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Executive  
Committee

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Minutes of the Meeting of the Executive Committee  
of the Teletherapy Evaluation Board  
Held at the Oak Ridge Institute of Nuclear Studies  
Medical Division Library, Oak Ridge, Tennessee  
25 January 1953

TO: ALL MEMBERS OF THE TELETHERAPY EVALUATION BOARD

The Executive Committee of the Teletherapy Evaluation Board  
convened at 10:00 a.m. Sunday, 25 January 1953 with the following  
members in attendance:

Marshall Brucer, M.D. (Chairman)  
Oak Ridge Institute of Nuclear Studies, Inc.  
Medical Division  
Oak Ridge, Tennessee

Herbert D. Kerman, M.D.  
Department of Radiology  
University of Louisville  
Louisville, Kentucky

C. C. McClure, M.D.  
School of Medicine  
Vanderbilt University  
Nashville, Tennessee

Robert Reeves, M.D.  
Professor of Radiology  
Duke University  
Durham, North Carolina

Sidney Rubenfeld, M.D.  
Associate Clinical Professor of Radiology  
New York University Post Graduate Medical School  
New York, New York

Galen M. Tice, M.D.  
Department of Radiology  
School of Medicine  
University of Kansas  
Kansas City, Kansas

Arthur C. Guyton, M.D. (absent due to illness)  
School of Medicine  
University of Mississippi  
University, Mississippi

1) The first item on the agenda was a review by Dr. Kerman of his observations that there was some confusion concerning the aims and plans of the Teletherapy Evaluation Board. He suggested that a statement from the Board be published in one of the Radiology journals. Dr. Kerman then read a statement which he had been asked to prepare as a suggestion for the Executive Committee. There was some discussion of the statement and a number of minor revisions were made. Dr. Rubenfeld moved that Dr. Kerman's statement be accepted as revised. The motion

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was seconded by Dr. McClure and passed by the Committee.

2) There was some discussion concerning the method of publication and under whose name it should be published. Dr. Kerman moved that the statement be submitted to Dr. Doub, the editor of Radiology, as an editorial statement preferably without signature. If a signature on the editorial was desired by the editorial committee of the journal, then it be signed by Dr. Brucer as Chairman of the Executive Committee. The motion was seconded by Dr. Reeves and passed by the entire committee.

3) Prior to the meeting a "standard proposal for an AEC contract" had been sent to each member of the Committee. The second item on the agenda was a discussion of this standard proposal. There was considerable discussion, which is summarized as follows: The committee suggested that the proposal should be revised to remove all statements which would legally bind any university to a specific cost. For example, statements where the university is directly bound to a cost should be stated as a cost to be borne from sources other than AEC. It was suggested that the title of the proposal be changed to fit the stated purpose of the TEB. This was approved.

Dr. McClure presented a proposal written to fit Vanderbilt University and gave his permission to use his proposal as a type example of a format to be followed by all participating universities. It was suggested that this type example be submitted to AEC unofficially for comment, and following the suggestions of the Commission a reworded statement should be mimeographed and submitted to every member of the TEB for their criticisms. Each member should be given approximately one month to return the proposal with any suggested amendments or changes. Following the return of all of the proposals a revised proposal should be resubmitted to the Executive Committee at the June meeting. Approval of the form for the proposal was tabled until the June meeting.

4) A review of the development of the Barnes Contract and the progress to date on the construction of the prototype machine was then brought up for discussion. Following a discussion of the problems concerned in negotiating a contract and carrying it through to completion, Dr. Tice made a motion that the Chairman of the Executive Committee be given full authority to proceed with the construction of the prototype model, without further referral to the Committee except for information purposes. The motion was seconded by Dr. Reeves and was approved by the entire Committee.

5) Dr. Brucer brought up for discussion a number of letters that had been written by members of the TEB and other interested individuals concerning individual problems in the construction of the prototype model. A number of persons have made very thorough analyses on the problems of rotational control and other desirable features which may or may not be added to the prototype design. Although it was felt that it was already implicit in the instructions already given to the Chairman of the Executive Committee, in order to clarify any misunderstanding, Dr. Reeves made a motion that the Chairman be allowed to ask any exceptionally interested persons to go to Rockford with him whether or not they are members of the Teletherapy Board to consult on individual problems of design and construction and to see the progress of the construction of the machine. Dr. McClure seconded the motion and it was passed by the Committee.

6) The Executive Committee then went through a discussion of the recommendation for membership on the subcommittees. The membership list, as stated in the 29 December 1952 letter to the Executive Committee, was approved as it stands with the exception of the subcommittee on the Clinical Program. Dr. Reeves moved that the subcommittee membership, as stated in the December 29th letter to the Executive Committee, be approved as written with the exception of the Clinical Program Subcommittee. He further moved that Dr. Brucer be made Chairman of each of these committees and be empowered to call such meetings of these groups as he saw fit. The motion was seconded and passed unanimously.

7) The problem of the fifth subcommittee on the Clinical Programs was then brought up for discussion. It was suggested by Dr. Rubenfeld that this Clinical Program Subcommittee be set up as a central steering committee which would eventually expand to a committee of the entire TEB. It was emphasized that the duties of this subcommittee should be primarily to organize the scope and early phases of the clinical program. During the next year the Clinical Program Subcommittee should organize an agenda and make recommendations to the entire membership. It was suggested that the final decisions in the Clinical Program should probably be voted on by the entire membership of the Board. Because of the importance of the duties of the Clinical Program Subcommittee it was suggested that its membership be somewhat larger than that of the other committees. Dr. Rubenfeld made the motion that the Executive Committee be members of the Clinical Program Subcommittee ex officio. This was seconded by Dr. Reeves. Following considerable discussion the motion and second was withdrawn and amended by Dr. Rubenfeld to read "the members of the Executive Committee be members of the Clinical Program Subcommittee". The motion as amended was seconded by Dr. Reeves and passed by the entire Executive Committee. Following considerable discussion on further subcommittee membership, the following members were suggested as members of the Clinical Program Subcommittee in addition to the Executive Committee:

Robert J. Andrews, M.D.  
Bowman Gray School of Medicine

Gilbert H. Fletcher, M.D.  
M. D. Anderson Hospital

H. B. Hunt, M.D.  
University of Nebraska

Isadore Meschan, M.D.  
University of Arkansas

Martin Schneider, M.D.  
University of Texas - Medical Branch

Stephen H. Weems, M.D.  
Emory University

Dr. Rubenfeld made a motion to approve this additional list which was seconded by Dr. Reeves and passed by the Executive Committee.

8) After considerable discussion the Board decided to appoint a Chairman of the Clinical Program Subcommittee. Dr. Korman moved, Dr.

Rceves seconded, and the Board voted to appoint Dr. Rubenfeld Chairman of the Clinical Subcommittee.

9) Dr. Brucer was asked by the Executive Committee to send out a statement of the approved memberships on subcommittees.

The question of dates for these subcommittee meetings was then brought up. It was pointed out that we should attempt to have one subcommittee meeting toward the end of each month from now until June so that the entire membership can participate in the program before the next meeting of the entire membership of the Teletherapy Evaluation Board. For the lack of time, it may be necessary to skip the February meeting and have two meetings in one month. Dr. Brucer was given authority to set the meeting toward the end of each month for all of the subcommittees except the Clinical Program Subcommittee.

The date for the second annual meeting of the Teletherapy Evaluation Board is set for the 11th of October, 1953. This should be a one day meeting, and on the 10th of October there should be a half day meeting of the Executive Committee. If it appears desirable, later on in the year, a scientific session may be set for the 12th of October. These dates are set as a tentative schedule for consideration during the next two months. If there are no serious objections by the end of March the schedule will automatically become the official dates for the annual meeting of the Teletherapy Evaluation Board.

10) There was some discussion on the dates for the next meeting of the Executive Committee and for the meeting of the Clinical Program Subcommittee. Since the Executive Committee must attend both of these meetings it was decided to hold the two meetings on succeeding days in June. Dr. Rubenfeld suggested that he may be able to arrange for a meeting place in New York in conjunction with the AMA meeting. It was pointed out that in order to hold a meeting of this Board away from Oak Ridge it might be necessary to get permission from the Executive Director of the Institute. Dr. Brucer was asked to inquire whether it would be possible to hold the meetings of the two committees at New York University School of Medicine at the time of the AMA meetings in New York City, and to report the decision by mail.

The meeting was adjourned at 12:15 p.m. for lunch. The meeting reconvened at 1:45 p.m.

11) The first problem brought up during the afternoon session was the question of the writing of a set of bylaws for the membership as a whole. It was felt that this would be a desirable feature to clarify the relationships of all parties and the Institute. Dr. Kerman made a motion that Dr. Brucer prepare a set of bylaws for the approval of the Executive Committee at the June meeting. Dr. Rubenfeld seconded the motion and it was passed by the entire Committee.

12) Some new data on the characteristics of europium, as communicated by Dr. W. S. Eastwood, the Atomic Energy Research Establishment, Harwell, England, was presented to the Executive Committee. Some of the recent discussions with Dr. Asbersold of the U.S. Atomic Energy Commission, Isotopes Division were mentioned. Following a discussion of the various

sources which could be used in the prototype model, Dr. Reeves made a motion that the Institute be encouraged to authorize the Barnes Company to start on the construction of the europium or cobalt shield to fit the prototype machine as soon as possible. This was seconded by Dr. Tice and passed by the Committee

The meeting adjourned at 3:30 p.m.

