosis.

Dr. King: Then you came to New Bern.

Dr. Bell: Came to New Bern when I finished that. Right. I came July of '52.

Dr. King: Interesting enough that you and I were classmates but didn't know we were coming.

Dr. Bell: Of course Sonny was a classmate also.

Dr. King: Yes, but he was already here. Dr. Junius Davis. The Pattersons also came at that time. Dr. Simmons came in July.

Dr. Bell: Joe came a little bit later.

Dr. King: No, a little earlier.

Dr. Bell: A little earlier? Okay.

Dr. King: January.

Dr. Bell: Right.

Dr. King: Tell me about your earlier practice of radiology here in New Bern.

Dr. Bell: In order to put a practice together I went to the three hospitals in New Bern, the hospital in Jacksonville, and the hospital in Morehead City. Actually, there was very little work in any of the hospitals at that time in radiology. I still remember that my first days work, which was by our schedule in Morehead City, I had one chest x-ray and a gallbladder series. During those first years I would call

around to see who had what as I planned my days. At least once every two or three months I would call and find that on that particular day no hospital had any films or any procedures planned. I had a completely free day.

Dr. King: Even here in New Bern?

Dr. Bell: Even here in New Bern.

Dr. King: How often would you go to Morehead City and Jacksonville?

Dr. Bell: I went to Morehead City and Jacksonville three times a week. Both places the same day. Traffic wasn't the problem it is now.

Dr. King: How many miles was that you think?

Dr. Bell: Oh, I drove about 50,000 miles a year all together. As I recall it was about 120 miles to make the circuit. Something like that.

Dr. King: Did you meet with any opposition of the other physicians for your services?

Dr. Bell: No, not at all. Everybody seemed to be glad I was there. They just weren't in the habit of using x-ray.

Dr. King: Did you help alter that situation?

Dr. Bell: It changed fairly rapidly. I'm trying to remember the first fumbling attempts I made to interest someone else to come into the area. It was early in the 1960's. The first person that thought he wanted to come, wanted to live in Jacksonville. I remember that he had just arrived in Jacksonville when the missile crisis

developed. It frightened him so much that he was near a major military base that he immediately quit and left.

Dr. King: Why did you decide to come to New Bern?

Dr. Bell: Well, my father had had a stroke at that time and the family needed some help to keep things going in Newport. That's why I essentially created a job here. There had never been a radiologist here, except for a little mail order radiology. Some of the films had been being sent to Kinston for a while, but at the time, they had no radiologist.

Dr. King: The radiologist there, Dr. Patrick, he hadn't come.

Dr. Bell: He didn't come until several years later. I'd estimate about 1955, 1956.

Dr. King: Of course most of this was what we consider now simple diagnostic radiology.

Dr. Bell: Absolutely.

Dr. King: Did you do any therapy then?

Dr. Bell: We started doing therapy in 1953.

Dr. King: Did you have a new machine?

Dr. Bell: Had a new machine. The Shriners bought a new machine and installed it at Kafer Hospital. Late in '53, or early in '54, I believe it was still in '53, we started treating the first patients.

Dr. King: The machines you had available for use, how old were they at that time?

Dr. Bell: They were fairly modern because GE had popularized a unit that could be converted from radiography and to fluoroscopy

to superficial therapy actually, though we never used it for that purpose. These early machines, well, it wasn't an early machine, it was the early machines that we had, were made by GE and designed for the small hospital trade. It was a little cumbersome, but you could use one tube to do all the various things that I described. As a matter of fact, you installed a used one in your office at a later date. They did quite a good job. There was no spot film device at first. Certified radiologist no longer used such a machine to do radiation therapy, but they did do good fluoroscopy without spot films and they did do good radiography.

Dr. King: What about your technical help? That's just so important in your work then.

Dr. Bell: Yes. The hospitals were willing to acquire trained technologist, except that there was only one at each hospital and it was sort of catch as catch can for call. They were amazingly well trained for their day. It really was not a problems except it would have been much nicer to have two rather than one, but each hospital couldn't afford two.

Dr. King: Now as the years passed, you began to improve your facilities. Did you improve it here in New Bern before the new hospital?

Dr. Bell: Oh yeah. The first thing that I did on my own was buy a portable x-ray machine, which the hospitals did not own at the time I came. It doesn't seem like much of a breakthrough at this point.

