

# **CONTEMPORARY SCIENTIFIC ARCHIVES CENTRE**

Catalogue of the papers and correspondence of

**JOHN RANDAL BAKER, FRS**

(1900-1984)

Compiled by Jeannine Alton and Julia Latham-Jackson

Deposited in the Bodleian Library,  
Oxford

CSAC 69/7/79

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## GENERAL INTRODUCTION

The papers were received from Dr. Baker in 1977 when he removed from his house in Oxford to smaller premises.

Dr. Baker was Reader in Cytology at the University of Oxford; he lectured regularly on several aspects of the subject and conducted research in cytological technique and the practical possibilities of different types of microscopy, with particular reference to the phase contrast and later the electron microscope. This material forms the bulk of the present collection and covers lectures and practical classes given to members of the university from 1928 to 1969, and the research data on which they were based. The lectures, which are all in longhand, show evidence of frequent and extensive revision, as do the duplicated typescript sheets for distribution in practical classes. In addition, the laboratory notebooks indicate very carefully the aims, techniques, methods and results of Dr. Baker's research, and experiments are frequently accompanied by reflections on the results, memoranda for alterations and revisions, or notes of new ideas to be tested and incorporated. Although many of the lectures are written out in full, Dr. Baker did not use the full text in the lecture room, but spoke from very short notes without using any memorized phrases.

After his retirement, Dr. Baker continued his research and lecturing, especially on electron microscopy. Item C.24 is a set of lectures for graduates on the construction and operation of the electron microscope, delivered in 1968 and 1969, while item C.25 is an experimental one-day course in electron microscopy for undergraduates, which he gave in 1969.

There are no correspondence files as such, but Dr. Baker kept a few letters of immediate scientific relevance with the papers to which they refer: see A.45, C.15, C.27.

Item D.1 consists of the autograph ms. of chapter 23 of Dr. Baker's book Race (London, 1974).

Dr. Baker currently retains the rest of his scientific papers which include some 60 laboratory notebooks and the diaries kept during scientific expeditions to the New Hebrides which he made in 1922-23, 1927 and as leader in 1933-34, as well as

correspondence about the Society for Freedom in Science (S.F.S.) which he co-founded with Michael Polanyi and Sir Arthur Tansley, and which he served as Honorary Secretary and Treasurer throughout its existence (1940-1960).

He also holds personal and family papers, some of military interest. 8 bound volumes of correspondence and papers relating to the Indian Mutiny, Ashanti Campaign, Egyptian Campaign of 1882, and other military campaigns of General Sir Archibald Alison, Bart. (Dr. Baker's maternal grandfather) are already deposited in the Bodleian Library (shelf-marks: Ms. Eng. Lett. C.448 - 452, D.419 - 20, E.151).

SUMMARY OF THE CAREER OF JOHN RANDAL BAKER

b.1900

- 1908 - 16            Educated at Boxgrove School, Guildford
- 1918 - 22            New College, Oxford
- 1923 - 55            Demonstrator in Zoology, Oxford University
- 1923                  m. Inezita Davis
- 1933 - 34            Leader, Oxford University Expedition to New Hebrides
- 1938                  DSc. (Oxon)
- 1939                  m. Mrs Helen Savage
- 1940                  Founder member, Society for Freedom in Science  
(Hon. Secretary and Treasurer, 1940 - 60)
- 1946 - 64            Joint Editor, Quarterly Journal of Microscopical Science
- 1955 - 67            Reader in Cytology, Oxford University
- 1958                  Fellow of the Royal Society
- 1964 - 67            Professorial Fellow, New College, Oxford
- 1964 - 65            President, Royal Microscopical Society (Hon. Fellow 1968)
- 1968                  Reader Emeritus in Cytology, Oxford University

SECTION A      CYTOLOGY

A.1-A.17      Notebooks on laboratory research 1929-67

The notebooks were numbered from I to XVI by Baker and also dated by him. The first item in this Section (A.1) does not strictly belong under the heading of Cytology, but it has been included because it was kept by Baker with the Cytology notebooks.

