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HISTORY OF THE INTERNATIONAL COMMISSION ON RADIOLOGICAL UNITS AND MEASUREMENTS (ICRU)

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Abstract—The International Commission on Radiological Units and Measurements was established in 1925 by the first International Congress of Radiology and since that time has established the units that are used in radiation dosimetry. The roentgen was introduced in 1928 and the rad in 1953. Since 1953 the Committee's activities have broadened substantially and in its most recent studies provided much of the technical information and background necessary for the practical interpretation of radiation dose in terms of the rad. This report covers the work of the Commission as it has developed since its formation over 30 years ago.

1. FORMATION

THE ICRU was formed in 1925 under the auspices of the First International Congress of Radiology, then meeting in London. The single factor having the most bearing on the formation of this Commission was the absence of any units of radiation dosage for use in therapeutic application of radium and X-rays. Up to that time, several units had been proposed and were in use in various countries but there was no international acceptance of any one of them.

2. MODE OF OPERATION AND HISTORY

In its initial formation, the ICRU consisted of two representatives from each of the countries participating in the Congresses of Radiology. Of these two members, one was expected to be a physicist and one a radiologist. In practice, about three-quarters of the members were primarily radiologists. Meetings of the ICRU were held during the International Congress. The continuity of the Commission and the arrangement of meetings, agenda, etc., were in the hands of a secretary selected from among the Commission members. The meetings of the Commission were presided over by one or two honorary chairmen who were usually people of substantial scientific or radiological reputation from the country in which the meeting was held. Occasionally there were also honorary secretaries having no defined responsibilities. In general, these honorary positions were filled by persons having little or no contact with the radiological field and hence were honorary in the strictest sense of the word.

Since there were of the order of fifty countries participating in each International Congress, the rules of the Commission permitted as many as a hundred members, but many countries made no attempt to designate members and the largest number meeting at any one time was forty-one. With such a large membership, it was extremely difficult to carry out the Commission's work; it usually developed that some eight or ten persons carried the load. On the other hand, many countries felt they should have a voice in the matter, with the result that there was an enormous amount of useless discussion at each of the meetings.

Formal minutes of the meetings were not kept. It was considered that the report released by the Commission constituted its findings as well as its minutes.

1925

At the first ICRU in London, a series of papers relating to X-ray dose measurement were presented.[1] Following the discussion of these papers a resolution to study the question of X-ray measurement was passed, and a committee was appointed to nominate an

* Chairman, ICRU 1953–1959.

international committee for this purpose.[2] The nominating committee included the following:

Sir W. BRAGG
Prof. F. H. HOPWOOD
Dr. E. A. OWEN
Mr. C. E. S. PHILLIPS
Prof. A. W. PORTER
Prof. S. RUSS

1928

The second meeting of the ICRU was held in Stockholm in 1928 at which time there were about forty members present. At this meeting, the Committee adopted the definition of a unit of "X-ray intensity" known as the roentgen.[3] This was an extremely important step forward and for the first time it was made possible to measure radiation in all countries in terms of the same unit. This unit has continued in use to the present time with various modifications in definition, but only minor changes in magnitude.

A resolution adopted in 1928 included the statements:

"(1) That this international unit be the quantity of X-radiation which, when the secondary electrons are fully utilized and the wall effect of the chamber is avoided, produces in one cubic centimeter of atmospheric air at 0°C and 76 cm mercury pressure, such a degree of conductivity that one electrostatic unit of charge is measured at saturation current.

"(2) That the international unit of X-radiation be called 'the Röntgen', and that it be designated by the small letter 'r'."

The membership of the ICRU in 1928 is not known.

1931

The third meeting of the ICRU was held in Paris in 1931 at which time thirty-nine members were present.[4] The following recommendations were made:

(1) The International Unit of X-radiation shall be the quantity which, when the secondary electrons are fully utilized and the wall effect of the chamber is avoided, produces in 1 cm^3 of atmospheric air at 0°C, and 76 cm mercury pressure, such a degree of conductivity that one electrostatic unit of charge is measured at saturation current.

