

## INTERNATIONAL CO-OPERATION IN PHOTOBIOLOGY

Comité International de Photobiologie

A history of C.I.P.\*

Today we recognize in photobiology an interdisciplinary study of great importance. Mankind is entirely dependent on solar radiation, and the interactions between light and matter are the subject of extensive investigations by physicists, chemists, biologists and medical scientists throughout the world. Vision, photosynthesis, photoperiodism, photodynamic action, photosensitization, ultraviolet effects and photomorphogenesis are only a few of the recognised areas of co-operation in photobiological research. It was not so in 1928 when organized photobiology had its beginnings. The need for international co-operation was first recognised by physicians who were studying erythema and other effects of light on human skin. Several medical applications of light had already been recognised and, at that time, both the treatment of *Lupus vulgaris* by ultraviolet irradiation and that of rickets by heliotherapy were of considerable importance. An international meeting to discuss these problems was organised at the University of Lausanne in September, 1928, with Professor A. Rosselet (University of Lausanne) as President. Other instigators of this first meeting who played important roles during the early years of internationally organised photobiology were J. Meyer, J. Saidman and H. Jausion (from France), W. Friedrich and H. Schreiber (from Germany) and A. Rollier (Switzerland). During this conference a meeting of representatives from participating countries was called and the first international committee, named the Comité International de la Lumière (C.I.L.) was constituted. Professor Axel Reyn of Denmark was elected President. The countries which were represented at the meeting were Belgium, Denmark, France, Germany, Italy, Switzerland, United Kingdom and U.S.A. The main aim of the newly constituted C.I.L. was to bring medical workers together with physicists, chemists and biologists at an international level to study the effects of light on human skin. The earliest statutes that we have been able to consult are those of 1939. The wider objectives of C.I.L. are there stated as follows:

C.I.L. considers that its task is to stimulate research into (a) the physics and chemistry of light, and methods of measurement; (b) effects of light on living organisms, from both the biological and pathological

points of view; (c) the use of light in therapy and hygiene.

The basic structure of the present C.I.P. was already in evidence. National groups or individual members were affiliated (at an annual fee of 5 Swiss francs) to the International Committee. Secretaries of these national groups were entrusted with the task of maintaining contact between C.I.L. and its members, and reports on national activities were made at international meetings. The C.I.L. was responsible for the organisation of International Congresses and other international meetings on light. It also set up occasional subcommittees to study particular problems.

The first *International Congress on Light* was held in Paris in 1929 under the Presidency of Dr. J. Saidman. At this Congress the C.I.L. was formally set up and given the responsibility of organizing either a Conference or a Light Congress every three years. These were to deal with the subject of light biology and therapy.

Two further Congresses were held before the war (see Table 1), in 1932 at Copenhagen and 1936 at Wiesbaden. The 1932 Congress was held in the Christiansborg Palace and at the Finsen Institute, and the opening address 'Light and Life' was given by Dr. Niels Bohr. Dr. Axel Reyn was President of the Congress and there were 42 participants (mainly from Austria, Belgium, Denmark, France, Germany, Holland, Portugal, Spain, Sweden, Switzerland, U.K. and U.S.A.). Some interesting members were Bernhard, Miescher, Morikofer and Rollier from Switzerland; Sir Henry Gauvain, Sir Leonard Hill and Dr. G. W. C. Kaye from England; Friedrich, Hausser and Jesionek from Germany; Carl Sonne, Lomholt and Axel Reyn from Denmark; and W. W. Coblenz from the U.S. Bureau of Standards. The general subjects discussed were (1) a standard unit for ultraviolet radiation, (2) the therapeutic effect of general light baths (especially in tuberculosis), (3) helioclimateological research in relation to public health—its organisation and physiological basis. The purpose of the Congress was to study all questions relating to biological and biophysical research in connection with light and the therapeutic uses of light. Light therapy at that time was still in its early days and it was thought that many diseases and disorders might be cured with ultraviolet radiation. The discussion of a standard ultraviolet unit resulted in the subsequently widely-used classification of the ultraviolet region into UV-A (400–320 nm), UV-B (320–280 nm) and UV-C

\*Editor's note: The history of C.I.P. is presented here for the interested readers of photobiology. Drs. Vince-Prue and Hall are Secretary-General of C.I.P. during 1968–1972 and 1972–1976, respectively.