Although all the notebooks are labelled 'Cytology', the later ones contain a considerable body of notes on microscopy, particularly in relation to phase contrast microscopy (A.9 - A.12, A.16, A.17) and the function of the eye as an integral part of the light microscope (A.16, A.17). Baker used the first person extensively in describing experiments, commenting on methods and planning future work which makes the notebooks read more like a diary and contributes to their interest as an illustration of his methods of work.

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|-----|---|-----------|
| A.1 | Notebook labelled inside front cover 'Notes for use in the demonstration of Invertebrates'.<br><br>Contains notes for dissection procedure, lists of slides and diagrams with an index at the front. There is no more material in the collection relating to the course on invertebrates. | ? 1929-48 |
| A.2 | 'Cytology I'.<br><br>Notebook labelled inside front cover 'Notes on Cytological Technique. Vol.1'.<br><br>Contains descriptions of procedure for cytological experiments, with comments on the results.   | 1934-40   |
| A.3 | 'Cytology II'.<br><br>Notebook labelled inside front cover 'Notes on Cytological Technique. Vol.2'.<br><br>Record of experiments, mainly for preparing and staining slides. There are also a few notes on microscopy, especially photo-micrography.                                       | 1940-42   |
| A.4 | 'Cytology III'.<br><br>Notebook labelled inside front cover 'The Cytology of Digestion. I'.<br><br>Record of experiments, mostly using newts.   | 1940-42   |

Section A. Cytology

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| A.5  | 'Cytology IV'.<br>Notebook labelled inside front cover 'The Cytology of Digestion. II'. (Deleted.)<br>Contains notes on other aspects of cytology as well as digestion.  | 1942    |
| A.6  | 'Cytology V'.<br>Mainly contains records of experiments to perfect various techniques for staining slides. Many of these techniques were learnt by students in practical classes (see A.47-A.52), and Baker was constantly working to refine and improve them. | 1943-44 |
| A.7  | 'Cytology VI'.<br>Contains similar material to A.6.  | 1944-45 |
| A.8  | 'Cytology VII'.<br>Further experiments to perfect various cytological techniques.  | 1945    |
| A.9  | 'Cytology VIII'.<br>The contents of the first part of the notebook continue the work described in A.6-A.8. The second half mainly contains notes on phase contrast microscopy, particularly experiments with different types of phase plates and annuli.       | 1946-49 |
| A.10 | 'Cytology IX'.<br>The subject-matter of this notebook is partly cytological technique and partly phase contrast microscopy.  | 1950-52 |
| A.11 | 'Cytology X'.<br>Includes at front of notebook a typed alphabetical index and list of contents by page number. The subject-matter is similar to A.10.  | 1952-54 |
| A.12 | 'Cytology XI'.<br>This notebook also has a typed contents list, but no alphabetical index. Experiments described cover a wide variety of topics in cytology and microscopy.  | 1954-57 |
| A.13 | 'Cytology XII'.<br>Mainly material on mordanting. Inside the front cover there is a note referring to p.32, 'was this the beginning of my work on mordants? (11 June 1958)'. There is also an index to items relating to mordanting.                           | 1957-59 |

Section A. Cytology

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| A.14 | 'Cytology XIII'.<br>This notebook is also mostly concerned with mordanting and has an index to experiments on aluminium haematein at the front.  | 1959-60 |
| A.15 | 'Cytology XIV'.<br>Mainly contains a record of further experiments on aluminium haematein; with an index at front of notebook.   | 1960-62 |
| A.16 | 'Cytology XV'.<br>The experiments in the first part of the notebook cover both cytological techniques and various types of microscopy. Later in the notebook there are a number of experiments on 'the function of the eye as an integral part of the light microscope', and these are indexed at the front of the notebook. | 1963-65 |
| A.17 | 'Cytology XVI'.<br>The work begun at the end of A.16 is continued in this notebook and is also indexed at the front. The remainder of the work covers various aspects of cytological technique.  | 1965-67 |

Section A. Cytology

A.18-A.52      Notes for lectures and practical classes 1928-66

The majority of these lectures were delivered to undergraduates, but the course in Advanced Cytology and Fine Structure (A.40, A.42) was intended for research workers as well as final year undergraduates.

