



## Clinical Pharmacology in the UK, c.1950-2000

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# **CLINICAL PHARMACOLOGY IN THE UK, c. 1950–2000: INFLUENCES AND INSTITUTIONS**

The transcript of a Witness Seminar held by the Wellcome Trust Centre for the History of Medicine at UCL, London, on 6 February 2007

**Edited by L A Reynolds and E M Tansey**

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History of Medicine at UCL.

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## WITNESS SEMINARS: MEETINGS AND PUBLICATIONS<sup>1</sup>

In 1990 the Wellcome Trust created a History of Twentieth Century Medicine Group, associated with the Academic Unit of the Wellcome Institute for the History of Medicine, to bring together clinicians, scientists, historians and others interested in contemporary medical history. Among a number of other initiatives the format of Witness Seminars, used by the Institute of Contemporary British History to address issues of recent political history, was adopted, to promote interaction between these different groups, to emphasize the potential benefits of working jointly, and to encourage the creation and deposit of archival sources for present and future use. In June 1999 the Governors of the Wellcome Trust decided that it would be appropriate for the Academic Unit to enjoy a more formal academic affiliation and turned the Unit into the Wellcome Trust Centre for the History of Medicine at UCL from 1 October 2000. The Wellcome Trust continues to fund the Witness Seminar programme via its support for the Centre.

The Witness Seminar is a particularly specialized form of oral history, where several people associated with a particular set of circumstances or events are invited to come together to discuss, debate, and agree or disagree about their memories. To date, the History of Twentieth Century Medicine Group has held more than 50 such meetings, most of which have been published, as listed on pages xi–xix.

Subjects are usually proposed by, or through, members of the Programme Committee of the Group, which includes professional historians of medicine, practising scientists and clinicians, and once an appropriate topic has been agreed, suitable participants are identified and invited. This inevitably leads to further contacts, and more suggestions of people to invite. As the organization of the meeting progresses, a flexible outline plan for the meeting is devised, usually with assistance from the meeting's chairman, and some participants are invited to 'set the ball rolling' on particular themes, by speaking for a short period to initiate and stimulate further discussion.

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<sup>1</sup>The following text also appears in the 'Introduction' to recent volumes of *Wellcome Witnesses to Twentieth Century Medicine* published by the Wellcome Trust and the Wellcome Trust Centre for the History of Medicine at UCL.



Each meeting is fully recorded, the tapes are transcribed and the unedited transcript is sent to every participant. Each is asked to check his or her own contributions and to provide brief biographical details. The editors turn the transcript into readable text, and participants' minor corrections and comments are incorporated into that text, while biographical and bibliographical details are added as footnotes, as are more substantial comments and additional material provided by participants. The final scripts are then sent to every contributor, accompanied by forms assigning copyright to the Wellcome Trust.<sup>3</sup> Copies of all additional correspondence received during the editorial process are deposited with the records of each meeting in archives and manuscripts, Wellcome Library, London.

As with all our meetings, we hope that even if the precise details of some of the technical sections are not clear to the non-specialist, the sense and significance of the events will be understandable. Our aim is for the volumes that emerge from these meetings to inform those with a general interest in the history of modern medicine and medical science; to provide historians with new insights, fresh material for study, and further themes for research; and to emphasize to the participants that events of the recent past, of their own working lives, are of proper and necessary concern to historians.

**Members of the Programme Committee of the  
History of Twentieth Century Medicine Group, 2008–09**

**Professor Tilli Tansey** – Professor of the History of Modern Medical Sciences, Wellcome Trust Centre for the History of Medicine at UCL (WTCHM) and Chair

**Sir Christopher Booth** – WTCHM, former Director, Clinical Research Centre, Northwick Park Hospital, London

**Mrs Lois Reynolds** – Senior Research Assistant, WTCHM, and Organizing Secretary

**Dr John Ford** – Retired General Practitioner, Tonbridge

**Professor Richard Himsworth** – former Director of the Institute of Health, University of Cambridge

**Professor Mark Jackson** – Centre for Medical History, Exeter

**Professor John Pickstone** – Wellcome Research Professor, University of Manchester

**Dr Helga Satzinger** – Reader in History of Twentieth Century Biomedicine, WTCHM

**Professor Lawrence Weaver** – Professor of Child Health, University of Glasgow, and Consultant Paediatrician in the Royal Hospital for Sick Children, Glasgow

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<sup>2</sup> Sir Iain Chalmers authorizes the Wellcome Trust to publish his work and to report or reproduce it in any form or media, including offprints, provided that it is understood that the Wellcome Trust's right to do so is nonexclusive.

## ACKNOWLEDGEMENTS

‘Clinical pharmacology in the UK, c. 1950–2000’ was suggested as a suitable topic for a Witness Seminar by Dr Jeffrey Aronson, who assisted us in planning the meeting. We are very grateful to him for his input and to Professor Rod Flower for his excellent chairing of the occasion. We are particularly grateful to Dr Mark Walport for writing such a helpful Introduction to these published proceedings. Our additional thanks go to Professor Desmond Laurence and Dr John Mucklow, who read through earlier drafts of the transcript, and offered helpful comments and advice. We thank Dr Jeffrey Aronson, Dr Arthur Fowle, Dr Tony Peck and Professor Brian Prichard for their help with the Glossary and Professor Desmond Laurence, Professor Brian Prichard and Professor Owen Wade for the photographs. For permission to reproduce images included here, we thank the Office of Public Sector Information, the Royal College of Physicians of London, St Bartholomew’s Hospital Archives and Museum, the Wellcome Library and the WHO. Sir James Black cooperated through the editorial process, but did not assign copyright for the use of his contribution, although he gave permission to include his contribution as recorded speech.

As with all our meetings, we depend a great deal on our colleagues at the Wellcome Trust to ensure their smooth running: the Audiovisual Department, and the Medical Photographic Library; Mr Akio Morishima, who has supervised the design and production of this volume; our indexer, Ms Liza Furnival; and our readers, Ms Fiona Plowman, Mrs Sarah Beanland and Mr Simon Reynolds; and Ms Stefania Crowther for editorial and marketing assistance. Mrs Jaqui Carter is our transcriber, and Mrs Wendy Kutner and Dr Daphne Christie assisted us in running this meeting. Finally we thank the Wellcome Trust for supporting this programme.

*Tilli Tansey*

*Lois Reynolds*

*Wellcome Trust Centre for the History of Medicine at UCL*



# HISTORY OF TWENTIETH CENTURY MEDICINE WITNESS SEMINARS, 1993–2008

- 1993    **Monoclonal antibodies**
- 1994    **The early history of renal transplantation**  
**Pneumoconiosis of coal workers**
- 1995    **Self and non-self: A history of autoimmunity**  
**Ashes to ashes: The history of smoking and health**  
**Oral contraceptives**  
**Endogenous opiates**
- 1996    **Committee on Safety of Drugs**  
**Making the body more transparent: The impact of nuclear  
magnetic resonance and magnetic resonance imaging**
- 1997    **Research in general practice**  
**Drugs in psychiatric practice**  
**The MRC Common Cold Unit**  
**The first heart transplant in the UK**
- 1998    **Haemophilia: Recent history of clinical management**  
**Obstetric ultrasound: Historical perspectives**  
**Post penicillin antibiotics**  
**Clinical research in Britain, 1950–1980**

- 1999    **Intestinal absorption**
- The MRC Epidemiology Unit (South Wales)**
- Neonatal intensive care**
- British contributions to medicine in Africa after the Second World War**
- 2000    **Childhood asthma, and beyond**
- Peptic ulcer: Rise and fall**
- Maternal care**
- 2001    **Leukaemia**
- The MRC Applied Psychology Unit**
- Genetic testing**
- Foot and mouth disease: The 1967 outbreak and its aftermath**
- 2002    **Environmental toxicology: The legacy of *Silent Spring***
- Cystic fibrosis**
- Innovation in pain management**
- 2003    **Thrombolysis**
- Beyond the asylum: Anti-psychiatry and care in the community**
- The Rhesus factor and disease prevention**
- The recent history of platelets: Measurements, functions and applications in medicine**