Dr. King: For all the hospitals here?

Dr. Bell: Yeah. The first portable you could carry around really. It was a self rectified tube and didn't weigh an awful lot. It packed up in a suit case and had a stand that you unfolded. It wasn't great by today's standards, but it did the job. We were able to make some films in the operating rooms and in beds at that time. Then the first, I guess, real expansion was the conversion of some of the machines to those with spot film devices, which the hospitals did.

Dr. King: Now, the spot film device, can you describe that?

Dr. Bell: That's while you're fluoroscoping, you can snap a picture of what you're seeing.

Dr. King: It's more of a localized spotted area.

Dr. Bell: It's more of a localized area.

Dr. King: It's almost like looking in a magnifying glass in a sense I guess.

Dr. Bell: Right. It was very essential in those days because we didn't have any amplification and fluoroscopic images were not great. We had to dark adapt to see anything. You could buy red goggles that had a little slit over one eye so that you could wear them and still drive a car and look through the slit to see if the light was green or red.

Dr. King: Now, the red goggles could get your eye accommodated I guess to the darkness and you could see better. It took how long to do that?

Dr. Bell: About fifteen minutes. We frequently had only one or two fluoroscopic exams so it took as long to get ready for the exam

as it did to do the exam. The first development beyond therapy was to expand, well, perhaps as a part of therapy, I acquired some radium about a year after we got the x-ray therapy machine. The thing that amazes me is that the first two years that I had the radium, I averaged treating a carcinoma of the cervix every week for two years. A 104 patients in two years.

Dr. King: Now which year was this? Do you remember?

Dr. Bell: This was about 1954 to '56.

Dr. King: You mentioned the x-ray therapy machine. Was that a part of the other machine or was that a separate machine?

Dr. Bell: The radium was not a machine.

Dr. King: I realize that. You said in conjunction with...

Dr. Bell: The therapy was a totally separate machine.

Dr. King: Where was that now?

Dr. Bell: That was at Kafer. It belonged to the Shriners. It was a 250 kev therapy machine, which was the standard for the day. The thing that interest me about the carcinoma of the cervix, however, is that the pathologist now tell me they only see two or three carcinoma of the cervix a year.

Dr. King: And presumably that's related to the frequency that pap smears are done now?

Dr. Bell: Well, a pathologist told me not too long ago that the number of pap smears that are done in this country would indicate that 70 to 80 percent of the women in this country have never had a pap smear. So it may have something to do with feminine hygiene. I don't

know. But it certainly is not the common carcinoma that it was in the fifties. The next development was nuclear medicine of which I knew nothing about from my residency, but it appeared to be a going thing.

Dr. King: Let me interject here. You didn't know anything about it because there wasn't much known about it at that time.

Dr. Bell: It hadn't really developed medical use at the time I did my residency. Dr. William Beierwaltes in Michigan was one of the forerunners of the medical use of radio-nucleids, (isotopes). I saw him at a meeting and got fascinated. He offered me the chance to come to Michigan and spend some time with him. A total of about two months spread over a period of about six months. When I got there I was surprised, this was in 1961, and I was surprised to find that I was in the department of thyroidology because that was what isotopes were used for at that time, diagnosis and treatment of the thyroid and blood volumes.

Dr. King: Can you go into a little more detail about the thyroid diagnosis?

Dr. Bell: At the time, we didn't do scans. The scanner hadn't come into being. It came into being while I was there actually. You measured thyroid activity and if a person were hyperthyroid or had carcinoma of the thyroid, you gave them doses of radioactive iodine.

Dr. King: Was the thyroid diagnosis by x-ray better or supplemented? The blood test were then available?

Dr. Bell: There weren't any really good blood test available.

As you remember, they were doing basal metabolism.

Dr. King: I was thinking that the TBI...

Dr. Bell: The first TBI was a radio-nucleid TBI. We did some of those. Actually, the most popular radio-nucleic exam at that time was the blood volume until surgeons discovered that it was easier to weigh the patient on the operating room table than it was to do a radio-nucleid BV. At one time there were more anesthesiologists qualified to do nuclear medicine than any other specialty, for that reason.

Dr. King: They did them during the operation then?

Dr. Bell: Yeah.