All the lectures are in manuscript, usually fully written but very occasionally in note form. They show evidence of frequent and extensive revision; often large parts of a lecture would be discarded and only a few pages retained to be included in the re-written version. Baker kept some of his old notes, but only those that contained points of continuing interest, so that this collection is far from complete.

The material is presented in chronological order as far as possible, and where a lecture has more than one date it is filed under the most recent one. Reading lists and lists of slides to be shown have normally been left with the lectures to which they apply.

Titles and descriptions in inverted commas are those which appear on the manuscripts.

- A.18              Timetables and schedules for lectures and practical classes, 1938-66. Incomplete.
- A.19-A.46        Lecture notes, 1928-64.
- A.19              One page of notes headed 'Gynandromorphism', 1928.
- A.20              Loose leaf binder labelled 'Lectures on Cytology, 1938, 1941, 1942'.
- A.21              Typescript list of dates for history of cytology.
- A.22              13 photomicrographs with accompanying notes to illustrate 'meiosis and mitosis in the brine shrimp Artemia Salina'. n.d.

Section A. Cytology

- A.23 Lecture notes 1941-49. There are only a few lectures for this period, as Baker threw away any notes that were no longer useful to him.
- Subjects covered are:
- 'The Freezing Drying Method' (1941)
  - 'Natural Parthenogenesis' ('Up to and including 1941')
  - 'The Golgi bodies' (1941. Additions 1942)
  - 'Modern Cytological Technique' (1944)
  - 'Mitochondria' (1944)
  - 'Mitosis' (1947)
  - 'Chromosomes of *Sciara*' ('up to date 1947')
  - 'The chromosomes of *Habrobracon juglandis*' ('Up to date 1947. Revised 1949')
  - 'Vital studies of cells' (1949)
- A.24 Undated lecture notes, probably written before 1949. The notes are headed as follows:
- 'Plasma membrane and cell wall'; 'Protoplasmic inclusions'; 'The Chromosomes in Sex-Determination'; 'The Chemistry of Cytoplasm'; 'Chromosomes'; 'Spiralization of chromosomes'; 'Mitotic poisons'; 'The arrangement of cells in insect testes'; 'Interpretation of the classical appearance of the Golgi element'.
- A.25 Notes headed 'Parthenogenesis. Analysis of (M.J.D.) White's summary of this subject in "Animal Cytology and Evolution"'. .
- A.26 Course in Cytology, Hilary Term, 1950.
- For an outline of this course see A.18. The following lecture notes are all dated 1950 and almost certainly belong to this course:
- 'The Physical Properties of Protoplasm'; 'The Cell-Membrane'; 'Golgi Element'; 'Fertilization'; 'The Cytology of Natural Parthenogenesis'.
- A.27 Notes on artificial fertilization and artificial parthenogenesis both marked 'Have used this in writing 1950 lecture'.

Section A. Cytology

- A.28 'Cytology for Honour Moderations. Microscopy: the living cell'. Brief notes, May 1951.
- A.29 'Mitochondria and microsomes'. Dated 1947, 1950, 1951 and annotated 'Old notes ... probably not wanted again'.
- A.30 Cytology course, 1952.  
'The Rôle of the Nucleic Acids'. 2 lectures, dated 1952 with notes on the same subject annotated 'Papers not used in 1954', and a lecture on 'The Golgi Controversy'.  
Included here are notes headed 'The cytoplasmic inclusions in spermatogenesis', and some on spermatozoa, 1952.
- A.31 Notes headed 'Vital Dyeing. Superseded 1954. Might contain something'.
- A.32 Cytology course, 1954.  
'Methods for the study of the living cell' and 'The rôle of the nucleic acids'. 2 lectures, 1954, with two sets of undated notes headed 'The synthesis of DNA' and 'The structure of bacteria', which were filed with the lectures.
- A.33 Cytology for Honour Moderations, 1955.  
9 pp. of notes mainly on vital dyes and phase contrast microscopy. Also 2 sets of notes headed 'Golgi apparatus' and 'Oogenesis'.
- A.34 Cytology course, 1956.  
'Unusual forms of mitosis'. Lecture notes, 1956, with 1 p. typescript headed 'Classification adopted 1955. Phylum Protozoa' kept with above, and a lecture dated '1954. Rewritten 1956', headed 'Methods for the Study of Living Cells. Vital Colouring'.
- A.35 8 pp. of notes headed 'These papers were not used in 1958. File them under "physical properties of protoplasm" '.
- A.36 'The pH of Cytoplasm'. Lecture notes, 1958. Also typescript list of 'Selected papers on the structure and composition of cytoplasm'.
- A.37 Lecture notes headed 'Endoplasmic reticulum in striated muscle', 1958.

