

CONTEMPORARY SCIENTIFIC ARCHIVES CENTRE

under the guidance of the Royal Society's

British National Committee for the History of Science, Medicine and Technology

Catalogue of the papers of
DOUGLAS RICHARD CHICK
(1916 - 1978)

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Deposited in the National Archive for Electrical Science and Technology
of the Institution of Electrical Engineers, London, 1980

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GENERAL INTRODUCTION

Douglas Richard Chick was born in Hastings, Sussex, in 1916. His father was an officer in the Indian army, as a result of which his early education took place in various army garrison schools in U.K. and abroad (see A.2, A.3, A.7 and Summary of Career). On returning to England in 1932, he attended Dartford Technical College before commencing a full-time sandwich course at Woolwich Polytechnic and a student apprenticeship with Johnson and Phillips Ltd. in 1933. (See A.4, A.5, A.8, A.9.)

After graduating from Woolwich in 1937 with a B.Sc. (Eng.) and a Higher National Diploma in Electrical Engineering, Chick began work as a Junior Scientific Officer at the Signals Experimental Establishment, Woolwich, engaged on research and development of military radio and radio jamming equipment. He continued to attend Woolwich Polytechnic in his spare time, doing research on gas discharge tubes for an M.Sc. degree (A.11, A.12). On the outbreak of the Second World War he joined the Ministry of Supply, working at Bawdsey and Christchurch on radar and low flying aircraft defence equipment. He was promoted to Scientific Officer in 1941, and spent the remainder of the war doing research on various aspects of radar including searchlight radar control, for which he received a wartime inventor's award in 1946 (see A.14). He also filed several patent specifications for work done during this period (see A.27). Other papers relating to Chick's career before 1946 are to be found at A.5, A.6, A.10, B.1.

In 1946 Chick joined the Research Laboratory of Associated Electrical Industries Ltd. at Aldermaston, where he was appointed Section Leader of the Nuclear Physics Section. He later became Group Leader of the newly-formed Nuclear Sciences Group (see B.14). A considerable part of the collection relates to work at A.E.I. Aldermaston, though the record is far from complete. There are a few notebooks covering some of Chick's early research on accelerators (B.2 - B.5) but the remaining material (B.6 - B.69) mainly consists of memoranda, correspondence, research reports, notes of meetings, etc., mostly from the late 1950s up to about 1962. Included with these is a collection of press-cuttings assembled by Chick, mainly relating to research on controlled thermonuclear reactions at A.E.I. Aldermaston and elsewhere (see B.39). Drafts for lectures and published papers re research in progress at A.E.I. are to be found in Section C.

In 1963 Chick moved to become Research Manager of the Vickers Company Research Laboratory, Ascot, where he remained until 1966. Papers relating to this period are to be found at B.70 - B.83.

In 1966 Chick was appointed Professor and Head of the Department of Electronic and Electrical Engineering at the new University of Surrey (formerly Battersea College of Advanced Technology). Having spent most of his life working in industry, Chick was convinced of the importance and mutual advantage of close cooperation between the technological universities and industry, and much of his work at Surrey was directed towards promoting this aim. Among other things he organised collaborative Ph.D. programmes and industrial research fellowships, introduced a compulsory industrial year for undergraduates, and formed an Industrial Electronics Group which made the expertise of his academic staff available to industry on a contract research basis. Most of the speeches and lectures in Section D emphasise the importance of collaboration with industry and there are also several folders documenting the 'Working Party on Continuing Development and Education for Engineers' (D.12 - D.26) which was set up to make arrangements for Surrey to help in the task of keeping engineers in industry in touch with the latest technological developments.

The remainder of Section D deals mainly with the setting up of a research group on Ion Implantation which grew in a short time to achieve an international reputation. There are also a few of Chick's own research notes from his last years at Surrey.

In addition to Chick's own papers there are a number of lectures and memoranda in the collection by colleagues at A.E.I. Aldermaston and elsewhere. Most of these are to be found in Section B, and they are itemised in the body of the catalogue, but special mention should be made of a number of items by or relating to D. Gabor, as follows: A.16, B.9, B.17, B.18, B.19, B.20, B.21, B.40, C.4 - C.7. See also items by Sir John Cockcroft (B.12, C.32) and Sir George Thomson (B.40). Correspondence, memoranda, etc. by T.E. Allibone are to be found passim in Section B.

The papers were received from Mrs. Chick and from Professor Stephens of the Department of Electronic and Electrical Engineering, University of Surrey, to both of whom we are grateful for help and advice.

Two engraved metal plaques commemorating the opening (see B.39) and closing of the Merlin Research Reactor, and which originally formed part of the collection donated by Mrs. Chick, are held separately by the Institution of Electrical Engineers, which also has a set of A.E.I. Research Reports.

SUMMARY OF CAREER

b.1916	Hastings, Sussex
Educated	Bishop Cotton School, Simla Karachi Grammar School Dartford Technical College
1933 - 37	Full-time sandwich course, Woolwich Polytechnic Student Apprentice, Johnson and Phillips Ltd.
1937	B.Sc. (Eng.), Higher National Diploma in Electrical Engineering
1937 - 39	Junior Scientific Officer, Signals Experimental Establishment, Woolwich
1939 - 41	Junior Scientific Officer, Ministry of Supply, Bawdsey and Christchurch
1941 - 46	Scientific Officer, Ministry of Supply, Malvern and Christchurch (Senior Scientific Officer, 1946)
1946	Wartime Inventor's award with W.S. Eastwood and A.J.H. Oxford
1946 - 63	Associated Electrical Industries Ltd., Research Laboratory, Aldermaston 1946-58 Section Leader, Nuclear Physics Section 1958-63 Group Leader, Nuclear Sciences Group
1950	M.Sc. (Eng.) London
1951	m. M.E. Thomas
1952	Fellow, Institution of Electrical Engineers
1953	M.Sc. (Physics) Reading
1960	D.Sc. (Eng.) London
1963 - 66	Research Manager, Vickers Company Research Laboratory Ascot
1966 - 78	Professor and Head of Department of Electronic and Electrical Engineering, University of Surrey

SECTION A

BIOGRAPHICAL AND PERSONAL A.1 - A.28

- A.1 Copies of obituaries from The Times and Nature, 1978.
A photograph of Chick is included in this folder.
- A.2 Miscellaneous curricula vitae, lists of publications, etc. (see also A.26).
- A.3-A.6 Contents of a folder labelled 'History 1924-37'. The original folder has been discarded and the contents split into 4 sections for ease of reference.
- A.3 1924-32.
Mainly school reports, correspondence re scholarships, etc. Schools attended include Garrison Elder Children's School, Abbassia; Bishop Cotton School, Simla; Karachi Grammar School (see also A.7).
- A.4 1933-35.
Includes material re Dartford Technical College which Chick attended 1932-34; apprenticeship with Johnson & Phillips Ltd., commenced in August 1933; and Woolwich Polytechnic where Chick was a full-time 'sandwich scheme' student from September 1934.
- A.5 1936-37.
Mainly re Woolwich Polytechnic and Johnson & Phillips Ltd. There is also some correspondence re an application by Chick for a wireless transmitting licence, 1936 and re his appointment as an Assistant in the Signals Experimental Establishment, Woolwich, 1937.
- A.6 1938-40.
This material was presumably added after the compilation of the original folder. Re award of London University B.Sc. (Eng.), 1938; miscellaneous applications for jobs, etc.

Biographical and personal

- A.7 Testimonials from the Head Master, Bishop Cotton School, Simla (1930) and the Head Master, Karachi Grammar School (1932) (see also A.3).
- A.8, A.9 2 hard-covered folders labelled 'Woolwich Polytechnic. Laboratory Reports. Electrical Communications. D.R. Chick'.