Dr. King: These were prolonged operations I assume.

Dr. Bell: Right. Or people who did not do well after an operation, because a person could go in shock from too much blood as well as too little, which is well known now. When I came back in '61, the Sisters at St. Luke's owned the house next to the hospital and were kind enough to make a room there available for me to put a radioactive counter, a probe and a well, which was about all the equipment people had at that time.

Dr. King: Now, by well, you mean...

Dr. Bell: That's what you use for measuring blood, for blood volumes and so forth. We started doing some radio-nucleic studies.

Dr. King: Let me go back just a second and explain that a little more fully for our non-medical audience. The radio-nucleides, can you explain that, or the isotopes?

Dr. Bell: These were isotopes. At this point, nuclear medicine was entirely either therapy, treating the thyroid, or using radioactive phospohoris for bone metastasis or radioactive gold for peritoneal metastasis, or was essentially a laboratory type study.

Dr. King: These isotopes were altered chemicals in a sense that gave off radiation that you could measure in these various instruments.

Dr. Bell: Right.

Dr. King: Go ahead now. I just wanted to get that straight.

Dr. Bell: Iodine-I-131 was the workhorse of the trade in those days, some even for blood volumes tagged to proteins. In 1962 during the missile crisis, since we had a new man at Jacksonville, I went to Oak Ridge Institute of Nuclear Studies. I was there during the Cuban crisis and saw the first total body scanner, the thing that has really revolutionized nuclear medicine. It was made by Picker and it sold for $10,000 and I ordered one of them. At about this time St. Luke's was being bought out by the county, the new hospital was under construction, and the operation was moved to the new hospital.

Dr. King: Can you explain a little more about the total body scanner?

Dr. Bell: You fed the patient the radio-nucleid. If it was a thyroid, they lay under the machine which went back and forth across their neck and recorded on a piece of photographic film the activity within the thyroid.

Dr. King: If it was an overactive thyroid, you gave them...

Dr. Bell: You recorded a very high uptake.

Dr. King: That showed up on the film. If you had a tumor that was not active...

Dr. Bell: It was a photopenic hole in the thyroid. We could do some livers with radioactive gold. It really didn't become a popular thing until somebody figured out how to make radioactive technetium available to the local hospital. They did this by creating a molybdenum "cow" so that you could get this generator in a lead container that was good for a week and get the technetium out of it.

Dr. King: That is, the molybdenum...

Dr. Bell: Disintegrated to technetium.

Dr. King: Incidentally, this technetium was co-developed by a Mr. ( ) who is retired to New Bern. He did go to the University of North Carolina, Chapel Hill, and was a chemist in working at this.

Dr. Bell: I think he worked at Brookhaven, didn't he?

Dr. King: Yeah, he worked at Brookhaven.

Dr. Bell: He was very instrumental in the development of this, which was really the breakthrough in nuclear medicine. Then it became possible to do brain scans and scan most parts of the body.

Dr. King: Bone scans.

Dr. Bell: Bone scans, livers, spleen.

Dr. King: Brain scans became very useful for the neurologist and the neurosurgeon.

Dr. Bell: Very useful. For the first time you could really make a diagnosis of a brain tumor. Before that, pneumoencephalograms and arteriograms merely showed displacement of vessels or other

structures. You presumed there was something, but now you can map a picture of the tumor.

Dr. King: Would the technetium show as a so called hot spot in treatment.

Dr. Bell: Hot spot in the brain.

Dr. King: Why did the tumors take up more than surrounding brain?

Dr. Bell: Because a tumor destroys the blood brain barrier. The technetium gets in the tumor but doesn't get out, while in the normal brain, it washes out. So one was given the technetium and an hour later the scan was made. A brain tumor wasn't the only thing that did this but was the most common of the lesions. But just abnormalities showed the uptake of the technetium.

Dr. King: Has that been superseded?

Dr. Bell: The CT scanner was the thing that superseded the brain scan. Not totally. The radio-nucleid brain scan still has some important applications, but for the run of the mill diagnosis of brain tumor and other common things, the CT scanners planted radio-nucleid brain scan. Currently the radio-nucleid scanner has not been replaced for liver, bone, and thyroid. It has utility other than that, but those are the popular exams, plus lung scans.

Dr. King: Lung scans were used for what?

