

INSTITIÚID ÁRD-LÉIGHINN BHAILE ÁTHA CLIATH
(Dublin Institute for Advanced Studies)

Wh-10-15

Annual Report of the work of the
Institute and its Constituent
Schools presented by the Council
to the Minister for Education in
respect of the Financial Year
1946-1947.

INSTITIÚID ÁRD-LÉIGHINN BHAILE ÁTHA CLIATH
(Dublin Institute for Advanced Studies)

Annual Report of the work of the Institute and
its Constituent Schools presented by the Council
for the Financial Year 1946-47.

In accordance with the provisions of Section 29 of the Institute for Advanced Studies Act, 1940 (No. 13 of 1940), the Council of the Institute has the honour to present to the Minister for Education for submission to the Government a report of the work and activities of the Institute and its Constituent Schools for the financial year ending 31st March, 1947.

The general purpose which it is hoped to accomplish is clearly stated in the Act establishing the Institute, namely, the Institute for Advanced Studies Act, 1940 (No. 13 of 1940) and in the Establishment Orders establishing the three Constituent Schools, namely, the Institute for Advanced Studies (School of Celtic Studies) Establishment Order, 1940, the Institute for Advanced Studies (School of Theoretical Physics) Establishment Order, 1940, and the Institute for Advanced Studies (School of Cosmic Physics) Establishment Order, 1947, and need not be referred to here. It is deemed desirable, however, to include in the report for the purposes of record certain particulars about the Constitution of the Council of the Institute and of the membership of the Governing Boards of the three Constituent Schools on the 31st March, 1947.

During the year under review (i.e. on 26th March 1947), a new Constituent School of the Institute, namely, the School of Cosmic Physics, was established by an order made by the

Government, as provided for under Section 4 (2) of the Institute for Advanced Studies Act, 1940. A short report of the Governing Board of the new Constituent School, covering the period 26th - 31st March 1947, is included in this Annual Report.

The report is presented under the following principal heads:-

- 1^o. Constitution of the Council of the Institute and of the Governing Boards of the three Constituent Schools on the 31st March, 1947.
- 2^o. Report of the Governing Board of the School of Celtic Studies.
- 3^o. Report of the Governing Board of the School of Theoretical Physics.
- 4^o. Report of the Governing Board of the School of Cosmic Physics.

1^o. (a) Constitution of the Council of the Institute.

CHAIRMAN:

The Reverend Patrick Browne, M.A., D.Sc.;

EX-OFFICIO MEMBERS:

Dr. Arthur W. Conway, M.A., D.Sc., Sc.D., LL.D., F.R.S.,
President, University College, Dublin;

Dr. Ernest H. Alton, M.A., Litt.D.,
Provost, Trinity College, Dublin;

Dr. T. P. C. Kirkpatrick, M.D., Litt.D., D.Litt., F.R.C.P.I.,
President, Royal Irish Academy.

MEMBERS APPOINTED BY THE GOVERNING BOARDS OF THE CONSTITUENT SCHOOLS:

Right Reverend Monsignor Patrick Boylan, D.D., M.A., D.Litt.;

Professor Thomas F. O'Rahilly, M.A., D.Litt.Celt.;

Professor Felix E. W. Hackett, M.A., M.Sc., Ph.D.;

Professor Albert J. McConnell, M.A., M.Sc., Sc.D., F.T.C.D.;

Professor John J. Nolan, M.A., D.Sc.;

Professor Leo W. Pollak, Ph.D., M.R.I.A.

(b) Constitution of the Governing Board of the School of Celtic Studies on the 31st March, 1947.

CHAIRMAN:

Right Rev. Mgr. Patrick Boylan, D.D., M.A., D.Litt.;

SENIOR PROFESSOR:

Thomas F. O'Rahilly, M.A., D.Litt.Celt.;

APPOINTED MEMBERS:

Miss Eleanor Knott, M.A., D.Litt.;

Miss Áine de Paor, M.A., Ph.D.;

Reverend John Ryan, S.J., M.A., D.Litt.;

Reverend Francis Shaw, S.J., M.A.;

Liam Ó Buachalla, M.Comm., H.Dip. in Ed.;

Liam Ó Domhnaill;

Edward MacLysaght (Éamonn Mac Giolla Iasachta), M.A.,
M.R.I.A., D.Litt.;

Ernest Gordon Quin (Earnán Ó Cuinn), M.A., F.T.C.D.

(c) Constitution of the Governing Board of the School of Theoretical Physics on the 31st March, 1947.