These contain ms. accounts of experiments, with diagrams, tables of results, etc., 1936-37, and presumably formed part of Chick's undergraduate course work (see A.10).
- A.10 Certificate of B.Sc. (Eng.), London University, and Higher National Diploma in Electrical Engineering, both 1937.

Letter of congratulation from the Principal, Woolwich Polytechnic.
- A.11 'University of London. Application for Registration as Postgraduate Student for Ph.D. Degree (Internal)'.

The date 5.10.39. is pencilled in at the head of the form but other details are entered in a mixture of inks and pencils, and October 1937 appears as the 'Date of Commencement of proposed course of Study'. The title of Chick's proposed thesis is entered as 'Production of Ultra High Frequency Oscillations from a partially evacuated tube'. The form was never completed.
- A.12 'Woolwich Polytechnic. Record of Work of Mr. D.R. Chick'.

Certificate of 168½ hours of attendance during session 1938-39 for 'Physics Research'.
- A.13 Publicity leaflet describing the A.E.I. Research Laboratory at Aldermaston Court, Berkshire. Chick worked at A.E.I. Aldermaston 1946-63.
- A.14 Photocopy of letter from the Ministry of Supply, 20 August 1948, announcing the award by the Committee on Awards to Inventors of £1,500 to be shared between Chick, W.S. Eastwood and A. J.H. Oxford for work on Radar Search-light Control Equipment.

The original is held by Mrs. Chick.

Biographical and personal

- A.15 'The Helix as an Accelerator of Protons to Energies in the Region of 3 to 20 MeV'.

Thesis submitted to London University by Chick for Degree of M.Sc. It was also issued as A.E.I. Research Report no.A.65 in which form it appears here.

Folder also includes brief correspondence with the Principal, Woolwich Polytechnic, re possibility of submitting this work for the degree, a statement by Chick's co-author, D.P.R. Petrie, re Chick's part in the work, letter from the Academic Registrar, London University, notifying conferment of the degree, 10 May 1950, and letter of congratulation from the Principal, Woolwich Polytechnic.

- A.16 Ms. notes by Chick on a series of lectures on statistics, January-March 1950. The lecturers are named as [G.A.] Barnard and [D.] Gabor. For other lectures by Gabor see B.9, C.4-C.7.
- A.17 Acknowledgement from London University, 16 February 1951, of Chick's registration for the Ph.D. Examination.
- A.18 Letter from the Institute of Physics, 17 January 1952, announcing Chick's election as an Associate.
- A.19 37 pp. typescript draft on 'The electron model of a proton linear accelerator in the form of a helix', n.d., but presumably related to Chick's Ph.D. work (see A.20 below).
- A.20 Letter from R.L. Fortescue to Chick, 6 May 1952. The second paragraph reads:

'I have asked about the steps that should be taken if you should decide to change from the proton accelerator as a subject for your thesis. The Van der Graaff (sic) work is thought to be too far removed from the proposed subject to be included even as a supporting thesis, and there is no doubt that if the helix work had to be abandoned, the best thing to do would be to re-register with a new heading. This means 5 years from the date of re-registering, of course. So on the whole the procedure is not to be recommended. Work on focussing is, I believe, your best subject, as it would be of wider outside interest; but the electron model would be quite suitable as a thesis subject without any other work.'

Biographical and personal

- A.21 4 pp. ms. notes by Chick, written after the receipt of Fortescue's letter, summarising his academic achievements to 1952 and outlining plans for the future.
- A.22 Certificate of M.Sc., University of Reading, 1953.
- A.23 Letter from the Director, Metropolitan-Vickers Electrical Co. Ltd. announcing the award of £10 to Chick for his paper on 'Particle Accelerators and their Applications'.

The letter is undated, but the paper was published in Brit. Comm. and Elec., 1956.
- A.24 Award of D.Sc. (Eng.), London University, 1960.

Brief correspondence with the Academic Registrar, August and September 1959, re Chick's submission for the degree.

Typescript 'Statement of the Candidate's Contributions' with Foreword by T.E. Allibone.

Letter from the Academic Registrar, 27 January 1960, announcing the conferment of the degree for Chick's work in the field of 'Electrical and nuclear engineering (particle accelerators, research reactors, physics of high density plasmas)'.
- A.25 Copy of Testimonial to Chick from members of the Faculty of Engineering in the University of Surrey 'to place on record our appreciation of your work as Dean of the Faculty from 1971-73 and from 1976 until 1978 and we hope that you will continue until 1979'.
- A.26 Photocopies of correspondence re Royal Society Fellowship proposal, 1976-78. Includes drafts of curricula vitae with supporting papers.

The original set of correspondence is held by Mrs. Chick.
- A.27 Set of 20 patent specifications filed by Chick, 1946-1959.

See B.66, B.67 for related correspondence and drafts.
- A.28 Set of Chick's publications (incomplete).

A list of publications is included in the folder.

See also D.48.

SECTION B

RESEARCH IN GOVERNMENT AND INDUSTRIAL
LABORATORIES, 1939-66 B.1 - B.83

The material is divided as follows:

- | | |
|-------------|---|
| B.1 | Ministry of Supply |
| B.2 - B.69 | Associated Electrical Industries Ltd.
Research Laboratory, Aldermaston |
| B.70 - B.83 | Vickers Company Research Laboratory, Ascot |

The majority of this Section relates to Chick's work at A.E.I.:

Aldermaston where he was Section Leader, Nuclear Physics Section, 1946-58, and Group Leader, Nuclear Sciences Group, 1958-63. Chick has outlined his major areas of work at Aldermaston as follows (see A.26):

- 1) Particle accelerations and low energy nuclear physics: based on design and construction of two Van de Graaf (sic) accelerators for use up to 4 MeV, and a unique RF travelling wave accelerator for protons and deuterons.
- 2) Thermonuclear and plasma research: with Sir George Paget Thomson and in collaboration with UKAEA. Design and development of metal walled discharge tubes (1959 'Sceptre' series of devices).
- 3) Neutron physics research using a medium power research reactor: MERLIN 5MW (commissioned 1959), designed and built as a research tool for industry, government bodies and the universities. 1 sold to Germany, 1 to AWRE.'

Material relating to particle accelerators and thermonuclear research is to be found at B.2 - B.9 and B.10 - B.40 respectively. There are also several folders of work on superconductivity (B.41 - B.51) and some more miscellaneous material (B.52 - B.69), but nothing remains of Chick's work on the Merlin Research Reactor apart from his published papers and a few press-cuttings describing the opening of the Reactor in November 1959 (see B.39). Lectures and papers relating to research in progress at A.E.I. Aldermaston, including work on Sceptre and the Merlin research reactor, will be found in Section C, especially C.11 - C.36.

The surviving papers from the Vickers Research Laboratory are a rather heterogeneous collection and cannot be considered fully representative of Chick's activities during that period.

Research in government and industrial laboratories

- B.1 Miscellaneous material re work for the Ministry of Supply, 1940-45. Includes a typescript note by Chick on 'S.L.C. Modulator Transmitters', 25 June 1941, with brief accompanying correspondence. The remaining material consists mainly of typescript notes on research in progress, not by Chick.
- B.2-B.69 Associated Electrical Industries Ltd. Research Laboratory, Aldermaston
- B.2-B.9 Work on particle accelerators.
- B.2 Laboratory notebook with entries in Chick's hand. The first one is dated 'circa Dec. 1947', and headed 'Rotating Magnetic Field Accelerator'. Entries continue to November 1951, and consist of ms. and typescript notes on research in progress with a few loose pages of calculations, etc.
- B.3 Laboratory notebook labelled 'Helix' containing ms. notes, diagrams and calculations re the helix accelerator. There were also a number of loose photographs which have been transferred to B.4.
- The first entry is dated 31 March 1954 and the date 20 April 1955 appears about two thirds of the way through the book; the remaining entries are undated. The notebook is not in Chick's hand.
- B.4 Bundle of photographs originally kept loose in B.3.
- B.5 Laboratory notebook containing an account of work on the helix accelerator.
- The first entry is headed 'Position on 9.4.54.' and begins 'It has been decided to build a pilot length of 1 metre with injection @ 2.5 MeV to accelerate to 4 MeV approx. with a power flux of about 500 KW. Initially there will be no focussing, but this will be tried at a later stage'.
- Entries in ms. and typescript including Minutes of Progress Meetings continue to July 1957. Most of the ms. entries are not in Chick's hand.