Dr. Bell: In suspected pulmonary emboli.

Dr. King: That's clots going to the lung.

Dr. Bell: Clots going to the lungs. Now I should say that the scanner changed however and the old rectilinear scanner that I

described earlier lived only about ten years and then we had nuclear cameras which worked more like a x-ray tube in reverse. The radiation went to the tube and the tube printed the picture.

Dr. King: And that gave more definition or finer detail?

Dr. Bell: It was quicker, gave better detail, more definition. It was really a much finer instrument. These, of course, now have been supplanted by the SPECT scanners and the PET scanners which are really a hybrid of a CT scanner with a nuclear detector.

Dr. King: Say that again.

Dr. Bell: They use the principle of CT scanning, but they measure radiation from within the patient rather than shooting radiation through the patient.

Dr. King: And you can define lesions better?

Dr. Bell: You also see an anatomical presentation of the brain. It's almost like what you expect a pathologist to see.

Dr. King: Now in the PET scanner, I think it's sometimes used to detect what functional areas in the brain that aren't functioning well.

Dr. Bell: Yes. The PET scanner has never become popular because no one yet has come up with a way to make the radio-nucleids that it uses available to the small hospital or practitioner.

Dr. King: That's the PET scanner?

Dr. Bell: The PET scanner. It uses a positron. The positrons have half lives of only seconds. They have to be prepared in nuclear reactors and by the time they get to the customer he has to be very

near, or they are inactive.

Dr. King: You might mention what you mean by half life.

Dr. Bell: Radio-nucleid life is spoken of in half life because for every isotope there is a characteristic period of time in which the activity drops to a half. After seven and a half half lives it's considered essentially dead. This ranges from twenty-odd years in some of the radium series down to micro seconds in some of the positrons. For this reason, the positron scanner is not in popular use but it is an important tool. The SPECT scanner, that stands for single photon emission computed tomography. It uses the same isotopes that the old nuclear scanners used and nuclear cameras used. The CT scan, however, has become the tail that wagged the dog. At the present time, thirty percent of all money spent on medical imagining in the United States is spent on CT scanning. I saw the first CT scanner about 1974. It had been in use experimentally for about ten years at that time and it was obviously a fantastic instrument. At the time, it would only examine heads. Bert Rowell, who was then in practice with me, and I, decided that we had to have one. So with great fear and trembling we contracted for the purchase for the first CT scanner which costs us $329,000.

Dr. King: That was when now?

Dr. Bell: That was I think about 1975.

Dr. King: This was only used for the head.

Dr. Bell: At that time it was only used for the head. After about a year, it obviously was supporting itself and they came out

with a total body scanner and we were able to trade for a total body scanner.

Dr. King: Let me go back. Can you say in simple terms what the CT scanner really does?

Dr. Bell: Well, Sir Huntsfield, I don't know his first name, the man that invented the CT scanner was a physicist that worked with a musical instrument company in London. On Christmas Eve he was watching his children's electric train run around the Christmas tree. It occurred to him that if you could take all the pictures of all the shadows that were cast by the train on the wall and feed them to a computer, you would have a good picture of the train. So they did exactly that. They made a x-ray tube to go round and round the brain and they measured pencil sized areas of radiation absorption as it went around and took all of these figures, and they were just figures, and fed them to a computer and came out with a composite of figures that could be digitally converted to a picture. It took about four days to make the first scans.

Dr. King: You might mention that the conventional x-ray of the head. What did you see when you took a picture?

Dr. Bell: Conventional x-ray of the head, you get one path of radiation through the entire head and the image is recorded on photographic film because the intensity of the radiation darkens, some parts of it more than others.

Dr. King: But you don't see much.

Dr. Bell: No, you don't see nearly as much. This actually gives

an anatomic rendition of the part.

Dr. King: That is, you can see the various structures inside the head, and if there's a growth or tumor or abscess or infection or something, that will usually show up.

Dr. Bell: Oh yes. Right. Not only in the head but in all parts of the body.

Dr. King: This computer, did they have to develop the software to convert this to that?

Dr. Bell: Oh yes.

Dr. King: That must have been a major undertaking there.

Dr. Bell: I'm sure it was. The technical problems, I can only imagine.

Dr. King: How many were in operation in North Carolina when you bought yours?