(2) The International Unit of X-radiation shall be called the "roentgen" and shall be designated by the letter "r".

(3) The "intensity" of the radiation shall be expressed in r/sec.

Between the 1928 and 1931 meetings, international comparisons of X-ray standards were carried out, one in 1928 by H. BEHNKEN, using a portable thimble chamber, and one in 1931 by L. S. TAYLOR using a portable primary standard. As a result of these intercomparisons, the ICRU, in 1931, recommended that the National Standardizing Laboratories establish agreement on the general characteristics of primary X-ray standards and of the radiation quality ranges over which these standards were to be used.[5] This then marked the first time that there was substantial agreement regarding the basic characteristics of primary radiation standards. The Committee further recommended that:

(1) The experimental methods of establishing a standard for the determination of the International X-ray Unit shall be entrusted to a subcommittee consisting of the following members of the Units Committee: M. DE BROGLIE (France), W. FRIEDRICH (Germany), E. A. OWEN (Great Britain), R. SIEVERT (Sweden), I. SOLOMON (France), E. PUGNO-VANONI (Italy), L. S. TAYLOR (U.S.A.); (Honorary Secretary of the Committee, E. A. OWEN). This Committee shall invite the collaboration of the various existing national bureaus for standard measurements and also those about to be instituted.

(2) This Committee shall consider: (a) methods of controlling the constancy of dosage meters; (b) the correlation of X-ray and γ-ray dosage; (c) the establishment of a γ-ray unit of intensity.

(3) The progress of the work done by the subcommittee shall be reported once a year to the members of the International X-ray Unit Committee.

(4) Each country shall be requested immediately to elect its two representatives on the International X-ray Unit Committee; until new representatives are elected the present members shall serve.

(5) The International Committee shall

Date and place of meeting	Members present	Officers
1925, London	?	E. A. Owen (U.K.), Secretary
1928, Stockholm	40	E. A. Owen (U.K.), Hon. Secretary H. Holthusen (Germany), Secretary
1931, Paris	39	E. A. Owen (U.K.), Hon. Secretary H. Holthusen (Germany), Secretary
1934, Zurich	33	E. A. Owen (U.K.), Hon. Secretary H. Holthusen (Germany), Secretary
1937, Chicago	41	L. S. Taylor (U.S.), Secretary
1950, London	13	W. V. Mayneord (U.K.), Chairman L. S. Taylor (U.S.), Secretary
1953, Copenhagen	12	W. V. Mayneord (U.K.), Chairman L. S. Taylor (U.S.), Secretary
1956, Geneva	11*	L. S. Taylor (U.S.), Chairman W. J. Oosterkamp (Netherlands), Secretary
1957, Geneva (with ICRP)	6	L. S. Taylor (U.S.), Chairman R. Sievert (Sweden) Co-chairman

* Main Commission only; 11 subcommittee members and 5 subcommittee consultants were also present.

henceforth be called "The International Committee for Radiological Units".

Thus, beginning in 1931, in addition to the members designated by the member countries of the Congress, the Commission also included in its membership representatives designated by each of the recognized National Laboratories. At the time, this included the National Laboratories of England, Germany, Sweden, and the United States.

At the same time, it became evident that the large size of the ICRU made its deliberations unwieldy. It was therefore proposed that the continuity of program and the direction of the technical discussions be placed in the hands of a small group known as the Executive subcommittee. This arrangement was put into effect at the following meeting.

1934

The fourth meeting of the ICRU was held in Zurich and St. Moritz in 1934, and was attended by thirty-three members.[6] At the outset of this meeting it was decided to establish an Executive subcommittee for the purpose of formulating the technical program for subsequent consideration by the whole committee. This plan, put into effect at the Zurich meeting, proved to be very effective, and the first set of preliminary operating rules for the ICRU were formulated.* These were as follows:

(1) The International Committee for Radiological Units shall be constituted by two representatives from each country sending delegates to the congress. When a country has a central X-ray standardization laboratory, it may in addition send a representative of that laboratory. Of the representatives from a single country at least one must be a radiologist, and one a physicist.