Marshall Brucer, M.D.  
Chairman  
Executive Committee

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MINUTES OF THE JUNE 3RD MEETING OF THE EXECUTIVE COMMITTEE OF THE  
TELE THERAPY EVALUATION BOARD

MEMBERS PRESENT: Dr. Robert J. Reeves, Duke University  
Dr. H. D. Kerman, University of Louisville  
Dr. C. C. McClure, Vanderbilt University  
Dr. Sidney Rubenfeld, Bellevue Medical Center  
Dr. Galen M. Tice, University of Kansas  
Dr. Marshall Brucer, ORINS Medical Division

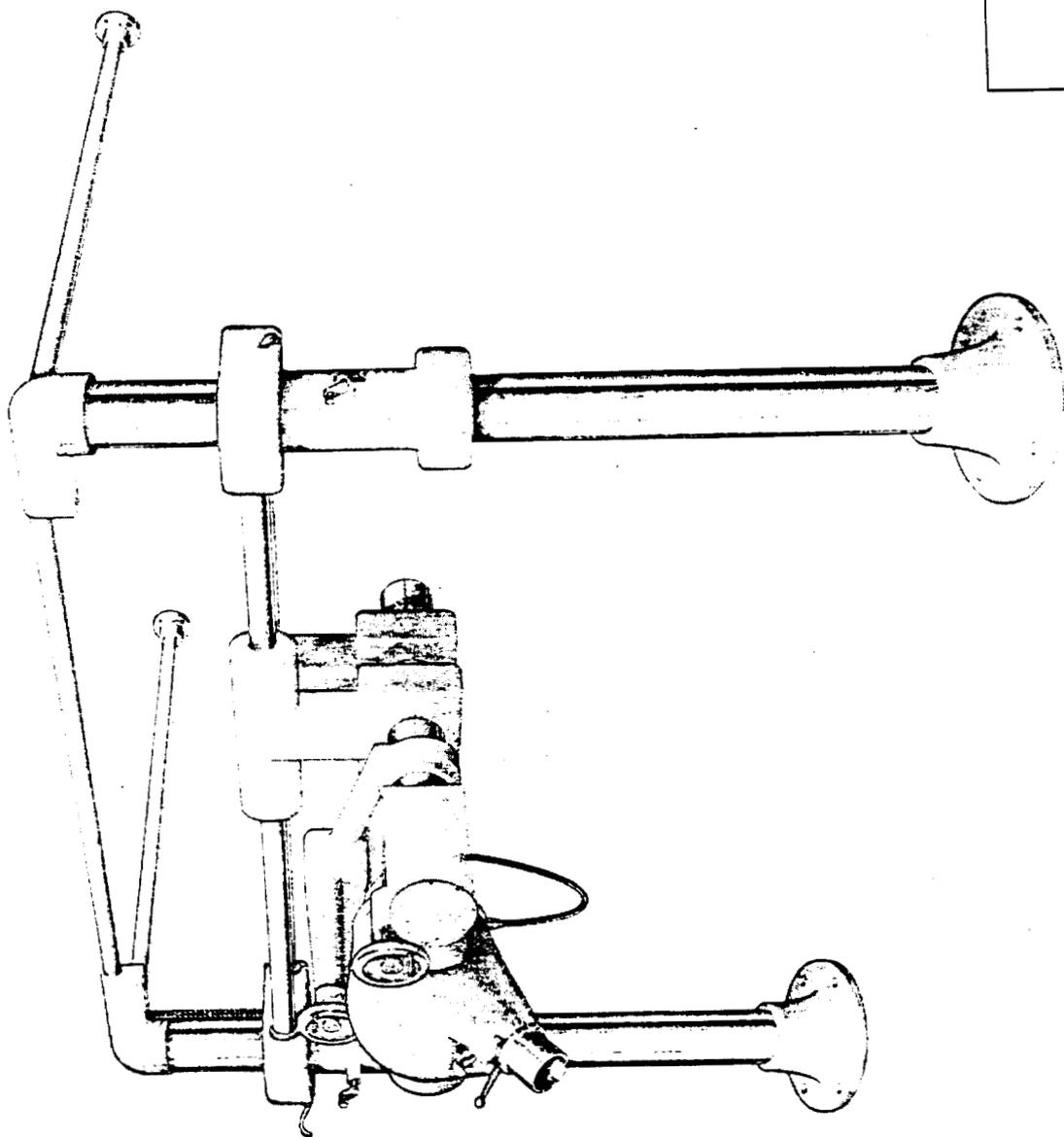
The Executive Committee of the Teletherapy Evaluation Board met on June 3 at the New York University College of Medicine Building, New York City. The meeting was opened with a review of the minutes of the January 25 Executive Committee meeting. Dr. Brucer summarized various directives of the January 25 meeting, all of which have been completed except the writing of a set of by-laws. It was agreed that the Chairman should prepare a set of by-laws, possibly patterned after those of the Oak Ridge Institute of Nuclear Studies, and present them for approval at the next meeting of the Executive Committee. Dr. Kerman made a motion that the minutes of the January 25 meeting be approved as written. The motion was seconded by Dr. McClure and unanimously carried.

The Subcommittee was asked if they desired a detailed review of the minutes of Subcommittees No. 1 through No. 4. It was agreed that a review was unnecessary and a motion by Dr. Rubenfeld, seconded by Dr. Tice, expressed approval of the minutes of these Subcommittees.

REVIEW OF THE CURRENT STATUS AND DEVELOPMENT OF THE LOW  
CURIAGE MACHINE.

The Subcommittee reviewed the design of the small teletherapy unit as now planned by the engineers of the W. F. and John Barnes Company, consisting of a spherical casting in two sections, the outer segment slightly distorted with a pneumatic device for operating the source wheel. It was stated that the Barnes and other interested companies have been informed that this unit could not be practical, and competitive with standard X-ray equipment, unless the cost could be maintained at \$10,000 or less. This estimate does not include the cost of the radioactive source and that of loading.

Then followed a discussion of the sizes and the specific activities of cobalt<sup>60</sup> sources currently available or expected to be available in the near future. Several design patterns were discussed which would allow the build-up of about 300 curies in a 2 cm diameter source. A double overlapping cloverleaf design is considered to be the most economical in space and curiage. The Executive Committee was informed that the Commission hopes to have high specific activity cobalt sources available in the future and that the present design of the machine could utilize a source of 30 r/min at 50 cm. Dr. McClure asked if Hevimet was to be used as a shielding material in the construction of the head and the committee was informed that the source wheel itself would be constructed of Hevimet and that this construction would result in a .



low curie cobalt teletherapy machine  
oak ridge institute of nuclear studies  
united states atomic energy commission  
W. F. and JOHN BARNES COMPANY  
301 SOUTH WATER STREET · ROCKFORD, ILLINOIS U.S.A.

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considerable saving in the shielding required by lead. Also, Dr. McClure asked if the moving parts of the unit would be lined with a material such as brass or steel, and the committee was informed that various designs under consideration were such that all moving parts would be lined with steel or brass depending upon various design considerations. Therefore, there will be no lead surfaces working against lead surfaces except in non-moving parts. The Subcommittee was informed of a design visualized by the ORINS Technical Shop consisting of a prefabricated spherical shield into which lead would be poured. However, it was feared that this method of construction would create a degree of warping in the shielding and the housing around the rotating wheel. It is the expressed opinion of the engineers from two different companies that such a fabrication method could be used if allowed a tolerance of 1/8 inch around the source wheel. This degree of freedom around the source wheel would lower the shielding properties of the head an appreciable amount. Therefore, this method of construction is considered undesirable.

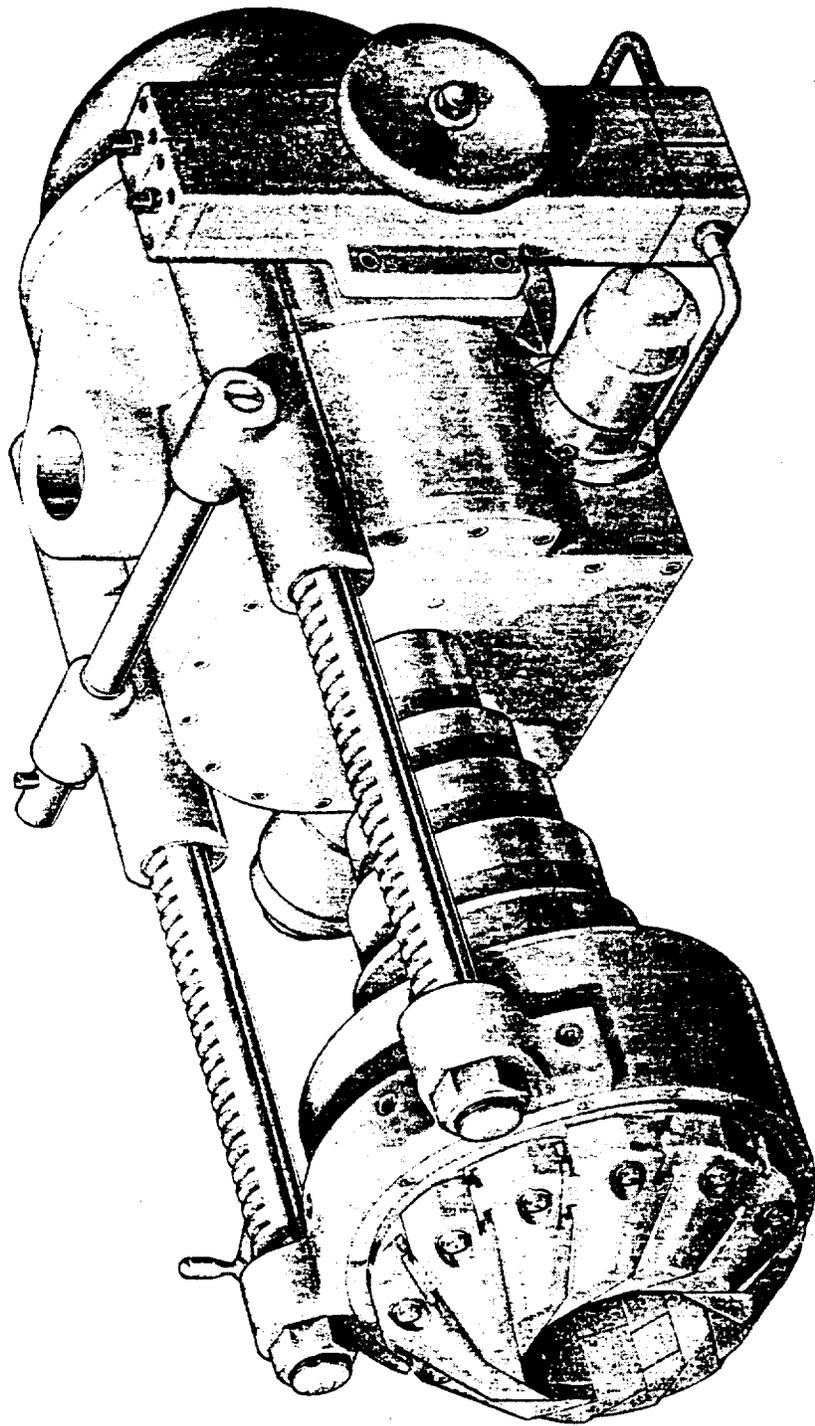
The Subcommittee was shown detailed design prints as drawn by the W. F. and John Barnes Company. It was unanimously agreed that the unit need not have a light localizer, inasmuch as the unit is to be used with the cone in contact with skin surface. Also, the Subcommittee discussed the advantages and disadvantages of cones constructed of brass or lead. In view of the cost of lead, it was agreed that the initial unit should be constructed with cones fabricated from brass in order to maintain a low unit cost. It was agreed that most medical schools would have shop time and facilities available for constructing additional cones. Following a detailed discussion, a motion was made by Dr. Reeves and seconded by Dr. Rubenfeld that the Subcommittee approve the present status of the design and development of the small teletherapy unit. The motion was unanimously carried.

