

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

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
1947-1948.

INSTITIÚID ÁRD-LÉINN 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 1947/48

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, 1948.

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, 1948.

The report is presented under the following principal heads:-

- 1°. Constitution of the Council of the Institute and of the Governing Boards of the three Constituent Schools on the 31st March, 1948.
- 2°. Report of the Governing Board of the School of Celtic Studies.
- 3°. Report of the Governing Board of the School of Theoretical Physics.
- 4°. Report of the Governing Board of the School of Cosmic Physics.

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

CHAIRMAN:

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

EX-OFFICIO MEMBERS:

Mr. Michael Tierney, M.A.,
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 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, 1948.

CHAIRMAN:

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

SENIOR PROFESSOR:

Michael A. O'Brien, M.A., Ph.D.;

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, 1948.

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, 1948.

CHAIRMAN:

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

SENIOR PROFESSORS:

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

Hermann A. Brück, D.Phil., Ph.D.;

Lajos Jánosy, 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, SCHOLARS AND EXTERN RESEARCH WORKERS

Senior Professors:

Michael A. O'Brien. (Appointed as from 1 July 1947; Director of the School from 27 October 1947).

Thomas F. O'Rahilly. (Retired on pension on 20 January 1948).

Assistant Professors:

Brian Ó Cuív;

Seán Mac Airt (until 31 January 1948 when he resigned to take up post of Lecturer in Celtic in the Queen's University of Belfast);

James P. Carney;

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

Miss Cecile O'Rahilly.

Assistant:

Miss Sheila Falconer

Scholar:

M. Louis Paul Nemo (Roparz Hémon) (as from 1 January 1948).

Extern Research Workers commissioned by the School:

Dr. M. A. O'Brien (until 30 June 1947);

Dr. T. F. O'Rahilly (as from 21 January 1948);

Mr. Seán Mac Airt (as from 1 February 1948);

Dr. R. I. Best;

Dr. Osborn Bergin;

Dr. D. A. Binchy;

Mr. Liam Price, D.J.;

Rev. Lambert McKenna, S.J.;

Dr. Séamus Ó Hinnse;

Mrs. Mary Ellen Carney;

Extern Research Workers (contd.)

Rev. T. A. Jennings;
Rev. Seán Ó Catháin, S.J.;
Rev. Shan Ó Cuív;
Professor J. Vendryès;
Mr. Heinrich Wagner;
Rev. Anselm Faulkner, O.F.M.;
Rev. Pádraig Ó Súilleabháin, O.F.M.

(2) THE WORK OF THE SCHOOL

General Lines of Research Work

Work on the general lines of research pursued in previous years was continued.

A proposal to publish, in a uniform series, editions of 16th century Irish Franciscan texts, mainly in prose, was approved; the first three volumes in the series were in active preparation by the end of the period under review.

Consideration was given to proposals for a dialectal survey and for collecting, editing and publishing a comprehensive vocabulary of the living Irish speech; it was agreed that plans for the carrying out of this work should be formulated and preliminary investigation of the field to be covered by the said proposals was commenced.

Individual Lines of Research

(a) Subjects of research by the various members of the academic staff:-

Dr. M. A. O'Brien - Old and Middle Irish genealogies, personal and family names.

Dr. T. F. O'Rahilly - literary and linguistic aspects of Modern Irish, early Irish history and mythology.

Mr. Brian Ó Cuív - Modern Irish prose texts in MSS., contemporary Irish dialects and vocabulary, phonetics.

Mr. Seán Mac Airt - Irish Annals and related historical and linguistic material.

Mr. James Carney - Modern Irish verse texts in MSS., genealogical, literary and linguistic materials.

Rev. Canice Mooney, O.F.M. - 16th century Irish Franciscan texts.

Miss C. O'Rahilly - romantic tales in Modern Irish MSS.

Miss S. Falconer - Arthurian literature in Modern Irish.

M. Roparz Hémon - syntax of Modern Breton.

(b) Revision of proofs and preparation of new matter for works in course of publication:-

Dr. O'Brien's Corpus Genealogiarum Hibernicarum, Vol. I - proofs of certain parts of the text and of the indexes were revised.