- 2004    **Short-course chemotherapy for tuberculosis**
- Prenatal corticosteroids for reducing morbidity and mortality associated with preterm birth**
- Public health in the 1980s and 1990s: Decline and rise?**
- 2005    **The history of cholesterol, atherosclerosis and coronary disease**
- Development of physics applied to medicine in the UK, 1945–90**
- 2006    **Early development of total hip replacement**
- The discovery, use and impact of platinum salts as chemotherapy agents for cancer**
- Medical ethics education in Britain, 1963–93**
- Superbugs and superdrugs: The history of MRSA**
- 2007    **The rise and fall of clinical pharmacology in the UK, c. 1950–2000**
- The resurgence of breast-feeding, 1975–2000**
- DNA fingerprinting**
- The development of sports medicine in twentieth-century Britain**
- 2008    **History of dialysis, c. 1950–2000**
- History of cervical cancer and the role of the human papillomavirus over the last 25 years**
- Clinical genetics in Britain: Origins and development**

## PUBLISHED MEETINGS

*'...Few books are so intellectually stimulating or uplifting'.*  
*Journal of the Royal Society of Medicine* (1999) **92**: 206–8,  
review of vols 1 and 2

*'...This is oral history at its best...all the volumes make compulsive reading...they are, primarily, important historical records'.*  
*British Medical Journal* (2002) **325**: 1119, review of the series

### **Technology transfer in Britain: The case of monoclonal antibodies Self and non-self: A history of autoimmunity**

#### **Endogenous opiates**

#### **The Committee on Safety of Drugs**

Tansey E M, Catterall P P, Christie D A, Willhoft S V, Reynolds L A. (eds)  
(1997) *Wellcome Witnesses to Twentieth Century Medicine*. Volume 1. London:  
The Wellcome Trust, 135pp. ISBN 1 869835 79 4

### **Making the human body transparent: The impact of NMR and MRI Research in general practice**

#### **Drugs in psychiatric practice**

#### **The MRC Common Cold Unit**

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Witnesses to Twentieth Century Medicine*. Volume 2. London: The Wellcome  
Trust, 282pp. ISBN 1 869835 39 5

### **Early heart transplant surgery in the UK**

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Twentieth Century Medicine*. Volume 3. London: The Wellcome Trust, 72pp.  
ISBN 1 841290 07 6

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**Intestinal absorption**

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**Population-based research in south Wales: The MRC Pneumoconiosis Research Unit and the MRC Epidemiology Unit**

Ness A R, Reynolds L A, Tansey E M. (eds) (2002) *Wellcome Witnesses to Twentieth Century Medicine*. Volume 13. London: The Wellcome Trust Centre for the History of Medicine at UCL, 74pp. ISBN 0 854840 81 8



### **Peptic ulcer: Rise and fall**

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**The discovery, use and impact of platinum salts as chemotherapy agents for cancer**

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**Clinical pharmacology in the UK, c. 1950–2000: Influences and institutions**

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**The resurgence of breastfeeding, 1975–2000**

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Other publications

**Technology transfer in Britain: The case of monoclonal antibodies**

In: Tansey E M, Catterall P P. (1993) *Contemporary Record* **9**: 409–44.

**Monoclonal antibodies: A witness seminar on contemporary medical history**

In: Tansey E M, Catterall P P. (1994) *Medical History* **38**: 322–7.

**Chronic pulmonary disease in South Wales coalmines: An eye-witness account of the MRC surveys (1937–42)**

In: D'Arcy Hart P, edited and annotated by E M Tansey. (1998) *Social History of Medicine* **11**: 459–68.

**Ashes to Ashes – The history of smoking and health**

In: Lock S P, Reynolds L A, Tansey E M. (eds) (1998) Amsterdam: Rodopi BV, 228pp. ISBN 90420 0396 0 (Hfl 125) (hardback). Reprinted 2003.

**Witnessing medical history. An interview with Dr Rosemary Biggs**

Professor Christine Lee and Dr Charles Rizza (interviewers). (1998) *Haemophilia* **4**: 769–77.

**Witnessing the Witnesses: Pitfalls and potentials of the Witness Seminar in twentieth century medicine**

By E M Tansey. In: Doel R, Soderqvist T. (eds) (2006) *Writing Recent Science: The historiography of contemporary science, technology and medicine*. London: Routledge, 260–78.

# INTRODUCTION

This Witness Seminar comes at a timely moment for clinical pharmacology, which, as a clinical subspecialty, finds itself in intensive care. The best use of medicines in clinical practice, new drug development and proper regulation of drugs each require medical practitioners with skills in clinical pharmacology. But in contrast, there is little demand for clinical pharmacologists in every day clinical practice – and it is the demand and opportunities for clinical practitioners that are the main drivers of specialty choice amongst young doctors. Clinical pharmacology must evolve and I will return to this at the end of this introduction.

My first contact with clinical pharmacology was at the interview for senior house officers at Hammersmith Hospital in 1978. Dr John Nabarro, my consultant at the Middlesex Hospital, knowing of my passion for research, advised me to apply for senior house officer (SHO) jobs at the Royal Postgraduate Medical School, Hammersmith Hospital and my senior registrar, Dr David Morris, suggested that rheumatology would be a good career choice within medicine for a young doctor interested in immunology. So I duly turned up to the interview, hoping to be appointed SHO to the rheumatology firm. The interviews were a formidable and curious affair, approximately 25 candidates milling around, with rapid fire interviews of about four or five minutes. The successful candidates were duly marched into the boardroom, lined up against the portraits of retired deans on the wall facing the interview panel and told which job they were being offered, with little doubt that each would accept. I found myself appointed SHO in clinical pharmacology and, without second thought, or any thought at all under the pressure of circumstances, accepted immediately. Indeed after many years on the other side of the interviewing table, I can only recall one candidate who ever did decline the offered post.

After my appointment as a senior lecturer in rheumatology in 1985, I discovered that the SHO interviews were almost as stressful for the interviewers as the interviewees, since the members of the interview panel had no idea in advance whether they would be asked to ask questions of any given candidate and Keith Peters, then the professor of medicine, would deliberately pick as an interviewer anyone who gave the appearance of dozing off or of complacency. This led to some quite curious and challenging questions – one professor would regularly jerk to life and ask some hapless candidate: ‘What price a life?’ I confess to using the same technique as Keith Peters when eventually I became professor of medicine and chaired the panel myself.

Back in 1978, as a newly appointed SHO, I had very little idea what to expect from clinical pharmacology. In particular, what patients would be referred to a clinical pharmacologist? And therein lies the paradox of clinical pharmacology. The skills of clinical pharmacology are essential for the practice of the best medicine – but the specialty ‘owns’ no diseases *per se* – it is the purest form of general medicine. In the late 1970s the department of clinical pharmacology at Hammersmith was the hub of the specialty in the UK. The department was led by Colin Dollery, supported by John Reid, Peter Lewis and Donald Davies; recently graduated senior academics from the department included Alasdair Breckenridge and Charles George, the junior staff included an array of ‘later to be’ professors and leaders including Morris Brown, John MacDermot, Mike Rawlins and Garret Fitzgerald. The clinical pharmacology firm in those days looked after patients with diseases requiring drugs that were difficult to manage. These included hypertension, Parkinson’s disease and epilepsy – but then as now the majority of the clinical practice was general medicine.