(2) There shall be a standing Subcommittee of the International Committee for Radiological Units consisting of six members including the chairman.

(3) The subcommittee shall elect its own Chairman and Secretary from amongst its members.

(4) The Subcommittee shall report on the progress of dosage-measurements and prepare the program to be submitted to the Main

* *Proc. IV Int. Cong. Radiol.* **4**, 148 (1934).

Committee. The report shall be published and circulated to members of the Main Committee at least six months before the meeting of the Congress.

The first executive subcommittee consisted of:

I. SOLOMAN (France) Chairman
L. S. TAYLOR (U.S.A.) Secretary
E. A. OWEN (U.K.)
H. BEHNKEN (Germany)
E. PUGNO-VANONI (Italy)
R. SIEVERT (Sweden)

For the first time the ICRU report carried some recommendations relative to the clinical measurement of dose, and the calibration of dose-meters. Also the ICRU recognized the agreements of the National Laboratories on X-ray standards.[7] The section on clinical measurement follows:

(1) Dosage measurement shall be made in roentgens. Dosage rate shall be expressed in r/min.

(2) All dosage measurements shall distinguish between the air dose which does not include scattered radiation, and the effective dose which includes scattered radiation.

(3) The specification of dosage shall include a statement of the quality of the radiation. For exact physical measurements the quality of the radiation may be specified in terms of the complete absorption curves in copper or aluminum. For most practical purposes the quality may be expressed by the first and second half-value layers of the same materials.

(4) The specification of dosage shall also include: (a) dosage rate, (b) the total time of irradiation and the intervals between the times of irradiation, (c) material and thickness of filter, (d) target-skin distance, (e) the dimensions and number of ports of entry.

(5) The practical instrument used to measure X-ray quantity shall be called a dose-meter and shall be calibrated in roentgens.

(6) The calibration of a dose-meter shall be tested periodically by a recognized testing laboratory, over the range of wave length for which it will be used.

(7) The constancy of the calibration of a dose-meter shall be tested by the ionization produced, under fixed conditions by a definite quantity of radium element.

(8) Dose-meters should be independent of the wave length within the range for which they will be used.

The ICR in its Rules and Regulations (plan), confirmed some of the earlier operating procedures of the ICRU and at the same time recognized the formation of the Executive Subcommittee:

The Congress secretariat shall call a meeting of the Committee on Units at the beginning of each International Congress.* The Committee on Units is composed as follows:

(a) An Executive Committee of six members.

(b) Two representatives of all the countries represented at the Congress of whom one shall be a radiologist and the other a physicist.

(c) Delegates of national laboratories for radiological testing.

The Committee on Units chooses its President and its Executive Committee from among its members. A representative of the country in which the Congress is held shall belong to the Executive Committee.

1937

The fifth meeting of the ICRU was held in Chicago in 1937, with forty-one members attending.[8] At this meeting, the Executive Subcommittee was in full operation and the affairs were conducted more expeditiously than ever before.

During the 6 year period from 1931–1937 important technical advances had been made, resulting in the production of X-rays at energies up to 1 MV. This made it apparent that wording of the earlier definition of the roentgen (in reality, more a definition of a device than a physical quantity) would require modification, even though the magnitude of the quantity measured be not changed. It was also decided to make the definition applicable to γ-rays, and accordingly the roentgen was redefined as follows:[8]

(1) The International Unit of quantity or dose of X-rays or γ-rays shall be called the

* *Proc. IV Int. Cong. Radiol.* **4**, 161 (1934).

"roentgen" and shall be designated by the symbol "r".

(2) The roentgen shall be the quantity of X- or γ-radiation such that the associated corpuscular emission per 0.001293 g of air produces, in air, ions carrying 1 e.s.u. of quantity of electricity of either sign.

(3) Measurements of radiation quantity shall be expressed in roentgens. Measurements of dosage rate shall be expressed in roentgens per minute.