Mr. Mac Airt's edition of The Annals of Inisfallen - proofs of text, translation and indexes were revised; 'copy' for the introduction was sent to printers.

Mr. Carney's edition of a collection of Poems on the O'Reillys - proofs of text and notes were revised; 'copy' for additional matter for the text was sent to printers.

Miss Falconer's edition of an Irish version of The Quest of the Holy Grail - proofs of the text were revised in page-form; 'copy' for the English translation of the text was sent to printers.

CELTICA, Vol. I No. 2, edited by Dr. O'Rahilly - 128 pages were passed for press; proofs of the remainder were revised and 'copy' for new matter sent to printers. In addition to several articles contributed by the Editor, this number of Celtica will contain contributions from Mr. Ó Cuív, Mr. Carney and Rev. Canice Mooney, O.F.M.

(c) Preparation of material for proposed publications:-

Dr. Best's edition of The Book of Leinster - some 500 folios of 'copy' were sent to printers early in the period under review but setting of the work was held up awaiting special symbols which had to be ordered.

Miss O'Rahilly's edition of The Romance of William of Palermo - 'copy' for the complete text was sent to printers.

The revised English edition of Part II of Thurneysen's Handbuch des Alt-Irischen prepared by Dr. D. A. Binchy and Dr. Osborn Bergin - 'copy' for texts and vocabulary was sent to printers.

Mr. Ó Cuív's edition, from three R.I.A. MSS., of Parliament na mBan - 'copy' for text was completed.

'Copy' for the text of the following volumes to be published in the proposed series of Irish Franciscan Texts was in final stages of preparation:-

Rev. Canice Mooney's edition of Aodh Mac Aingil's Scáthán Shacramuinte na hAithridhe;

Rev. Pádraig Ó Súilleabháin's edition of Rialachas San Froinsias;

Rev. Anselm Faulkner's edition of Parthas an Arma,

'Copy' for Mr. Heinrich Wagner's work on the Irish of Teilionn, Co. Donegal, was completed.

Part III of Mr. Liam Price's Place-Names of Co. Wicklow dealing with the Barony of Talbotstown Upper was almost ready for the printers.

CELTICA, Vol. II No. 1, edited by Dr. O'Brien - contributions from Brian Ó Cuív and James Carney were nearing completion.

Progress was reported in other works in course of preparation by extern research workers.

(3) STATUTORY PUBLIC LECTURES

Statutory Public Lectures under the auspices of the School were delivered in Trinity College, Dublin, on the 2nd and 9th December, 1947, by Professor J. Lloyd Jones, his subject being The Court Poets of the Welsh Princes.

(4) LECTURES AND DISCUSSIONS

Arrangements were made for the holding of a course of lectures and discussions on various aspects of Celtic Studies during the summer of 1948 and invitations to deliver lectures were sent to Professors Osborn Bergin, D. A. Binchy, Myles Dillon, Idris Foster and H. Gerard Murphy.

(5) PUBLICATIONS

The following works were published during the period under review:

		Date of Publication
29	THE BOOK OF MAGAURAN (Leabhar Méig Shamhradháin). Edited by Lambert McKenna, S.J. pp. xxvi + 470	27/11/47 Price 15s.
30	MISCELLANEOUS IRISH ANNALS. Edited by Séamus Ó hInnse. pp. xix + 222	18/12/47 Price 15s.
31	CNÓSACH FOCAL Ó BHAILE BHUIRNE i gCondae Chorcaí. Mícheál Ó Briain a bhailig. Brian Ó Cuív a chóraig. pp. xii + 287	23/12/47 Price 7s. 6d.

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

(1) ACADEMIC STAFF, SCHOLARS and VISITING PROFESSOR:

Senior Professors:

Walter Heitler, Director of the School;

Erwin Schroedinger.

Assistant Professor:

Hwan Wu Peng. (Left 31st December 1947 to return to China)

Scholars and Students:

Ning Hu. (Left 30th January 1948);

Miss Cecile Morette. (Left September 1947);

Achilles Papapetrou.

S. T. Ma. (Entered 1st August 1947);

Debidas Basu. (Previously a student without emoluments, was
awarded a Scholarship as from 1st November 1947);

Wadi Attala Bassaly. (Student without emoluments.