Research in government and industrial laboratories

- B.6 Folder containing sets of 'Helix Design Data' as follows:
- 'Helix Design Date'
5 pp. typescript, n.d.
 - 'Helix Design Data. Pitch and Energy, against Axial Distance'
2 pp. typescript, 27 April 1955.
 - 'Helix Dsign Data 2. Position of Turns'
4 pp. typescript with accompanying ms. draft and graphs (not in Chick's hand), 3-5 May 1955.
 - 'Helix Design Data 3. Position of Turns (revised)'
4 pp. typescript with ms. draft (not in Chick's hand), 24 May 1955.
- B.7 Miscellaneous notes, photographs, diagrams, etc. re helix accelerator, in various hands.
- Includes:
- 3 pp. ms. diagrams by Chick headed 'Water Load', n.d.
 - 2 pp. typescript by D. Walks, n.d., headed 'Effects of Changing Frequency of the Helix from 300 Mc/s to 400 Mc/s'
 - 3 pp. ms. notes, not by Chick, headed 'Electrostatic Quadruple Field of 4 Quadrant Electrodes', n.d.
 - Duplicated typescript of paper by W. Walkinshaw and K. Wyllie on 'Helix as Linear Proton Accelerator', n.d., c.1948.
 - Duplicated typescript of paper by K. Johnsen on 'Theoretical Losses in a Helix with Shield and Support', 1954.
- B.8 2 duplicated typescripts with no indication of author or date, headed:
- 'Chapter 1. Electromagnetic fields inside a helix'
 - 'Chapter 4. The Helix Accelerator'
- B.9 Folder labelled 'Hertz Vector Analysis. Helix. Gabor. 3 Phase Analysis', containing 2 sets of ms. notes by Chick, possibly on lectures by Gabor.
- For other lectures by Gabor see A.16, C.4 - C.7.

Research in government and industrial laboratories

- B.10-B.40 Thermonuclear and plasma research.
- B.10 Correspondence and memoranda, September 1957.
Includes:
 Memo. from T.E. Allibone to Section Leaders and
 Sub-Section Leaders, 3 September 1957, re
 administrative changes in the A.E.I. Research
 Laboratory.

 Photocopy of memo. from R. Carruthers, G.N.
 Harding, R.S. Pease and P.C. Thonemann re
 'Neutrons from Zeta', 6 September 1957.

 Photocopy of letter from P.C. Thonemann to
 Allibone re reactions in Zeta, 13 September 1957.
- B.11 2 typescript drafts, 9 pp. and 8 pp. of letter to Nature
 by P.C. Thonemann and others on 'The Production of
 High Temperatures and Nuclear Reactions in a Gas Dis-
 charge'. The second draft is dated 3 January 1958.
- B.12 8 pp. duplicated typescript Press Release, 12 January 1958
 (marked 'not for release before 18.00 hours 24.1.58.') on
 'Progress in Thermonuclear Research at Associated Electrical
 Industries Ltd., Aldermaston, Berks.' Announces achieve-
 ment of very high temperatures in Sceptre.

 2 pp. duplicated typescript by Sir John Cockcroft for
 Press Conference, 23 January 1958, to announce the
 achievement of temperatures of about 5 million degrees
 in Zeta (for release at the same time as the A.E.I. Aldermaston
 statement).
- B.13 9 pp. typescript by T.E. Allibone, 20 January 1958, on
 'Progress in Thermonuclear Research at the Research
 Laboratory, Associated Electrical Industries Ltd.,
 Aldermaston'. It is annotated 'Submitted to New Scientist,
 24.1.58. (by hand)'.

B.14 Correspondence and memoranda, January 1958.
Includes:
 Photocopy of letter to T.E. Allibone from the
 Chairman, A.E.I., 13 January 1958, which opens
 'I think I ought to put on paper my congratulations
 for these exciting, startling, revolutionary discoveries
 of the team under your leadership at Aldermaston'.

Continued

Research in government and industrial laboratories

- B.14 (continued) Memo. from Allibone, 16 January 1958, beginning 'To mark the great and historic occasion in the life of our Laboratory I propose on January 24th to make Mr. D.R. Chick "Group Leader, Nuclear Sciences"', and continuing to outline other administrative changes.
- Letter of congratulation from L. J. Davies.
- B.15 7 pp. typescript of interview given by Allibone, Chick and A. A. Ware to H. G. Meyer of Radio Im Amerikanischen Sektor, Berlin, 28 January 1958. Includes brief related correspondence.
- B.16 Memoranda from J. C. Bass, November 1959:
- 7 pp. typescript headed 'Plasmas, Electron Beams and Microwaves' with accompanying brief note, 6 November 1959.
- 4 pp. typescript on 'Microwave Excitation of Plasma for Hard-Core Experiments', 23 November 1959.
- B.17-B.22 Memoranda and correspondence from D. Gabor, 1959-62 (see also B.40).
- B.17 'Memo on Thermonuclear Power', 9 January 1959.
30 pp. duplicated typescript including diagrams and appendices, with occasional marginal annotations by Chick.
- B.18 'Second Memo on Thermonuclear Power', 24 May 1959.
8 pp. duplicated typescript and one diagram.
- B.19 'A Project of Thermonuclear Power Production', 28 September 1959.
17 pp. duplicated typescript including diagrams. The opening sentence refers to B.17 and B.18 and to a third memo. of 17 August which was not found among Chick's papers.
- B.20 Photocopy of letter from Gabor to Sir Willis (later Lord) Jackson, May 1960, asking for an electrical engineer from Aldermaston to collaborate on an ion source project at Imperial College. The letter is accompanied by a brief exchange of correspondence between Jackson and Allibone on the same subject.

Continued

Research in government and industrial laboratories

- B.20 (continued) Photocopy of memo. from Gabor on 'A New Thermionic Generator', 28 July 1960. An attached note from Allibone to Chick and others, 29 September 1960, suggests a meeting to discuss the memo.
- B.21 Duplicated typescript by D. Gabor, A.F. Pearce and C.J. Powell to accompany application to the Department of Scientific and Industrial Research for a grant for a 'High Power Ion Beam Source Project', 16 January 1961.
- B.22 Miscellaneous correspondence with and re Gabor, February 1961-January 1962, mainly re ion beam source project.
- B.23-B.36 Memoranda, research reports, etc., 1958-62.
- B.23 'A contribution to the cost of increasing the power to SCEPTRE III and to the construction of SCEPTRE IV, a thermonuclear reactor designed to produce a temperature of 30 million degrees', by T.E. Allibone.

Report for Executive Committee of the A.E.I. Board, March 1958.
- B.24 'Notes on visit to USSR by Sir John Cockcroft and R.S. Pease'.

Photocopy of 9 pp. typescript by R.S. Pease, date stamped December 1958.
- B.25 'The A.E.I. Research Programme, Autumn 1959/60. Sceptre IV', by D.R. Chick.

A.E.I. Research Report no. A.1006, October 1959.
- B.26 'Sceptre Discharges', by S.E. Hunt.