While solving some problems, the new definition inadvertently introduced a new source of difficulty, through reference (paragraph 3) to the term "radiation quantity". It is obvious that the roentgen does not measure "radiation quantity" in the usually accepted sense. There had also crept into common usage the acceptance of the roentgen as a measure of "dose"—again a concept at variance with the normally accepted understanding of that term. While not basically affecting the clinical measurement of radiation in the normal energy range, these inconsistencies have plagued the ICRU for many years.

There was developed at this time a more complete pattern for the description of radiation treatment conditions. This was designed to take into consideration all of the many factors necessary for a description of a radiation treatment. These recommendations for recording treatment have been continued since that time but have undergone some modification at almost every meeting of the Committee.

A new and much more detailed set of rules was developed to govern the selection of members and the work of the ICRU.

Thirteen years lapsed before the next meeting, during which time World War II had been in progress, and many of the original members of the Committee had either died or been killed. During this interim period the secretary of the Executive subcommittee, had kept abreast of developments in the field preparatory to reviving the Committee's operations.

In reorganizing the Committee, it seemed advisable to change its basis of membership selection in order to avoid the handicap of working with such large numbers. In advance of the Fifth Congress, discussions held between Dr. A. C. CHRISTIE (President of the Fourth ICR), L. S. TAYLOR and W. V. MAYNEORD led to agreement that a membership of about twelve would be desirable. With this number, it would no longer be necessary to have an Executive subcommittee. This suggestion was put by the past President of the Fourth Congress to the incoming President of the Fifth Congress, and was tentatively accepted by them subject to later approval by the International Executive Committee of the Congress. Approval was obtained during the 1950 Congress in London, and at the same time the Committee was renamed as a Commission.

1950

The reorganized Commission held its sixth meeting in London in 1950.[9] At this meeting a new set of rules was developed governing the membership and the work of the ICRU. The rules limited the membership of the Commission to a chairman and twelve additional members, selected for their recognized technical ability without regard to nationality. They also insured a reasonable turnover in membership, yet at the same time provided for adequate continuity of membership.

In its 1950 recommendations, the ICRU recognized for the first time the need for absolute measurements of radiation based on calorimetry or other fundamental techniques. It recognized further that the Commission was not in a position at that time to make any specific recommendations but the way was prepared for introducing improvements at a later time.

No changes were made in the 1937 recommendations on the specification of the conditions of X- and γ-ray treatment or the section on instruments. It was recognized at the meeting that some changes were desirable but that the need was not very pressing. Action was deferred until the next Congress.

The definition of the roentgen remained unchanged in spite of some acceptable arguments that change was needed.

The definition of the curie for the measurement of *any* radioactive material was adopted in accordance with the recommendation of the Commission on Standards, Units and Constants

of Radioactivity appointed by ICSU. This made the curie applicable to radioactive materials other than radium.

For the year or two prior to the 1950 meeting, the American and British Units Committees had been very active in the development of the concepts of energy measurements as applied to radiological problems. These were widely circulated well in advance of the meetings with the result that at the 1950 meetings, it was relatively easy to bring about substantial agreement between the different viewpoints prevailing. This advance action paved the way for the acceptance of the new energy unit for dose proposed later by the American and British representatives.

1952

In 1952, a joint meeting was held in Stockholm between the ICRU, the ICRP, and the UNESCO Joint Committee on Radiobiology. This meeting was primarily for the purpose of discussing the genetic aspects of radiation. While it was agreed that no specific recommendations would be made as a result of these meetings, it is interesting to note that the general findings were substantially the same as those made in April 1956 by the ICRP and in June 1956 by the U.S. National Academy of Sciences.

A short meeting of those members of the ICRU present was primarily for discussion of agenda for the regular meeting to be held in 1953.

1953

The seventh meeting of the ICRU was held in Copenhagen in 1953 with twelve members attending.[10] The most important outcome of this meeting was the introduction of a new basic unit for the measurement of radiation dose. This unit, known as the rad, was designed to place the measurement of dose on the basis of first principles. The new concepts and definitions adopted were as follows:

(1) Intensity of radiation is the energy flowing through unit area perpendicular to the beam per unit time. It is expressed in ergs/cm^2 sec^{-1} or W/cm^2.