Dr. Bell: We had the third one in North Carolina.

Dr. King: The other two were the major hospital centers? Duke and Chapel Hill.

Dr. Bell: That may not be correct. Let me back up a little and say that the first CT scanners were called First Generation scanners that the examination was made in a water vat. The one that we bought was the first of the units that could be used with somebody just sticking his head in a machine, going through air. We had the third one of those. I'm sure that Duke, Wake Forest, and Chapel Hill had all been playing with the First Generation scanners at that time, but I don't remember the details. I would presume they certainly had it.

Dr. King: You bought it individually, separate from the hospital.

Dr. Bell: Yeah.

Dr. King: Did you rent space from the hospital?

Dr. Bell: We rented space from the hospital. We had originally offered to make the down payment of ten percent if the hospital would buy it. After it was ordered and about to be delivered, Mr. Moore came in...

Dr. King: Mr. Moore being the hospital administrator?

Dr. Bell: Hospital administrator, and told us that he wasn't crazy enough to spend $300,000 for a machine that would only x-ray heads. So we were faced with the dilemma of either losing our down payment or taking it on our own. He said he would rent us space in the hospital if we wanted to buy it, so we did.

Dr. King: You remember how much you paid for it then?

Dr. Bell: Three hundred and twenty-nine thousand for the first one and the body scanner was about seven hundred thousand.

Dr. King: But it became very useful.

Dr. Bell: It became very useful and satisfactorily profitable to us. After the hospital exercised their option to buy the machine from us a few years later, it had become tremendously profitable. The utility of the CT scanner just has continued to increase.

Dr. King: Is that due to the development of the machine?

Dr. Bell: The machine basically hasn't changed, it's speeded up, but the software has been developed.

Dr. King: The software, you mean the computer software.

Dr. Bell: The computer software has been advanced tremendously, and the things that people know they can do with it has advanced tremendously. Now it's almost the first line of examination in x-ray. Few people can get in the hospital and get out now and not have a CT scan.

Larry Erdman introduced angiography to New Bern. That's the study of blood vessels by x-ray in which you place catheters in the vessel, inject contrast, and take films very rapidly as it flows through the vessels. I would estimate that he did this about 1970.

Dr. King: By contrast, you mean substance that shows up in the x-ray picture, inside the vessels.

Dr. Bell: That's right.

Dr. King: Blood doesn't ordinarily show up or you can't see the vessels on just a plain x-ray picture.

Dr. Bell: The exams he was doing were rather limited to his field of interest, of course.

Dr. King: He, being a surgeon.

Dr. Bell: A surgeon, he was interested in the major vessels and the vessels to the legs. When Bert Rowell decided to come to New Bern and practice, he had been well skilled in angiography in his residency. It was decided that I should go away for study in angiography, which I did, courtesy of Dr. Irving Johnsrude at Duke. Then we took over the practice of angiography. It's major utility was in the brain but we did it in virtually any vessel.

Dr. King: Now, describe this process that you did.

Dr. Bell: You usually, starting from the groin or under the arm, you'd pass a catheter.

Dr. King: That's a small little tube.

Dr. Bell: A small little tube through the vessels. In the case of the brain, to each of the three major vessels that go to the brain, and inject contrast material that you can see in the vessels and take a great many pictures very quickly as it flows through them. A total examination frequently will have as many as seventy pictures. At the present time, the anatomical detail of CT, and more recently MR, has gotten so good that angiography is not as widely used for diagnosis but is essential in treatment because it provides a road map for the surgeon. And indeed, a significant number of procedures can be done angiographically, although, we have never done them here to any extent, aneurysms or vascular malformations in the brain.

Dr. King: Small dilations or breakthrough on the wall of the artery.

Dr. Bell: Right. Can be filled with little balloons to occlude them. In the legs, and narrow vessels, can be dilated with angiography. The popularity of angiography has continued. There possibly are slighter fewer cases done than there were twenty years ago.

Dr. King: Now, my recollection was the angiography preceded the CT scan, but I was not right in that.

Dr. Bell: Oh yes, angiography preceded CT scanning. As a matter of fact, fairly good angiograms were done as early as before World War II.

Dr. King: Yes, but I mean with you.

Dr. Bell: Yes, they did precede CT scanning.

