

and weight and age of the patient and the location of the carcinoma and that, then, the computer actually determines the quality of the X-radiation that will be used? That is, it decides how much, how much kilovoltage and how much milliamperage, for example, in this treatment process?

Dr. LAUGHLIN. Yes; the computer is capable of providing the optimum treatment. The way in which it is normally used, however, is that the radiologist would suggest a proposed treatment utilizing a specific radiation energy. The computer would compute this out and then the radiologist conducting the examination would say this is quite an acceptable treatment, or can you not do even better to avoid the radiation dose to a particular area. This would require a repetition of the computer analysis and would be a process of successive approximation to the optimum dose distribution.

Senator NELSON. Does the computer determine what the safety factor is and how many roentgens a patient can take over a certain period, or is that left up to the radiologist?

Dr. LAUGHLIN. That is definitely left to the radiologist. It is his business to have to determine how many roentgens of dose should be administered. But the computer can show him how that dose is going to be distributed throughout the patient's body and warn him of excessive dose level that is going to a healthy tissue region.

Senator NELSON. Then the computer does have to have among its statistics all the factors about the size of that patient, obviously?

Dr. LAUGHLIN. Yes. All the data on the anatomy of the patient, both externally and internally, in the regions which will be exposed to radiation will be vital.

Senator NELSON. In summary, what is the main value of using this computer system rather than just having the roentgenologist make all these calculations himself?

Is it a matter of time or is it a matter of time and accuracy?

Dr. LAUGHLIN. It is a matter of both. As a matter of actual practice, if the roentgenologist had to do all these calculations, he ordinarily simply would not have time to do them and the treatment of the patient in that case would have to rely somewhat on judgment. With the use of these kinds of facilities, he is able to give to all patients a very comprehensive type of analysis which would be prohibitive timewise.

Senator NELSON. Thank you very much, Doctor. It was a very informative presentation. The committee appreciates very much your giving so generously of your time.

Dr. LAUGHLIN. Thank you.

Senator NELSON. Did you have any other questions?

Mr. CALLAHAN. No, thank you, Mr. Chairman, and thank you very much, Dr. Laughlin.

Dr. LAUGHLIN. Thank you.

Mr. CALLAHAN. Mr. Chairman, we will now move to discussion of medical information collection systems, which I have listed as item No. 9 on the agenda.

The communication system I will now report on is another unique and dramatic approach to collecting patient medical data. The tradi-