Section A. Cytology

- A.38      Advanced Cytology and Fine Structure. Michaelmas Term, 1958. Reading lists for this course are included in A.42.
- I.      'Introduction'
- II.     'The interpretation of electron-micrographs'. This lecture is annotated 'Based on my address to the Histochemical Society at Philadelphia'.
- A.39      'Introduction to Animal Cytology'. Lecture for Honour Moderations, 1959.
- A.40      Advanced Cytology and Fine Structure. Michaelmas Term, 1959. Reading lists for this course are included in A.42.
- 'The Viscosity of Ground Cytoplasm'. Dated 1959, with ms. note 'In a letter dated 14 May 1959, Dr. L.V. Heilbrunn says I am quite right: he did make the "careless error" I discovered'.
- A.41      'Can we trust electron micrographs?'. Notes for an address to Bios., 30 November 1959. This may not have been used as a university lecture, but it was included with the lecture on electron-micrographs at A.38.
- A.42      Advanced Cytology and Fine Structure, 1960. Reading lists for this course are included here, with 3 sets of lecture notes:
- 'Résumé before 3rd lecture' (1 p. brief notes. Probably for 1960)
- 'Ground cytoplasm: refractive index' (undated, but one section is annotated 'omitted 1960')
- 'A gland cell in action' (undated, but annotated 'The cytology of secretion. Papers not used in 1964')
- A.43      Cytology and Fine Structure, Trinity Term, 1960. Reading lists for this course, which is sometimes referred to by Baker as part of the 'B' course, are included here with the following 2 lectures:
- 'The idea of a "Typical Cell"'. This lecture is described in a note as 'An address to zoological students at Makerere College, August 1957. Modified for Institute of Biology at Reading University, 19th October 1957. Modified for Honour Moderations, January 1959. Re-written for 'B' course, April 1960'. (It was used again for Honour Moderations, 1961 - note on envelope in which it came.)

Section A. Cytology

- A.43 (Cont'd.) 'Meiosis'. This lecture is described in the schedule (A.18) as elementary. It is dated 1947 and annotated 'Largely rewritten 1950. Additions 1958. Corrected and used again 1960'. It is accompanied by two loose pages of notes on chromosomes that were found in the same place.
- A.44 Cytology. Trinity Term, 1962.  
This folder contains notes for four out of the eight lectures in this course, and a set of reading lists. The subjects covered are:  
'Polytene chromosomes'  
'The structure of cytoplasm as revealed by the electron microscope'  
'Mitochondria'  
'The Golgi problem'
- A.45 Cytology, Trinity Term, 1964.  
A course of six lectures. In most of the lectures there are several pages of new notes interspersed with older ones and the whole set provides a good illustration of Baker's method of work. The titles of the lectures are:  
'Polytene chromosomes'  
'Mitochondria'  
'The Golgi apparatus'  
'The cytology of secretion'  
'Cytoplasmic inclusions in spermatogenesis'  
'Oogenesis'  
Also included here is a letter from A.B. Novikoff dated 14 February 1964 which was filed with material on the Golgi apparatus, and mainly contains comments on a paper by Baker published in the Journal of the Royal Microscopical Society on 'New developments in the Golgi controversy'.
- A.46 Notes on the literature, used as a basis for lecture notes.