A.E.I. Thermonuclear Section Memorandum No.5, November 1960.
- B.27 'Summary of the Proposed A.E.I. Plasma Research Programme 1960/61'.

Duplicated typescript, no author or date.
- B.28 'Interferometric Determination of Electron Density in the Sceptre IV Discharge. First Progress Report, October-December 1960'.

A.E.I. Research Report, no author, February 1961.

also

'Second Progress Report, January-March 1961', issued May 1961.

Research in government and industrial laboratories

- B.29-B.35 Progress reports on 'Controlled Thermonuclear Research',
January 1961-July 1962.
- These were all issued as A.E.I. Research Reports with
no indication of author.
- B.29 January 1961, subtitled 'First Levitron Progress Report',
with some annotations by Chick.
- B.30 February-April 1961, subtitled 'Second Levitron Progress
Report'.
- B.31 May-July 1961.
- B.32 August-October 1961.
- B.33 November 1961-January 1962.
- B.34 February-April 1962.
- B.35 May-July 1962.
- B.36 'A Proposed contract for work on the scattering of light
by plasmas at A.E.I.'.
- 2 typescript drafts by R.S. Pease, 3 May and 8 May 1962.
- B.37-B.39 Press-cuttings, mainly re thermonuclear research.
- B.37 Folder labelled 'Press comments on Lecture by I.V. Kurchatov,
given at Harwell, 25th April 1956'. Contains cuttings
from British and foreign papers.
- B.38 Miscellaneous cuttings from British and American papers,
1957-58.
- B.39 Hard-covered scrap-book containing extracts from news-
papers, magazines and learned journals, 1951, 1955-59,
1965-67. The majority of the cuttings date from 1958 and
relate to Zeta and Sceptre, but there are also several re
the 'Merlin' reactor, opened at the A.E.I. Research
Laboratory, Aldermaston, by the Duke of Edinburgh,
6 November 1959. The later series of cuttings (1965-67)
is on a variety of subjects.
- The book also contains a few memoranda by members of
the laboratory at A.E.I. Aldermaston, re subjects con-
nected with the press-cuttings.

Research in government and industrial laboratories

- B.40 Photocopy of typescript of paper by D. Gabor on 'Wave Theory of Plasmas'. 15 pp., n.d., c.1950-51.

Photocopy of typescript of paper by G.P. Thomson on 'Theory of Torus with concentrated discharge assuming constant "tyrewise" velocity'. 14 pp., October 1951 + 2 pp., November 1951.

B.41-B.51

Research on 'Superconductivity', 1961-64.

The following material forms an account of work on superconductivity conducted at A.E.I. Aldermaston.

It consists of correspondence, internal memoranda, progress notes, minutes of meetings, etc., exchanged with colleagues at Aldermaston and at other A.E.I. Divisions at Manchester and Rugby. The material is presented in chronological order and items of particular interest have been itemised.

- B.41 Minutes of Meetings of the Cryogenics Sub-committee.

The first meeting of this Sub-committee was held on 25 January 1961. Chick was not present, but he attended all the subsequent meetings listed below. The Sub-committee's brief was to report to T.E. Allibone on 'cryogenic research and whether A.E.I. should set up a cryogenics laboratory' as a basis for Allibone's recommendations to the A.E.I. Research Committee.

There are Minutes for subsequent meetings on 14 March, 8 May, 30 May, 23 November. The Sub-committee was disbanded in January 1962 after the setting up of a Study Group on Super-cooled Transformers which made it redundant.

Folder contains Agendas and Minutes of Meetings and some related correspondence.

- B.42 Correspondence, internal memoranda, notes of meetings, etc., March 1961-January 1962.

Includes:

Report of Meeting of Cryogenics Information Panel, 30 May 1961.

Notes on Meeting on Applications of Superconductivity, 5 December 1961.

Minutes of Meeting to set up a Study Group on Super-cooled Transformers, 10 January 1962.

Correspondence is mainly with J.E.L. Robinson and H.W. Hardern of A.E.I. Transformer Division, Manchester.

Research in government and industrial laboratories

- B.43 Folder labelled 'Technical Notes. Superconductivity' containing typescript reports and memoranda submitted to Chick by members of the Transformer Study Group, January-April 1962.

This group was set up at the meeting on 10 January 1962 (see B.42) with Chick as Chairman 'to undertake a pre-feasibility study of power transformers using super-cooled conductors . . . The group was to collect all existing relevant information by reviewing literature, convening inter-Section meetings when required, and by means of external contacts, in order to ascertain the extent of the research and engineering effort required'.

- B.44 Correspondence, internal memoranda, notes of meetings, reports on research, etc., February-March 1962.

Includes:

Minutes of Meeting on Supercooled Transformers, 12 February 1962 (with 12 pp. typescript on 'Transformer Scaling Laws' prepared by Chick for this meeting).

Notes by Chick on a meeting to discuss transformers, 1 March 1962.

Memorandum by K.J.R. Wilkinson, A.E.I. Rugby, on 'Superconducting Power Transformer Windings', 9 March 1962.

Report by Chick on a visit to A.E.R.E. Harwell, 14 February 1962 (report dated 20 March).

Notes of a discussion on 'Superconductivity in Power Transformer Windings', 30 March 1962.

Correspondence is mainly with colleagues at A.E.I. Divisions in Rugby and Manchester.

- B.45 Correspondence and memoranda, April-May 1962.

Research in government and industrial laboratories

- B.46 Correspondence, memoranda, notes of meetings, reports on research, etc., June-July 1962.
- Includes:
- Notes on Meeting to Discuss Cryogenic Transformers, 7 June 1962.
 - Minutes of Meeting with a Representative of B.O.C. (British Oxygen), 15 June 1962.
 - Report on visit to Harwell, 19 June 1962.
 - Nuclear Sciences Group Technical Memo. by Chick on 'Current Distribution in Thin Superconducting Films', 9 pp. typescript, 27 June 1962.
 - Nuclear Sciences Group Technical Memo. by J.E. Read on 'Field Homogeneity in a Solenoid System', date stamped 25 July 1962.
- B.47 Correspondence, memoranda, notes of meetings, etc., August-September 1962.
- Includes:
- Notes of a discussion on 'Superconducting Transformer Windings', 1 August 1962.
 - Account by K.J.R. Wilkinson of a meeting at the National Physical Laboratory on 'High Field Superconductors', 11 September 1962.
- B.48 Correspondence, memoranda, notes of meetings, reports on research, etc., October-November 1962.
- Includes:
- Notes by Chick on meeting at Amersham re 'Amersham Cyclotron', 24 October 1962.
 - 14 pp. typescript draft by K.J.R. Wilkinson on 'Power Transformers and the Feasibility of Superconduction', October 1962.
 - Minutes of Cryogenics Team Progress Meeting, 7 November 1962.

Continued

Research in government and industrial laboratories

- B.48
(continued) Draft 'Proposals for Investigations into the Fabrication and Properties of Superconducting Materials', for submission to the Department of Scientific and Industrial Research, November 1962.
- Cryogenics Team Memorandum no.4 by J.S. Heath on 'A Current Regulator for Superconductor Testing', November 1962.
- B.49 Correspondence, memoranda, notes of meetings, research, etc., December 1962-May 1963.
- Includes:
- Proposal submitted to the Department of Scientific and Industrial Research for 'Investigations into the Fabrication and Properties of Superconducting Materials', 17 December 1962.
- Cryogenics Team Memorandum no.5 by P.H. Borchers entitled 'Some Experimental Results', December 1962.
- Minutes of Cryophysics Team Meeting, 17 January 1963.
- B.50 Copies of notes, articles, press-cuttings, etc. re research on superconductivity in other laboratories, 1961-63.
- B.51 Typescript of paper by K. J.R. Wilkinson on 'Super-conductive windings in power transformers', published in Proc. IEE, 110, no.12, 1963.
- Folder also includes 16 pp. typescript by Chick on 'Large Scale Applications of Superconductivity', May 1963, and typescript report of Chick's contribution to a discussion re A.E.I. work on superconductivity before a 'Joint Meeting of the Science and General Division and the Power Division', 4 February 1964.
- B.52-B.55 Contents of a large folder labelled 'Activation Analysis'. The original folder has been discarded.
- B.52 'The Power Density from D-D Reactions'.
- A.E.I. Research Report no. A.953 by Chick and W.M. Jones, May 1959.
- Included in the folder is a 4 pp. typescript draft by Chick with the same title, 18 February 1959, and several pages of ms. calculations.
- B.53 Ms. notes and calculations in Chick's hand, all undated.