Dr. Brucer pointed out that a low curiage teletherapy unit of the foregoing design probably would be commercially available in the next six months. Dr. Kerman stated that if this is true, it would require early action by the Teletherapy Evaluation Board in developing a program of clinical investigation using the low curiage machine, and made a motion that the Executive Committee recommend to the Teletherapy Evaluation Board that a clinical investigation program be designed to incorporate the use of the small head and neck unit, and that a teletherapy program be geared to the development of the small head and neck unit. The motion was seconded by Dr. McClure and unanimously approved.

#### DEVELOPMENTS OF HIGH CURIAGE MACHINE

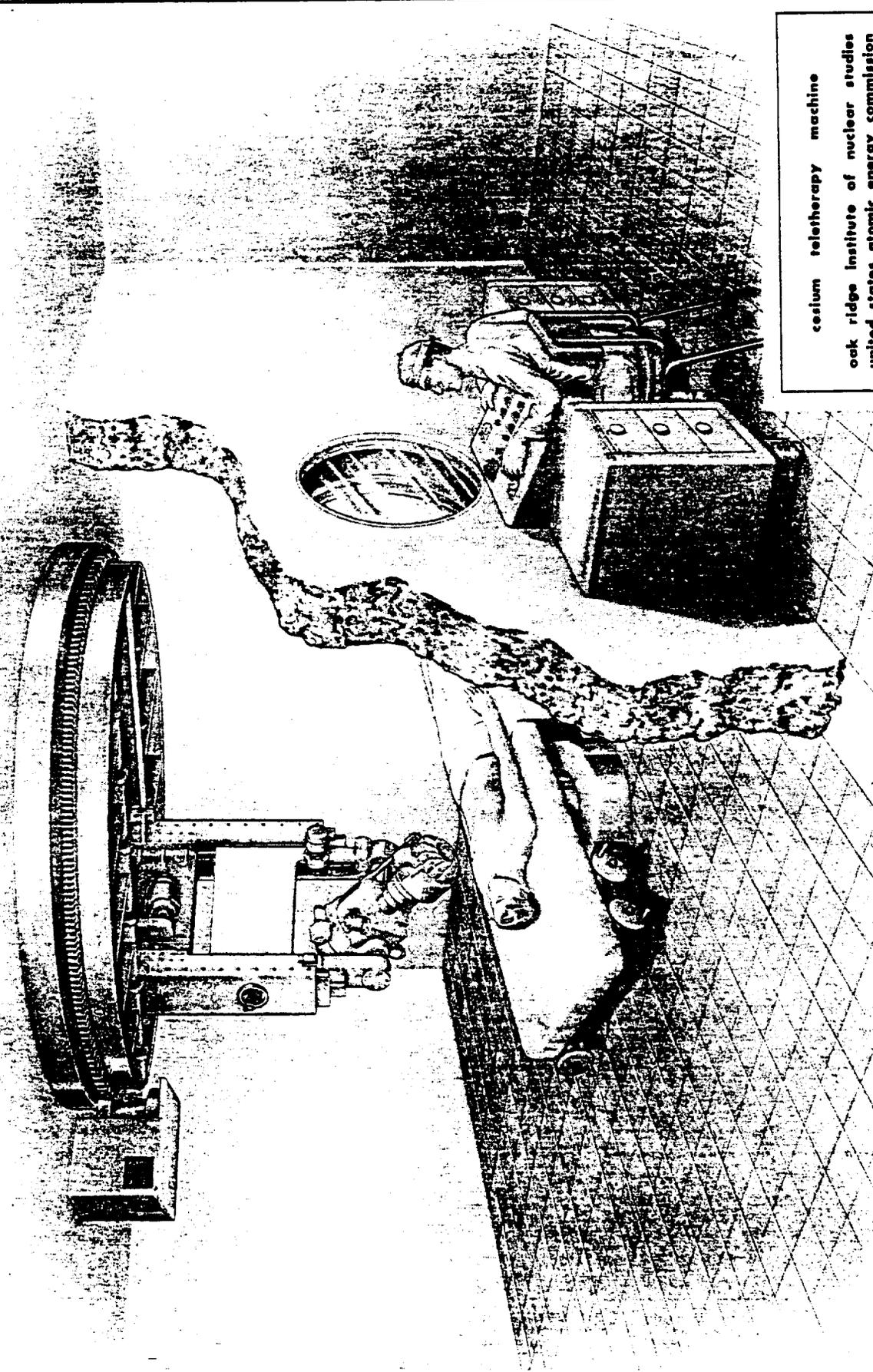
The Subcommittee was shown full size detailed plans of the high curiage machine as currently designed by the W. F. and John Barnes Company and were informed that the Institute would make final approval of these plans on June 12, and construction of the prototype unit would start immediately. The Subcommittee examined in detail the design of the Barnes unit and were well pleased with the current status of the design and development of the unit.

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cesium teletherapy machine  
oak ridge institute of nuclear studies  
united states atomic energy commission  
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SHIELDING REQUIREMENTS FOR HOUSING A HIGH CURIAGE OR LOW CURIAGE TELE THERAPY UNIT.

The Subcommittee discussed the problem of shielding in a room for housing high curiage and low curiage teletherapy machines, and it was feared that this might be a limiting factor in the use of small curiage therapy units. Dr. Brucer reviewed the preliminary standards as set forth in the National Bureau of Standards Handbook on Radiation Protection. It was pointed out that the formula for calculating the room shielding requirements defined a time factor which assumed that the therapy unit would be on a total of 48 hours per week. It was the unanimous opinion of Subcommittee members that this was an erroneous factor. The Subcommittee was informed that members of the Subcommittee on Housing Designs concurred in this belief and that Drs. Hoecker, Lofstrom, and others were obtaining data from old records to verify the actual average "time-on" of their machines during a working day or working week.

Since the Executive Committee meeting, it has been learned that the National Bureau of Standards handbook definitions are being changed and that such changes will be available for the next meeting. Also, Dr. Lofstrom of Wayne University has prepared this brief summary of his current experience.

MAXIMAR 250

Date	Exposure reading (hrs.)	
12-12-52	09021	
2-11-53	09137	116
5-13-53	09422	401
6-6-53	09489	468

Total of 25 weeks - average actual hours per week - 18.7

Department operates approximately 44 hours per week.

Monday 5/25	3 hrs	39 min & 39 secs
Tuesday 5/26	3 hrs	37 min & 30 secs
Wednesday	3 hrs	21 min & 42 secs
Thursday	3 hrs	19 min & 21 secs
Friday	2 hrs	30 min & 30 secs

It appears that the time factor could easily be reduced to 0.5 and that when the data on the position of the beam during various therapeutic maneuvers is available, the time factor may be reduced to less than 0.1 except in the direct downward position.

Instead of an overall shielding of walls, floor, and ceiling as specified by the National Bureau of Standards handbook, Dr. Kerman suggested consideration of a simplified shielding arrangement utilizing a mobile shield in critical areas for shielding the primary beam during therapy. Dr. Braestrup's mobile shield was discussed since it follows a similar pattern. During the discussion which followed Dr. Kerman's suggestion, it was pointed out that

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additional shielding might be necessary for the floor and ceiling depending upon the location of the room and personnel working in adjoining areas.

Dr. Rubenfeld questioned the possibility of reducing the shielding requirements if the small therapy unit could be installed to operate in two fixed positions. In reply to this question the committee reviewed the minutes of the Subcommittee on design of small source unit. Dr. Brucer informed the committee of the discussions which developed a suspension mechanism from a simple saw horse to the present concept of a unit which would provide an up and down, in and out motion, rotation of the head, and tilting of the unit. Dr. Tice and Dr. Kerman brought up the question of shielding for the ceiling and both expressed the opinion that ceiling shielding was not critical as it first appeared. Dr. Brucer again reviewed the formula developed by Dr. Wyckoff of the National Bureau of Standards and pointed out that if these standards are to be followed the only practical variable in reducing shielding requirements was a direct function of the "time-on" factor. It was pointed out that the utilization of less shielding would place responsibility on the individual therapist to define his "time-on" factor as being less than one-tenth of the total assumed working week of 48 hours. Dr. Kerman and Dr. Rubenfeld made the statement that these standards seemed to be more rigid than those currently accepted by the X-ray manufacturers and might be excessively cautious. Dr. Brucer agreed that in general this was recognized but that some states were making these recommendations legal standards.

At this point Dr. Rubenfeld requested the Subcommittee to study the shielding required for a small source and a large source therapy unit. By keeping all factors constant in the National Bureau of Standards formula except the output of the teletherapy unit, it was demonstrated that there was a relatively small difference between the shielding required for a low curriage and high curriage teletherapy unit. For example, the difference in shielding required for a 240 rmm source and the shielding required for an 1800 rmm source amounted to only 20 cm of concrete.

#### REVIEW OF THE PROBLEM OF PRODUCTION OF EUROPIUM

Data was presented to the Executive Committee showing the early work of Dr. Eastwood in England using short-term irradiation of a small europium source and the later interpretations of the work by personnel at Oak Ridge National Laboratory. The problem of europium irradiation has turned out to be an excessively complex one because of the build-up of daughter activities. The Oak Ridge Institute of Nuclear Studies has a number of sources ready for irradiation, but will not send them to the reactor until the current calculations by the Oak Ridge National Laboratory are completed. A number of discussions are scheduled for next month with Dr. Eastwood. Because of the complexity of the problem, a more detailed report will be made to the Subcommittee at a later date.

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## RESERVATION OF CESIUM SOURCES BY INDIVIDUAL UNIVERSITIES

The Subcommittee was informed that the United States Atomic Energy Commission now has 15 requests for various sources and that some of them are two years old. Also, it was pointed out that commercial organizations such as General Electric X-ray Division, Picker X-ray Company, Keleket, etc., have for some time been trying to make reservations for a large number of cesium sources. This may be an excellent way for distributing sources but might interfere with our problem of keeping costs of units at a minimum. Following the discussion, the committee recommended that all universities contemplating the purchase of a teletherapy unit make application with the United States Atomic Energy Commission immediately for a large source. The Subcommittee asked if the application (AEC Form-313) should be submitted to the Committee on Human Application and the members were informed that this would be the procedure. However, for external radiation sources the procedure could be simplified by a statement from the local Isotopes Committee that a qualified radiologist would supervise the use of the unit. Also, it was recommended that the universities ordering a source should specify approximately 2,000 curies of cobalt<sup>60</sup> or 7,000 curies of cesium<sup>137</sup>. Early action should be taken inasmuch as the Commission has an established policy that they will distribute sources on a "first come, first served" basis. Dr. McClure made a motion that Dr. Brucer write a letter informing each member university of the current Atomic Energy Commission policy on the distribution of radioactive sources and ask each university to file application immediately for purchase in the next two or three years.