CHAIRMAN:

Arthur W. Conway, M.A., D.Sc., Sc.D., LL.D., F.R.S.;

SENIOR PROFESSORS:

Erwin Schroedinger, M.A., Ph.D., D.Sc.;

Walter Heitler, Ph.D.

APPOINTED MEMBERS:

Edmund T. Whittaker, Sc.D., LL.D., F.R.S.;

William H. McCrea, M.A., Ph.D.;

Felix E. W. Hackett, M.A., M.Sc., Ph.D.;

Albert J. McConnell, M.A., M.Sc., Sc.D., F.T.C.D.;

Alfred O'Rahilly, M.A., D.Sc., D.Phil., D.Litt.;

George R. Keating, M.Sc.;

Thomas S. Wheeler, Ph.D., D.Sc., F.R.C.Sc.I.

(d) Constitution of the Governing Board of the School of Cosmic Physics on the 31st March, 1947.

CHAIRMAN:

John J. Nolan, M.A., D.Sc.

SENIOR PROFESSORS:

Leo W. Pollak, Ph.D., M.R.I.A.;

Hermann A. Brück, Ph.D.;

Lajos Jánossy, Ph.D.

APPOINTED MEMBERS:

John J. Dowling, M.A., F.Inst.Phys.;

Walter Heitler, Ph.D.;

Eric M. Lindsay, M.A., M.Sc., Ph.D., F.R.A.S.;

Rev. Patrick J. I. McLaughlin, D.Sc.;

Austen H. Nagle, A.R.C.Sc., B.Sc., D.I.C.;

Thomas Edwin Nevin, D.Sc.;

Patrick J. Nolan, Ph.D., D.Sc.;

John H. J. Poole, M.A., B.A.I., Sc.D.;

Ernest T. S. Walton, M.A., M.Sc., Ph.D., F.T.C.D.

2°. Report of the Governing Board of the School of Celtic Studies.

(1) ACADEMIC STAFF and EXTERN WORKERS.

Senior Professors:

Thomas F. O'Rahilly. (Director of the School until
21st March, 1947.)

Richard I. Best. (Retired on reaching the age of
75 years on 17th January, 1947.)

Assistant Professors:

Brian Ó Cuív;

Seán Mac Airt;

James P. Carney;

Rev. Canice Mooney, O.F.M.;

Miss Cecile O'Rahilly (appointed as from 1st
September, 1946).

Assistant:

Miss Sheila Falconer.

Extern Research Workers commissioned by the School:

Dr. R. I. Best (subsequent to his retirement from the
Academic Staff);

Dr. M. A. O'Brien;

Dr. Osborn Bergin and Dr. D. A. Binchy;

Dr. Séamus Ó Hinnse;

Mr. Liam Price, D.J.;

Mrs. Mary Ellen Carney;

Rev. Lambert McKenna, S.J.;

Rev. T. A. Jennings;

Rev. Seán Ó Catháin, S.J.;

Rev. Shán Ó Cuív;

Professor J. Vendryès;

Mr. Heinrich Wagner.

(2) THE WORK OF THE SCHOOL.

During the year under review facilities were provided in or under the auspices of the School for the study and investigation of Irish place-names and of the phonetics and vocabulary of the living Irish speech of to-day, for research into the etymology of Old and Middle Irish and for the investigation of historical and genealogical data available in Irish MSS. Works intended for publication by the School include studies in the phonetics and vocabulary of Modern Irish dialects and editions of unpublished Irish poems and prose-texts and of unpublished Irish Annals.

Professor T. F. O'Rahilly, whose work "Early Irish History and Mythology" was published in June, 1946, completed four articles dealing with various aspects of Irish studies for publication in a forthcoming number of "Celtica".

Professor R. I. Best's edition of the Book of Leinster was well advanced by the end of the period under review and 'copy' for the text of the work will shortly be ready for the printer.

Mr. Brian Ó Cuív completed his edition of a glossary of the Irish of Baile Bhúirne, Co. Cork, the printing of which is now well advanced. His edition of Flaithrí Ó Maolchonaire's Catechism of Christian Doctrine and of a Modern Irish Devotional Tract was also completed; these editions will be published in a forthcoming number of "Celtica", for which he has also edited a 16th century Irish poem. At the end of the period under review Mr. Ó Cuív had commenced work on an edition of a well-known text, Parlaimint na mBan, available in three R.I.A. MSS.

Further proofs of Mr. Seán Mac Airt's edition of the Annals of Inisfallen have been revised and 'copy' for the Indexes to the work is now with the printer.