Dr. King: I mean, you had it before you got the CT scanning.

Dr. Bell: Yes we did.

Dr. King: But I had forgotten that Dr. Rowell was also involved.

Dr. Bell: I became active in angiography slightly before Bert got here, but in anticipation of his coming and in anticipation of Larry's leaving, honestly. He had decided he was leaving. I knew that Bert was trained. I got my training so that I could pick up from Larry, and then when Bert joined me we could go on further.

Dr. King: Angiography is generally done by the radiologist, with what exception?

Dr. Bell: Generally done by radiologist or cardiologist. There are some major exceptions. In probably the largest hospital in North Carolina, angiography is done by a surgical group. That's Charlotte Memorial. Cardiologist have expanded their role beyond the heart and they're doing a number of vessels other than the heart now. There are still some places of course where the radiologist do the hearts. Most of angiography I think is still done mostly by radiologist. I don't have the figures. Something else that came along that isn't radiology at all actually but is imaging, that started with the sonar of World War II in picking up German submarines, is ultrasound. Bert Rowell and I purchased our first ultrasound unit shortly after he came.

Dr. King: Do you remember when he came?

Dr. Bell: I think it was 1974. Of course, equipment for ultrasound has developed tremendously. It is a very handy tool. It's now used in many offices, all hospitals.

Dr. King: Can you describe the instrument or the thing that you do with that or how it works?

Dr. Bell: It's a process of making a picture with ultrasound.

Dr. King: Ultrasound being the sound waves themselves.

Dr. Bell: Sound waves themselves. The probe that is used to make the picture actually sends the energy into the organ and measures the character of its reflection back to the probe. It measures tissue planes. As far as anybody knows, it is totally harmless to the patient. It has become amazingly popular in obstetrics where you can see the fetus easily.

Dr. King: You can determine the sex I think.

Dr. Bell: Yeah, you can determine the sex late in pregnancy by the very obvious identification of the genitalia. Also, it's great for the gallbladder, the uterus, the pancreas, and in really skilled hands, it's application even extends to such things as the appendix.

Dr. King: Also the heart is. It's very instrumental in diagnosing the aspects of heart disease.

Dr. Bell: Yes. I didn't think about the heart, but that's absolutely true. Of course initially we did the heart, but the equipment that's used now to examine hearts has changed so much that neither Bert or I, I would expect would recognize them, echocardiogram, anymore. Then of course most recently, the MR scanner.

Dr. King: Is it MR or MRI?

Dr. Bell: Radiologist are trying to change it to MRI. That's magnetic resonance imaging. It initially was NMR, or nuclear magnetic resonance. But some of our friends began to refer to this as meaning "no more radiologists."

Dr. King: Why was that?

Dr. Bell: Well, it actually is not radiology, and NMR fit well for "no more radiologist." They began to tell us that with MR, wouldn't need radiology anymore, so we tried to change it to MRI, magnetic resonance imaging.

Dr. King: But the other was nuclear...

Dr. Bell: Magnetic Resonance. Indeed, MR is used by others than radiologist, though radiologist are most often involved with MR throughout the country. This is an instrument very similar to CT scanning. It has some advantages over CT but overall is not as useful as CT.

Dr. King: Can you say in simple understanding terms what it does to make these images?

Dr. Bell: (laughter) Not very simple. The patient is put in a strong magnetic field.

Dr. King: Just between magnets.

Dr. Bell: Right. Protons are lined up by the magnet.

Dr. King: Protons being tiny particles in the nucleus of the cell..

Dr. Bell: Yes. But as a matter of fact, the only ones that are

practical to use are those that are either in water or fat, but most tissues have water and fat in them. After they are lined up, a radio frequency signal hits them and knocks them down.

Dr. King: Knocks the protons down.

Dr. Bell: Protons down. Since they are magnetized, they come back up, but the speed with which they resume their original alignment enables the detectors to gather information that they can place digitally into a picture.

Dr. King: By digital, you mean computerized.

Dr. Bell: Computerized, uh huh. The picture looks very similar to the untrained eye to a CT scan.

Dr. King: But it shows up different things as I recall.

Dr. Bell: Yes. It shows different things in a different way, but it's greatest practical application is the fact that it does not see bone, and structures close to bone can be much more easily visualized.