(2) Quantity of radiation is the time integral of intensity. It is the total energy which has passed through unit area perpendicular to the beam and is expressed in ergs/cm^2 or W-sec/cm^2.

(3) Absorbed dose of any ionizing radiation is the amount of energy imparted to matter by ionizing particles per unit mass of irradiated material at the place of interest. It shall be expressed in rads.

(4) The rad is the unit of absorbed dose and is 100 ergs/g.

(5) Integral absorbed dose is the integration of the energy absorbed throughout a given region of interest. The unit is the gram-rad. 1 g-rad = 100 ergs.

The reasons for adoption of the rad were related (1) to the fact that we were using energies very much higher than was ever dreamed of in the 1930's, and for which the roentgen is not always the most suitable unit of measurement, and (2) the unit of absorbed dose, based on energy imparted to matter, would be applicable to other forms of radiation such as β-rays, α-rays and neutrons. It was clearly recognized during these meetings that much more information needed to be provided before the rad could be regarded as a practical unit. However, since 1953 its attractions became evident and it has begun to appear regularly in the radiological literature.

It will be noted that a physical definition of "quantity of radiation" was included; this mainly to help to distinguish the meaning of the term "quantity" as used in the definition of the roentgen.

Definition of the roentgen was again the subject of extensive discussion, particularly with reference to proposals by the Dutch and British members. While still unhappy about the current definition, and in spite of recognition of the validity of the proposals it was agreed to leave the definition unchanged. It was felt that any gains in physical preciseness of definition might be offset by the feeling among radiologists that their unit of radiation measurement was being changed. In addition, it was felt by some that adoption of the rad would eventually detract from the importance of the roentgen as a radiological unit.

The recommendations on the specification of radiation treatment were extensively revised and

extended to include the technical data required for treatment with radio nuclides.

With some background of experience with the operating rules adopted in 1953 some minor changes were proposed and later approved by the ICR.

The Commission established two subcommittees to provide more concentrated studies in the fields of X-ray standards and standards of radioactivity. W. J. OOSTERKAMP (Netherlands) served as chairman of the Subcommittee on X-ray Standards, and B. RAJEWSKY (Germany) as chairman of the Subcommittee on Standards of Radioactivity.

During the 1953 meetings, the Commission held its first symposium at which invited papers were presented on current work in radiation units and measurements.[11] This provided an opportunity to discuss at open meetings the work being done in various countries and the problems that require further investigation.

1955

In 1955, an informal meeting of the ICRU was held in Geneva during the International Conference on the Peaceful Uses of Atomic Energy. This was attended by the eight members present at the Conference, and was mainly in preparation for the formal meeting to be held the following year.

1956

The eighth meeting of the ICRU was held in Geneva in the spring of 1956. This marked the first time that the Commission had met separately from the meetings of its parent organization—the International Congress of Radiology. Meetings were held jointly with the ICRP and extended over a period of 12 days.

Another departure at these meetings was the fact that they were held with the assistance of the World Health Organization. This resulted from contacts made during the preceding few months, when the WHO had indicated its need for technical advice in the field of radiation protection and units. During the course of the meetings, the Commission officially accepted an earlier invitation of WHO to enter into an official relationship with WHO as a "Non-governmental Participating Organization". As a result of this relationship, the ICRU is now recognized by the World Health Organization as its body of technical advisors in the field of radiological units and measurements.

The meetings were attended by the ten members and the chairman of the Main Commission; eleven subcommittee members and five subcommittee consultants were also in attendance.

The report of the ICRU developed during the 1956 meetings represents the most complete effort thus far.[12] In addition to some degree of clarification of the different units used in measuring radiation dose, the report includes for the first time a large body of technical data called for in the 1950 and 1953 recommendations. It also includes extensive discussions and instructions regarding the problems met in introducing the new energy units into medical and biological practice.