Mr. Carney prepared some additional material for his collection of Poems on the O'Reillys. Part of the text of this work is now with the printer for revise in book-form. He also completed his edition of a Tract on the O'Rourkes for publication in a forthcoming number of "Celtica", to which he has also contributed two articles on literary and linguistic subjects. Mr. Carney is now collecting material for a comprehensive work on the genealogies of the O'Reillys.

Rev. Canice Mooney, O.F.M., continued his work on an edition of Aodh Mac Aingil's Scathán Shacramainte na hAithrige. He also prepared two short articles for publication in "Celtica".

Miss Cecile O'Rahilly commenced work on an edition of an Irish version of The Romance of William of Palerne from the R.I.A. MS. A.V.2.

Proofs of the texts of Miss Sheila Falconer's edition of an Irish version of The Quest of the Holy Grail have been completely revised and are now ready for proofing in book-form.

Professor M. A. O'Brien completed the Indexes to his work, Corpus Genealogiarum Hibernicarum, proofs of which are expected from the printer.

Final proofs of Dr. Séamus Ó Hinnse's work, Miscellaneous Irish Annals, are now with the printer.

Rev. Lambert McKenna, S.J., completed his edition of The Book of Magauran, the printing of which is now well advanced.

Mr. Liam Price continued his work on the Place-Names of Co. Wicklow, the second part of which was published during the year under review.

Dr. Osborn Bergin and Dr. D. A. Binchy commenced work on the revised English edition of the second part of Thurneysen's Handbuch des Alt-Irischen. The revised English edition of Part I of the Handbuch ("A Grammar of Old Irish") was published during the year under review.

Mrs. Carney commenced work on an edition of an Irish version of the Aphorisms of Hippocrates from the British Museum MS. Harl. 4347.

An Etymological Dictionary of Old and Middle Irish is being prepared for submission to the School by Professor J. Vendryès (Paris).

Rev. Shán Ó Cuív is preparing a Bibliography of the Writings of the late Canon Peter O'Leary which is intended for publication by the School.

Mr. Heinrich Wagner was commissioned to continue his study and investigation of the Irish of Teilionn, Co. Donegal.

(3) STATUTORY PUBLIC LECTURES.

It was intended that the Statutory Public Lectures should be delivered by Professor J. Lloyd-Jones in Trinity College, Dublin, towards the end of February, 1947. Since, however, the dates proposed for the lectures occurred during the period of abnormally severe arctic weather and since, owing to the fuel crisis then prevailing, the authorities of Trinity were unable to provide any heating facilities in the lecture hall, it was agreed that the delivery of the lectures be postponed.

- (4) PUBLICATIONS. Date of
Publication
- 23 Celtica Vol. I, No. 1. 26/4/46
Edited by T. F. O'Rahilly.
Contributors: Rev. Canice Mooney,
O.F.M.; James Carney; Brian Ó Cuív;
Seamus Ó Ceallaigh; Máire Mhac an
tSaoi and T. F. O'Rahilly.
pp. 160. Price 4s.
- 24 Early Irish History and Mythology 15/6/46
By T. F. O'Rahilly.
pp. x + 566. Price 25s.
- 25 Dhá Sgéal Artúraíochta 13/8/46
Edited by Máire Mhac an tSaoi.
pp. xiii + 85. Price 4s.
- 26 The Place-Names of Co. Wicklow - II 30/11/46
The Barony of Ballinacor South.
By Liam Price.
pp. (x + 52) Price 2s.
- 27 A Grammar of Old Irish 20/12/46
By Rudolf Thurneysen. Revised and
Enlarged Edition translated from
the German by D. A. Binchy and
Osborn Bergin.
pp. xxi + 688. Price 21s.
- 28 The Irish of Ring, Co. Waterford 21/3/47
By Risteard B. Breatnach.
pp. xvii + 176. Price 5s.

3^o. Report of the Governing Board of the School of Theoretical Physics.

(1) ACADEMIC STAFF, SCHOLARS and VISITING PROFESSORS:

Senior Professors:

Walter Heitler, Director of the School;

Erwin Schroedinger.

Assistant Professor:

Hwan-Wu Peng.

Scholars and Students:

Friederich I. Mautner. (Left 14th September, 1946);

Ning Hu;

Mlle. Cecile Morette;

Achilles Papapetrou. (Entered 29th October, 1946);

Mme. Tonnelat. (From 7th to 30th June 1946, inclusive);

Miss Sheila Power. (Part-time);

Rev. Pius Walsh, O.F.M.

Debidas Basu. (Entered 6th September, 1946);

Wadi Attala Bassaly. (Entered 8th October, 1946)

(Messrs. Basu and Bassaly are students without
emoluments)

Technical Assistant:

Miss Mary Houston.