The combination of working for John Nabarro, a meticulous and rigorous diabetologist, followed by an equally meticulous and rigorous clinical pharmacologist, Colin Dollery, taught me things that medical school had not. The first was that taking a history and clinical examination were not activities that were ‘plucked from memory’ on each and every occasion – the model instilled in medical school. Assessing a hypertensive at Hammersmith involved filling in a form – no question of forgetting some aspect of the history or examination – the results were collected rigorously and ultimately entered in to a computer database. The second was the quantitative aspects of drug treatment, whether in the prescription of insulin or the titration of the blood pressure of a patient with hypertension. I will never forget the patience of Colin Dollery, who personally titrated the blood pressure of a patient undergoing the dangerous procedure of surgical removal of a phaeochromocytoma, a catecholamine-secreting tumour of the adrenal gland. This was not a matter that he would delegate to either one of his juniors or to the anaesthetic team. These lessons remain important today in an era when properly implemented electronic records, recording clinical information in a systematic fashion and supported by expert systems could transform the practice of medicine.

Clinical pharmacology is a very small specialty – but one that is disproportionately important in relation to its size. One of the notable features of the specialty has been the success of its practitioners in the national structures of medicine. Although the ranks of district hospital physicians include few clinical pharmacologists, this could

not be said of the ranks of medical Knights. This reflects the crucial importance of clinical pharmacology in the regulation and assessment of drug effects and side effects. Bodies such as the Medicines and Healthcare products Regulatory Agency (MHRA), the Medicines Commission and the National Institute for Health and Clinical Excellence (NICE) have each had prominent leadership by members of the small community of clinical pharmacologists. The pharmaceutical industry is similarly critically dependent on the skills of pharmacologists in the laboratory and the clinic for the development of new medicines.

Six months of SHO experience is a somewhat debatable qualification for writing the introduction to this Witness Seminar. Directorship of the Wellcome Trust is a more plausible explanation for the invitation to contribute, but could be seen also as an equally doubtful qualification! However, I have had the pleasure of long-standing professional association and friendship of many of those who participated in this Witness Seminar, edited and presented as ably as ever, by Tilli Tansey and her colleagues. I have also participated in the debate about the future of the specialty.<sup>3</sup> And that future probably depends on changing clinical pharmacology from a subspecialty of medicine in its own right to a skill set that is key to the future of all of the major subspecialties of medicine. For example, gastroenterology can only proceed if there are some gastroenterologists who can use the tools of clinical pharmacology to advance the specialty. This is the model that has worked for a discipline such as immunology, in which immunologists are embedded in every subspecialty of medicine. Clinical pharmacology is in need of rebranding and Garret Fitzgerald has suggested 'clinical therapeutics and translational medicine' as the banner for the next generation of clinical pharmacologists.<sup>4</sup> Is this simply spin? I think not. The new title recognizes that the skill set needed to advance medicines research in the twenty-first century is broad and, in addition to pharmacological skills, requires skills in imaging, the physiology and pathology of health and disease, trial design and bioethics. This should be an attractive area for budding clinical scientists. But the brand alone will not be sufficient, first class marketing will be required as well.

Moreover, writing this introduction provides me with the opportunity to signal my admiration for the Witness Seminar series as a whole. One of the important issues for those that are responsible for the funding of scientific research is how to evaluate the outcomes of the research. Witness Seminars provide an invaluable tool, because they illustrate the complexity of scientific discovery

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<sup>3</sup> Breckenridge *et al.* (2006).

<sup>4</sup> Fitzgerald (2005).



and the human side of the research endeavour. It is over-simplistic to think that the pathways of scientific discovery can be unravelled by simple bibliographic analysis of the research literature. As an example, no amount of citation analysis could capture the development of medical ultrasound, described in Volume 5 of the *Wellcome Witnesses to Twentieth Century Medicine*, a journey from Second World War sonar research, through the Glasgow shipyards to the obstetric clinic. The present volume is not an account of specific scientific discovery. Instead it documents the development of an important small specialty which has been key to the practice of modern medicine.

**Mark Walport**

The Wellcome Trust

# **CLINICAL PHARMACOLOGY IN THE UK, c. 1950–2000: INFLUENCES AND INSTITUTIONS**

The transcript of a Witness Seminar held by the Wellcome Trust Centre for the History of Medicine at UCL, London, on 6 February 2007

**Edited by L A Reynolds and E M Tansey**

# CLINICAL PHARMACOLOGY IN THE UK, c. 1950–2000: INFLUENCES AND INSTITUTIONS

## Participants

Dr Stuart Anderson	Professor Desmond Laurence
Dr Jeffrey Aronson	Professor Denis McDevitt
Professor David Barnett	Professor Walter Nimmo
Dr Linda Beeley	Professor Michael Orme
Professor Sir James Black	Dr Tony Peck
Professor Morris Brown	Professor Laurie Prescott
Professor Mark Caulfield	Professor Brian Prichard
Sir Iain Chalmers	Professor John Reid
Professor Donald Davies	Professor Jim Ritter
Professor Robin Ferner	Professor Phil Routledge
Professor Rod Flower (chair)	Dr Tilli Tansey
Dr Arthur Fowle	Professor Geoffrey Tucker
Professor Sir Charles George	Professor Patrick Vallance
Professor David Gordon	Professor Duncan Vere
Professor David Grahame-Smith	Professor Owen Wade
Dr Andrew Herxheimer	Professor David Webb
Dr Kenneth Hunter	Professor Frank Woods
Professor Trevor Jones	

**Among those attending the meeting:** Professor Ray Hill, Mr Alan Hunter, Professor Sir Stanley Peart

**Apologies include:** Professor Sir William Asscher, Professor Nigel Baber, Professor Peter Barnes, Professor Nicholas Bateman, Professor Nigel Benjamin, Dr Peter Bennett, Professor Sir Alasdair Breckenridge, Professor Joe Collier, Professor Hal Cook, Professor Sir Colin Dollery, Professor Sir Liam Donaldson, Professor Sir Michael Drury, Professor Sir Abraham Goldberg,<sup>†</sup> Professor John Griffin, Ms Rachel Hillman, Professor Leslie Iversen, Dr Peter Jackson, Professor David Lawson, Professor Michael Radcliffe Lee, Professor Salvador Moncada, Dr John Mucklow, Professor Munir Pirmohamed, Professor Lawrence Ramsay, Professor Sir Michael Rawlins, Professor Alan Richens, Professor Peter Rubin, Professor Peter Sever, Professor Stephen Smith, Professor Thomas Walley, Professor Kent Woods

<sup>†</sup> Died 1 September 2007

**Dr Tilli Tansey:** Good afternoon ladies and gentlemen. My name is Tilli Tansey and I am the convenor of the Wellcome Trust's History of Twentieth Century Medicine Group. This was established some years ago by the Wellcome Trust, to bring together historians, scientists and clinicians interested in recent medical history, and also to provide material resources for present and future historians. One of the ways we have been most successful in doing this is this idea of a Witness Seminar, where we gather together people who have been involved in particular debates or discoveries, and ask them to talk among themselves about their own personal reminiscences, about what happened, when, why and who were the main drivers of various discoveries, or non-discoveries in some cases.<sup>1</sup>

An important part of any meeting is of course the selection of the chairman, and we are delighted that when Jeff Aronson suggested that we had a meeting on clinical pharmacology, Rod Flower – who has been to some of our meetings before – was not only available but willing to take on this onerous duty, so we are very grateful that Rod is here to do so, and without further ado I will hand over to him.

**Professor Rod Flower:**<sup>2</sup> Thanks very much, Tilli, and I would like to add my welcome to all of you to what we hope will be a great session. It's appropriate that I start by thanking Tilli, Daphne, Wendy and Lois and the team here for hosting this meeting, and also Jeff for putting in a lot of groundwork in setting out agendas and ideas for what I hope will be a really stunning afternoon. I think that when we first sat down to consider this entire area, we quickly realized that there was far too much to cover in an afternoon meeting and so we made a decision to cut the subject matter in half. We are going to have a *second* meeting later in the year, which will deal specifically with clinical pharmacologists and the regulatory bodies. That will be on 25 September 2007 and you will all get an invitation to that event. We do hope that you will be able to come and complete the circle.<sup>3</sup> It is just impossible to get everything covered in one afternoon.