Dr. King: The CT scanner does see bones and they get in the way.

Dr. Bell: And they're bothered by artifacts from bones, yes.

Dr. King: Now that's become very useful also.

Dr. Bell: Yes. The limitation of it is that it's relatively slow compared to CT scanning; examination frequently takes as much as an hour; that many people have claustrophobia and they find the examination difficult.

Dr. King: Because of the...

Dr. Bell: The tube that you have to be in.

Dr. King: Which is a small tube maybe two feet in diameter.

Dr. Bell: Well, yes, maybe so. I'm not sure just how large it is. I'm a close fit in one though. Then some people with pacemakers and so forth can't be safely examined in one. You hesitate to put an unconscious patient in one.

Dr. King: How about if you have some metal in you somewhere?

Dr. Bell: This can be a problem, however, it's not the problem it was originally thought to be.

Dr. King: If you have a bullet left in you, you could avoid that?

Dr. Bell: If it's in you leg, it will give you no trouble. If it's a tiny piece of metal in the eye, it might give trouble.

Dr. King: What does it do to the piece of metal?

Dr. Bell: It magnetize it and may move and may do some damage to the eye that interferes with vision. But moving a piece of metal in your leg a little bit doesn't do any harm.

Dr. King: It's the movement of it, it's not the heating up of the metal or anything.

Dr. Bell: No, not really. This has been considered a possible problem in some areas, but I'm not aware of any real damage having occurred from it.

Dr. King: What's new on the horizon now? We've been through a lot.

Dr. Bell: I don't know of any absolutely new tools that the radiologist are after. Certainly, most radiologist would like to have a PET scanner if you could get the positrons. The software continues

to improve in amazing fashion.

Dr. King: Who develops the softwares? The companies themselves?

Dr. Bell: The companies themselves I think. Of course, many of the universities have fellows who work on it all the time.

Dr. King: Bill, can you talk some about mammograms? We haven't talked about that, and that certainly is a well known procedure now.

Dr. Bell: It's an old procedure. We've been doing mammograms in New Bern for at least 25, maybe 30 years. Both film and equipment has improved during that period of time. But just in the last five years or so the subject has exploded from one or two mammograms a week on an average volume, the present volume in New Bern must be between 30 and 50 a day. It is rapidly becoming, if it has not become, the most frequently done examination in radiology. I believe that it may now pass even x-rays of the chest. There is no doubt that carcinomas of the breast that cannot be felt, can be seen in most cases by a mammography. Under mammographic guidance and needle placement, biopsies can be made to confirm the diagnosis with little damage to the breast. About one patient in a thousand that has a mammogram will have a carcinoma.

Dr. King: One out of a thousand.

Dr. Bell: About one out of a thousand. For every carcinoma that is found, there will be at least four or five lesions sufficiently suspicious to merit biopsy.

Dr. King: By needle or ultrasound?

Dr. Bell: Needle biopsy is coming into vogue, but there are

technical problems with needle biopsy of a carcinoma of the breast so that it is as yet not universally state of the art. Whether it will become, I'm not certain. It requires stereotactic localization.

Dr. King: By that, you mean...

Dr. Bell: A special type of machine, and even then it is difficult to be certain in a small lesion that the needle entered the lesion.

Dr. King: Can the surgeon be anymore sure of open biopsies in small lesions?

Dr. Bell: Yes. With the surgeon, a needle or wire is placed near the suspicious area, often in the suspicious area, and he knows that if he removes an area of tissue, say two centimeters in diameter with a relation to a spot on the needle or wire, that the small lesion will be in his biopsy specimen. This is further confirmed by x-raying this specimen in demonstrating the lesion in the specimen that's been removed. It works very well. There appears to be evidence by a number of series now that the survival rate from carcinoma of the breast at five and even at ten years has definitely benefitted by these procedures, this examination. It is a technically demanding procedure both for the technician and for the radiologist.

Dr. King: How about the patient?

Dr. Bell: It is a somewhat unpleasant exam for the patient. I use that term advisedly. Some people would tell me that it is a very unpleasant exam.

Dr. King: Is that necessary? There's a lot of letters to Ann Landers about this.

Dr. Bell: Yes. The compression of the breast is usually absolutely necessary for a high quality examination. Without any compression, film screen mammography is nearly worthless. With superb compression, it's a very highly accurate exam. It becomes a matter of judgment of the patient and technician frequently as to whether or not optimum compression can be obtained.