(Received 30 December 1974; accepted 10 April 1975).

Table 1. International Congresses held under the auspices of C.I.L. and C.I.P.

1928	<i>International Conference on Light</i> ; Lausanne, Switzerland (see Table 3).
1929	<i>1st International Light Congress</i> ; Paris, France. President: J. Saidman (France).
1932	<i>2nd International Light Congress</i> ; Copenhagen, Denmark. President: Axel Reyn; Secretary-General: A. Kissmeyer (42 members). Symposium Topics: Standards for UV radiation. Therapeutic effects of light. Helioclimatological research in relation to public health.
1936	<i>3rd International Light Congress</i> ; Wiesbaden, Germany. President: W. Friedrich; Secretary-General: H. Schreiber. Symposium Topics: Light therapy. Bioclimatology.
1954	<i>1st International Congress of Photobiology</i> (4th International Light Congress); Amsterdam, Holland. President: J. V. Ebbenhorst-Tengbergen; Secretary-General: J. Voogd (250 members). Symposium Topics: Photoperiodism in plants and in animals. Effects of non-ionizing radiations on the genetic elements of cells. The fundamental effects of non-ionizing radiations on the skin.
1957	<i>2nd International Congress of Photobiology</i> ; Turin, Italy. Presidents: M. Ponzio (Dr. Ponzio died before the Congress) and E. Benassi; Secretary-General: G. Matli (200 members, 12 countries). Symposium Topics: A comparison of the biological effects of ionizing radiation and ultraviolet light. Vision and light quanta. Photoreceptors in biology. Dermatoses produced by light and their photoallergic basis.
1960	<i>3rd International Congress of Photobiology</i> ; Copenhagen, Denmark. Finsen Memorial Congress. President: B. Chr. Christensen; Secretary-General: B. Buchmann (350 members, 26 countries). Symposium Topics: Light climate and its measurement. Biological action spectra. Photoreceptors in aquatic organisms. <i>Lupus vulgaris</i> . Initial mechanisms involved in radiation effects. Photoreactivation. Phototherapy.
1964	<i>4th International Congress of Photobiology</i> ; Oxford, England. President: E. J. Bowen; Secretaries-General: N. Millot and D. Vince-Prue (450 members, 28 countries). Rapporteur Topics: Basic photochemistry in relation to photobiology. Photochemistry of nucleic acids and its biological implications. Visual processes in man and animals. Molecular and fine structure of receptors. Photoenvironment. Energy conversion and the photosynthetic unit. Micro-irradiation of cells. Photochemistry and photobiology of space research. Light and melanin pigmentation of the skin.
1968	<i>5th International Congress of Photobiology</i> ; Dartmouth College, New Hampshire, U.S.A. President: R. B. Setlow; Secretary-General: S. Gordon (755 members, 34 countries). Symposium Topics: Photochemical mechanisms. Vision. Photosensitization of skin by plants and drugs. Epidemiology of skin cancer. Photomorphogenesis and phytochrome. Biological clocks and timing mechanisms. Photochemistry and biochemistry in photosynthesis. Bioluminescence. Photodynamic action. Repair mechanisms.
1972	<i>6th International Congress of Photobiology</i> ; Ruhr University, Bochum, Germany. President: G. O. Schenck; Secretary-General: H. Tronnier (650 members, 32 countries). Section (Symposium) Topics: General photochemistry. Photobiochemistry, photodynamic action. Photobiology of lower systems (Bacteria, Phages). Photobiology of higher systems. Photosynthesis. Modern experimental methods. Photobiology in medicine. Photoclimatology.
1976	<i>7th International Congress of Photobiology</i> ; to be held in Rome, Italy, August 30–September 2, 1976. Secretary-General: A. Castellani. Proposed Symposium Topics: Solar energy conversion systems. Reactivity of excited states. Light and development. Proteins and nucleic acid photoreactions. Photosensitized reactions of biological macromolecules. Photo-movement. Repair from radiation damage. Mutagenic effects of radiation. Photosynthesis. Cancerogenic effects of radiation. Comparative effects of exciting and ionizing radiation. Vision. Light-induced degeneration of skin: chronic actinic dermatology.