Visiting Professor:

L. Rosenfeld, of the University of Utrecht.

(2) SEMINARS and LECTURES:

In the summer term 1946, Dr. Peng continued the Wednesday Seminar lectures on "The Perturbation Theory of the continuous spectrum in relation to Field Quantization" after which a series of lectures on "Conservation Theorems and Invariance Properties of the Lagrangian" was given by Dr. L. Rosenfeld who was then a Visiting Professor at the Institute. After the summer vacation Dr. T. E. Nevin of University College,

Dublin, delivered four lectures on "The Resonance Field Method of Measuring Nuclear Magnetic Moments". These were followed by a series of lectures on "Heisenberg's S-Matrix" by Dr. Heitler and two lectures on "Solutions in General Relativity" by Dr. Papapetrou. Attendance at the Seminar, which included Professors and Lecturers from the two Universities, varied from 10 to 15.

In addition to the Wednesday Seminar lectures a series of lectures intended for advanced students from the Universities was inaugurated in November 1946. These lectures were given by Dr. Schroedinger on Monday afternoons, the subject being "Space-Time Structure". From 15 to 20 students from both Universities attended.

(3) VISITING PROFESSORS:

During the months of May and June 1946, Dr. L. Rosenfeld from the University of Utrecht was on a visit to the Institute. In addition to the Wednesday Seminar lectures mentioned above he gave a series of lectures on "The Two Nucleon Problem" and a general lecture on "Complementarity". Attendance at the lectures varied from 15 to 20 and included Professors and Lecturers from the two Universities. The attendance at the general lecture was about 25 and included some advanced students from the Universities.

Professor Rosenfeld's lectures met generally with intense interest and his presence at the Institute proved to be most stimulating for the research work of the School.

Other distinguished visitors to the Institute included Professor Chadwick of the University of Liverpool, Professor Blackett of the University of Manchester who delivered a lecture on the "Magnetic Field of the Earth", and Professor Urey of the University of Chicago.

(4) STATUTORY PUBLIC LECTURES:

The Statutory Public Lectures were delivered by Dr. Heitler on 29th November and 6th December 1946, in the Physical Laboratory, Trinity College, Dublin. The title of the lectures was: "The Indestructible Matter".

(5) GENERAL LINES OF RESEARCH WORK:

Work on the Affine Field Theory was continued, the result of principal interest being that by choosing for the Lagrange density the simplest and most obvious scalar density thinkable, one is led to a form of unified theory which bears great resemblance to the one that Einstein and Straus proposed about a year earlier in a more dogmatic and less simple way. Yet the affine version is more general in not demanding the value zero (or rather excluding an exact zero) for the so-called cosmic constant.

In addition Professor E. Schroedinger explored a more general relationship between metric and affinity, while his collaborator, Dr. A. Papapetrou, studied the spherically symmetric solutions of the new special form of affine theory. He also continued and finished work he had begun before coming to the Institute, concerning a type of exact solutions in Einstein's theory of gravitation, a type much more general than had ever been known before.

Incidental contributions were made to the following questions. Professor Schroedinger continued and finished his discussion on the foundation of the theory of probability. Mr. W. A. Bassali obtained, essentially by the Ritz method, special numerical solutions of the integral equation that governs the propagation of nuclear fission under given circumstances.

He also studied the group-theoretical problem of the symmetry of tensors in great detail for an arbitrary number of dimensions and an arbitrary number of equivalent indices. The question is, of course, the same as that about the symmetry of eigen-functions, but the different make-up does bring out new features, before all because all classes of symmetry occur and are of interest in the case of tensors.

Professor Heitler and his group continued work on Quantum-electrodynamics, Meson theory and Cosmic rays. Professor Heitler investigated the relativistic, retarded interaction between two particles, in particular the interaction between two nucleons effected by a meson field. It was shown that unambiguous results can be obtained in the two limiting regions of very low and very high energies whilst the intermediate region can so far only be treated approximately.

The work of Dr. S. Power and Professor Heitler on the origin of the soft component of cosmic radiation was completed with the result that the soft component in the high atmosphere can be understood as due to the decay of a short-lived meson.

Professor H. W. Peng and Dr. C. Morette calculated the production of mesons in nuclear collisions at low energies. This work was undertaken in view of the fact that mesons may shortly be produced artificially by the large cyclotrons now in operation in U.S.A. The theoretical predictions of Professor Peng and Dr. Morette will aid this experimental work. In addition Professor Peng carried out a mathematical investigation of the wave function of a quantized field by means of generating functions. The work on the scattering of

two nucleons begun by Dr. P. Walsh (who left the Institute) was continued by Mr. Basu. Dr. Hu extended his investigations on the S-matrix to the many-body problem, the magnetic moments and the photodisintegration of nucleon isobars. This work showed that the theory of the S-matrix can be generalized considerably beyond its original scope and that the theory is capable of giving unambiguous answers to a great variety of physical questions.