Section A. Cytology

- A.47-A.52      Notes for demonstration and practical classes 1935-66
- These include lists of equipment needed, duplicated instruction-sheets for distribution to the class, labels for demonstrations, lists of slides, etc. Although the objects (slides, models, etc.) that were on show are not a part of this collection, it is still possible to get a clear picture of many of the demonstrations because of the full descriptions on the labels.
- Timetables and schedules for the practical classes are included in A.18.
- The material is presented in chronological order as far as possible.
- A.47      To 1949.  
Includes 3 pp. headed 'Dissociation, etc.' dated 'before 1935'.
- A.48      1950-1953.
- A.49      1954-1959.
- A.50      1960-1962.  
Includes a letter from Baker to research workers in his department re arrangements for the use of microtomes, 27 April 1962.
- A.51      1964.  
Includes a letter from Baker to 'all workers in the Cytology Lab.' about the problems of noise in the laboratory, and some electron micrographs, mainly illustrating the cytology of secretion.
- A.52      Misc. undated material.

SECTION B      HISTOCHEMISTRY

B.1-B.14      Notes for lectures and practical classes 1934-65

Much of the material on histochemistry relates to the practical classes. Baker prepared typewritten duplicated sheets for distribution to his students outlining methods for histochemical tests to be performed in class, and these were constantly being revised as a result of his own experiments. The Cytology notebooks (A.2 - A.17) provide frequent examples of a series of experiments undertaken to improve a given technique.

The material is filed in chronological order as far as possible.

- B.1              Schedules of lectures and practical classes, 1949-65.  
Incomplete. Includes lists of students attending in 1956 and 1963.
- B.2-B.9        Histochemistry lectures, 1934-65.
- B.2              'Histochemical methods'. Lecture notes dated 1937, 1938, 1939,  
with 3 pp. on 'Lipides and Lipoids', 1934.
- B.3              'Micro-incineration'. Lecture notes, 1941.
- B.4              Notes for introductory lectures on history and methods of histo-  
chemistry, dated 1949-65 (and some undated). Several versions  
of a hand-out on the classification of histochemical methods,  
and a reading list dated 1963 are included here.
- B.5              'Microspectroscopy with Zeiss microscope, January 1951.  
For histochemistry class and prelim.'
- B.6              'Histochemistry. Notes additional to lecture notes', n.d.
- B.7              Misc. undated notes on various histochemical tests.
- B.8              Various lectures, mostly delivered 1962-65 (some are undated).  
Subjects covered are:  
                  'Aldehydes', 'Nucleic Acids', 'Carbohydrates', 'Phenolic  
                  compounds', 'Lipids', 'Amino-Acids', 'Metals, Enzymes'.  
There is also a set of notes headed 'Tests not done in the class'  
(1962) and 3 pp. of miscellaneous notes.
- B.9              Misc. shorter notes.  
Includes list of those attending Baker's lectures in histochemistry  
(all undated) and a letter to Baker on lipids signed 'H.S.'

Section B. Histochemistry

- B.10-B.14      Notes for practical classes in histochemistry, 1947-65.  
Lists of equipment needed and duplicated instructions for tests to be carried out by students. These were revised and brought up to date every year.
- B.10            1947-1951.  
Includes a set of ms. drafts of the tests and the first duplicated versions (1949).
- B.11            1952-1954.
- B.12            1956-1960.
- B.13            1962-1966.
- B.14            Misc. material relating to histochemical tests and demonstrations.

## SECTION C            MICROSCOPY AND MICROTECHNIQUE

Baker's interest in and involvement with this field is reflected by the fact that he was joint editor of the Quarterly Journal of Microscopical Science, 1946-64, and President of the Royal Microscopical Society in 1964 and 1965. His book, Principles of Biological Microtechnique was published in 1958.