It was agreed that some interim secondary standards of radiation measurement should be developed and made available to any countries requiring calibration of its equipment. The National Bureau of Standards (U.S.) agreed to undertake the responsibility for the development and construction of this equipment, which consists of a spherical cavity ionization chamber, standard diaphragms for free-air chambers and a standardized capacitor for checking current measurements. Through the co-operation of the WHO and UNESCO the secondary standards together with trained personnel will be sent to those countries requiring calibration of their working or primary standards.[13]

The Committee structure of the Commission was reorganized and enlarged; it now consists of the following four Committees:

Committee I:	Standards and Measurement of Radioactivity for Radiological Use. Chairman: W. E. PERRY, U.K.
Committee II:	Standards and Measurement of Radiological Exposure Dose. Chairman: H. O. WYCKOFF, U.S.
Committee III:	Measurement of Absorbed Dose and Clinical Dosimetry. Chairman: L. H. GRAY, U.K.

Committee IV: Standard Methods of Measurement of Characteristic Data of Radiological Equipment and Materials.
Chairman: B. COMBEE, Netherlands

In order to describe better the Commission's scope of activities, it's name was changed to International Commission on Radiological Units and Measurements (ICRU).

During the meetings, two half-day symposia were held for the purpose of presenting and discussing seventeen reports on specialized problems in the field of radiation units and measurements. The symposia were arranged by the ICRU, and through the assistance of the World Health Organization, were held in the UNO buildings. They were attended by some seventy-five persons including members of the ICRP and its subcommittees. The papers were not published as in 1953.

For a period of $3\frac{1}{2}$ days following the Commission meetings, several members (L. S. TAYLOR, W. OOSTERHAMP, L. H. GRAY) of the ICRU met with a WHO study group to consider on a world-wide basis how the recommendations of the ICRU might better be implemented. As one result of this study, the WHO will take active steps to disseminate on a world-wide basis the recommendations developed by the ICRU.

1956

An informal meeting of the ICRU was held in Mexico City in the summer of 1956 during the seventh International Congress of Radiology. Seven members who were in attendance at the Congress met to work on some of the phraseology of the report which had been developed in Geneva.

Listed below are the formal meetings of the ICRU held since its inception, the number of members in attendance, and the Commission Officers. (The Officers listed were in office at the time of meeting. Terms of new officers began after confirmation of their election during the International Congress, and continue for a 3 year period corresponding to the interval between Congresses. Honorary chairmen are not listed, as they were not permanent members of the Commission.)

The Eighth International Congress of Radiology is scheduled to meet in Munich in 1959. The next formal meeting of the ICRU has been scheduled to meet in Geneva in September 1958. It is expected that Committees of the ICRU will meet more frequently than the Main Commission to expedite the completion of their special studies. For the period 1956–1959, the membership of the Main Commission numbers thirteen, and that of the four Committees (including consultants) will be approximately from forty to fifty. Officers of the Main Commission for this period are L. S. TAYLOR (U.S.), Chairman; L. H. GRAY (U.K.), Vice-chairman; H. O. WYCKOFF (U.S.), Secretary.

REFERENCES

1. Discussion on Int. Units and Stds. for X-ray work, *Brit. J. Radiol.* **23,** 64 (1927).
2. Discussion in Int. Units and Stds., *Brit. J. Radiol.* **30,** 285 (1925). (Nominating committee set up).
3. Int. X-ray Unit of Intensity, *Brit. J. Radiol.* **1,** 363 (1928).
4. *Radiology*, **22,** 289 (1934).
5. Roentgen Ray Standards and Units (Standardizing Procedure of the National Laboratories), *Amer. J. Roentgenol.* **31,** 815 (1934). (Also German, French, Swedish and British refs.).
6. *Radiology*, **23,** 580 (1934).
7. Roentgen Ray Standards and Units (Standardizing Procedure of the National Laboratories), *Amer. J. Roentgenol.* **31,** 815 (1934). (Also German, French, Swedish and British refs.).
8. *Amer. J. Roentgenol.* **39,** 295 (1938); *Radiology*, **29,** 634 (1937).
9. Report of ICRP and ICRU. NBS Handbook 47
10. *Amer. J. Roentgenol.* **71,** 139 (1954); *Radiology* **62,** 106 (1954).
11. Reports submitted to the International Commission on Radiological Units and Measurements, Copenhagen, July 1953, *Acta Radiol.* Suppl. 117 (1954).
12. *Report of the ICRU.* NBS Handbook 62 (1957).
13. *NBS Tech. News Bulletin* **41** 190 (1957).