## EXECUTIVE COMMITTEE MEMBERSHIP

The Executive Committee was informed that Dr. Arthur C. Guyton, University of Mississippi had formally submitted his resignation from the Executive Committee of the Teletherapy Evaluation Board. Dr. Guyton had requested that his resignation be accepted for personal reasons and pressing demands of other assigned duties at the University of Mississippi. Also, he is of the opinion that the Executive Committee of the Board holds the responsibility for long range developments of the Board's program; therefore, inasmuch as he was originally appointed to represent the University of Mississippi only until such time as a radiologist is appointed at that medical school, it would be desirable that he not continue his membership on this committee. It was explained, however, that he would retain his membership on the Teletherapy Evaluation Board, until such time as the University of Mississippi obtains the services of a radiologist. Dr. McClure made a motion that the Executive Committee accept the resignation of Dr. Guyton with regret and with an expression of appreciation for valuable services rendered. The motion was seconded by Dr. Reeves and carried.

Dr. McClure made a motion that Dr. Carl E. Nurnberger, University of Tennessee at Memphis be appointed interium membership on the Executive Committee until the next meeting of the Teletherapy Evaluation Board. The motion was seconded by Dr. Kerman and approved.

The Executive Committee was informed that many persons had strongly recommended that membership to the Teletherapy Evaluation Board be left open in order that any future application by medical schools could be accepted. Dr. Brucer also stated that the Board of Directors of the Oak Ridge Institute of Nuclear Studies concurred in this matter. Dr. McClure made a motion, seconded by Dr. Reeves, that membership to the Teletherapy Evaluation Board be open to any accredited or approved medical school. The motion was unanimously carried.

#### PREPARATION FOR FUTURE MEETINGS OF SUBCOMMITTEES AND EXECUTIVE COMMITTEE OF THE TELETHERAPY EVALUATION BOARD

The Executive Committee reviewed the expressed wishes of Subcommittees No. 2 and No. 5 for the postponement of the next meeting of the Teletherapy Evaluation Board previously scheduled to meet in October of this year. Subcommittee No. 5 has worked out tentative plans for evaluation programs and felt that another meeting for the purpose of final approval should be held before the next meeting of the Teletherapy Evaluation Board; Subcommittee No. 2 has asked for a meeting late in August. After discussing various meeting dates, Dr. Kerman made a motion that the following dates be approved: Subcommittee No. 2 on August 30 in Oak Ridge, Tenn.; Subcommittee No. 5 at the time of the Executive Committee Meeting September 27 in Oak Ridge; next meeting of Executive Committee in Oak Ridge on January 9, 1954; next Teletherapy Evaluation Board meeting January 9-10, 1954. It was recommended that the Executive Committee meeting be held on the morning of January 9 with the Teletherapy Evaluation Board meeting starting at noon of that day and continuing through January 10. The motion was seconded by Dr. Tice and carried. Following this motion, it was recommended that Subcommittee No. 2 invite representatives of medical schools who are definitely interested in obtaining a small unit.

#### PREPARATION OF A STANDARD PROPOSAL FOR AN ATOMIC ENERGY COMMISSION CONTRACT

The Subcommittee reviewed the tentative draft of a research contract between participating medical schools and the United States Atomic Energy Commission for the evaluation of radioactive isotopes gamma ray sources for medical teletherapy.

The members of the Subcommittee approved the contract with corrections to be made as suggested by various members of the Board. The Chairman of the Committee was requested to make the changes and submit the revised draft to all members of the Teletherapy Evaluation Board for their action.

#### TRAINING OF CLINICAL PHYSICISTS

Dr. Kerman brought up for discussion the problem of supplying trained clinical physicists at approximately the master's degree level. He requested that a committee be formed to study possible methods in which the Teletherapy Evaluation Board might be able to assist in solving this critical problem. Following a lengthy discussion, Dr. Rubenfeld made a motion that a Subcommittee

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No. 6, **Clinical Physicist Training Program** be established and that the Subcommittee establish a well defined program setting forth the need for such personnel, suggest possible methods of supporting a training program, and make recommendations Teletherapy Evaluation Board on proposed courses of action for promoting this program. The motion was seconded by Dr. Tice and carried. By acclamation Dr. Kerman of the University of Louisville was appointed Chairman of this Subcommittee with instructions to select other Subcommittee members from medical schools interested in the program

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May 26, 1953

MEMORANDUM TO: TEB EXECUTIVE COMMITTEE  
AND SUBCOMMITTEE NO. 5

Marshall Brucer, M.D., ORINS Medical Division  
Herbert D. Kerman, M.D., University of Louisville  
C. C. McClure, M.D., Vanderbilt University  
Robert Reeves, M.D., Duke University  
Sidney Rubenfeld, M.D., New York University - Bellevue Medical Center  
Galen M. Tice, M.D., University of Kansas Medical Center  
Arthur C. Guyton, M.D., University of Mississippi  
Robert J. Andrews, M.D., Bowman Gray School of Medicine  
Gilbert H. Fletcher, M.D., M. D. Anderson Hospital  
H. B. Hunt, M.D., University of Nebraska  
Isadore Meschan, M.D., University of Arkansas  
Martin Schneider, M.D., University of Texas - Medical Branch  
H. Stephen Weems, M.D., Emory University

There will be a meeting of Subcommittee No. 5, the Clinical Program Subcommittee, on Tuesday, 2 June 1953, 9:00 a.m. in the Dean's Board Room, on the first floor of the New York University College of Medicine building, 477 First Avenue at 28th Street. Dr. Sidney Rubenfeld is Chairman of this Subcommittee and will prepare the agenda for the meeting. Primary duties of the 5th Subcommittee, according to the minutes of the Executive Committee meeting 25 January 1953, is to organize an agenda and make recommendations to the entire membership on the problems of the Clinical Program.

There will be a meeting of the Executive Committee on Wednesday, 3 June 1953, 9:00 a.m., in the Dean's Board Room, on the first floor of the New York University College of Medicine building, 477 First Avenue at 28th Street.

The agenda for this meeting is as follows:

1. Review of the minutes of the last meeting.
2. Review of the minutes of the Subcommittees No. 1 through No. 4.
3. Review of the problem of production of europium.
4. Current status and development of the high curiage machine.
5. Current status and development of the low curiage machine.
6. Preparations of the standard proposal for an AEC contract.
7. Reservation of sources by individual universities.
8. Preparations for the October meeting.
9. Election of a new member to the Executive Committee.
10. Election of the Executive Committee at the next meeting.
11. Election of new members to the TEB.

*Marshall Brucer* by: ME.  
Marshall Brucer, M.D.

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April 28, 1953

MEMORANDUM TO: EXECUTIVE COMMITTEE

SUBJECT: RESIGNATION OF DR. ARTHUR C. GUYTON

Dr. Arthur C. Guyton has talked to me concerning his membership on the Executive Committee of the Teletherapy Evaluation Board.

"Since then I have come to the definite conclusion that it is essential for me to resign for the following reasons: Sometime between now and the last of the year we will select our new head of the Department of Radiology, and he will immediately take my place on the Teletherapy Evaluation Board. Second, because it would be necessary for me to resign my position as a member of the Executive Committee at that time, it is impossible for me to carry through with any program of the Executive Committee that may be started at the present time. Third, it would be highly desirable from your point of view to have a member on the Executive Committee who will be able to carry through from start to finish. Fourth, in looking over my own schedule of activities, I find myself scheduled to appear at at least two major meetings every month for the next five months. Fifth, it is essential that I spend more time in the laboratory in order to complete the research work that we are contracted to perform."

One of the items on the agenda for the New York meeting will be for the Executive Committee to accept this resignation and to select another member or decide whether this should be left to the membership as a whole in October.

*Marshall Bruce*  
Marshall Bruce, M.D.  
Chairman  
Executive Committee *J.H.H.*

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April 15, 1953

MEMORANDUM TO: EXECUTIVE COMMITTEE AND  
SUBCOMMITTEE NO. 5

Arrangements are now completed for the meetings of Subcommittee No. 5 and the Executive Committee to be held in New York.

Subcommittee No. 5 will meet in the Dean's Board Room, on the first floor at the New York University College of Medicine building, 477 First Avenue at 28th Street, on June 2 at 9:00 a.m. The Executive Committee will meet at the same place on June 3.

This memorandum constitutes an official call for the meeting. For those members attending the AMA meetings, the Institute will pay expenses for 1 or 2 days subsistence and one half of the round trip fare to New York. For those members not attending the AMA meetings, the Institute will pay all of the expenses in accordance with our standard travel policy.

*Marshall Brucer*

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Marshall Brucer, M.D.  
Chairman  
The Executive Committee

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April 3, 1953

MEMORANDUM TO: TEB EXECUTIVE COMMITTEE AND  
SUBCOMMITTEE NO. 5

After careful consideration of the problem of the meeting being held in New York, the Business Office of the Institute has stated the following.

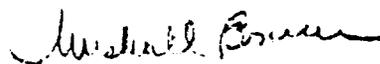
"In view of the fact that many of the members of the TEB will be attending the American Medical Association meeting in New York on June 1-5, and also in consideration of the excess travel requirements which would be placed on these individuals by calling the meeting in Oak Ridge at approximately the same time, it is advantageous to the Institute to call a meeting of the Board in New York to be held simultaneously with the American Medical Association meeting.

"Accordingly, it is appropriate for the Institute to bear all of the travel cost, in accordance with established Institute travel policy, for those persons who are not attending the American Medical Association meeting, who would make the trip to New York solely for the purpose of attending the meeting of the Board. For those persons who would have attended the AMA meetings, regardless of the Board or Committee meeting, but must now attend both meetings, the Institute should pay travel cost for one-way and one day's subsistence for each day they would be held over in New York to attend our Board meeting."

Since we can now call this meeting for New York City without any additional cost to any of the members, this letter is your official notice that Subcommittee No. 5 will meet in New York City on June 2, at a place to be determined by Dr. Rubenfeld. The Executive Committee will meet on June 3 at the same place.

Since our secretarial staff has no connections in New York City, we would appreciate each member making his own hotel arrangements for this meeting. It is likely that the AMA meetings will have a rather large attendance and I would suggest that arrangements be made immediately. The meetings will be held starting at 9 o'clock each morning, and we hope to finish by mid afternoon.

Sincerely yours,



Marshall Brucer, M.D.