Research in government and industrial laboratories

- B.54 Bundles of calculations by Chick, some with attached titles as follows:
- 'Pinch relations'
 - 'Diffusion and field freezing'
 - 'Plasma Oscillations'
 - 'Reaction Times'
 - 'Magnetic Heating. Direct Conversion. Compression'
 - 'Stability Criteria'
 - 'Frequencies. Radii of Gyration'
 - 'Space Charge effects'
 - 'Toroidal Coordinates'
 - 'Basic Equations. Spitzer'
 - 'Scattering'
- B.55 'Final Performance Tests on the 4 MeV Electrostatic Generator'.
- A.E.I. Research Report no.1406 by F. Cheetham, W.W. Evans, B. Eales and S.E. Hunt.
- B.56-B.63 Miscellaneous material re work on neutron sources and activation analysis.
- B.56 'Activation Analysis Using a Van de Graaff Accelerator', by R.A. Pope.
- Nuclear Physics Section Memorandum no. 188, January 1961.
- B.57 'A Survey of the Possibility of Producing Neutron Sources for Activation Analysis', by E.C. Fellows, B. Liley, S.E. Hunt, R.A. Pope.
- Nuclear Physics Section Memorandum no. 199, February 1962.
- Included in the folder are undated ms. and typescript versions of a draft by Chick on 'Neutron Generation and Activation Analysis' of which the ms. bears the annotation 'Section Memo. 199'.

Research in government and industrial laboratories

- B.58 'A Design Study of a Mobile Accelerator Neutron Source', by E.C. Fellows and S.E. Hunt.
Nuclear Physics Section Memorandum no. 202, April 1962.
- B.59 'Some Problems Involved in the Design of a Neutron Generator Capable of Producing 10^{12} n/sec.', by R.A. Pope.
Nuclear Physics Section Memorandum no. 214.
- B.60 Brief correspondence, April 1963, and papers re registration of the A.E.I. Research Laboratory, Aldermaston, in accordance with the provisions of the Radioactive Substances Act 1960. Includes official Forms of Application for 'Registration to Keep and Use Radioactive Material' and for 'Authorisations for the Disposal and/or Accumulation of Radioactive Waste'.
- B.61 Miscellaneous drafts and memoranda:

'Silicon Detector Survey', by D.G. Waters. 5 pp. typescript, 14 March 1963.

'Target Monitoring on the Neutron Source', by D.R. Chick. 2 pp. typescript, 4 July 1963.

'1 MeV Electron Microscope Power Supplies', by D.R. Chick. 3 pp. typescript, 16 July 1964 + 4 pp. ms. notes.
- B.62 Miscellaneous correspondence, 1963-64.
- B.63 Undated ms. notes, photographs and printed matter.
- B.64 Correspondence and memoranda re magnetohydrodynamics (MHD), 1959-62.
Includes:

'Possible Programme of Research on Magnetohydrodynamics', by K. Phillips. 5 pp. typescript, 12 November 1959, with annotations by Chick.

'Remarks on the M.H.D. Programme', by K. Phillips. 3 pp. typescript, n.d.

Continued

Research in government and industrial laboratories

- B.64 (continued) 'Some Comments on the I.E.E. International Symposium on Magnetoplasdynamic Power Generation', by A.A. Ware. Plasma Physics Section Memorandum no.16, October 1962.
- Memorandum from T.E. Allibone to A.A. Ware, 9 November 1962, re organisation of MHD research at A.E.I. Aldermaston.
- B.65 Folder labelled 'Submarine Repeaters', containing memoranda, notes of meetings, etc., May-June 1962.
- B.66 Correspondence, mainly with the Manager of the A.E.I. Patent Department, re patent applications by Chick and others, 1950, 1956-62. Includes copy of Nuclear Physics Section Memorandum no. 185 by D.V. Freck on 'The Detection of Nuclear Radiations by Semiconductor Devices', November 1960.
- B.67 Draft patent specifications by Chick and others.
- See A.27 for a set of 20 patents filed by Chick, 1946-59.
- B.68 Miscellaneous notes and memoranda on various subjects by members of the A.E.I. Research Laboratory, Aldermaston.
- B.69 Miscellaneous reports on research in other laboratories, 1953-64.

Research in government and industrial laboratories

- B.70-B.83 Vickers Company Research Laboratory, Ascot.
- B.70, B.71 Contents of a folder labelled 'Acetylene'. The original folder has been discarded.
- B.70 Ms. notes by Chick on acetylene production, n.d., c.1963-64. A 'Bibliography on the Production of Acetylene from Hydrocarbons', produced by Vickers Research Laboratory Library, December 1963, is also included here with some items marked by Chick.
- B.71 Notes of visits to discuss research, memoranda, reports, etc. by D.R. Napier of Vickers Research Laboratory, 1958-61. These papers were presumably inherited by Chick when he joined the Laboratory in 1963.
- B.72-B.75 Contents of a folder labelled 'English Steel. Plasma Arc Smelting'. The original folder has been discarded.
- B.72 Notes, correspondence, research reports, etc.
Includes:
Letter from J.E. Russell, English Steel Corporation Ltd., 13 March 1964, re flame spraying of refractories and neutron activation analysis.
Photocopies of typescript research notes by D. Engeldow, English Steel Corporation Ltd., on 'The Plasma Electrode Process' (21 January 1964) and 'Refractory Flame Spraying' (2 April 1964).
Miscellaneous related ms. notes by Chick.
- B.73 Brief correspondence re arrangements for Chick to visit the English Steel Corporation Ltd., Sheffield, on 1 July and 15 October 1964.
2 pp. ms. notes by Chick headed 'Meeting. Ridal, ESC'.
1 p. ms. notes by Chick headed 'Sheffield 15.10.64.'
Photocopy of typescript headed 'Preliminary Specification for Scanning Electron Beam Inclusion Counter', n.d. or author, but annotated by Chick 'Ridal' (K.A. Ridal of English Steel Corporation Ltd.).
6 pp. ms. notes by Chick headed 'Inclusions', n.d.

SECTION C

TALKS, LECTURES, CONFERENCES, 1946-65 C.1 - C.42

Some of the material in this Section is not by Chick but consists of lectures which he presumably attended and of which he kept copies amongst his own papers. See particularly the lectures delivered at Imperial College by D. Gabor and others (C.4 - C.10) and the course of lectures on 'Nuclear Physics for Engineers' (C.1).

The material is arranged chronologically as far as possible, undated items being placed roughly in the period to which they appear to belong.

For lectures, conferences, etc. at the University of Surrey, see Section D.

C.1 'Course in Nuclear Physics for Engineers', January-March 1946.

Photocopied typescript, 77 pp., including lectures as follows:

C. Helmholtz	Particles, units, dynamics of particles, relativistic effects
W.J.H. Pankofsky	The Linear Accelerator
E.M. McMillan	The Synchro-Cyclotron The Synchrotron
R.L. Thornton	The Cyclotron
W.M. Powell	D.C. Magnet Design
K.L. McKenzie	Oscillators

C.2 'The Engineering Problems Involved in the Work of the Nuclear Physics Section'.