Quite why I was selected as chairman for this meeting, I don't know, except that I am quite probably the only person in the room without a clinical qualification. With that in mind, I would just like to say that whether scientists or clinicians, we all have this subject very close to our hearts. When I first

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<sup>1</sup> For the background to the Witness Seminar as an historical tool, see pages vii–viii.

<sup>2</sup> Biographical notes appear on pages 101–20.

<sup>3</sup> The Witness Seminar, 'Clinical pharmacology in the UK, c.1950–2000: Industry and regulation', was held on Tuesday, 25 September 2007, and is published as volume 34 in the series *Wellcome Witnesses to Twentieth Century Medicine* (Reynolds and Tansey (2008)).

began in pharmacology, the very title ‘clinical pharmacology’ always struck me as a little counter-intuitive, because, after all, all physicians give their patients drugs, so why shouldn’t pharmacology be clinical? Why do you have to make a special case for it? It was only later I came to appreciate the rather turbulent history of the subject which, in conversation with a student once, I likened to that of a young person growing up in the 1940s and 1950s, full of self-confidence and new ideas, becoming increasingly embarrassed by their elderly father ‘therapeutics’. I don’t know whether that is a close approximation to what actually happened, but I guess we are going to find out. We also, hopefully, are going to discover why it wasn’t called ‘human pharmacology’; the relationship between clinical pharmacology and pharmaceutical medicine; and the answer to lots of other important questions as well.

I will just say a few words about how we are going to operate. This is very much a forum for *you* to speak, and to share your recollections. I only have two jobs to do today: one is to finish at four o’clock for tea, and the other is to ensure we finish at 6 o’clock in time for drinks, so in between I will just attempt to guide the discussion, if I think it is flagging, or if I want to move into a different area. But other than that, it is up to you to talk, and we will endeavour to capture everything faithfully and transcribe it for your later attention. So in order to set the ball rolling, I am going to ask Jeff Aronson from the Radcliffe Infirmary in Oxford to kick off with a few remarks.

**Dr Jeffrey Aronson:** Thank you. First of all I would like to add my thanks to Tilli and her colleagues for all the hard work they have done in organizing this, and to Rod for being so willing to chair it. We *did* pick him because we wanted somebody who wasn’t a clinical pharmacologist, but who knew his way around, and I think we have found the perfect man. Tilli and Rod have asked me if I would give a kind of brief historical introduction and I tried to tackle that by producing a sheet of paper that’s in your pack on which I have included some key publications and events.<sup>4</sup> I have started with the *British National Formulary* in 1946, which replaced the *National War Formulary*,<sup>5</sup> and I have gone on right up to the 75th anniversary of the British Pharmacological Society (BPS) last year.<sup>6</sup>

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<sup>4</sup> For some key publications and events in clinical pharmacology, see Appendix 1 on pages 77–79, provided by Dr Jeffrey Aronson.

<sup>5</sup> For further details, see the Glossary, page 121. See also Wade (1993).

<sup>6</sup> Cuthbert (2006); Aronson (2006); Dollery (2006).



Figure 1: A woodcut of Ge Hong, c. 15th century.

I am conscious that I will have picked publications and events that some of you might think ought not to be there, or there may be some that I have missed that you think ought to be there. So, I encourage you to annotate this sheet of paper with any additional information you think might be valuable – publications I don't know about, events I have forgotten – and at some time in the future let us have it back, so that we can increase the amount of information in this chronology. On the other side of the paper you will find something I have called 'Towards a map of the history of academic departments'. If at some time – perhaps today, but it doesn't have to be – you could try, particularly those of you who were professors of clinical pharmacology or lecturers or whatever, in different institutions, to answer those questions, it would be very helpful in building up a map of the history of the subject, to see where people came from, where they were at particular times, and so on. I hope that you will be able to add your bits of information to those two sheets of paper.<sup>7</sup>

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<sup>7</sup> The returned forms (although insufficient for the proposed analysis) will be deposited, along with the other records of this meeting, in GC/253 in archives and manuscripts, Wellcome Library, London. See also Aronson (2004).

I guess we think about clinical pharmacology as being largely a twentieth-century subject, but actually for hundreds of years, as we all know, physicians have been developing drugs in one way or another, using tools that we would now recognize as being those of a clinical pharmacologist. A good example that I know of, and one that we illustrated on one of the issues of the *British Journal of Clinical Pharmacology* last year – well known for its green cover – is Ge Hong.<sup>8</sup>

He was a fourth-century Chinese physician, who took some *qinghaosu* – what we nowadays call *Artemisia annua* – dunked it in water and squeezed it out. And that was the first demonstration that you could make an extract from a plant to treat malaria, intermittent fevers actually. He described all this in a text called *Emergency Prescriptions Kept up One's Sleeve*.<sup>9</sup> Because the substances that are in this plant are so unstable, it is now believed that this squeezing-out process somehow creates an emulsion that allows you to extract the active ingredient. You wouldn't be able to do it other than by traditional methods. Whether that's true or not, I have no idea, though it makes a good story. But I think that Ge Hong was a clinical pharmacologist, at least a pharmacognosist. Then there were the Peruvians who used cinchona bark to treat ague (malaria).<sup>10</sup> There was also William Withering, a favourite of mine, and his meticulous description of the use of foxglove in dropsy.<sup>11</sup> And the Reverend Edward Stone, observing the efficacy of willow bark as a febrifuge.<sup>12</sup> All of these people, I think, could be called clinical pharmacologists in one way or another. And we are just taking it up to date with modern techniques, and that's often what I think defines a subject.

Being interested in words,<sup>13</sup> I thought I would look at the words that describe our discipline, and so I have done a little bit of very, very sketchy research on the terms: 'therapeutics', 'materia medica' and 'clinical pharmacology'.

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<sup>8</sup> The image of Ge Hong was featured on the cover of the issue of the *British Journal of Clinical Pharmacology* [(2006) 61: 647–790] to celebrate the 75th anniversary of the British Pharmacological Society and the 15th International Union of Pharmacology [IUPHAR] congress in Beijing.

<sup>9</sup> Hsu (2006).

<sup>10</sup> Containing quinine. See Collier (1984); Bruce-Chwatt (1988).

<sup>11</sup> Digitalis was first prescribed by the English physician and botanist William Withering (1741–99), who used it to treat oedema (dropsy). See Withering (1785); Aronson (1985); Sheldon (2004).

<sup>12</sup> Stone (1763); see also Hedner and Everts (1998).

<sup>13</sup> See, for example, Dr Jeffrey Aronson's series of articles on medical linguistics, published under the general heading 'When I use a word...', which has appeared in the *British Medical Journal* since 1994.

‘Therapeutics’, in its original singular form, ‘therapeutic’, as a noun, first appears in the *Oxford English Dictionary* in a citation from the sixteenth century. But its modern form, the plural form ‘therapeutics’, first occurs in 1671, as long ago as that, in a book by William Salmon called *Synopsis Medicinæ*, or a *Compendium of Physick*. He wrote that ‘the Therapeuticks, or active part of Physick, is either Material, or Relative’.<sup>14</sup> And that’s a very old term, to which Rod alluded.

I have traced the term ‘materia medica’ back to the beginning of the nineteenth century. It was originally used specifically to describe medicines, rather than the art of using them, which, I think, is how we would now think of it. And in the early days the definition given was ‘the remedial substances used in the practice of medicine’. But William Cullen in 1789 used it in this latter sense in his *Treatise of the Materia Medica*, and the *Materia Medica Americana* [*Potissimum regni vegetabilis*], of 1787, which I translate as ‘the materia medica of America, especially plants’, where ‘plants’ implies members of the vegetable kingdom (‘regni vegetabilis’).<sup>15</sup> So the term materia medica is very old. But the first textbook to my knowledge to use the term was *Elements of Materia Medica and American Therapeutics* by Edward Ballard and Alfred Baring Garrod, which was published in 1845.<sup>16</sup> The Bodleian Library’s catalogue lists a rather impressive 790 titles containing the words materia medica, and I haven’t surveyed all of them.