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March 24, 1953

MEMORANDUM TO: TEB EXECUTIVE COMMITTEE  
SUBCOMMITTEE NO. 5

At the last meeting of the Executive Committee it was suggested that it might be advantageous to have the June meeting of both the Executive Committee and the Subcommittee No. 5 in New York City concurrent with the AMA Meetings. I was asked to check into the matter to see if we could call such a meeting away from Oak Ridge.

It has been decided that such a meeting can be held under the terms of our contract provided:

1. There is no additional expense for a meeting place. (Tentative arrangements for a meeting place have been made by Dr. Rubenfeld.)
2. That we pay only the expenses of each consultants' travel up to but not exceeding the cost of a trip to Oak Ridge. Such expenses will be paid in conformance with our standard travel policy.

Will you please let me know immediately if these arrangements meet with your approval. If a majority of the group approves I will call the two meetings for:

Subcommittee No. 5      Tuesday, June 2, 1953

Executive Committee      Wednesday, June 3, 1953



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Marshall Brucor, M.D.  
Chairman  
The Executive Committee

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MINUTES OF THE EXECUTIVE COMMITTEE, TELETHERAPY EVALUATION BOARD  
IN SESSION JANUARY 9, 1954

Members present: Dr. C. C. McClure - Vanderbilt University  
Dr. Herbert D. Kerman - University of Louisville  
Dr. Robert Reeves - Duke University  
Dr. Galen M. Tice - University of Kansas  
Dr. Carl Nurnberger - University of Tennessee  
Dr. Marshall Brucer - ORINS Medical Division  
Dr. Sidney Rubenfeld - Bellevus Medical Center

The Chairman of the executive committee opened the meeting with a review of an agenda prepared by the executive committee for submission to the Teletherapy Evaluation Board.

Item 1. Bylaws. Discussion was delayed for a detailed report of Item 2.

Item 2. Review of minutes of subcommittees. Dr. Brucer made a summary of the work of the subcommittees.

- A. Subcommittee No. 1, Source Evaluation and Shield Design, has not yet completed their original assignment. It was suggested that this subcommittee be continued for further study and evaluation of data to be collected from the hectocurie teletherapy unit and the kilocurie rotational teletherapy unit.
- B. Subcommittee No. 2, Small Source Design, has designed and approved a low curiage teletherapy unit which has been manufactured by the W. F. & John Barnes Company of Rockford, Illinois, and offered for sale by the Keleket X-ray Corporation. The original design has resulted in a unit price exceeding the early cost estimates. It was recommended that the subcommittee be continued to study other designs with an attempt to obtain a hectocurie unit at one half the present cost of the Barnes unit.
- C. Subcommittee No. 3, Rotational Methods, has not been able to function because a rotational unit has not been available. It is expected that the subcommittee will begin its study in the latter half of this calendar year.
- D. Subcommittee No. 4, Housing Design, has completed a series of studies on housing design problems, and the report has been used by the University of Southern California for designing a room to house the teletherapy unit manufactured by the W. F. & John Barnes Company. Dr. Jaffe will present for further study his adaptation of space to house the hectocurie unit at the Cedars of Lebanon Hospital. It was felt that the facilities had been over designed resulting in a much higher cost than originally anticipated. It was recommended that this subcommittee continue its efforts to simplify the design criteria. It was suggested that Dr. Jaffe's housing design be presented to the TEB with the suggestion that the Board authorize Subcommittee No. 4 to accept this design as a basis for further study.

- E. Subcommittee No. 5, Clinical Program, will report to the TEB on the efforts and recommendations of this subcommittee through the chairman, Dr. Rubenfeld.
- F. Subcommittee No. 6, Clinical Physicist Training Program, will make its report to the Board through Dr. Hoecker. The executive committee was informed that the Board of Directors of the Oak Ridge Institute of Nuclear Studies and the United States Atomic Energy Commission had made certain recommendations with respect to the program of this subcommittee.

Item 3. Actions of the executive committee not previously discussed in subcommittee reviews.

- A. The statement of purpose of the TEB published in Radiology required no action by the executive committee.
- B. The proposal for the AEC contract was to be discussed but required no immediate action by the executive committee. It was pointed out that this proposal is an obligation for each university and that the members present would be informed about the proposals that had been submitted. The executive committee should be prepared to discuss any question raised by member institutions.

Item 4. Current TEB membership. No action by the executive committee was required. Dr. Brucer reported that no institution had withdrawn from the TEB and that there was a possibility of two additional medical schools requesting membership sometime within the near future.

Item 5. Election of Chairman of the TEB.

Item 6. Election to membership on the executive committee.

Item 7. Additional business of the TEB.

Items 5, 6, and 7 did not require consideration by the executive committee except as they related to the provisions of the bylaws to be studied and recommended to the Board, January 10, 1954.

At this point, Dr. Rubenfeld suggested that the TEB give serious study to the costs incurred in treating patients with teletherapy units as compared with the costs of conventional X-ray therapy. He made a motion that the TEB request the American Board of Radiology to undertake a study to determine the over-all cost of radiation therapy, comparing conventional X-ray costs with estimated teletherapy costs. Dr. Brucer stated that such a study would entail considerable cost and effort and asked whether any member of the executive committee had a suggestion about how such a project could be started. Dr. Kerman was of the opinion that such information would be valuable; however, he did not believe the study was a function of the executive committee or the TEB. Dr. Brucer stated that such a request would require the executive committee's careful definition of the scope and objectives of such a project. Dr. Brucer reported that such a study had been made and it was found that the cheapest unit to get and operate was a 250 kv X-ray machine. When consideration is given to the usefulness factor in terms of depth dose, however, the kilo-caesium teletherapy machine appears to be the most economical, with cobalt teletherapy units falling in

second place, and high energy accelerators following.

Dr. Brucer was of the opinion that the Medical Research Council of England had made a study but that their report had not been published. Dr. Reeves stated it might be worth while to learn what information is available from surveys made 6 or 8 years ago by the Blue Shield and agencies advocating socialized medicine.

It was agreed that any attempt to make the study suggested by Dr. Rubenfeld should be very broad and should include all cost factors such as administrative costs; overhead and maintenance; and procurement of facilities such as equipment, real estate, building, land, etc. Dr. Tice also pointed out that the cost would have to give consideration to the amount of time the X-ray and teletherapy equipment is used. Dr. Tice quoted from a previous report by Dr. Hoecker showing that the time varies greatly with different machines and institutions.

Dr. McClure said he thought that a large number of people might be interested in such cost data and that it would be desirable to have a detailed study made. Dr. Reeves stated that the Dean of the Duke University Medical School had, within the past two or three weeks, requested such information to justify the purchase of a teletherapy unit for that university. Dr. Kerman, for the purpose of discussion, agreed that the information might be worth collecting; however, he wanted to know how an organization would go about collecting the information and how it would be possible to get a reasonable application of the data once it is available. Dr. Brucer thought the cost data would have to be expressed in cost per roentgen depth dose. This should be a fairly easy cost estimate to obtain; it would be necessary, however, to use other factors such as space, amount of maintenance, etc.

Dr. Rubenfeld modified his motion to read: "In order to properly evaluate the practical application of teletherapy units, the TEB shall request the American College of Radiology to furnish any information available on the relative cost of radiation therapy, giving comparative costs of private and institutional radiation therapy". The motion was seconded by Dr. McClure and carried by a unanimous voice vote.

Following adjournment for lunch, the executive committee began a detailed study of a proposed set of bylaws for submission to the TEB.

The preamble of the bylaws was accepted as written in the proposed draft.

Article I, Membership: Dr. Kerman suggested that the membership requirements read: ".....other institutions recommended by the Executive Committee and approved by the Teletherapy Evaluation Board". The suggested change was approved.

Article II, Institutional Representation: This section was approved with minor modifications in wording.

Article III, Powers of the Teletherapy Evaluation Board:

Paragraphs 1 and 2 were approved as written except for the addition of a sub-item which delegates to the TEB the authority "To elect new member institutions to the Teletherapy Evaluation Board".

Paragraph 3 was approved as written in the proposed draft.

Paragraph 4 was amended to add the following: The Teletherapy Evaluation Board shall "..... b. Elect a person to act as Executive Secretary for one year".

Paragraph 5 was approved as written (later amended by action of the Board).

Paragraph 6 was amended to read: ".....A request to call a meeting of the Board shall state the purpose or purposes of the proposed meeting".

#### Article IV, Membership of the Executive Committee:

Paragraph 1 was amended to read as follows: "The Executive Committee shall consist of seven persons and the Executive Secretary to the Board. The secretary shall not have a vote on Executive Committee actions. A majority of the committee shall constitute a quorum for transacting business".

Paragraph 3 was accepted with minor modifications in wording.

Paragraph 4 was accepted with minor modifications in wording.

Paragraph 8 was modified to read: "the Executive Committee shall meet at the call of the Chairman or a majority of the Committee as often as necessary and in any event not less than twice during the calendar year".

Paragraph 2 originally read: "The membership of the Executive Committee shall have at least one person from the Oak Ridge Institute of Nuclear Studies, at least one physicist, and at least four persons from member institutions." When this paragraph was read, Dr. Rubenfeld pointed out that this would permit a person from a nonmember institution to serve as an appointee on the executive committee. Dr. Brucer agreed that this was correct. He then referred to the provision of the Institute Bylaws whereby the Council has elected persons from nonaffiliated institutions to serve on the Board of Directors. Dr. Rubenfeld expressed strong objections to such a procedure, and stated that, in his opinion, no person should serve on the executive committee unless he was a representative from a member institution. Dr. Rubenfeld then made the following motion: "The membership of the executive committee shall consist of the Chairman of the ORINS Medical Division, one physicist from a member institution, and five persons from the Teletherapy Evaluation Board". Dr. Nurnberger observed that if "member institutions" included the Oak Ridge Institute of Nuclear Studies then Dr. Rubenfeld's motion would permit ORINS to have two members on the executive committee. Dr. Brucer stated that the original wording of the bylaws had been selected to guarantee that the executive committee membership would have at least one person from the Oak Ridge Institute of Nuclear Studies, at least one physicist, and at least four persons from members institutions. In this manner, the TEB would always have a majority representation and

at the same time would have freedom of selecting eminently qualified persons to serve on the executive committee. It was Dr. Brucer's opinion that this assured majority would guarantee the interest of the member institutions and would leave the Board considerable freedom in electing executive committee members. Dr. Rubenfeld's motion would be limiting the Board in its freedom of action, without accomplishing any additional safeguards for the interest of the member institutions. For example, the TEB can always elect only members of the Board if that should be their wishes; Dr. Rubenfeld's motion, however, would prevent the Board from ever electing a non-institutional representative without a two-thirds vote to amend the bylaws. Dr. Tice and Dr. Reeves felt majority representation on the TEB could be assured by vote of the TEB.