Left October 1947);

Miss Sheila Power. (Part-time without emoluments).

Technical Assistant:

Miss Mary Houston.

Visiting Professor:

H. Froehlich, of the H. H. Wills Physical Laboratory,
Royal Fort, Bristol.

(2) SEMINAR and LECTURES:

In the summer term, 1947, Dr. Schroedinger and Dr. A. Papapetrou lectured to the Wednesday Seminar on the subjects of their recent papers on the General Theory of Relativity and its generalisations.

After the summer vacation Dr. H. Froehlich (University of Bristol), who was then on a visit to the Institute conducted the Seminar, his subject being "The properties of very light nuclei".

In the Hilary term, 1948, the Seminar consisted of

lectures on varied topics. Professor Hackett (University College, Dublin) gave three talks on A. N. Whitehead; Dr. Janossy (School of Cosmic Physics) gave two lectures on Cosmic Ray Showers; Dr. A. W. Conway and Dr. A. Papapetrou spoke on Spinors and the Hydrogen Spectrum respectively.

The attendance at the Seminar, which included Professors and Lecturers from the two Universities, normally varied from 10 to 15 — attendance at the special courses was, however, considerably higher.

Dr. Schroedinger completed his course of Monday lectures for students in June 1947. The subject dealt with was Space-Time Structure. The attendance of 15 to 20 students from both Universities was maintained.

The Monday lectures were continued in the autumn by Dr. H. Froehlich, cf. (4) below.

(3) COLLOQUIUM:

Three distinguished physicists lectured to the Colloquium from 7th to 15th July 1947:-

Professor C. Møller (University of Copenhagen) lectured on "The Centre of Gravity of an Arbitrary System in Relativistic Quantum Mechanics and related problems".

Dr. C. F. Powell (University of Bristol) described "New Experiments by the photographic plate method on nuclear physics", including his important discovery of a new type of meson.

Professor J. L. Synge (Carnegie Institute of Technology, Pittsburgh) gave two lectures on (i) Boundary value problems and (ii) Relativistic electrodynamics.

It was hoped that Professor Niels Bohr of Copenhagen could have been a lecturer but he had to cancel his intended participation at the last moment on grounds of ill-health. The Colloquium aroused great interest. There was a very good attendance of physicists from abroad as well as from our own Universities.

(4) VISITING PROFESSORS:

From October to December 1947, Dr. H. Froehlich (Bristol) was on a visit to the Institute. In addition to the Wednesday Seminar lectures previously mentioned, he gave a series of lectures on "The Theory of the Dielectric Properties of Matter". Attendance included Professors and Lecturers from both Universities.

Another distinguished visitor to the Institute was Professor N. F. Mott of the University of Bristol. He gave a special lecture on "Liquid Helium" to the Seminar on 4th March 1948.

(5) STATUTORY PUBLIC LECTURES:

The Statutory Public Lectures were delivered by Dr. E. Schroedinger on 5th, 12th, 19th and 26th February 1948, in the Physics Theatre, University College, Dublin. The title of the lectures was "Nature - and the Greeks".

(6) GENERAL LINES OF RESEARCH WORK:

Dr. Heitler and his group worked on quantum-electrodynamics, meson theory and cosmic rays. The collaboration with the Cosmic Ray Section (under Dr. Janossy) of the School of Cosmic Physics has already proved most fruitful. At the suggestion of Dr. Heitler, Dr. Janossy and the Reverend Dr. James McConnell - who is now a professor in St. Patrick's College, Maynooth, but continues his close association with the Institute - carried out an investigation on the light approximations in scattering problems, in particular the influence of damping. Dr. McConnell also completed his work on negative protons, which he had begun earlier at the Institute.

Dr. Hu made further substantial progress in his work on the scattering matrix. He was able to show that all physical properties of bound states can be derived from the knowledge of the scattering cross sections alone.

Dr. Heitler and Dr. Ma generalised the theory of radiation damping developed earlier at the Institute to problems with finite

line breadth. This theory could now be formulated in the most general way.

Dr. Peng and Dr. Cecile Morette completed their work on the production of mesons at low energy with very satisfactory results. This work has gained in importance in view of the artificial creation of mesons now accomplished in U.S.A.