When I grew up in Glasgow the subject that I studied was materia medica, not clinical pharmacology. Materia medica was what was on the syllabus, although the textbook that we used was *Dilling’s Clinical Pharmacology*. It’s an interesting textbook, because it was first published in 1884 by a man called John Mitchell Bruce, who wrote it, and he called it *Materia Medica and Therapeutics*. When Dilling came on board it was called *Bruce and Dilling’s Materia Medica and Therapeutics*, but when the twentieth edition appeared in 1960, it was called *Dilling’s Clinical Pharmacology*.<sup>17</sup> That’s the first time that the term clinical pharmacology appears in a textbook to my knowledge, and in the same year of course Desmond Laurence published the first edition of his now famous textbook *Clinical Pharmacology*.<sup>18</sup> So, 1960 is the first time that we see this term in the title of a textbook.

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<sup>14</sup> Salmon (1671).

<sup>15</sup> Cullen (1789); Schoepf (1787).

<sup>16</sup> Ballard and Garrod (1845).

<sup>17</sup> Bruce (1884); Dilling (1960).

<sup>18</sup> Laurence (1960).



I found a translation of a German book in the Bodleian Library, Oxford, by two pharmacologists, Hans Horst Meier and Rudolph Gottlieb. The original German title translates into something like *Experimental Pharmacology and the Basis of Therapeutics*. It was translated from the German by John Taylor Halsey – I don't know who he was – with the English title, *Pharmacology, Clinical and Experimental*, in 1914.<sup>19</sup> It's not quite there, but already by 1914 it sounds as if people are thinking about clinical pharmacology.

The first use of the precise term 'clinical pharmacology' and by whom is not clear. It has been attributed to Harry Gold, a US physician of Russian ancestry, who did some fantastic work on cardiac glycosides in the late 1920s and early 1930s, delineating the pharmacokinetics of digoxin, purely by measuring the stuff in the urine.<sup>20</sup> Incredible, and, I think, amazing clinical pharmacology, given the limitations of the technique. He certainly used the term 'clinical pharmacology'. We have evidence of this in John Gaddum's Dixon Memorial Lecture of 1954, entitled 'Clinical pharmacology', who said he used the term because Gold had.<sup>21</sup> And again, at a symposium that Desmond Laurence edited in 1958 (he kindly sent me a copy), in which Gold again, in a lecture entitled 'Human pharmacology', used the term 'clinical pharmacology'. In that lecture, Gold says that he thinks that human pharmacology is a much better term for the subject than clinical pharmacology, and he argues the case.<sup>22</sup> Some of you may have views about that and may be able to throw some light on it.

Finally, I want to contribute a personal reminiscence, since this is a Witness Seminar. On the list of publications that I have given you, I particularly included some from around the late 1960s–early 1970s, because these were the publications that actually influenced me to come into clinical pharmacology.<sup>23</sup> There was a 1967 *British Medical Journal* editorial, 'Future of clinical pharmacology'; a 1969 *British Medical Journal* editorial, 'Clinical pharmacology as a specialty'; the Royal College of Physicians' *Report* of 1969; and a *Lancet* editorial in 1970, 'The image of clinical pharmacology'.<sup>24</sup>

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<sup>19</sup> Meyer and Gottlieb (1914).

<sup>20</sup> See Hutcheon (1972); Miller (1981); see also Aronson (2007).

<sup>21</sup> Gaddum (1954).

<sup>22</sup> See Gold (1959): 47; see also Gold (1968).

<sup>23</sup> See list of publications and key events in Appendix 1, page 77.

<sup>24</sup> Ware (1969); Royal College of Physicians of London (1969); Anon. (1970).

In July 1970, I had just passed the final exams, MBChB, in Glasgow and a neighbour of ours, Jake Davidson, a radiologist at the Western Infirmary in Glasgow, came across the road – he lived across from us – to congratulate me on passing. He asked, ‘What are you going to specialize in?’ Well, I hadn’t a clue, I hadn’t thought about it; you didn’t have to in those days, not the way they do nowadays. He said, ‘Well, what was your best subject in medical school?’ I said, materia medica, because I had got a distinction; it was the only thing I had a distinction in at all. I was absolutely fascinated by it. He said, ‘Well, you have got to be a clinical pharmacologist.’ I said, ‘What’s that?’ He said, ‘Go and read about it’. And I did, and these are the papers that I read: the *BMJ* editorial, the *Report* of the Royal College, the WHO *Report* of 1970, the *Lancet* editorial; and I thought, ‘That’s for me’.<sup>25</sup> I was hooked. So that’s why I became a clinical pharmacologist. I wonder if anybody else was influenced by those publications at that time, either to continue their studies or to take them up, and I would be interested to hear that. But that’s all I have to say.

**Flower:** Thanks very much, Jeff. Does anyone want to comment on the question of the nomenclature and how clinical pharmacology got its name? Concerning early influences on career choice, I should say that you are not the only person who got into pharmacology by accident, without knowing what it was. I am sure there is a long list of us who had to go and look it up in the dictionary before we applied for posts. Would anyone like to come in on this point?

**Dr Andrew Herxheimer:** I got interested because I was almost the only person in my year at medical school at St Thomas’ Hospital Medical School, London who enjoyed the therapeutics lectures, and when I had done my house job I asked Dr R S (Sam) Stacey, who was the reader, whether there was a job in his department. I started to do some experiments of conventional pharmacology, animal work, and I got really stuck and didn’t like working with animals and made a mess of it. But I also started doing human experiments, which worked, and I thought for that reason what interested me was human pharmacology. I was as interested in healthy human beings as in patients at that point, and I thought that ‘human’ pharmacology included healthy and unhealthy people. So, I preferred the expression human pharmacology.

**Professor Michael Orme:** Just to say, Jeff, that I predate you by only a few years, I think. But my particular seminal influence was Colin Dollery’s article in 1966.<sup>26</sup>

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<sup>25</sup> WHO (1970). See Figure 5, page 41.

<sup>26</sup> Dollery (1966).

At that stage I was doing a house job at the Hammersmith, and I think that, combined with the presence of many august bodies, persons that are here at this meeting as well, influenced me to specialize in clinical pharmacology. It was a combination of the clinical work with the pharmacology and therapeutics that was my stimulation.

**Professor Denis McDevitt:** I got in by serendipity and I suspect that I am not the only one.<sup>27</sup> I hadn't read anybody's article. When I had qualified and was starting training in medicine, the department from which it was known that people were most likely to pass the Membership of the Royal College of Physicians was the one that Owen Wade ran at the department of therapeutics and pharmacology at Queen's University, Belfast. I went to work there, not because I was attracted to clinical pharmacology; it was more because I wanted to pass the Membership and then make a decision about my career. Once I got there I got hooked, particularly because of working with Robin Shanks, who had come from ICI, where he had worked with Sir James Black.<sup>28</sup> We started to do work with propranolol in thyroid disease, some of the early work.<sup>29</sup> It turned out to be a really fascinating thing to do, and I never wanted to do anything else.

**Professor Owen Wade:** I used the words 'clinical pharmacology' because when I was appointed at Belfast, most of the other pharmacologists were 'preclinical pharmacologists'. British pharmacology was very much dominated in the 1930s by an influx of Germans: Wilhelm Feldberg, Hugh Blaschko and others.<sup>30</sup>

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<sup>27</sup> This is a recurring theme in other Witness Seminars. See, for example, Zallen *et al.* (eds) (2004): 30. See also the special issue, 'Creativity and discovery in biomedical sciences' of *Creativity Research Journal* (1994) 7. For a further perspective see Booth (1990) and Pepys (2007).

<sup>28</sup> Propranolol [*Inderal* (ICI 45520)] was launched in 1964 by ICI. See Black *et al.* (1964). See also Reynolds and Tansey (eds) (2008).

<sup>29</sup> McDevitt *et al.* (1968); McDevitt (1976).