Professor Heitler began work on a book on the "Theory of the Meson".

(6) CONFERENCES and LECTURES ABROAD:

Invited by the Züricher Naturforschende Gesellschaft, Professor Schroedinger attended the bicentenary festival meeting of this society in September 1946 and delivered one of the four general lectures that were given on that occasion, speaking on "Affine Field Theory and Meson". He also lectured at Ascona (Ticino) to the Eranos-meeting, on "The Spirit of Science" (Der Geist der Naturwissenschaft). Both lectures were published in the German language in Switzerland.

In July 1946 an international conference was held in Cambridge to which all three Professors of the School (E. Schroedinger, W. Heitler, H. W. Peng) were invited. Professor Heitler was asked to give one of the main lectures, entitled: "The Quantum Theory of Damping as a Proposal for Heisenberg's S-Matrix".

(7) PUBLICATIONS:

The following works were published from the School during the year under review:-

(1) Contributions to Journals and Periodicals.

Heitler: A Theorem in the Charge-Symmetrical Meson Theory - Proc. R.I.A. 51 A 3, 33, 1946.

Hu: Radiation Damping in the General Theory of Relativity - Proc. R.I.A. 51 A 7.

Peng: On the Representation of the Wave Function of a Quantized Field by means of a Generating Function - Proc. R.I.A. 51 A 8.

Schroedinger: The General Affine Field Laws. - Proc. R.I.A. 51 A 4.

Schroedinger: The Foundations of the Theory of Probability I - Proc. R.I.A. 51 A 5.

Heitler and Hu: Proton Isobars in the Theory of Radiation Damping - Proc. R.I.A. 51 A 9, 123, 1947.

Heitler and Hu: On the Interpretation of Complex Roots of the S-Matrix - "Nature" 159, 776, 1947.

Schroedinger: The Final Affine Field Laws. - Proc. R.I.A. 51 A 13, 163, 1947.

Schroedinger: Der Geist der Naturwissenschaft. - Eranos-Jahrbuch 1946, Vol. XIV, p. 491.

Schroedinger: Affine Feldtheorie und Meson. - Verh. Schweizer. Naturforsch. Ges. p. 53, 1946.

Papapetrou: A Static Solution of the Equations of the Gravitational Field for an arbitrary Charge Distribution - Proc. R.I.A. (in the press).

Schroedinger: The Foundations of the Theory of Probability II. - Proc. R.I.A. (in the press).

Schroedinger: The Relation between Metric and Affinity - Proc. R.I.A. (in the press).

Heitler: The Quantum Theory of Damping as a Proposal for Heisenberg's S-Matrix. (Cambridge lecture) - Proc. Phys. Soc. (London) (in the press).

(2) Communications of the Dublin Institute for Advanced Studies - Series A: Physics.

No.3 - DEVELOPMENTS IN QUANTUM ELECTRODYNAMICS.

By P. A. M. Dirac.

Price 3s. pp. 33. Date of publication 5/12/46.

(3) Book.

The book by W. Heitler, "Elementary Wave Mechanics" has been translated into French.

4^o. Report of the Governing Board of the School of Cosmic Physics.

This report covers only the period from the 26th to the 31st March, 1947.

By the Institute for Advanced Studies (School of Cosmic Physics) Establishment Order, 1947 (No. 77 of 1947), made in accordance with the provisions of Sections 6 and 7 of the Institute for Advanced Studies Act, 1940 (No. 13 of 1940), the School of Cosmic Physics was established as a Constituent School of the Institute on the 26th March, 1947.

The following were appointed Senior Professors of the School:-

Leo W. Pollak, Ph.D., M.R.I.A. - to take up duty as from
1st April, 1947;

Lajos Jánosy, Ph.D. - to take up duty as from 1st July,
1947; and

Hermann A. Brück, Ph.D. - to take up duty as from
1st October, 1947.

The inaugural meeting of the Governing Board of the School was held on the 26th March, 1947, at which Dr. L. W. Pollak was appointed Director of the School and arrangements were made for

(a) acquiring and adapting the premises No. 5 Merrion Square for the Geophysical and Cosmic Ray Sections of the School; and

(b) taking over Dunsink Observatory.

D. MacGRIANNA

PÁDRAIG DE BRÚN

CLÁRATHÓIR

CATHAOIRLEACH

5^o Márta, 1948