Dr. Basu completed the first part of his work on the scattering of high energy neutrons by protons and began the second part considering the influence of higher approximations.

Dr. Sheila Power began an investigation on the contribution of exchange currents to the photodisintegration of the deuteron.

The work of Dr. Heitler on the relativistic interaction of two particles was completed.

The work on Einstein's theory of gravitation and its generalisations by Einstein and Straus in Princeton and by Schroedinger in Dublin was continued by the latter and by Dr. Papapetrou. From the original variational principle of Einstein (1916) - in the form Palatini had given to it a few years later - a variety of theories of a wider scope is obtained by loosening the symmetry demands on the metrical and/or the affine components of time-spatial connection and by taking either the former or the latter or both as the independent functions. It was found that the Einstein-Straus theory and the Schroedinger theory were the most obvious and the only promising types obtained in this way by straightforward generalisation without any further artifice, a fact which the earlier publications of the former authors were more apt to obscure than to reveal. The conservation laws and a family of identities intimately connected with them were established for the two non-symmetric theories. Moreover, it was shown by Dr. Papapetrou (who first investigated solutions with spherical symmetry) that not even with merely rotational symmetry could any solution both approximate to Galilean metric at infinity and be free altogether of singulari-

ties — a most relevant result, because it leaves little hope of finding such solutions at all, and thus directs endeavour in a different direction.

(7) PROFESSORS' ACTIVITIES:

Professor W. Heitler was on leave of absence from the Institute from January 1948 to July 1948. He was acting as Visiting Professor in Columbia University, New York, by invitation.

(8) PUBLICATIONS:

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

(1) Contributions to Journals and Periodicals.

Morette and Peng: Cross-sections for Production of Artificial Mesons - Nature, 160, 59, 1947.

Heitler and Power: On the Origin of the Soft Component of Cosmic Radiation - Phys. Rev. 72, 266, 1947.

McConnell: Production and Annihilation of Negative Protons II - Proc. R.I.A. 51 A 14, 173, 1947.

Heitler: Bemerkung über eine Erweiterung der Bornschen Näherung für Stossprobleme - Acta Phys. Austriaca 1, No. 2, 1947.

Schroedinger: The Final Affine Field Laws II - Proc. R.I.A. 51 A 16, 205, 1948.

Morette and Peng: On the Production of Mesons by Nucleon-Nucleon Collisions - Proc. R.I.A. 51 A 17, 217, 1948.

Schroedinger: The Final Affine Field Laws III - Proc. R.I.A. 52 A 1, 1, 1948.

Papapetrou: Einstein's Theory of Gravitation and Flat Space - Proc. R.I.A. 52 A 2, 11, 1948.

Heitler: Radiation Damping and Velocity of Light - Nature, 161, 678, 1948.

Papapetrou: Question of Non-singular Solutions in the Generalised Theory of Gravitation - Phys. Rev. 73, 1105, 1948.

Schroedinger: Die Besonderheit des Weltbilds der Naturwissenschaft - Acta Phys. Austriaca 1, No. 3, 1948.

Hu: Further Investigation on Heisenberg's Characteristic Matrix - Proc. R.I.A. 52 A 5, 51, 1948.

Hu: Further Investigation on Heisenberg's Characteristic Matrix II - Proc. R.I.A. (in the press).

Heitler and Ma: Quantum Theory of Radiation Damping for Discrete States - Proc. R.I.A. (in the press).

Heitler: On the Relativistic Interaction of two particles - Proc. R.I.A. (in the press).

Basu: On the Relativistic Scattering of Neutrons by Protons - Proc. R.I.A. (in the press).

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

No.4 - COSMIC RAYS. By L. Janossy.

Price 3s. pp. 55. 5 plates.

Published January 1948.

No.5 - ON THE DEFINITION OF THE CENTRE OF GRAVITY OF AN ARBITRARY CLOSED SYSTEM IN THE THEORY OF RELATIVITY.

By C. Møller (in the press).

(3) Book.

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

/4°.

4°. Report of the Governing Board of the School of Cosmic Physics.

A. Geophysical Section.

(1) ACADEMIC STAFF:

Senior Professor:

Leo W. Pollak, Director of the School.