<sup>30</sup> Professor Owen Wade wrote: 'The best description of Feldberg, Blaschko and Chain is in Medawar and Pyke (2000). Feldberg and Blaschko were much older than me. Indeed, Feldberg taught me in my first year as a student in Cambridge University Medical School, department of physiology, in 1939. Many years later when Feldberg was in retirement and still working in the NIMR, his department was infiltrated by an antivisectionist who criticized Feldberg's anaesthesia of the animals he was working on. This got enormous publicity in the press that was quite unjustified and I was upset that no senior member of the Physiological Society came forward to defend this great scientist, who had found out so much about the transmission of nerve signals by acetylcholine, which is immediately destroyed by anticholinesterase.' Part of a note on draft transcript, 11 July 2008. See also, for example, Bisset and Bliss (1997).

They were using drugs, not to treat patients, but in order to explore human physiology. I was amazed how little they knew about the use of drugs like penicillin, streptomycin and cortisone, which had come on the scene by the time I went to Belfast in 1957.<sup>31</sup>

**Professor Desmond Laurence:** I fell into the subject completely by accident when I was an ex-service registrar at St Thomas' Hospital, London, in 1948 and I associated myself with the department of medicine, because there were two very attractive people there, Peter Sharpey-Schafer, professor of medicine, and Tony Dornhorst, a reader and consultant.<sup>32</sup> They showed me what clinical science was, which I had never even heard of. One day I was summoned by the dean and the professor of medicine and they said, 'What are you going to do with yourself?' I said, 'I suppose I am going to be one of the 50 people now applying for each hospital registrar post.' They said, 'Would you like to be a lecturer in therapeutics? We are going to provide the reader in therapeutics with a lecturer; he wants a non-medical lecturer, but we are not going to let him have one. And, if you will accept the job, we will force you on him.' And not long after that Andrew Herxheimer and I shared a room in the same department. So, that's how it started for me, no intentions at all; it just grew on me.

**Flower:** A bit like taking the 'King's shilling'.<sup>33</sup>

**Professor Jim Ritter:** I was first exposed to pharmacology within Bill Paton's department and several of the pharmacologists there: Hugh Blaschko (in whose house in Park Town, Oxford, I rented a flat), Edith Bülbring and a number of other distinguished pharmacologists.<sup>34</sup> But a lot of pharmacologists were actually clinicians: Blaschko was a clinician – having done clinical medicine before he did pharmacology – and Bill Paton had done clinical medicine, but I don't think Edith Bülbring had.<sup>35</sup> But Bill Paton, in particular, even though he was a scientist par excellence, was very proud of his background in clinical medicine and not only proud of it, but felt that it contributed very substantially

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<sup>31</sup> See Tansey and Reynolds (eds) (1997).

<sup>32</sup> See also Reynolds and Tansey (eds) (2000): 59, 63.

<sup>33</sup> Accepting the 'King's shilling' from a recruiting sergeant was formal acceptance of the conditions of Her/His Majesty's Army as an enlisted man.

<sup>34</sup> Medawar and Pyke (2000). See also note 30. For details of the department of pharmacology in Oxford during Paton's tenure, see Rang and Perry (1996): 299–301.

<sup>35</sup> See Born and Banks (1996).

to the way that he thought about scientific problems.<sup>36</sup> I can remember him arguing the toss with Humphrey Rang, who was another great influence in my life, and who also had done clinical medicine at the time.<sup>37</sup> Humphrey and Bill Paton used to debate the relative merits of having done clinical medicine before one did one's basic pharmacology.

**Professor David Grahame-Smith:** The great influence on me was the man who is sitting next to me on my left, Sir Stanley Peart. At some point in about 1960, I went to see him and said I wanted to do some research, not knowing at all what research was all about. At the time I was a registrar in medicine at St Mary's Hospital, London, where he was professor of medicine. He said, 'What do you want to do?' I said, 'I don't know, I want to do research, and you are the professor of medicine.' So he said, 'Well, there's a patient on the ward with something called the carcinoid syndrome', which had only fairly recently been described. He said, 'This tumour makes something called serotonin (5HT) and it seems nobody knows really how it is made. Why don't you find out?' So I did, although my approach was a bit messy.<sup>38</sup> I was placed in Albert Neuberger's department of chemical pathology, and he was very kind to me, as were the people in that department. I knew no biochemistry at all, but learned it as I went along, kitchen sink stuff then. And having done that, and Hugh Blaschko having examined my PhD, I went to the US to become an endocrinologist, and did some work on ACTH, and cyclic AMP, and steroidogenesis.<sup>39</sup>

So, I was very thoroughly a clinical biochemical pharmacologist, not a pharmacologist. And while I was in the US, Stan Peart wrote to me and said that there was a senior lectureship in clinical pharmacology coming up at St Mary's: 'What about it?' Well, as a young married man with two young children, what was I going to do? So, I came back to be a senior lecturer in clinical pharmacology. But my career progress was not structured and one of the things

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<sup>36</sup> See, for example, Paton (1982); Paton and Rang (1965). See also Colquhoun (2006). Professor Edith Bülbring's papers (PP/BUL) are held in archives and manuscripts, Wellcome Library, London, as are those of the British Pharmacological Society (SA/BPS). See Bolton and Brading (1992).

<sup>37</sup> See Rang and Dale (1987).

<sup>38</sup> Page (1954); Grahame-Smith (1964); Twarog (1988). The Serotonin Club, an international association for scientists interested in serotonin (5-hydroxytryptamine), was founded in 1987 and sponsors a satellite meeting at the International Congress of Pharmacology (IUPHAR) every four years and hosts annual lectures and dinners, including one meeting annually of the British Pharmacological Society. See also Green (2008).

<sup>39</sup> See, for example, Grahame-Smith *et al.* (1967).

that worries me now is the terribly rigid structure of medical academic careers. It worries me that people can't move from one thing to another in the way that they used to be able to do. It takes the fun out of career development.

**Professor Sir Charles George:** Like Denis McDevitt, I went in by serendipity. I was doing cardiology in Birmingham and Brian Pentecost said, 'You must go and work for John Goodwin and Celia Oakley'. But, that job came up two or three months later, and I had just done a trial of ICI 50172 or practolol in angina, and so I applied for Colin Dollery's registrar post in 1969 and got that, and the rest is history.<sup>40</sup>

**Professor Duncan Vere:** I think I got into clinical pharmacology and therapeutics for entirely negative reasons. I was on the house, and very interested in medicines and drugs, but my recollection is of the extraordinary primitivity of the work that was going on. I remember a patient with malignant hypertension who did not have long to live and there were no real treatments then, apart from Kempner's rice diet or a total sympathectomy, or whatever.<sup>41</sup> And Clifford Wilson turned up one day, having just been to Oxford, and fished in his waistcoat pocket and said, 'I have got something here which Bill Paton gave me, called hexamethonium. Would you like to try it on Mr So and So?' I said, 'What is the dose?' And he said, 'Well, we have no idea.' [**Flower:** He gave you a form of consent then, obviously.] I gave the patient a very small amount and he went out like a light. He did recover and lived for about three more days, but that's another story.<sup>42</sup>

I was supposed to be becoming a nephrologist, but I was doing research on the then fairly new metabolic ward and discovered that all the experiments went wrong and produced results that I would not have expected. So I tried to find out why and discovered that the patients were getting the wrong drugs and the wrong electrolytes. And the atmosphere was unbelievable. If I could just say that in those days the nurses had to add up the amounts of dietary constituents to six places of decimals, from wartime tables by McCance and Widdowson, which

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<sup>40</sup> Briant *et al.* (1973). Practolol was withdrawn in 1975 following yellow card reports to the Committee on Safety of Medicines of unforeseen side effects concerning serious skin, eye and abdominal problems. See, for example, the debate in the House of Commons on 'Drugs (Adverse Effects)', 16 March 1977, *Hansard* **928**: cols 583–94. For further details of the practolol problem, see Reynolds and Tansey (2008): 4–5, 30; Abraham and Davis (2006).