Annotated typescript of paper by Chick delivered at an A.E.I. Research Laboratory Colloquium, 14 January 1948.

Includes photocopy of a set of notes dated May 1947 which were found with the lecture.

C.3 Typescript draft of lecture on 'Fission Processes'. There is no indication of author or date, but the first page is annotated 'A.E.I.'

3 pp. typescript (undated), apparently by Chick, headed 'Estimate of Power Required for a Pinch'.

Talks, lectures, conferences

C.4-C.10

Lectures at Imperial College, London.

All duplicated typescript.

- | | | |
|-----|----------|---|
| C.4 | D. Gabor | Introduction to Internal Electronics
(Postgraduate course in Electronics & Communication, Winter Term 1949-50).
65 pp. |
| C.5 | D. Gabor | The Electromagnetic Field
(Postgraduate course in Electronics & Communication, Winter Term 1949-50)
70 pp. with a few underscorings by Chick. |
| C.6 | D. Gabor | General Dynamics
(Postgraduate course in Electronics & Communication, Spring Term 1950)
56 pp. with notes and comments by Chick. |

Folder also includes sets of problems on the course, and ms. exercises and answers by Chick.

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|------|-----------------|--|
| C.7 | D. Gabor | Introduction to Statistical Physics
(Postgraduate course on Electronics & Communication, Summer Term 1950)
66 pp., with notes and calculations by Chick.

See A.16, B.9 for notes by Chick on lectures by Gabor. |
| C.8 | E. Colin Cherry | A course on 'Linear Electric Circuit Theory' |
| C.9 | E. Colin Cherry | The Application of the Methods of Classical Dynamics to Lumped Electric Circuits |
| C.10 | D.P.R. Petrie | Lectures on Vector Analysis
92 pp. with some annotations by Chick. |

Talks, lectures, conferences

- C.11 Lecture on 'Nuclear Physics and Accelerators', describing the work of the Nuclear Physics Section, Aldermaston, 9 April 1952.
- Ms. and typescript outlines of contents of lecture; 2 pp. ms. headed 'Questions'.
- 30 pp. typescript of lecture with ms. annotations.
- Ms. and typescript background material, some not in Chick's hand.
- C.12 Lecture on accelerator tubes as used with DC voltage sources, delivered at the Clarendon Laboratory, Oxford, 30 May 1952.
- 2 typescript drafts with accompanying graphs.
- C.13 Undated typescript with ms. annotations and additions found with C.12. It describes progress in nuclear research at Aldermaston and appears to have been delivered at the opening of a conference.
- C.14 'Particle Accelerators and Nuclear Physics at Aldermaston'.
- Typescript draft with ms. annotations for lecture delivered at University College, London, 26 January 1955.
- Folder includes diagrams and background notes, some in another hand.
- C.15 Untitled lecture reviewing work on gas discharges at A.E.I. Aldermaston.
- 12 pp. typescript, n.d., but with attached note from Chick to Allibone 'T.E.A. Lecture notes for information', date stamped 31 January 1957.
- C.16 'The Merlin Research Reactor'.
- Typescript draft of paper by Allibone, Chick and A.J. Salmon delivered at the Symposium on the Peaceful Uses of Atomic Energy, Sydney, 1958.

Talks, lectures, conferences

- C.17 'A review of work carried out towards a Thermonuclear Reaction'.

19 pp. typescript with no author or date. Brief accompanying correspondence suggests that this is a copy of a paper delivered to the Institution of Electrical Engineers in December 1958 by D.W. Fry. It contains a review of papers presented at the Second Atoms for Peace Conference, Geneva, September 1958.
- C.18 'Plasma Physics'.

Heavily corrected typescript of lecture delivered to:

Battersea College of Technology, 24 February 1959

Northampton College of Technology, 12 March 1959

University of Algiers, 23 March 1959

Additional ms. and typescript notes and correspondence re arrangements for the lecture at Battersea are also included in the folder.

See also C.19
- C.19 'Plasma Physics'.

Final typescript of C.18 as prepared for delivery to the University of Algiers, 23 March 1959.

Folder also includes typescript synopses in English and French, miscellaneous background notes, and a letter of thanks to Chick from the Director of the Institut d'Études Nucléaires de l'Université d'Alger.
- C.20 'The Merlin Research Reactor'.

2 typescript drafts of lecture delivered at the University of Algiers, 24 March 1979.

Includes summary, French translation and some background material.
- C.21 Typescript of discussion following a paper by Allibone and Chick on 'The basic physics of thermonuclear processes' given at the Institution of Electrical Engineers Convention on Thermonuclear Processes, April 1959. (A reprint of the paper is included at A.28.)

Includes miscellaneous ms. and typescript notes and calculations assembled as background material.

Talks, lectures and conferences

- C.22 Fourth Meeting of CERN Study Group on Fusion, Harwell, 18-20 June 1959.
- Programme of meeting, with annotations by Chick.
- Ms. and typescript notes, not all in Chick's hand, presumably background to A.A. Ware's report to the meeting on results obtained with Sceptre IIIA at A.E.I. Aldermaston.
- Duplicated typescript report on the meeting.
- C.23 'Plasma Research at A.E.I. Research Laboratory, Aldermaston Court'.
- Typescript drafts of paper by Chick delivered at the IVth International Conference on Ionization Phenomena in Gases, Uppsala, August 1959.
- Includes photographs of Sceptre IV.
- C.24 Correspondence with the Institution of Electrical Engineers re a lecture to have been delivered by Chick at Malvern, 12 October 1959. Chick was unable to give the lecture as arranged because he was asked to join the British delegation to an international conference on thermonuclear research at Los Alamos, 12 and 13 October 1959 (see C.25-C.27). His place was taken by B.S. Liley.
- C.25-C.27 Meeting at Los Alamos, 12-13 October 1959.
- C.25 2 typescript drafts, 4 pp. each, of paper re Sceptre IIIC and Sceptre IV, delivered at the meeting by Chick.
- C.26 2 sets of ms. notes with ms. and typescript drafts for report on the meeting by Chick. Includes press-cutting and other background material.
- C.27 Final version of Chick's report on the meeting issued as A.E.I. Research Report no. A.1013, November 1959.

Talks, lectures and conferences

- C.28 'Aldermaston Plasma Research Programme'.
11 pp. typescript with diagrams (not in Chick's hand) and 2 pp. preliminary ms. notes for lecture delivered to the Research Department of Metropolitan-Vickers Electrical Co. Ltd., 9 November 1959.
Included in the folder is correspondence re a talk on work in progress at A.E.I. Aldermaston delivered to the Assistant Superintendents' Group at Metropolitan-Vickers later in the same day.
- C.29 13 pp. typescript with diagram and tables of untitled lecture describing 'the type of knowledge and training that would be expected, and the use that might be made of graduates in atomic and nuclear physics by a present day industrial research establishment'.
This may have been delivered at Brunel College, London, c.1959-60.
A 10 pp. outline of the talk is also included in the folder.
- C.30 4 pp. typescript headed 'Reactor Section Symposium', possibly notes for an opening speech, n.d., c.1960.
Included in the folder are notes by Chick on a lecture on 'Nuclear Shipping' by D.R. Smith, n.d., c.1960-61.
- C.31 14 pp. typescript of lecture describing a visit to South Africa by Chick and others to discuss the possible sale of a Merlin type reactor to the South African Atomic Energy Board.
Some photographs and press-cuttings are included in the folder. The return journey via Nairobi, Athens and Rome is also described.
- C.32 Folder labelled 'CTR Lectures File'.
Contains:
7 pp. typescript report by Chick on 'U.S./U.K. Meeting on Controlled Thermonuclear Research', Harwell, 13-14 October 1960.
Official report on the meeting (duplicated typescript).