Senior Technical Assistant:

Thomas J. Morley. (Entered 1st November 1947).

Junior Technical Assistant:

Miss Nuala O'Brien. (Entered 8th October 1947).

(2) WORK OF THE SECTION:

The main activity of the Director was devoted to the supervision of the reconstruction of No. 5 Merrion Square for the purposes of the Geophysical Section and the Cosmic Ray Section, and to the provision of equipment for the Geophysical Section.

Apart from the necessary offices for the professors and staff, No. 5 Merrion Square has been converted into a modern research institute with machine-shop for precision mechanics, high and low tension battery-room, experimental and photographic laboratories for research work, lecture room, students' room for practical work, room for visiting professors, observational tower for meteorological and geophysical work, and anemograph room.

According to programme a complete meteorological observatory has been incorporated in the School. Dublin up to that time was one of the few capitals in the world which had no meteorological observatory. The existing meteorological posts in the city observed only once or twice a day and none of them was equipped with recording instruments. The observatory of the School, which has been named "Meteorological Observatory of Dublin City" is equipped with the most

up-to-date instruments for measuring and recording all meteorological elements including radiation of sun and sky. The instruments are installed either on the tower erected on the roof of 5 Merrion Square or on Leinster Lawn.

The results of the observations are published in a monthly "Summary" and in a "Monthly Bulletin" which are issued regularly on the 1st and 7th of each month.

(3) STATUTORY PUBLIC LECTURE:

Professor Pollak delivered a public lecture in University College, Dublin, on 21st November 1947, the subject being "A Glimpse at 300 Years of Cosmic Physics".

(4) RESEARCH WORK:

Professor Pollak continued work on the third volume of his tables for harmonic analysis. This "Eight-place supplement to harmonic analysis and synthesis schedules" gives to eight places of decimals the 2068 factors for the harmonic analysis of empiric functions using 3 to 24, 26, 28, 30, 34, 36, 38, 42, 44, 46, 52, 60, 68, 76, 84 and 92 equidistant values, an accuracy which proved to be necessary in certain applications. He also prepared the manuscript of a paper "Indirect auto-correlation method of searching for periodicities" which will be published in the Proceedings of the Royal Irish Academy. It is shown that the correlogram for determining hidden periodicities can under certain circumstances be computed from harmonic constants, thus reducing considerably the laborious work of the auto-correlation method. A further advantage of computing correlograms by the detour through Fournier analysis is that not all possible amplitudes but only a suitable selection of them need be used.

Professor Pollak has finished and delivered the manuscript of his contribution to the book "Methods in Geophysics — Climatology" which he has written in collaboration with Professor V.

Conrad, Harvard University, and which will be published by the Harvard University Press, Cambridge, Mass., U.S.A.

B. Cosmic Ray Section.

(1) ACADEMIC STAFF:

Senior Professor:

Lajos Jánossy. (Appointed 1st July 1947).

(2) WORK OF THE SECTION:

The main effort at the beginning was to set up facilities for experimental work. Equipment was purchased and installed in (a) workshop, (b) laboratory, (c) special cosmic ray laboratory and (d) dark-room. In this work great assistance was received from the staff of the Physics Department, University College, Dublin, and their help is very gratefully acknowledged.

A certain amount of theoretical work was carried out on calculations on extensive air showers and on the theory of scattering (the latter in collaboration with Rev. Professor McConnell, Maynooth).

(3) LECTURES:

Professor Jánossy delivered a Statutory Public Lecture in Trinity College, Dublin, on 21st January 1948. The title was "The Experimental Meson".

Professor Jánossy also delivered a lecture on "Penetrating Showers" in Queen's University, Belfast, in November 1947.

A lecture on "Penetrating Particles in Cosmic Ray Showers" was given by Dr. G. D. Rochester of the University of Manchester in the School on 3rd December 1947.

A general course of lectures by Professor Jánossy on "Elementary Particles and Cosmic Rays" commenced on 23rd January 1948 and was continued during the Hilary Term.

(4) ACTIVITIES ABROAD:

Professor Jánosy attended and read papers at the Conference on Cosmic Rays, Cracow, in October 1947, which was organised by the International Union on Physics, supported by UNESCO.