#### Congress Publications

*Proceedings of 1st International Congress on Photobiology, 1954.*

H. Veenan and Sons, Netherlands, 1954.

*Proceedings of 2nd International Congress on Photobiology, 1957.*

Minerva Medical Monograph (Milan). Supplement of *Minerva Fisioterapica II*, No. 2, 1957.

*Progress in Photobiology* (Eds., B. Chr. Christensen and B. Buchman).

Proceedings of the 3rd International Congress on Photobiology, 1960. Elsevier, Amsterdam, 1961.

*Recent Progress in Photobiology* (Ed., E. J. Bowen).

Proceedings of the 4th International Congress on Photobiology, 1964. Blackwells, Oxford, 1965.

*An Introduction to Photobiology* (Ed., C. P. Swanson).

Introductory lectures given at the 5th International Congress on Photobiology, 1968. Prentice-Hall, New Jersey, 1969.

*Proceedings of VI International Congress on Photobiology, 1972* (Ed., G. O. Schenck).

Publ. 1974 by Deutsche Gesellschaft für Lichtforschung e.V., Frankfurt/Main.

(<280 nm). The third Congress at Wiesbaden was also mainly devoted to light therapy (especially in dermatology) and bioclimatology.

It was not until after the war in 1950 that a move was made to reestablish the International Committee. W. Morikofer, then Director of the Davos Observatory, together with Dr. R. Latarjet (France) and Dr. A. Hollaender (U.S.A.), reshaped the C.I.L. in a provi-

sional form, with Dr. Morikofer as President and Dr. J. Meyer as Secretary-General. Its objectives were to reorganise the national committee and to organise an international meeting in Paris on 25–29 September, 1951, under the general title of Journées Internationales de la Lumière. The principal topic of the meeting was 'Lumière et Habitation' and, in addition, sessions were devoted to germicidal lamps and to

Table 2. National groups affiliated to C.I.L. and C.I.P. in 1974

Country	Year affiliated	Secretary in 1974
Austria	before 1939	Prof. K. Burian, Institute of Plant Physiology, University of Vienna, A-1010, Wien.
Belgium	before 1952	Prof. C. Sybesma, Laboratory of Biophysics, Free University, B-1050 Brussels.
Czechoslovakia	1968	Dr. B. Vechet, Czechoslovak Academy of Sciences, Institute of Microbiology, Prague-4, Krc., Budejovicka 1083.
Finland	before 1939	Dr. V. Rossi, Meterological Institute, Vuorikatu 24, Helsinki-10.
France	1929	Mme. N. Robeyrotte, Laboratoire Pasteur de l'Institut du Radium, Rue d'Ulm 26, Paris (5 <sup>e</sup> ).
Germany	1929	Professor Dr. A. Schraub, Institut für Biophysik, Universität Giessen, Leihgesterner Weg. 217.
Hungary	before 1939	Professor B. Faludy, Department of Phylogenetics and Genetics, Eotvos Lorand University, Budapest VIII, Museum Korut 4/a.
India	1964	Prof. K. K. Rohatgi-Mukerjee, Physical Chemistry Section, Jadavpur University, Calcutta-32.
Israel	before 1960	Professor M. Avron, Weizmann Institute of Science, Rehovoth.
Italy	1929	Dr. A. Castellani, Laboratorio di Radiobiologia Animale, C.N.E.N., Casaccia, Roma.
Japan	1962	Prof. T. Yoshizawa, Laboratory of Biophysics, Kyoto University, Kitashira Kawa, Sakyo-Ku, Kyoto 606.
Netherlands	before 1939	Dr. J. C. Goedheer, Biophysica, Bijlhouwerstraat 6, Utrecht.
Poland	1965	Dr. Z. Zarebska, Institute of Biochemistry and Biophysics, ul. Rakowieska 36, 02-532 Warsaw.
South Africa	1962	Dr. G. H. Findlay, 528 Medical Centre, 319 Pretorius Street, Pretoria.
Sweden	1962	Prof. L. O. Björn, Inst. Plant Physiology, University of Lund, Lund.
Switzerland	1929	Dr. K. Schwarz, Städtische Poliklinik für Hautkrankheiten, Herman Greulich-Strasse 70, CH 8004, Zurich.
U.S.S.R.	1973	Prof. S. V. Tageeva, Photobiology Section, National Biology Committee, Academy of Sciences of U.S.S.R., Moscow, B-133, Vavilova 26.