Continued

Talks, lectures, conferences

- C.32
(continued)
- 15 pp. typescript plan and 29 pp. full version of lecture on 'Thermonuclear Research', presumably by Chick, annotated 'IOW 10.2.61.'
- 'Zagreb Lecture. Research in Plasma Physics', by Sir John Cockcroft, March 1961. 12 pp. typescript marked 'Second and Final Draft. Not intended for publication'.
- C.33
- 'Major Generals' Study Period, R.M.C.S. Tuesday 21st March (at RMCS Shrivenham)', 1961.
- 6 pp. typescript outlining the work of A.E.I.
- C.34
- 2 typescript drafts of brief introduction by Chick to the discussion following a lecture by R. Carruthers and D.L. Smart on 'The Engineering Aspects of Plasma Physics', delivered at a meeting of the Institution of Electrical Engineers Electronics and Communications Section, 22 March 1961.
- C.35
- '7th Meeting of European Study Group on Fusion', Frascati, Rome, 6-8 April 1961.
- Correspondence with organisers.
- Ms. and typescript notes and drafts for Progress Report on work at A.E.I. Aldermaston, presented at the meeting by Chick.
- List of delegates, abstracts of papers, etc.
- C.36
- 'Notes on the A.E.I. Levitron', by B.S. Liley.
- Ms. and typescript drafts, April 1962.
- C.37
- Brief correspondence with the Institution of Electrical Engineers re a Discussion Meeting on 'Applications of Superconducting Materials', 8 April 1963.
- C.38, C.39
- 10th Meeting of the European Study Group on Fusion, Aachen and Jülich, 12-14 May 1964.
- C.38
- Programme, list of participants, abstracts of papers with Chick's notes of what was said.
- C.39
- 47 pp. typescript report on the meeting by Chick.

Talks, lectures, conferences

- C.40 Conference on Lasers and Their Applications,
Institution of Electrical Engineers, 29 September-
1 October 1964.
- Programme and list of participants, Chick's ms. notes
of what was said, press-cutting.
- C.41 Colloquium on Plasma Jets, Institution of Electrical
Engineers, 26 November 1964.
- Programme with abstracts, Chick's ms. notes on papers
given.
- C.42 'Management of Research in the United Kingdom'.
- Lecture to IIT Research Institute, Chicago, March 1965.
- 2 ms. drafts and background material.

SECTION D

UNIVERSITY OF SURREY, 1965-78 D.1 - D.48

The material is divided as follows:

- D.1 - D.11 Lectures, speeches, conferences, 1965-73
- D.12 - D.26 Material re 'Working Party on Continuing Development and Education for Engineers', 1968-73
- D.27 - D.41 Material re Ion Implantation Group, 1965-69
- D.42 - D.48 Miscellaneous other material (includes some of Chick's research notes, 1977-78)

The University of Surrey, formerly Battersea College of Advanced Technology, received its charter in 1966. Chick was appointed Head of the Department of Electronic and Electrical Engineering in 1965 and proceeded to build up research activities in the department in preparation for the move to a much larger site at Guildford during 1968-70. His early efforts to establish Surrey as a centre of research in ion implantation are well documented in D.27 - D.41; he also established a Lasers and Telecommunications Group, encouraged the already existing Control and Computers Group, and formed an Industrial Electronics Group to make the expertise of his academic staff available to industry on a contract research basis.

Chick's other main aim was to promote a close liaison between industry and the University, and many of the lectures, etc. in D.1 - D.11 reflect this, as well as his attempts to collaborate with industry in research. The 'Working Party on Continuing Development and Education for Engineers' (see D.12 - D.26) was also an attempt to cement close relations with industry by involving the University in the task of keeping engineers in touch with new technological developments.

Initially Chick's administrative work left him very little time for personal research, but some notes remain from his last two years at Surrey (see D.43) when he was working on various aspects of ion implantation.

University of Surrey

- D.8 4 heavily corrected typescript drafts of speech presenting D. Gabor for the conferment of an honorary Doctorate by the University of Surrey, 1972.
- Folder also includes a copy of Chick's letter of congratulation to Gabor on the award of the Nobel Prize with Gabor's reply, November 1971; letters from K.J.R. Wilkinson and T.E. Allibone containing biographical reminiscences of Gabor, October and November 1972; and a photocopy of a letter from Gabor, 21 November 1972, outlining 'what I like to hear about myself'.
- D.9, D.10 Lecture on 'Academic Tutoring', delivered to a weekend course at Surrey University, 24 March 1973.
- D.9 Ms. and typescript drafts of lecture.
- D.10 Final typescript, rough drawings for illustrative slides or models, programme of the meeting.
- D.11 Correspondence re short address to be delivered by Chick at a seminar on 'The Responsibility and Role of the Postgraduate Student in the University', Surrey University, 5 December 1973.
- Folder also contains brief notes for Chick's address and synopsis of an address by the other speaker at the seminar (D. Boud).

University of Surrey

D.12 - D.26 'Working Party on Continuing Development and Education
for Engineers'.

The Working Party, consisting of members of the University of Surrey and representatives of various industrial firms, was set up as the result of a select conference on 'Further Training of Technologists' held at Surrey on 3 July 1969 (see D.16 - D.19). Its purpose was to discuss proposals by Surrey to offer a series of courses designed to keep older engineers in touch with the latest technological developments in order to prevent stagnation in industry caused by resistance to new ideas by an out-of-date management. Industry was unable to guarantee support for Surrey's proposals and the project was eventually shelved in January 1971.

The first part of the section covers the development of ideas through correspondence and preliminary meetings, culminating in the organisation of the select conference. For ease of reference, names of manufacturing and industrial firms approached by Chick in relation to this project are included in the Index of Correspondents.

D.12 Correspondence, mainly with K. Addison of English Electric Co. Ltd., December 1968-February 1969
re arrangements for meeting described at D.13.

D.13 'Meeting on Regenerative Technological Education',
University of Surrey, 28 February 1969.

The meeting was chaired by Chick and attended by representatives of the English Electric Co. Ltd. and Kodak Ltd.

Papers include ms. and typescript 'briefing notes', notes taken at meeting and typescript summary of what was said.

University of Surrey

- D.14 Correspondence, memoranda, notes of meetings, March-June 1969.
- Includes:
- 5 pp. memorandum from P.J. McVey to Chick outlining proposed 'Regenerative Education' course.
 - Notes of meeting with representatives of Mullard Ltd., 18 April 1969.
 - Notes of meeting with representatives of IBM Ltd., 27 May 1969.
- D.15 Correspondence with the University Grants Committee, April-August 1969, re application by the University of Surrey for a grant from the 'pump-priming' reserve for 'the establishment of Technologist Retraining courses in cooperation with industry and appropriate academic departments'.
- D.16-D.19 Select conference on 'Further training of Technologists', University of Surrey, 3 July 1969.
- D.16 Programme and list of participants; Chairman's Agenda; seating plan for dinner, notes of discussions at dinner by A.H. Benny and Chick.
- D.17 Typescript draft and final version of Chick's paper on 'A University Approach'; miscellaneous background notes by Chick and others.
- D.18 Typescript draft of paper by K.G. Stephens on 'Costs, Ways and Means'; duplicated typescript set of conference papers produced for circulation.
- D.19 'Notes on meeting held after the Select Conference'. 2 pp. typescript.
- Letters of thanks from two of the participants.
- D.20 Correspondence and memoranda, July 1969-April 1970, mainly re setting up of a 'Working Party on Continuing Development and Education for Engineers' under the chairmanship of F.E. Jones of Mullard Ltd. (see also D.21-D.23).