MEMBERS PREPARING REPORTS OF THE ICRU

1956, Geneva

L. S. TAYLOR, Chairman (United States)
W. J. OOSTERKAMP, Secretary (Netherlands)
A. ALLISY (France)
R. H. CHAMBERLAIN (United States)
F. ELLIS (Great Britain)
G. FAILLA (United States)
L. H. GRAY (Great Britain)
H. HOLTHUSEN (Germany)
H. E. JOHNS (Canada)
B. RAJEWSKY (Germany)
R. SIEVERT (Sweden)

1953, Copenhagen

H. M. HANSEN, Hon. Chairman (Denmark)
W. V. MAYNEORD, Acting Chairman (Great Britain)
L. S. TAYLOR, Secretary (United States)
A. ALLISY (France)
W. BINKS (Great Britain)
R. H. CHAMBERLAIN (United States)
F. ELLIS (Great Britain)
G. FAILLA (United States)
H. HOLTHUSEN (Germany)
H. E. JOHNS (Canada)
W. J. OOSTERKAMP (Holland)
B. RAJEWSKY (Germany)
R. SIEVERT (Sweden)

1950, London

W. V. MAYNEORD, Hon. Chairman (Great Britain)
L. S. TAYLOR, Secretary (United States)
W. BINKS (Great Britain)
R. COLIEZ (France)
F. ELLIS (Great Britain)
G. FAILLA (United States)
H. HOLTHUSEN (Germany)
G. C. LAURENCE (Canada)
R. R. NEWELL (United States)
W. J. OOSTERKAMP (Holland)
B. RAJEWSKY (Germany)
R. SIEVERT (Sweden)
A. TIVOLI (Italy)

1937, Chicago

G. FAILLA, Hon. Chairman (United States)
I. SOLOMON, Chairman (France) Executive Sub-committee
L. S. TAYLOR, Secretary (United States) Executive Sub-committee
G. SCHWARZ (Austria)
J. JUUL (Denmark)
H. M. HANSEN (Denmark)
H. HOLTHUSEN (Germany)
H. BEHNKEN (Germany)*
W. FRIEDRICH (Germany)
F. L. HOPWOOD (Great Britain)*
G. W. C. KAYE (Great Britain)
N. S. FINZI (Great Britain)
A. LAMBADARIDES (Greece)
D. DEN HOED (Holland)
A. BOUWERS (Holland)
M. PONZIO (Italy)
E. PUGNO-VANONI (Italy)*
M. TANAKA (Japan)
K. INOUYE (Japan)
J. JOVIN (Roumania)
E. C. ERNST (United States)
R. R. NEWELL (United States)

1934, Zurich

P. SCHERRER, Hon. Chairman (Switzerland)
H. KOENIG, Hon. Vice-chairman(Switzerland)
H. HOLTHUSEN, Hon. Secretary (Germany)
E. A. OWEN, Hon. Secretary (Great Britain)*
H. BEHNKEN (Germany)*
F. BĚHOUNEK (Czechoslovakia)
A. BOUWERS (Holland)
E. C. ERNST (United States)
N. S. FINZI (Great Britain)
G. GUËBEN (Belgium)
L. HASS (Hungary)
H. M. HANSEN (Denmark)
S. A. HEYERDAHL (Norway)
D. DEN HOED (Holland)
F. HOLWECK (France)
A. LIECHTI (Switzerland)
M. PONZIO (Italy)
E. PUGNO-VANONI (Italy)*
R. M. SIEVERT (Sweden)
I. SOLOMON (France) (Chairman, Exec. Subcommittee)
L. S. TAYLOR (United States) (Secretary, Exec. Subcommittee)
K. T. WATANABE (Japan)

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* Members, Executive Subcommittee

January, 1957.