<sup>41</sup> See Glossary, page 123.

<sup>42</sup> Paton (1982).

were totally irrelevant.<sup>43</sup> I remember remonstrating with an assistant matron about this, and she said: ‘But it does them good, Dr Vere.’ That sort of thing. We investigated. There were errors of complex prescribing (some 22 per cent of drug administrations), which we wrote up. One day Jim Crooks came into the lab and said, ‘Look, we have published something about complex prescribing. We have found exactly the same things in Ireland and so on, and in Dundee.’<sup>44</sup> And so my interest was kindled.

We also worked on the reaction of patients to subcutaneous drainage and to the thromboembolic effects of acid intravenous fluids and found, of course, thrombosis and so on.<sup>45</sup> So the final straw was that Clifford Wilson came and saw me one day and said, ‘Look here, don’t you think you ought to be a clinical pharmacologist?’ Then he gave me the very references that Jeff Aronson has referred to.<sup>46</sup> So, that was how I came into it.

**Professor David Barnett:** It’s interesting that the influences that people have described on the way that they have chosen a career vary. My choice was also somewhat serendipitous in that I had just finished my Membership of the RCP and Robert Kilpatrick said there was some money for a research fellowship, funded, I think, by Roche at the time, and then I became involved in the possibility of a Merck fellowship. That, I think, was the transition zone for me, because I spent two years in San Francisco with Ken Melmon and the Cardiovascular Research Institute and it did two things.<sup>47</sup> One is that it helped me to fall in love with biology and to understand the science ethic. But also the alternative pathway of clinical pharmacology, that is of understanding how drugs affect physiology, and that kick-started my interest. So I didn’t read the background material, it just happened by accident, but it was a joyous experience and I never really looked back.

**Professor Laurie Prescott:** I am interested to hear how everybody fell into clinical pharmacology almost by accident. In my case it was quite different. I had always been interested in chemistry and pharmacology and from an early

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<sup>43</sup> See, for example, McCance and Widdowson (1946).

<sup>44</sup> Crooks (1975); Wier *et al.* (1976).

<sup>45</sup> Vere (1965).

<sup>46</sup> The list of articles circulated at the meeting can be found in Appendix 1, page 77. See also notes 24 and 25.

<sup>47</sup> See, for example, Barnett *et al.* (1978).

stage after qualifying in medicine I seriously intended to become involved in some way with the clinical use of drugs. I happened to see an editorial entitled ‘Clinical pharmacology’ by Louis Lasagna at the Johns Hopkins Hospital, Baltimore, Maryland.<sup>48</sup> I wrote to him saying that I was interested in becoming a clinical pharmacologist and did he have any suggestions? He invited me to apply for a research fellowship, and a very pleasant pub lunch with him in London turned out to be my interview for the position. This was 1963 and I was probably one of the first to hold a formal research fellowship in clinical pharmacology. I was at the Johns Hopkins Hospital for two years, during which time I gained much experience, and I learnt to start work early and to really work hard.<sup>49</sup> I came back to a lectureship in therapeutics in the department of materia medica and therapeutics in Aberdeen with Professor Alastair Macgregor. At that time, Jim Crooks was a senior lecturer in the department. So, I started with a very purposeful intention of specializing in clinical pharmacology.

**Aronson:** I ought to say that Laurie’s mention of Lou Lasagna reminds me that all but one of the papers I listed here are UK papers. I concentrated on the UK story because that’s what we are here for. There’s one US report and one interesting Anglo–American report, when British and US pharmacologists got together and had a meeting. It was published in the journal *Clinical Pharmacology and Therapeutics* and is absolutely fascinating.<sup>50</sup> But Laurie is right – Lou Lasagna was writing about clinical pharmacology in the 1960s and publishing editorials.

Perhaps I may add a reminiscence. Hearing David Grahame-Smith saying how much Stan Peart had influenced him, I ought to say how much David influenced me. Although I had decided to become a clinical pharmacologist before I met him, he was a huge influence on me throughout the time he was Rhodes professor of clinical pharmacology in Oxford. I had been working in Abe Goldberg’s department in the Stobhill Hospital, Glasgow – John Reid’s stamping ground – and Abe had been Stanley Alstead’s successor as Regius professor, and I worked there for a few years before I decided to leave Glasgow and look for clinical pharmacology jobs elsewhere.<sup>51</sup> There was a man called Brian Whiting there who was measuring plasma digoxin concentrations, and I

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<sup>48</sup> Lasagna (1959, 1966).

<sup>49</sup> See, for example, Prescott (1964).

<sup>50</sup> Melmon and Turner (1986). See also Appendix 1.

<sup>51</sup> See, for example, Goldberg (1983).



thought, ‘What a waste of time’. Bloody fool – me, I mean, not Brian. ‘Why is he measuring plasma concentrations? This stuff is distributed all over the place. How does he know that the plasma concentration has got anything to do with cardiac concentrations? It’s a drop in the ocean, surely. It can’t tell you anything.’ I wanted to find a way, or to think of a way, of measuring the effects of the material, but I hadn’t a clue, I really didn’t know anything about it. And when I came down to Oxford, looking for a job, David told me about the sodium–potassium pump.<sup>52</sup> I had never heard of it. I didn’t know what it was. But my eyes just lit up when I heard him talk about it, because here was a method for measuring the effect of a drug.<sup>53</sup> The fact that it was in a red cell miles from the heart actually didn’t strike me, and that I should have been thinking exactly the same thing as plasma concentrations and cardiac concentrations when it came to ATPase in red cells and the heart. But that’s what really turned me on to working with David, and, as I say, I was hugely influenced by everything he did scientifically while he was professor.

**Professor Patrick Vallance:** I guess I just drifted into clinical pharmacology. What I was thinking about as people have been talking was how I ended up having the substrate to even think about drifting into it. The answer is undergraduate teaching, and there were three people who taught me and who influenced a large number of individuals and they were Humphrey Rang,<sup>54</sup> Joe Collier<sup>55</sup> and Brian Robinson.<sup>56</sup> There were two things about undergraduate pharmacology that led me into clinical pharmacology. The first was that it was an integrating science, it wasn’t just about looking at the biochemistry or physiology, something actually changed when you intervened, you could see biology in action. The second point was that this was clearly demonstrated. In those days (c. 1978–80) at St George’s Hospital Medical School, London (St George’s, University of London since 2005), there was an integrated pharmacology and clinical pharmacology

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<sup>52</sup> See Eisner and Smith (1991).

<sup>53</sup> See, for example, Aronson *et al.* (1977); Boon *et al.* (1984).

<sup>54</sup> Professor Humphrey Rang worked on the binding of radiolabelled atropine to smooth muscle of the gut for his PhD in Oxford. See Paton and Rang (1965).

<sup>55</sup> Professor Joe Collier wrote: ‘Brian (Fyfe) Robinson retired from his chair in cardiovascular medicine at St George’s Hospital Medical School around 1985 (as I recall). He had been a student at St George’s and after his obligatory stint in the armed services (call-up) he came back to St George’s where, barring a research stint in the US, he gradually rose through the ranks both as a clinician and as an academic to get his personal chair.’ E-mail to Mrs Lois Reynolds, 3 August 2008. See Collier *et al.* (1970).

<sup>56</sup> See, for example, Benjamin *et al.* (1995).

course and there were a couple of practicals where  $\beta$ -blockers or atropine were given to what was called a volunteer – somebody encouraged out of the audience by Joe Collier and injected with a  $\beta$ -blocker.<sup>57</sup> We saw physiological parameters changing, and I think that was incredibly important for a large number of students. It inspired them to go on to try to understand what they had seen. I think rather few of them ended up as clinical pharmacologists, but many took away a basic understanding and some inspiration.