Professor Jánosy also lectured at the University of Budapest in October 1947 and at the University of Brussels in December 1947, at an informal conference organised by Professor Cosyns.

(5) PUBLICATIONS:

The following publications appeared during the period covered by the report:-

Contributions to Journals and Periodicals.

Jánosy: Investigation into the Production of Mesons
- Physical Society Cambridge Conference Report, p. 36,
1947.

Jánosy and Nicholson: Meson Formation and the Geomag-
netic Effects - Proc. Roy. Soc. A192, p. 99, 1947.

Broadbent and Jánosy: Local and Extensive Penetrating
Cosmic Ray Showers - Proc. Roy. Soc. A190, p. 497,
1947.

Broadbent and Jánosy: Extensive Penetrating Cosmic
Ray Showers - Proc. Roy. Soc. A191, p. 517, 1947.

Broadbent and Jánosy: Production of Penetrating
Particles in Extensive Air Showers - Proc. Roy. Soc.
A192, p. 364, 1948.

C. Astronomical Section, Dunsink Observatory.

(1) ACADEMIC STAFF:

Senior Professor:

Hermann Alexander Brück. (Appointed 1st October 1947).

Chief Assistant:

Hugh Ernest Butler. (Entered 1st December 1947).

Assistant (Part-time):

Frederick Jones O'Connor. (Entered 20th October 1947).

(2) RECONSTRUCTION OF OBSERVATORY:

The offices and instruments of the Observatory were in a state of complete decay when the Observatory was taken over, and it was evident that a major effort of reconstruction was required before any scientific work could be undertaken. It was necessary to repair buildings, install electric light and power, and overhaul the existing instruments. It also appeared to be highly desirable to re-arrange the existing accommodation in such a manner that some new equipment, a workshop and similar offices could be set up. Detailed plans were drawn up for this purpose, and arrangements were made to have the necessary repairs carried out.

Members of the staff began overhauling the various telescopes and auxiliary instruments such as measuring machines or clocks. By the end of the period covered by this report, three of the four major telescopes had been dismantled. The 12-inch South Refractor had been completely overhauled, re-assembled, tested and actually used for regular observations of lunar occultations. The 15-inch reflector in the dome on the roof of the main building had to remain in its dissembled state pending the necessary re-covering of the telescope dome. The mounting of the 8-foot Ramsden circle, which is now of historical interest only, was taken down altogether to make room for a projected solar telescope which is to be erected over the Meridian Room which adjoins the main building.

The Board of Works finished by the end of the financial year re-decorating the residence in the main building, the Assistant's House and the interior of the dome for the 12-inch refractor. They also started repairing the basement of the main building which is to be converted into a workshop and laboratories.

Arrangements have been made with the officers of the Joint Permanent Eclipse Committee of the Royal Society and the Royal

Astronomical Society, the Royal Irish Academy, and the Director of the Cambridge Observatory to receive on loan a number of valuable instruments to be used for the installation of a tower telescope for solar observations. Some of these instruments had arrived by the end of the period under review.

(2) LIBRARY:

The periodicals and books of the once comprehensive library were sorted out and re-catalogued. Most of the series of publications were incomplete since few had been received in recent years. A circular letter was sent to all observatories with an appeal for resumption of exchange of publications, and several thousand publications were received as a result.

(3) THE "ARMAGH-DUNSINK-HARVARD TELESCOPE":

The new 36-inch telescope of the Schmidt-Baker type which is to be owned and operated jointly by the Armagh, Dunsink and Harvard Observatories, is at present under construction by the Perkin Elmer Corporation, Conn., U.S.A. When completed in 1949 it is to be mounted at Bloemfontein, South Africa.

(4) LECTURES:

A Statutory Public Lecture was delivered by Professor Brück on 3rd March, 1948, in the Physics Theatre, University College, Dublin. The title was "Matter in Interstellar Space".

A course on "Astrophysics" was given by Professor Brück in the Hilary Term.

A lecture on "Starcounts" was given by Professor Brück at Cambridge, and two lectures of general interest to members of the Irish Astronomical Society in Armagh and Belfast.

D. Mac GRIANNA

CLÉIRATHÓIR

PÁDRAIG De BRÚN

CATHAOIRLEACH

16 Márta 1949