The Cytology notebooks (A.2 - A.17) show considerable evidence of work in microscopy, particularly in the field of phase contrast microscopy and investigations of the function of the eye as an integral part of the light microscope. There is also a notebook on photomicrography (C.1) containing a record of constant efforts to improve and regulate the quality of photographs produced from microscopical slides.

The majority of these lectures and classes were for undergraduates, the only exception being the lectures on electron microscopy (see C.24) which from 1967 were restricted to graduates, although Baker did experiment with a one-day course on electron microscopy for undergraduates in October 1969 (see C.25).

The papers are presented as follows:

- C.2 - C.20      Notes for lectures and practical classes in microscopy
- C.21 - C.27      The electron microscope; notes and lectures
- C.28 - C.43      Notes for lectures and practical classes in microtechnique

Within each section the material is arranged chronologically as far as possible.

- C.1              Notebook labelled 'Photomicrography 2' covering the years 1941-67, and containing records of experiments to ascertain the best conditions for photographing microscopical slides. There are also a few observations on photomicrography scattered throughout the notebooks on Cytology (see A.2 - A.17).
- C.2-C.20        Notes for lectures and practical classes in microscopy, 1949-66.
  - C.2              Schedules and timetables of lectures, demonstrations and practical classes in microscopy, 1951-66. Incomplete.

Section C. Microscopy and Microtechnique

- C.3-C.16 Lectures on microscopy, 1949-66.
- The following notes were kept by Baker in 14 numbered envelopes. The titles on the front of the envelopes are listed below with a brief indication of their contents. Some of the material originally in the envelopes was transferred by Baker to a separate course on 'Physics for Biologists', and this is to be found at C.17.
- C.3 'Microscopy 1. Syllabus of course. Current lists of lectures and practical classes. Lists of lecture diagrams. List of recommended books. Introductory remarks.'
- The syllabus and list of lectures have been transferred to C.2. There are two drafts of introductory remarks dated 1955, 1960 and 1963.
- C.4 'Microscopy 2. The objective (introduction; resolving power)'. Contains 5 pp. ms. notes labelled 'Old notes on resolving power. Not used in 1952, but could still be useful'. For other notes on this subject see C.17.
- C.5 'Microscopy 3. The objective (aberrations; types of objective)'. Contains 7 pp. ms. notes for lecture on this subject dated '1963, Slightly modified 1964, 1965'.
- C.6 'Microscopy 4. Diffraction by the object.'
- The notes in this envelope were transferred by Baker to the course on 'Physics for Biologists' and are now at C.17.
- C.7 'Microscopy 5. The eyepiece.'
- Contains undated ms. notes for lecture on different types of eyepiece.
- C.8 'Microscopy 6. Lighting and condenser systems.'
- Undated ms. notes for lecture on this subject.
- C.9 'Microscopy 7. The reflecting microscope.'
- 3 pp. undated ms. lecture notes and some background material.
- C.10 'Microscopy 8. Micrometry. The camera lucida.'
- Contains 1 p. ms. notes headed 'The Camera Lucida', dated 1962, 1963.

Section C. Microscopy and Microtechnique

- C.11 'Microscopy 9. Phase contrast.'
- Contains:
- 'Phase contrast microscopy. 9 pp. lecture notes dated 1953, largely rewritten 1960, ditto 1964, 1965.'
- 'Non-vectorial treatment. Not used 1964.' 1 p.
- 'Vectorial treatment, more advanced than that given in the lecture to B-course students.' 5 pp.
- 'Phase contrast. Lecture notes removed and not used when lecturing to the Prelim. (Physics for biologists), 1966.' 8 pp.
- 2 pp. notes on 'Wilfrid Llowarch's film'.
- Reading lists, diagrams, etc.
- See also C.17.
- C.12 'Microscopy 10. Polarized light (lectures).'
- Contains lectures on polarized light numbered I-V. Nos. I and II are dated '1949. Revised 1951, 1953, 1955' and annotated 'Lecture-notes not used 1955-6, but worth keeping'. Misc. notes and reading lists are also included.
- C.13 'Microscopy 11. Polarized light. Unclassified papers.'
- Background notes, discarded sections of lectures, etc.
- C.14 'Microscopy 12. Interference microscopy. Lecture.'
- Contains 2 lectures, one annotated '1953 lecture; worth keeping' and the other dated '1955, revised 1959'.
- C.15 'Microscopy 13. (Unclassified papers).'
- Includes: Report on a meeting and some correspondence with F.H. Smith (representative of C. Baker of Holborn Ltd., manufacturers of microscopes and scientific instruments) re the operation of a recently purchased microscope (1955).
- Letter from 'Wilfrid' [Llowarch] re 'a device to illustrate circular polarisation', September 1955.
- Misc. notes and diagrams.
- C.16 'Microscopy 14. Fluorescence microscopy.'
- Notes dated 1949, 1952; list of references.