Dr. Murnberger again suggested that the executive committee should represent as many different institutions as possible rather than being dominated by more than one representative from any institution. It was suggested that Dr. Rubenfeld amend his motion by adding "There shall be only one member from any one institution".

Dr. McClure wanted to know whether the executive committee could obtain the services of recognized authorities on a consultant basis. It was stated that this provision was available to the TEB, the executive committee, and all subcommittees. Dr. Kerman felt that the executive committee should have five members from the TEB at all times as a majority to guarantee the actual control of any policy pertaining to the TEB. It might be desirable, however, to get more freedom of action and a broader understanding of problems involved, if noninstitutional persons serve as members of the executive committee. He stated that it is the responsibility of the executive committee to serve the interests of the member universities and if there were doubts that this could be done by outside membership on the committee, then Dr. Brucer's recommendation should be disregarded and Dr. Rubenfeld's motion should be accepted. Dr. Kerman, however, did not feel that it would make too much difference inasmuch as control of policy would still rest in the majority representation of members from the TEB. Dr. Rubenfeld again stated that this was a committee of the TEB and, therefore, it should contain only representatives from the Board.

Dr. Murnberger offered an amendment to Dr. Rubenfeld's motion to read: "The membership of the executive committee shall consist of the Chairman of the ORINS Medical Division, one physicist from a member institution, five persons from the TEB, and not more than one person from any one member institution". The amendment was seconded by Dr. McClure and unanimously carried by voice vote. Dr. Rubenfeld's amended motion was then seconded by Dr. Tice. The motion was then voted down by a vote of 5 to 2.

Dr. Brucer stated that inasmuch as there were strong opinions in favor of the defeated motion, he recommended that the discussion of the motion, and the original wording of the bylaws, be presented to the full TEB for their action. This recommendation met with the unanimous approval of the executive committee.

Paragraph 5 was amended to read: "All persons duly elected or appointed to the Executive Committee shall have one vote on its actions regardless of their qualification to vote on Board actions".

**Article V, Powers of the Executive Committee:** This section was approved with minor modification in wording.

**Article VI, Membership of the Subcommittees:**

Paragraph 5 was approved with minor modification in wording.

Paragraph 1 was amended to read: "Membership to subcommittees shall be appointive by the Executive Committee or by the Board".

The executive committee agreed unanimously to delete the sentence: "The membership of each subcommittee shall be limited to a maximum of nine persons". This paragraph originally contained the same provision for membership representation as suggested for the executive committee. Dr. Rubinfeld again brought up for discussion the advisability of limiting membership on subcommittees only to persons from member institutions. He asked Dr. Brucer if, in his analysis of the function of these subcommittees, it could be arranged for consultants to come in from time to time for discussion on the more complex problems under consideration. Dr. Brucer stated that this had been the procedure followed during the past year. He also stated that on the invitation of some subcommittees there had been invitations extended to industrial representatives to sit in on various meetings. Dr. Rubinfeld asked whether there had been any occasion to call in any radiologists or physicists. Dr. Brucer pointed out that radiologists and physicists could have been called in but so far as he remembered they had not, inasmuch as there was a radiologist or physicist present at each subcommittee meeting. Dr. Rubinfeld stated that he was trying to decide for himself whether subcommittee membership should be limited to members of the Board with the privilege of calling in outside consultants when the necessity arose. Following this discussion, it was unanimously agreed that membership on the subcommittees should be decided by the TEB.

Paragraph 6 was amended to read: "The authority of the subcommittees is in making recommendations to and advising the Executive Committee!"

Paragraph 2 was accepted with minor modifications in wording.

**Article VII, Travel Policy:** This article was adopted with minor modifications in wording.

**Article VIII, Consultants:** This article was adopted with minor modifications in wording.

**Article IX, Publication Policy:** This article was deleted from the proposed bylaws by unanimous consent.

**Article X, Amendment or Suspension of Bylaws:** This article was adopted as originally written.

Following a short review of the year's activity the committee adjourned.

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Marshall Brucer, M.D.  
Chairman  
The Teletherapy Evaluation Board

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MARCH 6, 1954 MEETING OF THE EXECUTIVE COMMITTEE OF THE  
TELE THERAPY EVALUATION BOARD

Members Present: Dr. Vincent Collins - Baylor University Graduate School  
Dr. H. D. Kerman - University of Louisville  
Dr. James Lofstrom - Wayne University  
Dr. C. C. McClure - Vanderbilt University  
Dr. Carl E. Nurnberger - University of Tennessee  
Dr. Marshall Brucer - ORINS Medical Division

1. AEC Contract Proposal-Statement of TEB Program.

Dr. Brucer opened the meeting by reviewing a letter from the Medical Branch, Division of Biology and Medicine, US-AEC, requesting a formal statement of the program and objectives of the clinical research program of the TEB. It was emphasized that the statement should be available to the Commission by May 1, 1954, inasmuch as the Commission will at that time review the first research proposals submitted by member universities.

The Executive Committee recognized the responsibility of Subcommittee No. 5, Clinical Program, for formalizing such a statement, however, because of the urgency, a preliminary draft was made by the Executive Committee and sent to members of Subcommittee No. 5 for study and approval in the April 17 meeting. The preliminary statement is attached to these minutes as Appendix A. Dr. Vincent Collins, a member of the Executive Committee and Subcommittee No. 5, was requested to coordinate the activities of both committees in drafting a final statement.

Dr. Collins stated that patients to be treated under the clinical research program of the TEB would not always be suitable for measuring the program's effectiveness by the five-year survival criteria. Therefore, other criteria should be codified to permit a statistical analysis of the end results. He then recommended one or more consultant statisticians for Subcommittee No. 5. Dr. Collins reviewed the curriculum vitae of Drs. Harold Tivey and Carl E. Hopkins, of the University of Oregon, and suggested that they be considered as consultants available to Subcommittee No. 5.

2. Subcommittee Membership and Dates of Meetings.

The Executive Committee reviewed and approved the recommendations for Subcommittee memberships made by the nominating committee at the January 9 meeting, with the exception that Dr. H. D. Kerman be added to Subcommittee No. 5. The approved subcommittees and scheduled meetings are as follows:

<u>Subcommittee</u>	<u>Membership</u>	<u>Date</u>
5 Clinical Program	Dr. Vincent Collins Dr. Isadore Meschan Dr. George Cooper Dr. Galen Tice Dr. H. D. Kerman	April 17

<u>Subcommittee</u>	<u>Membership</u>	<u>Date</u>
2 Small Source Design	Dr. Henry Jaffe Col. John Isherwood Dr. James Kelly Dr. Stephen Weens Dr. Harold W. Lewis	June 12
1 Source Evaluation and Shield Design	Dr. H. D. Kerman Dr. David Carroll Dr. Carl Nurnberger Mr. John Tolan	July 10
3 Rotational Methods	Dr. Kenneth Loeffler Dr. Robert Andrews Dr. Frederick Mandeville Dr. C. C. McClure	August 14
4 Housing Design	Dr. James Lofstrom Dr. Paul Riemenschneider Dr. Robert Reeves Dr. Sidney Rubenfeld	September 20
6 Clinical Physicist Training Program	Dr. Frank Hoecker Dr. Walter Burdette Dr. William Riser Dr. Howard Hunt Dr. Arthur Guyton	October 9

### 3. Cost Problems of Cobalt 60.

Dr. Brucer informed the committee that recent calculations of cost per rhm of cobalt 60 sources at a specific activity of 10 curies/gram indicate that kilocurie sources may not be the most economical to use for teletherapy. The calculations were based on four factors: total curriage, specific activity, diameter, and height of a right cylinder. The calculations also assumed that the right cylinder would consist of a number of wafers, irradiated and stacked to produce a uniform distribution of radiation.

The comparative costs of rhm delivered to a tumor must reflect the cost of the source, the teletherapy unit, and housing; however, the critical factor is the efficient utilization of a therapy unit. The treatment time of a kilocurie unit may be one-third the time required for a hectocurie unit, but the dead time on each machine reduces this advantage to a minimum.

Dr. Brucer suggested that these factors be studied during the next meeting of Subcommittee No. 2, Small Source Design. Dr. Lofstrom suggested that no final decision be made until more experience is obtained from the operation of both units. Dr. Collins suggested that the TEB carry to completion the programs for the hectocurie and kilocurie units, and that the Board extend its program to include multiple units for stationary and rotational therapy. The suggestion of Dr. Collins was made as a motion by Dr. Lofstrom. The motion was seconded by Dr. Collins and carried.

#### 4. Rules of Procedure.

The Executive Committee reviewed the proposed bylaws as adopted by the TEB at its annual meeting of January 10, and as revised by the Institute Board of Directors in a meeting on February 16. The committee approved the Board of Directors' recommendations that the bylaws be called "Rules of Procedure" and that a termination of the program be provided for. Dr. Lofstrom made a motion that the Rules of Procedure be adopted as revised by the Institute Board of Directors. The motion was seconded by Dr. McClure and carried. (See Appendix B.)

#### 5. Radiation Shielding Properties of Marble.

Dr. Brucer reviewed the results of recent tests to determine the shielding properties of marble, and recommended that Subcommittee No. 4 review the results at the September meeting.

## Appendix A

### THE CLINICAL RESEARCH PROGRAM OF THE TELE THERAPY EVALUATION BOARD

The Clinical Research Program of the Teletherapy Evaluation Board has as its primary objective the evaluation of supervoltage radiation in cancer therapy. The member medical schools shall accomplish this objective by pooling their efforts and clinical material over a period of years so that statistical significance may be assured.

Each of the participating schools will have at least one teletherapy machine plus other equipment in the lower energy range. Twenty-five per cent of the time of the teletherapy machine will be devoted to a program jointly arrived at, following specific treatment patterns approved by the Board. The other 75 per cent of the time of each machine will be on problems of specific interest to the individual school.

Each of the schools will contribute information on a parallel series of studies using conventional techniques and 200 kvp equipment. A uniform system of records and clinical classifications for each disease chosen for study is now in process of development. Before general adoption, a pilot run of the classification and record system will be accomplished by the initial group of five or six schools ready to start this year. This initial group will work closely with Subcommittee No. 5, which is primarily responsible for the design of the clinical experiment. The results of their study will be presented to the entire TEB at the next annual meeting for general approval.

The program details will follow a number of general lines of procedure.