Table 2. (Continued)

Country	Year affiliated	Secretary in 1974
United Kingdom	1929	Dr. K. H. Ruddock, Applied Optics Department, Imperial College, South Kensington, London SW7.
U.S.A.—official C.I.P. member	1929	Dr. Harvey E. Sheppard, Staff Officer, National Research Council, U.S. National Committee for Photobiology, Division of Biological Sciences, 2101 Constitution Avenue, Washington, D.C. 20418.

*C.I.P. Affiliated to IUBS* in 1955 as a Commission in the Division of General Biology (later changed to Functional and Analytic Biology).

*C.I.P. Bulletins* numbers 1–7 published from October 1959–March 1964.

B. C. Christensen and B. Buchmann, Eds. from 1–4 Finsen Memorial Hospital, Copenhagen.

J. Voogd and E. M. F. Roe, Eds. from 5–7, Philips Co., Eindhoven, Netherlands.

actinotherapy. During the meeting the international committee was reestablished in its official form. Seventeen national committees were listed at that time, although some had not been in contact with C.I.L. since 1939. In a letter written in 1950, Dr. Morikofor pointed out that a change in emphasis and approach was needed. Before the war the interest in

light at an international level came mainly from medical doctors looking for therapeutic uses (*although* some photobiologists, physicists and radiation climatologists had contributed from the beginning). Radiation had, however, now lost much of its interest for medical therapy because it was being replaced by chemical methods. On the other hand the problems

Table 3. International meetings sponsored by C.I.L. and C.I.P.

1928 Lausanne (Sept. 11, 1928)	International Conference on Light. President: A. Rosselet (Switzerland). Secretaries-General: E. Bach and L. Exchaquet (Switzerland). Foreign representatives: Prof. Peemoller (Germany), Dr. M. Lewick (U.K.), Dr. Ledent (Belgium), Prof. Sonne (Denmark), Dr. E. Mayer (U.S.A.), Dr. Roussel (France), Prof. Ceresole (Italy).
1930 Liege 1934 St. Moritz 1937 Paris 1938 Davos 1939 Torino	The standard lamp. President: M. Ponzio. Rapporteurs: Dr. W. Freidrich (Germany), Dr. van Wisk (Holland), Dr. Latarjet (France).
1951 Paris	Journées internationales de la lumière. Symposium topics: (a) Lumière et Habitation. (i) Effets physiologiques et pathologiques de la lumière. (ii) Bases physiques et climatologiques. (b) Lampes germicides. (c) Actinothérapie.
1965 Lucerne 1967 Hvar, Yugoslavia	Scientific and practical aspects of colour. Photochemistry and Photobiology in Plant Physiology (90 members from 19 European countries).
1969 Rome	Radiosensitising and Radioprotective Drugs. Published in <i>Annali dell Istituto Superiore di Sanita</i> , Vol. 5, special number 1, 1969. Editor: A. Castellani.
1970 Evian	(Two Symposia as Part of IV International Congress of Radiation Research). (1) Cell survival and DNA repair, replication and recombination. (2) Fast reaction methods in chemistry and biology.
1973 Rio de Janeiro	New Trends in Photobiology. Symposium Topics: Photochemistry of biological macromolecules. Effects of ultra-violet light on cellular systems and their component molecules. Solar energy conversion. Photoperiodism. Repair mechanisms in cellular systems. Clinical aspects of light. Photophysiology and phototherapy. Published in <i>Ann. Brazilian Acad. Science</i> (1975).
1974 Seattle	(Two Symposia as Part of V International Congress of Radiation Research). (1) Photodynamic action. (2) Effect of UV on genetic material.

of the interactions between light and living organisms were not solved. He concluded that the first task of C.I.L. was to complete the national committees and to expand the interests of C.I.L. to include other fields such as photobiology, radiation physics and photochemistry.