University of Surrey

- D.21 'Working Party on Continuing Development and Education for Engineers'.

Agenda and Minutes of first meeting, University of Surrey, 4 February 1970.

Folder includes papers re a meeting of the Surrey members of the Working Party on 29 January to discuss the agenda and arrangements for the February meeting.
- D.22 'Working Party on Continuing Development and Education for Engineers'.

Agenda and Minutes of second meeting, University of Surrey, 15 April 1970; set of notes taken at the meeting (not by Chick).
- D.23 'Report to the Vice-Chancellor of the Working Party on Continuing Development and Education of Electronic Engineers'.

Ms. draft, not in Chick's hand.
- D.24 Correspondence and memoranda, August 1970-January 1971. Mainly replies by various firms to a letter from Chick outlining proposals for a 'Proposed course of Continuing Education in Electronics' to be held at the University of Surrey.

Includes account by P. J. McVey of meeting with representatives of Standard Telecommunication Laboratories/Standard Telephone and Cables, 14 January 1971.
- D.25 Memorandum from P. J. McVey to Chick, 17 May 1973, re possibility of reviving proposals for 'continuing education in electronics'.
- D.26 University of Surrey. Department of Electronic and Electrical Engineering. Report on Advanced Post-graduate courses by Chick and W.F. Lovering, 1970 and 1974. (A letter of thanks from J. Diamond on receipt of a copy of the 1970 report has been left in place inside the front cover.)

University of Surrey

D.27-D.41

Ion Implantation Group.

Chick first became interested in ion implantation at A.E.I. Aldermaston, but he was unable to persuade the company to support work in this field. On his appointment to the University of Surrey he decided to take it up again, and his struggle to establish Surrey as a centre for research in ion implantation is well documented in this section, which contains correspondence, notes of meetings, applications for research grants, etc., 1965-69.

In February 1970 Surrey was nominated by the Science Research Council as one of the three U.K. Universities to be given special recognition and support for research in the field of ion implantation. The author of The Times obituary of Chick (see A.1) writes: 'Professor Chick's originality and creativity is best evidenced by the fact that in 1966 he initiated research work on ion implantation well before industry recognized its importance in microelectronics. Today, the department is one of the internationally recognized centres of excellence in this area'.

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|-----------|---|---------|
| D.27 | Correspondence with colleagues in other universities mainly <u>re</u> possibility of initiating research on ion implantation at Surrey. | 1965-68 |
| | Included here is a 4 pp. typescript draft by Chick on 'The possibility of making field effect transistors and integrated circuits by ionic beam techniques', 30 January 1966. | |
| D.28-D.34 | Correspondence with industrial firms and government laboratories, in alphabetical order. | |
| D.28 | Atomic Power Constructions Ltd.
(appeal for funds by Chick) | 1966 |
| | Central Electricity Generating Board
(<u>re</u> possible use by Surrey of the site of the former Guildford Power Station) | 1968 |
| | Gilbert Hall & Partners Ltd. | 1967 |

University of Surrey

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|------|---|---------|
| D.29 | Miles Hivolt Ltd.
(re possible market for a low-cost Van de Graaff generator) | 1968 |
| | Mullard Research Laboratories.
(re possible research collaboration with Surrey) | 1968 |
| | Services Electronics Research Laboratories .
(Chick's carbon only) | 1966 |
| D.30 | Standard Telecommunication Laboratories Ltd.
(re gift of Van de Graaff Accelerator to Surrey University by S.T.L.) | 1967 |
| D.31 | United Kingdom Atomic Energy Authority, Atomic Energy Research Establishment, Harwell.
(re arrangements for research collaboration with Surrey. Includes 2 pp. typescript account by Chick of meeting with J. Adams at Harwell, 17 June 1968) | 1966-68 |
| D.32 | United Kingdom Atomic Energy Authority, Atomic Weapons Research Establishment, Aldermaston.
(re arrangements for collaboration on ion implantation work with Surrey. Includes copies of agreements for use of research facilities at A.W.R.E. by members of Surrey University, appointment of visiting lecturers to Surrey from A.W.R.E., etc. Also includes 2 pp. typescript 'Summary of the Research carried out by the Ion Implantation Group in collaboration with AWRE Aldermaston since April 1967', by K.G. Stephens, 12 June 1968) | 1966-68 |
| D.33 | United Kingdom Atomic Energy Authority. Culham Laboratory. | 1966-67 |
| D.34 | Vickers Ltd.
(appeal for obsolete equipment by Chick) | 1967 |

University of Surrey

- D.35 Photocopies of applications to the Science Research Council by Chick and K.G. Stephens for grants for research as follows:
- 'The Study of Ion Implantation in Semiconductors'. 1966
(Chick)
 - 'The Study of Ion Implantation in Metals'. 1967
(Stephens)
 - 'Installation of a 2 MeV Van der Graaff (sic) accelerator'. (Chick) 1968
 - 'Ion implantation studies in collaboration with A.W.R.E. Aldermaston'. (Stephens) 1969
- Miscellaneous background material is also included in the folder.
- D.36 Correspondence with the Science Research Council, 1966-68.
- D.37-D.39 Correspondence and memoranda exchanged between members of Surrey University, mainly re possibilities for interdepartmental cooperation in the acquisition of an accelerator.
- D.37 1966.
Includes 'Notes of a Meeting of the Accelerator Working Party', 30 November 1966.
- D.38 January-February 1968.
Includes:
2 drafts of 'Notes taken at a meeting to discuss Interdepartmental Accelerator Activity, 19 January 1968'.

Memoranda addressed to the Vice-Chancellor for submission to the Surrey University Research Committee outlining proposals to provide temporary accommodation for 3 accelerators to be used in interdepartmental research projects.
- D.39 March 1968-January 1969, May 1971.
Includes copy of claim for ancillary equipment for 2 MeV Van de Graaff accelerator for submission to the Surrey University Research Committee, 12 July 1968.

University of Surrey

- D.40 'History of decision to work on Ion Implantation'.
5 pp. typescript, n.d., c. June 1968.
- D.41 'Summary of Ion Implantation Group Activities'.
8 pp. typescript draft dated 5 November 1968.

University of Surrey

- D.42-D.48 Miscellaneous other material.
- D.42-D.45 Contents of folder labelled 'RF Ion Accelerator Notes'.
The original bulky folder has been discarded.
- D.42 Set of photocopied notes by C.W. Miller relating
to University of Surrey ion accelerator work.
Includes a letter from Miller to Chick, 26 April 1976,
which accompanied some of the notes.
- D.43 Laboratory notes and calculations in Chick's hand,
mainly 1977-78 but a few much earlier. Some
photographs are also included in the folder.
- D.44 Ms. draft patent application by Chick for 'An
improved ion accelerator for semiconductor manu-
facturing'.
- D.45 Memoranda to Chick re ion accelerator work, mainly
from N.J. Barrett, January-May 1978.
- D.46 University of Surrey. Department of Electronic and
Electrical Engineering. Laser Group. Research Report
for Period Ending September 1971.
- 6 pp. typescript submitted to Chick by Q.V. Davis
with supporting ms. reports by members of the group.
- D.47 'Introduction to Electrical Engineering'.

Manual prepared by Chick for Surrey University students,
May 1977. 150 pp. typescript.
- D.48 Miscellaneous printed matter re the University of Surrey.
Includes:

Article by Chick and others describing the work of
the Department of Electronic and Electrical
Engineering, reprinted from National Electronics
Review, 7, no.3, 1971.

Pamphlet entitled 'Research in Progress' issued by
the Department of Electronic and Electrical
Engineering, 1972.

Undated brochure outlining the work of the Industrial
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