1. A limited series of types of cancer will be chosen. They will be from three classifications.
  - a. Radiocurable cancers in which, for one reason or another, supervoltage is preferable.
  - b. Potentially radiocurable cancer in which cure with conventional therapy is seldom achieved.
  - c. Cancers in which palliation only may be expected.
2. The conventional end point of five year survival is an inadequate evaluation mechanism except in 1-a. The ultimate value of the isotope radiation machines may be unrelated to their ability to match or surpass the survival rates of conventional therapy. Therefore, in spite of the difficulty and dangers of codifying intangibles, subjective impressions, and economic factors, some of these other criteria for evaluation must be devised to allow an assessment of all types of cancer listed under 1. The specific points assessed in the recording system will be:
  - a. Survival Rate: Survival rates will be standardized on a life table basis when sufficient data has been gathered. Since such a standardization can be accomplished only on large samples of specific population groups, simpler methods comparing a matched series treated with conventional techniques will be used on the early data.

- b. Indices of Morbidity: Any change in the natural course of the untreated disease is an effective index of the effect of the treatment. Although most of the judgments concerning a change in the course of the disease are subjective impressions, these form the body of data upon which the final judgment of any treatment is based. Some factors such as a return to useful occupation, decreased nursing time, use of narcotics, and time in hospital can easily be codified and are especially valid upon comparison with parallel series in the same organization.
- c. Evaluation of the Cause of Death: In many of the cancers an excellent index of the effectiveness of treatment is an evaluation of the immediate cause of death. If radiation therapy changes the terminal pattern of events, such changes can be codified to allow an assessment of the effectiveness of the therapy.
- d. Distribution of Disease at Death: There are six main classifications that will allow a rank order assessment of the results of therapy, based upon the distribution of the disease at death and the incidence of complications due to radiation.

#### CLASSIFICATION FOLLOWING AUTOPSY

- A. Therapy was started at primary site to irradiate only known site of cancer.
  - 1. No persistent disease at primary site, no distant metastases.
    - a. No complications at primary site due to radiation.
    - b. Complications at primary site did not appreciably affect morbidity.
    - c. Complications at primary site did appreciably affect morbidity.
    - d. Complications at primary site did contribute to cause of death.
  - 2. No persistent disease at primary site, with distant metastases.
    - a. No complications at primary site due to radiation.
    - b. Complications at primary site did not appreciably affect morbidity.
    - c. Complications at primary site did appreciably affect morbidity.
    - d. Complications at primary site did contribute to cause of death.
  - 3. With persistent disease at primary site, no distant metastases.
    - a. No complications at primary site due to radiation.
    - b. Complications at primary site did not appreciably affect morbidity.
    - c. Complications at primary site did appreciably affect morbidity.

- d. Complications at primary site did contribute to cause of death.
- 4. With persistent disease at primary site, with distant metastases.
  - a. No complications at primary site due to radiation.
  - b. Complications at primary site did not appreciably affect morbidity.
  - c. Complications at primary site did appreciably affect morbidity.
  - d. Complications at primary site did contribute to cause of death.
- B. Therapy was started at secondary site, or at primary site with other areas of cancer known to exist.
  - 1. No persistent disease at site of therapy.
    - a. No complications at primary site due to radiation.
    - b. Complications at primary site did not appreciably affect morbidity.
    - c. Complications at primary site did appreciably affect morbidity.
    - d. Complications at primary site did contribute to cause of death.
  - 2. With persistent disease at site of therapy.
    - a. No complications at primary site due to radiation.
    - b. Complications at primary site did not appreciably affect morbidity.
    - c. Complications at primary site did appreciably affect morbidity.
    - d. Complications at primary site did contribute to cause of death.
- C. Incidence of known complications in specific diseases.

In addition to the general codification of the cause of death following therapy, certain specific complications, which are of significance in conventional techniques, will be especially studied. For example, in the treatment of bronchogenic carcinoma, the incidence of bronchial hemorrhage is especially significant; in the esophagus the incidence of perforation into the mediastinum; in brain tumors the degree and persistence of epilation, bone necrosis, alteration of neurological sequellae; in breast tumors the incidence of recurrence in the chest wall.

D. Economic and social factors.

Some of the factors that may be of decisive importance but do not necessarily relate to any particular point in therapy should also be studied. How often is a planned course of therapy completed? How serious was the discomfort of the treatment period? What was the total cost of therapy? To what grade of activity was the patient returned?

E. Physical factors in dosimetry.

There will be a continuing study of the skin area, time-dose relationship, the comparison of integral dose with systemic reaction, and an attempt will be made to develop a more satisfactory theory of organ-specific integral dose criteria.

The program will not be a static one but will be under the constant scrutiny of Subcommittee No. 5. The specification of the first few diseases will be completed by early summer. Following an initial pilot run by the first few schools, diseases will be added to the list. A portion of the program is written specifically for the hectocurie machine without rotation. It is expected that simple rotational patterns will be developed as a second step and will be followed by more complex combined techniques.

## Appendix B

### RULES OF PROCEDURE OF THE TELETHERAPY EVALUATION BOARD

#### PREAMBLE

The Teletherapy Evaluation Board has been established for the purpose of carrying out a co-operative program for the investigation, development, and evaluation of radioisotopes for teletherapy. It is expected that the objectives of this initial co-operative phase of the program will be attained within approximately five years. The Board will remain in existence only for the duration of this phase of the program. The Board has been established as a unit of the Medical Division of the Oak Ridge Institute of Nuclear Studies the operations of which are carried out under a prime contract with the United States Atomic Energy Commission.

#### DEFINITIONS

**Teletherapy Evaluation Board:** The Teletherapy Evaluation Board hereinafter called the "Board" shall be a group of persons, who are under consultant contracts with the Oak Ridge Institute of Nuclear Studies, and who have been delegated authority by the proper officer of their educational institution to represent their institution in all Board proceedings.

**Member Institutions:** A member institution is any four-year medical school or other organization which has been admitted for membership on the Board under the procedures states in Article I.

**Member:** A member is a person who has been appointed by a member institution to represent that institution's interest on the Board.

**Alternate Member:** An alternate member shall be such person as has been proposed by a Board member or member institution for a consultant contract with the Institute to represent the member institution on the Board in the absence of a regular member or to otherwise participate in the proceedings if so authorized by the Executive Committee or by the

Board.

**Executive Committee Member:** An Executive Committee member is a person elected to the Executive Committee in accordance with Article IV.

**Subcommittee Member:** A subcommittee member is a person appointed to serve on a subcommittee under the provisions of Article VI.

## ARTICLE I

### Membership

Membership on the Board is open to A.M.A. accredited four-year medical schools, the Oak Ridge Institute of Nuclear Studies, and any other institution recommended by the Executive Committee and approved by the Board. Members who meet these requirements shall be admitted by application to and acceptance by the Board of Directors of the Oak Ridge Institute of Nuclear Studies. Each institution holding membership shall pay the sum of \$2,500 to the Oak Ridge Institute of Nuclear Studies for the purpose of partially defraying the program costs.

## ARTICLE II

### Institutional Representation

1. An executive officer of each participating institution shall appoint one voting member, who shall be made a consultant to the Oak Ridge Institute of Nuclear Studies, Medical Division, as its representative on the Board. He shall be known as a member of the Teletherapy Evaluation Board. Alternate members may be appointed as consultants to the Oak Ridge Institute of Nuclear Studies, Medical Division, on recommendation of the institutional members and shall be permitted to vote in Board actions in the absence of the regular member. Other consultants may be appointed to the Board upon recommendation of the Executive Committee, but shall not have voting privileges in Board actions. The member or his alternate shall have the power to cast the vote of his institution in Board actions

and shall act for his institution on all questions relating to the proceedings and functions of the Board.

2. The Board shall investigate, develop, and evaluate radioisotopes for teletherapy for the purpose of advising, consulting, and recommending to the Oak Ridge Institute of Nuclear Studies a co-operative program to be conducted on a basis mutually agreeable to the participating institutions. Actual programs carried out by the Oak Ridge Institute of Nuclear Studies shall be conducted in accordance with the Institute's prime contract with the United States Atomic Energy Commission and are subject to action by the officers of the Institute.

3. Each representative shall serve for such period as may be determined by the executive head of his institution, provided that such term of service shall in any event be limited to the period during which the institution he represents is entitled to membership on the Board.

### ARTICLE III

#### Powers of the Teletherapy Evaluation Board

1. The Board shall have the responsibility for investigating and developing a comprehensive co-operative program to evaluate radioisotopes for teletherapy. The Board shall elect an Executive Committee which shall have delegated powers as set forth in Article V.

2. The Board shall meet at least once each year for the following purposes, among others:

- a. To request and receive from the Executive Committee such reports as it deems necessary or desirable.
- b. To confer with and advise the Executive Committee on matters of policy.
- c. To review the progress of subcommittees.
- d. To elect persons to the Executive Committee.

- e. To recommend new member institutions to the Teletherapy Evaluation Board.

3. Prior to the annual meeting the Chairman of the Board shall appoint and meet with at least three members, who are not already members of the Executive Committee, to form a nominating committee. Their nominations shall be presented to the annual meeting for the election of the Executive Committee.

4. The Teletherapy Evaluation Board shall:

- a. Elect by the majority vote of the members present, and voting, one of its members to act as Chairman for one year.
- b. Elect by the majority vote of the members present, and voting, a person (not meaning a Board member) to act as Executive Secretary for one year.

5. Not less than 40 per cent of the members of the Board shall constitute a quorum for transacting business at all meetings of the Board.

6. The Chairman may call special meetings of the Board whenever he deems it expedient or he shall call such meetings when requested to do so by a majority of the Executive Committee or a majority of the Board. A request to call a meeting of the Board shall state the purpose or purposes of the proposed meeting.

7. Notice of meetings of the Board and an agenda of the business to be transacted thereat shall be sent to members at least one month prior to such a meeting.

#### ARTICLE IV

##### Membership of the Executive Committee

1. The Executive Committee shall consist of seven persons and the Executive Secretary to the Board. The secretary shall not have a vote on Executive Committee actions. A majority of the committee shall constitute

a quorum for transacting business.

2. The membership on the Executive Committee shall include at least one person from the Oak Ridge Institute of Nuclear Studies, at least one physicist, and all members of the Executive Committee shall be from member institutions. Not more than one person from any institution shall be a voting member of the Executive Committee.

3. Membership on the Executive Committee shall be elected by a plurality of the Board members present and voting at an annual or called meeting. Members of the Executive Committee shall be elected for a term of two years and shall be eligible for re-election except that the 1954 election shall elect three members for one year to allow overlap of appointments.

4. When vacancies on the Executive Committee occur between meetings of the Board, the Executive Committee may appoint qualified persons to serve as interim members of the Executive Committee until the next meeting of the Board.