Section C. Microscopy and Microtechnique

- C.17 'Physics for biologists', 1963-66.  
This course was for first-year undergraduates taking the Preliminary Examination in Biology. These lectures also formed part of the Microscopy course at C.3-C.16 above. Only notes and reading lists specifically headed 'Physics for builogists' are included here. The titles of the lectures are:  
    'The resolving power of the objective lens'  
    'Diffraction by the object'  
    'Phase contrast'  
    'Polarized light'
- C.18-C.20 Notes for demonstrations and practical classes, 1949-66.  
Mainly lists of equipment needed and labels for demonstrations, with some instructions and diagrams.
- C.18 1949-1958.
- C.19 1960-1966.
- C.20 Misc. undated material. Includes a letter from Baker to Miss B.E.H. Charke about arrangements for starting work in his department, 5 September 1963.

Section C. Microscopy and Microtechnique

C.21-C.27      The electron microscope: notes and lectures, 1961-70

These lectures and demonstrations were designed to teach students the basic principles of electron microscopy and to prepare anyone who was interested for training as an electron microscopist. Until 1966 the course was for Final-year undergraduates and research students, and very little material from this period survives. From 1967 it was restricted to graduates and there is a complete set of notes for 1968 and 1969.

The Zoology Department acquired a new electron microscope, the EM6B, in 1965. Baker was in charge of electron microscopy in the department from autumn 1967, after his retirement, and he was active in ensuring that research workers were given the opportunity to take the best possible advantage of the new instrument (see C.23).

- C.21              Timetables and schedules for lectures and demonstrations on electron microscopy, 1963, 1965, 1967, 1968.
- C.22              Lecture notes on 'The electron microscope: construction and operation', 1961-67.  
3 bundles of notes labelled 'Papers that might be useful', 'Papers probably not wanted again (except for teaching Akashi)', and 'Unclassified papers used in 1967 but not in 1968'.
- C.23              Typescript 'Report on electron microscopy in the Department of Zoology', 22 February 1968.
- C.24              'The electron microscope: construction and operation'. Michaelmas Term, 1968 (modified 1969). Delivered after Baker's retirement from full-time work in the Department of Zoology, this course was intended for graduates and research workers. The lecture notes are in a loose-leaf binder and form a complete set including an outline of subjects to be covered, a reading list and a list of lantern slides and diagrams required for each lecture.
- C.25              'One-day course in electron microscopy for undergraduates'. October 1969. A typescript report on this lecture by Baker dated 2.2.70. is included in this folder, with 2 photographs of a model designed by Baker to illustrate the basic principles of the transmission electron microscope.

Section C. Microscopy and Microtechnique

- C.26 Notes for demonstrations of electron microscopy.
- C.27 Misc. material re electron microscopy. Includes a letter from W. Lowarch, 23 September 1967, re the Pirani gage and an undated letter from A.C.T. North re possible overlapping of courses.

Section C. Microscopy and Microtechnique

C.28-C.43      Notes for lectures and practical classes in microtechnique, 1934-64

Baker's book, The Principles of Biological Microtechnique, was published in 1958 as a result of his work in this field, and some of the lectures have headings to the effect that they are based on parts of his book.

C.28              Schedules and timetables of lectures and practical classes in microtechnique, 1948-64. Incomplete.