On September 29, 1951, after the last session of the Paris meeting, half a dozen of its members [H. Blum, A. Hollaender (U.S.A.); R. Latarjet, J. Mayer (France); W. Morikofler (Switzerland) and B. Rajewsky (Germany)] met in a local restaurant and agreed that it would be opportune to change the name from Comité International de la Lumière to Comité International de Photobiologie (C.I.P.). The shift from C.I.L. to C.I.P. was motivated by two considerations. Firstly the progress of chemotherapy towards cures for tuberculosis, osteomyelitis, rickets and lupus had diminished the importance of heliotherapy and of phototherapy with quartz-mercury vapour lamps. Consequently, the interests of C.I.L. were progressively turning towards problems of illumination, lighting and vision. Secondly, photobiology was growing in importance. Avery had recently established the genetic role of nucleic acids, thus opening UV photobiology to genetics, virology, microbiology and cancer while, in the range of visible light, the photochemistry of vision, photosynthesis, etc., were rapidly expanding. The Comité International de Photobiologie organized the first International Congress of *Photobiology* in 1954 in Holland.

In 1964, with the revision of the Statutes to their present form, the aims of C.I.P. were reformulated as the stimulation of scientific research concerning (a) the physics, chemistry and climatology of non-ionizing radiations in relation to their biological effects, and, (b) the effects of the applications of these radiations in biology and medicine. The frontier nature of photobiological studies and the necessity of a multidisciplinary approach were strongly emphasized.

In 1955 C.I.P. became the Commission on Photobiology in the division of General Biology of the International Union of Biological Sciences (I.U.B.S.). It is an active and successful component of I.U.B.S. and represents the interests of photobiology at the international level.

The present-day activities and structure of C.I.P. are briefly as follows: The Board of the International Committee is composed of the President, Secretary-General, Treasurer, and 4 Vice-Presidents. They serve for a 4-year term and are elected by the General Assembly of C.I.P., which is composed of delegates of national groups and meets during each International Congress of Photobiology. The Executive Committee of C.I.P. consists of the Board, a representative from each affiliated national group and up to 6 co-opted members. The latter are often co-opted from countries where there is no official national group. Honorary members are also members of the Executive Committee (without vote). The Executive Committee meets every two years. Any country may

apply to C.I.P. for affiliation. At present there are 19 national groups (see Table 2) and in addition there are individual members. In all, C.I.P. maintains contacts with photobiologists in about 30 different countries. Participation by national groups from more countries would strengthen C.I.P. and would be welcomed by the Committee.

C.I.P. is responsible for organizing International Congresses of Photobiology. The first *International Congress on Photobiology* (4th International Congress on Light) was held in Amsterdam in 1954. The second was held in 1957 and the third in 1960, when the present pattern of holding a Congress every 4th year was established. Some details of these International Congresses can be found in Table 1. The Congresses have grown in size from 250 members in 1954 to about 750 in 1968. Only 12 countries were represented in 1957 while, in 1968, 34 countries participated. However, although the Congresses are growing larger, the scale is still such that really good personal contacts can be made.

C.I.P. also sponsors smaller international meetings. Some of these are listed in Table 3. Recently, C.I.P. has endeavoured to hold a meeting of the Executive Committee during the Radiation Research Congress, which alternates with the Photobiology Congress. Many photobiologists are also interested in radiation research and can, therefore, easily attend this committee meeting. C.I.P. has sponsored and helped to organize symposia of interest to both photobiologists and radiation research workers at the International Radiation Research Congresses.

C.I.P. administers the fund of the Finsen Foundation, which was established to honour the Danish scientist Niels Finsen (1860–1904). Finsen received the Nobel Prize in Medicine and Physiology in 1903 for his work on the healing and damaging effects of sunlight on human skin. *Finsen prizes* in the form of a gold medal, are awarded on the occasion of an International Congress to scientists who have made an outstanding contribution to photobiology. A list of the Finsen medallists is given in Table 4.

Other activities of C.I.P. include the setting up of subcommittees to consider special problems in photobiology. At present the important topics of Nomenclature and Dosimetry in Photobiology are being discussed. Previous subcommittees have considered methods of measuring UV radiation, therapeutic light sources, and light at high altitudes.

C.I.P. also compiles a *World Directory of Photobiologists*. This was first published after the 5th International Photobiology Congress in 1968 and names from 51 countries (based on the Congress records) were included. This list was updated at the 6th Congress in 1972 and, the second edition of the World Directory of Photobiologists is now available (enquiries may be made to the Secretary-General of C.I.P., Dr. D. O. Hall, King's College, 68 Half Moon Lane, London SE24 9JF, U.K.).