Dr. King: When ya'll started that over twenty-five years ago, was it done in New Bern outside of radiological department?

Dr. Bell: I don't think so. I honestly don't know. If it has started, it started in the last year and a half. It's become very popular for some offices to obtain the images and mail the undeveloped images to some expert on mammography who develops the films, because processing is critical, interprets them, and...

Dr. King: In what way is it different from the ordinary film?

Dr. Bell: The ordinary film can be processed in the same manner, but you have to have consistent processing to a very fine degree to get good mammograms.

Dr. King: This is on a film x-ray that is maybe specially made for mammograms?

Dr. Bell: Yes it is.

Dr. King: It's not a photograph?

Dr. Bell: No. The xerography approach to mammography is now very rarely encountered. Xerox has a new unit which is a magnificent unit and requires less compression than film screen, but it's much more expensive. The equipment is many times the cost. The film is

more, so the examination is a great deal more.

Dr. King: Well, let me ask you some other questions, if you care to comment. There's been, as you said, an explosion in all fields of x-ray that help mostly, and we're talking here about making a diagnosis, has it been worthwhile as far as you visualize?

Dr. Bell: You mean is it worth the money?

Dr. King: Well, I guess that's what most people are concerned about. Of course, you don't have a chance to follow up the patients, so you can't say. But you certainly can make more diagnosis earlier and more complete than you did forty years ago.

Dr. Bell: There is no doubt that you can do that. I would imagine that the costs of the diagnostic efforts have increased at a lot more rapid rate than the number of people we have been able to cure.

Dr. King: By that is, if you make a diagnosis it doesn't necessarily mean you're going to cure it in some instances.

Dr. Bell: Right. Plus the fact that much money is spent in searching for things at times that don't pan out or aren't curable when they do find it.

Dr. King: But on the other hand, you may find some that are curable.

Dr. Bell: Yes.

Dr. King: Like I say, it's important to know what the patient doesn't have. That's encouraging.

Dr. Bell: Right.

Dr. King: Is there anyway that you can reduce the expenses of

the x-rays or the equipment expenses? Do technicians have to be well trained?

Dr. Bell: I don't see much prospect of decreasing the cost of the individual examination other than in some instances where there is unnecessary duplication of very expensive equipment. I'll go on record as saying that I see no need for two MR scanners in New Bern. The volume is not that great over several years of experience now, and to keep and maintain two units has got to increase the cost of doing the examination. But other than a few examples like that, I don't see how to reduce the real cost of the examination. Perhaps the profit margin can be decreased in some cases.

Dr. King: Bill, I think that as far as us doctors are concerned, and me particularly, the x-ray department has certainly led the advances in medicine in New Bern, and having many instances develop them before they were in general use, what part did the administrative hospital play in this?

Dr. Bell: Well, first I'd like to say that x-ray advances in New Bern have been on a reciprocal basis. The clinicians here have wanted these procedures which has made it possible to develop them. The hospital, however, has been for the most part very cooperative, though I feel that Lonnie Moore's early decision concerning CT scanning was an obvious mistake. By and large, his attitude was most conductive to the development of a good radiology program and I think he deserves a lot of credit for having reached the point that it has reached. I think we've been very lucky, and very lucky in the clinicians here.

Many clinicians here that demanded services; I remember well their demanding a pathologist which was crucial, demanding anesthesiologist which you can't imagine doing without now.

Dr. King: You got any thoughts about the future or how medicine is going to be in the future?

Dr. Bell: (laughter) Well, I think there's gonna be a slow down in technology because I think we probably have reached the point that truly technology cannot be afforded at the rate that it has been being developed. I don't know what the answer is there. It cost money to make such developments and apparently we've reached the point that money is not available on a national scale. It's like the supersonic jets.

Dr. King: They don't want to use the money for that.

Dr. Bell: Well, I think maybe you can't. What is it? Fifteen percent of the entire gross national product now is devoted to health care. How much can be spent?

Dr. King: This is the end of the tape. Is there anything that you wish to interject?

Dr. Bell: No.

Dr. King: Thank you Bill.

Dr. Bell: I enjoyed it.

END OF INTERVIEW