C.29              Brief notes for introductory lecture, 1949, 1951.

C.30              Notes on fixation. Includes:

'Fixatives. 1940, 1941. Superseded 1944'

'Fixative mixtures. This needs rewriting' (undated)

'Fixation II. Formaldehyde in detail, as an example of a fixative. Rewritten 1955'

'Fixation III. Other fixatives. 1949. Revised and rewritten 1952, ditto 1954'

C.31              Notes on 'Fixation' numbered I-VII:

- I.            'Introduction. Written Feb.-Mar. 1957. Based on my new book. Revised 1961'
- II.          'The reactions of fixatives with proteins. The visible effects. 1957. Used again 1961'
- III.        'The reactions of fixatives with proteins. The chemical changes. 1957. Slightly modified 1961'
- IV.        'The reactions of fixatives with lipids and carbohydrates. 1957'
- V.          'The reactions of fixatives with tissues and cells: methods of research. 1957. Omitted 1961'
- VI.        'Fixative mixtures. 1957. Modified 1961'
- VII.       'Summary of what has been said' (undated)

C.32              Notes on 'Fixation' numbered I-IV:

- I.            'Introduction. 1964'
- II.          'The chemistry of fixation, exemplified by formaldehyde and gluteraldehyde. 1966'

Continued

Section C. Microscopy and Microtechnique

- C.32 (Cont.d) III. 'Summary of the chief properties of the selected primary fixatives (other than formaldehyde and gluteraldehyde). 1964. Partly rewritten 1966'
- IV. 'Fixative mixtures. In 1965 there was no time to deliver this lecture'
- C.33 Notes on staining and dyeing:
- 'Old notes on staining. Probably not wanted again'. Dated 1934, 1937, 1938, 1939, 1940
- 'Lecture on The use of colouring agents in micro-technique ... 1946. Superseded 1951'
- Undated notes on 'Dye-chemistry'.
- C.34 Notes on 'The principles of staining' numbered I-IV:
- I. 'What are dyes?' 1954
- II. 'Mordants and dye-lakes' 1952
- III. 'The electrostatic charges on dyes and tissue-elements' n.d.
- IV. 'Specificity' n.d.
- 'Parts of Staining III and IV not used in lectures in 1955 (because there was no time)'.
- C.35 Notes on 'Dyeing' numbered I-III, VI;
- I. 'What are dyes? Classification. Methods of direct attachment (electrovalency, hydrogen bonding). 1965. 1966'
- II. 'The differential action of dyes. Metachromacy. The blood dyes. Mordants. 1965'
- III. 'Mordants. 1961. Old lecture not used 1964'
- VI. 'Vital colouring (based on chapters 15 and 16 of my book)'. 1957.
- Undated notes paginated 7-11.
- C.36 Misc. notes on microtechnique. Includes:
- 'Blood methods' 1946
- 'The staining of blood' 1951
- 'Notes on blood-stains, from Langeron' n.d.
- 'Embedding' 1959

Section C. Microscopy and Microtechnique

- C.37 Notes for lectures to Honour Moderations students, 1953, 1955.
- C.38-C.43 Notes for demonstrations and practical classes in microtechnique, 1936-66.  
Mainly duplicated sheets of instructions for distribution in class. For timetables and schedules of practical classes, see C.28.
- C.38 1936-1952.
- C.39 1953-1955.
- C.40 1956-1959.
- C.41 1960-1966.
- C.42 'Lecture demonstration of the effect of pH on the staining of celloidin and gelatin'. Various notes, 1952-59.
- C.43 Misc. notes re microtechnique, mainly undated. Includes copy of a letter from Baker (16 January 1961) to members of the Department of Zoology re arrangements to give undergraduates facilities for making microscopical preparations, and 4 pp. typescript headed 'Notes on the use of carminic acid and haematein with mordants. Not used finally in book but worth keeping'.

SECTION D            PUBLICATION

D.1            'The assessment of cognitive ability'.

Autograph ms. draft of Chapter 23 of Baker's book, Race (London, 1974).

82 pp.