For a time and with the aid of industrial funds,

Table 4. Awards of Finsen medals

1937	C. Corno (Davos, Switzerland).
1951	A. Rollier (Leysin, Switzerland). H. Jausion (Paris, France).
1954	W. W. Coblenz (Washington, U.S.A.).
1960	P. B. Rottier (Utrecht, Holland). "for fundamental studies of the basic phenomena underlying the formation of erythema of the human skin by UV radiation".
1964	A. Terenin (Leningrad, U.S.S.R.) "for his important contributions in the field of photochemistry". C. Rupert and A. Kelner (Baltimore and Waltham, U.S.A.) "for their important contributions to the discovery and elucidation of photorestitution <i>in vivo</i> and <i>in vitro</i> ".
1968	A. Hollaender (Oak Ridge, U.S.A.) "for fundamental contributions in the early development of photobiology, in particular radiation genetics". E. J. Bowen (Oxford, U.K.) "for fundamental contributions in the development of the chemical aspects of light". W. S. Stiles (London, U.K.) "for fundamental contributions to the sensory aspects of human vision".
1972	Th. Förster (Stuttgart, Germany) "for fundamental studies of molecular behaviour in the excited state". R. Hill (Cambridge, U.K.) "for fundamental contributions to knowledge of the photosynthetic process in plants". R. Latarjet (Paris, France) "for fundamental radiation studies particularly in the field of viruses".

Table 5. Presidents and Secretaries of C.I.L. and C.I.P.

Date	President	Secretary-General	Vice-President	Treasurer
1928-1932	Axel Reyn (Denmark)	A. Rosselet (Switzerland)		
1932-1936	Axel Reyn (Denmark)	R. Ledent (Belgium)		
1936-1946	H. Jausion (France)	H. Schreiber (Germany)		
1946-1949	J. Saidman (France)	W. Morikofer (Switzerland)		
1949-1951	W. Morikofer (Switzerland)	J. Meyer (France)		
1951-1954	W. Morikofer (Switzerland)	H. F. Blum (U.S.A.)	B. Rajewsky (Germany) C. Dejardin (France) R. Ledent (Belgium) M. Ponzio (Italy)	W. Burkhardt (Switzerland)
1954-1960	A. Hollaender (U.S.A.)	W. Burkhardt (Switzerland)	B. Rajewsky (Germany) R. Latarjet (France) M. Ponzio (Italy)	E. C. Wassink (Netherlands)
1960-1964	R. Latarjet (France)	E. M. F. Roe (U.K.)	B. Christensen (Denmark) H. Pfeleiderer (Germany) M. H. Pirenne (U.K.)	J. Voogd (Netherlands)
1964-1968	C. P. Swanson (U.S.A.)	E. M. F. Roe (U.K.)	G. H. Findlay (S. Africa) T. W. Goodwin (U.K.) G. O. Schenck (Germany) D. Shugar (Poland)	R. Beukers (Netherlands)
1968-1972	G. Porter (U.K.)	D. Vince-Prue (U.K.)	L. R. Caldas (Brazil) I. Setlik (U.S.S.R.) R. B. Setlow (U.S.A.) E. M. F. Roe (U.K.)	A. Wiskemann (Germany)
1972-1976	R. B. Setlow (U.S.A.)	D. O. Hall (U.K.)	A. Castellani (Italy) D. Vince-Prue (U.K.) I. Honjo then K. Shibata (Japan) G. O. Schenck (German)	A. Wiskemann (Germany)

C.I.P. was able to publish a widely circulated Bulletin. Unfortunately this is no longer possible. Instead, items of C.I.P. news are published in *Photochemistry and Photobiology* from time to time, so that readers of this journal are kept up to date about C.I.P. activities, including international meetings.

Like many other international scientific organisations, C.I.P. has grown in size since its inception in 1928. It has also changed direction. Originally stem-

ming from medical interest in effects of light on human skin and in light therapy, it now embraces the broad spectrum of photobiological endeavour and has members from many disciplines. In an interdisciplinary field such as photobiology, contacts between scientists are of prime importance. The objectives of C.I.P. are to establish and maintain such contacts.

DAAPHNE VINCE-PRUE

DAVID O. HALL