5. All persons duly elected or appointed to the Executive Committee shall have one vote on its actions regardless of their qualification to vote on Board actions.

6. The Executive Committee shall elect a Chairman from its members.

7. Unless otherwise elected as a member of the Executive Committee the Chairman of the Board shall be an ex officio member of the Executive Committee with full powers and privileges.

8. The Executive Committee shall meet at the call of the Chairman or a majority of the Committee as often as necessary and in any event not less than twice during each calendar year.

#### ARTICLE V

#### Powers of the Executive Committee

The Executive Committee shall have the following powers, among others:

- a. To appoint any and all subcommittees necessary for organizing and promoting the teletherapy evaluation program. The Executive Committee shall have power to define the scope of effort assigned to each subcommittee, to delegate to each subcommittee authority necessary for the performance of its duties, and shall have, at its own discretion, authority to discharge any subcommittee. Each subcommittee shall, in writing, be fully identified by title and be given a statement of objectives for which it was appointed.
- b. To act in an advisory capacity to the Board of Directors of the Oak Ridge Institute of Nuclear Studies on use of the teletherapy fund.
- c. To act upon the recommendations of any subcommittee.
- d. To prepare the agenda for meetings of the Board. New business may be introduced from the floor.

#### ARTICLE VI

##### Membership Duties and Authority of the Subcommittees

1. Membership to subcommittees shall be appointive by the Executive Committee or the Board. At least one person shall be from the Oak Ridge Institute of Nuclear Studies, at least one person should be a physicist, and at least a majority on each subcommittee shall be from member institutions. Any person may be appointed to a subcommittee on action of the Executive Committee without respect to membership on the Board. Voting on subcommittee matters shall be informal and all participants of the subcommittees shall be allowed to vote whether or not they are from member institutions.

2. Subcommittee membership shall be reviewed annually by the Executive Committee. Reappointments or new appointments shall be made at the first meeting of the Executive Committee following each annual meeting of the Board.

3. Each subcommittee shall elect a chairman from its members.

4. The Chairman of the Board shall be an ex officio member of each subcommittee.

5. The duties and organization of subcommittees shall be by action of the Executive Committee or by action of the Board at its annual or any called meeting.

6. The authority of subcommittees is limited to the making of recommendations to an advising the Executive Committee.

#### ARTICLE VII

##### Travel Policy

1. The expenses incurred by an appointed representative or his alternate, or by another appointed consultant, in attending official meetings of the Board, the Executive Committee, or any subcommittee meeting shall be reimbursed by the Oak Ridge Institute of Nuclear Studies in accordance with the representative's consultant contract in existence at the time of travel.

2. For each meeting of the Board, the Executive Committee, or a subcommittee, the Chairman of the Medical Division of the Oak Ridge Institute of Nuclear Studies shall prepare, for each member or consultant notified to attend, a request for performance under the consultant contract in effect between that member or consultant and the Oak Ridge Institute.

#### ARTICLE VIII

##### Consultants

Each representative on the Board may recommend specialists to the Oak Ridge Institute of Nuclear Studies for consideration in appointment to the Institute's staff of consultants.

ARTICLE IX

Amendment or Suspension of Rules of Procedure

These Rules of Procedure may be amended or suspended by a two-thirds vote of the members present and voting at any regular or called meeting.

These Rules of Procedure of the Teletherapy Evaluation Board of the Oak Ridge Institute of Nuclear Studies were adopted by the Board on January 10, 1954.

\_\_\_\_\_  
Chairman  
Teletherapy Evaluation Board

Approved

\_\_\_\_\_

\_\_\_\_\_

Date

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1954  
MINUTES OF THE JULY 22nd MEETING OF THE EXECUTIVE COMMITTEE AND INTERESTED  
SUBCOMMITTEES OF THE TELE THERAPY EVALUATION BOARD

TEB Members Present:

Executive Committee

Marshall Brucer, M. D., ORINS Medical Division  
Vincent Collins, M. D., Baylor University Graduate School  
Herbert D. Kerman, M. D., University of Louisville  
James E. Lofstrom, M. D., Wayne University  
Carl E. Nurnberger, Ph. D., University of Tennessee  
Henry Jaffe, M. D., University of Southern California

Subcommittee No. 5

Vincent Collins, M. D., Baylor University Graduate School  
Isadore Meschan, M. D., University of Arkansas  
George Cooper, M. D., University of Virginia

Subcommittee No. 2

Henry Jaffe, M. D., University of Southern California  
John A. Isherwood, M. D., Baylor University Graduate School  
James F. Kelly, Jr., M. D., Creighton University  
H. Stephen Weens, M. D., Emory University

Subcommittee No. 1

Herbert D. Kerman, M. D., University of Louisville  
David S. Carroll, M. D., University of Tennessee  
Carl E. Nurnberger, Ph. D., University of Tennessee  
John Tolan, Emory University School of Medicine

Subcommittee No. 3

R. Kenneth Loeffler, M. D., Jefferson Davis Hospital

ORINS Staff Members Present:

Gould A. Andrews, M. D.  
William G. Pollard, Ph. D.  
J. Howard Harmon

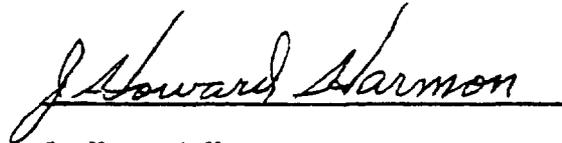
Visitors Present:

J. R. Mason, United States Atomic Energy Commission  
George T. Harrell, M. D., Chairman, Medical Advisory Panel  
E. E. Beauchamp, Oak Ridge National Laboratory

A joint meeting of the committees interested in the problem of the moving field teletherapy machine, and certain construction problems of the small fixed fields machines, met at the Faust Hotel in Rockford, Illinois July 22, 1954. Dr. Brucer discussed the design and construction details of the large rotational teletherapy unit, and the desired operation of the automatic control features of the unit.

Mr. L. J. Bulliet of the W. F. and John Barnes Company described the analogue computer designed for the automatic operation of the unit. The attached brochure gives representatives detailed information as presented by Dr. Brucer and Mr. Bulliet.

In the afternoon the Barnes Company demonstrated the cesium kilocurie teletherapy unit and models of the hectocurie cobalt 60 therapy unit. There was also a tour of the Barnes plant which preceded the showing of the teletherapy unit.



J. Howard Harmon  
Executive Secretary

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MINUTES, EXECUTIVE COMMITTEE, TELETHERAPY EVALUATION PROGRAM

7 July 1955

Members Present:

Dr. James Lofstrom . . . . . Wayne University  
Dr. Henry Jaffe . . . . . University of Southern California  
Dr. Vincent Collins . . . . . Baylor University, Graduate School  
Dr. David Carroll . . . . . University of Tennessee  
Dr. Marshall Brucer . . . . . ORINS Medical Division

Members Absent:

Dr. Carl Nurnberger . . . . . University of Tennessee  
Dr. Isadore Meschan . . . . . University of Arkansas

A meeting of the Executive Committee was held in Oak Ridge, Tennessee, Thursday, at 8:00 p.m.

The committee reviewed objections to the program by members of the Advisory Committee to the Biology and Medicine Division of the United States Atomic Energy Commission. One objection was that the name "Teletherapy Evaluation Board" could imply that this group was a duly constituted national medical specialty board. To avoid this misunderstanding the Executive Committee voted to recommend to the next annual board meeting that the name be changed to "Teletherapy Evaluation Program".

In order to avoid the impression that the evaluation program has an exclusive participation, the committee recommended that future annual meetings follow the precedents established at the Detroit meeting of this year. It was recommended also that recognized authorities in the field of radiation therapy be invited as consultants to meetings of various committees of the board. It was pointed out that because the program is centered in Oak Ridge, various groups would construe the program as an official AEC program with special consideration to participants. The members of the committee recommended that considerable effort be given to avoid this misconception.

The committee reviewed the extensions of research grants by the Atomic Energy Commission. Some grants had been extended while others had been rejected. The committee suggested that the rejected grants be resubmitted early this fall and recommended that no effort be given to embellishing the grant applications.

Members of the committee reported that considerable data and pathological material had been collected and indicated a desire to transmit the collections to ORINS for filing and processing. The committee instructed the executive secretary to write all members of the board and request that each institution submit by September 1 all available data

on patients treated under the accepted cobalt 60 therapy plan and data on control patients treated by conventional X ray in accordance with the accepted treatment plan. The data will be filed by ORINS in alphabetical order. Dr. Tivey is to be requested to visit Oak Ridge before the September meeting of the American Roentgen Ray Society to study the available data and make recommendations for establishing a method for correlation and analysis. In order to avoid an undue burden on ORINS travel funds the committee recommended that Dr. Tivey make his report to members of the clinical committee who would be in attendance at the American Roentgen Ray Society meeting in Chicago on or about 20 September. The committee expressed the hope that after this meeting the preliminary plan could be formalized and submitted for final approval at a clinical committee meeting to be held in December.

The committee discussed a policy for exhibiting the clinical material and the program. It was agreed that various members of the clinical committee could exhibit their material before medical meetings. Dr. Lofstrom was instructed to prepare, in behalf of the clinical committee, an exhibit for the December 1955 meeting of the Radiological Society. Other members of the clinical committee will be given the responsibility for preparing exhibits for future meetings of other medical societies.

Dr. Brucer presented the following report of funds contributed by participating members to help defray costs of the teletherapy evaluation program. This does not include costs of meetings or other costs directly charged to the Institute.

INCOME

Contributions from Participating Medical Schools \$55,000.00

DISBURSEMENTS FROM TELETHERAPY FUND ONLY

	<u>Total Cost</u>	<u>Tel. Fund Portion</u>	
Pulse Height Analyzer (100% of cost)	\$ 9,853.16	\$ 9,853.16	
D. C. Amplifier (25% of cost)	1,013.40	253.35	
Teletherapy Unit (25% of cost)	62,475.00	15,619.00	
Cesium Source (25% of cost)	15,000.00	<u>3,750.00</u>	
Total			<u>29,475.51</u>
Balance of Fund as of 6/30/55			<u>\$25,524.49</u>

Dr. Brucer reported on ORINS' tentative plans for the third advanced medical course to be held in 1956. He explained that the fourth week of the course, July 9-14, 1956 would deal with problems in the field of Teletherapy and Brachytherapy. This week is just before the meeting of the International Congress of Radiology in Mexico City and ORINS hopes to get some European Radiotherapists to come through Oak Ridge during the fourth week of this course. Dr. Brucer further outlined plans for holding the annual meeting of the TEB just before the fourth week of the advanced medical course.