**Professor Brian Prichard:** I suppose the reason I went into clinical pharmacology is possibly almost unique. I started at King's College, London, aged 17, and I thought, 'Well, I don't want to complete preclinical studies too quickly and start clinical studies'. (I should also add in parentheses that my favourite pastime was spending the long vacation cycling across Europe to the Alps and back with a couple of friends.) So, I did a BSc in physiology, which meant two extra-long vacations, besides just one for the ordinary preclinical course. The part of the BSc that I enjoyed particularly was pharmacology with George Brownlee and Peter Quilliam. Having done the BSc and wanting another long vacation, I thought I would spend one more year and do a Master's degree by examination in pharmacology. After qualifying in medicine at St George's, I spent four years doing various clinical posts there when Desmond Laurence advertised his research assistantship in clinical pharmacology. It was due to the MSc that I was appointed on 1 December 1961, at University College Hospital Medical School (UCHMS). My entry into clinical pharmacology could be put down to a passion for transcontinental cycling.

**Flower:** What about industrial clinical pharmacology? We have several people from industry here: Arthur Fowle, Tony Peck and Trevor Jones. OK, Arthur is going to say a few words about how he became a clinical pharmacologist.

**Dr Arthur Fowle:** I am afraid it is entirely unglamorous. I had a long suit in cardiovascular research, which seemed to be the best-funded way of studying clinical science, which I always thought I was in. I went to the Wellcome Foundation by accident and thought that I was there to solve problems for them, such as finding out why British drivers weren't welcome in Europe because of the number of accidents they had, which I thought was probably due to very cheap alcohol on the boat, but French authorities thought was due to Marzine,

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<sup>57</sup> For a description of Paton's UCH preclinical practical classes and students' self-administration of drugs to observe their effects, see Rang and Perry (1996): 297.

which most travellers used to take at that time.<sup>58</sup> And, I solved those kind of problems from 1965 and thought of myself as a clinical scientist, until I read Colin Dollery's article.<sup>59</sup> Colin and I had been housemen together and good friends, and I suddenly realized that perhaps I was a clinical pharmacologist and so it really had nothing to do with training, but just copying.

**Dr Tony Peck:** Yes, I had a fellow feeling with David Grahame-Smith that I needed a living, and Eric Neil, professor of physiology, and Franz Hobbiger, reader in pharmacology at the Middlesex, had a job going and I went into clinical pharmacology for that reason.<sup>60</sup> Of course, the Middlesex Hospital, which will come out later I am sure, was the one medical school in London that never had a department of clinical pharmacology. It had a pharmacology department, which C A Keele headed for a long time, with Desirée Armstrong, and their work on substances causing pain and itch was quite seminal.<sup>61</sup> But the Middlesex was not a place to do clinical pharmacology, because, as I said, it never had a department. Its medicine was regarded as an extension of Harley Street, London. Anyway, it provided me with a living and a lot of fun teaching, but it was only when I joined the dear old Wellcome Foundation down at Beckenham in 1969 that I really had the opportunity to start doing human research and had a great deal of fun for 25 years.<sup>62</sup>

**Flower:** But when you joined the Wellcome Foundation in those days there was no department of clinical pharmacology, was there? I mean, did they call it that in those days?

**Peck:** May I pass that to Arthur?

**Fowle:** Yes, we did. We changed the name from medical department to clinical pharmacology in 1966, and Tony came to join us when he said he did.

**Professor Donald Davies:** First of all to correct you, chairman. I am a biochemical pharmacologist who went into a clinical pharmacology department, so there are at least two of us here.<sup>63</sup> I had studied for my PhD

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<sup>58</sup> Cyclizine hydrochloride, a H<sub>1</sub>-receptor antagonist.

<sup>59</sup> Dollery (1966).

<sup>60</sup> See, for example, Anon. (1957, 1959).

<sup>61</sup> See, for example, Armstrong *et al.* (1957).

<sup>62</sup> See, for example, Peck (2004).

<sup>63</sup> Professors Donald Davies and Geoff Tucker.

with Professor Tecwyn (Tec) Williams at St Mary's Medical School, London, on drug metabolism. I then joined Bernard Brodie's laboratory at the National Institutes of Health (NIH, Bethesda, Maryland) in the US, where the research was directed to relationships between kinetics and metabolism and drug action in man.<sup>64</sup> While I was at Brodie's laboratory, Colin Dollery applied to the MRC for a grant to set up the MRC Clinical Pharmacology Research Group at the Hammersmith Hospital.<sup>65</sup> Fortunately for me, Tecwyn Williams was one of the reviewers and it is alleged that he suggested that Dollery appoint a biochemical pharmacologist and put my name forward. I came back to the Royal Postgraduate Medical School (RPMS) at the Hammersmith Hospital, London, in 1967 and brought with me analytical techniques and knowledge of kinetics and metabolism, reactive metabolites and drug interactions, and that's how I got started in clinical pharmacology.

**Flower:** We have talked about how we got into the subject, but maybe now is a good time to start talking about the way in which the subject developed in different centres around the country, and Don [Davies], I don't know whether you would like to say a few words about the Hammersmith, when you first began there and so on?

**Davies:** There are others here who might correct me, but we began applying a knowledge of kinetics, drug metabolism, analytical techniques to solving drug problems in patients at the Hammersmith, particularly work on drug interactions with Alasdair Breckenridge and Michael Orme, and on cardiovascular drugs, differences in dose–response, with Charles George and John Reid.<sup>66</sup> That led to a great output of research, and perhaps those were the low-hanging fruits that were easily gathered. Where it became more difficult – we will see what others think – is when clinical pharmacologists moved into mechanisms of drug action, but possibly more importantly, mechanisms of disease processes, without the firm foundation of drug metabolism and kinetics to back up the research. That was more complex and it became more difficult to obtain research funds.

**Flower:** What we are trying to get now is a sense of what was happening at the beginning when academic departments began to call themselves 'departments of clinical pharmacology' and how the subject gathered momentum.

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<sup>64</sup> See, for example, Neff *et al.* (1965); Vesell (ed.) (1971).

<sup>65</sup> MRC grants for 'research groups' were introduced in 1961. See Thomson (1973): 153.

<sup>66</sup> See, for example, Breckenridge *et al.* (1971).

**Laurence:** It really happened for me when Tony Dornhorst at St Thomas' asked, 'Are you going to apply for the readership at UCH/UCL made vacant by Bill Paton [in 1956]?' I said, 'No, because I am not yet qualified to be a reader.' He said, 'Go and see Max Rosenheim, professor of medicine (that's Sir Max Rosenheim after 1967), and tell him I told you to.'<sup>67</sup> So I did and, briefly, the job was demoted for me, and it was, interestingly, a joint appointment between University College London and UCH Medical School, which were then separate, later to come together. At the interview I was supported by Max Rosenheim and for many years after; he was a great man for supporting people. I attended the interview committee and this was in the days when the title 'senior physician' was bandied about and meant something, and the 'senior physician' at UCH said to me, 'Tell me, Dr Laurence, what is this chemical pathology that you are so interested in?'<sup>68</sup> I got the post and it was titled Pharmacology and Therapeutics, joint with UCL, and I believe it originated when Harry Himsworth, later secretary of the Medical Research Council (MRC), was professor of medicine (1939–49). He and the then professor of pharmacology at UCL got together – I am afraid I don't know who it was at UCL at that time.<sup>69</sup> They perceptively saw this was a coming scientific and clinical subject, and that there should be clinicians integrated with basic sciences. Anyway, I got the job. My background was clinical, so my work in UCL was limited; I simply did clinical pharmacology at the medical school, and we developed from there.

**Flower:** How many people were there when you first began?

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<sup>67</sup> Professor Desmond Laurence wrote: 'When Max Rosenheim was president of the Royal College of Physicians (PRCP), the College ran Advanced Medicine Conferences. I was told I must contribute, so I put my best foot forward and showed Max my text. He said it was too complex. I replied: "This is an Advanced Medicine Conference". He said, "Exactly, so keep it simple." He was a marvellous man, also what is known as a "doctor's doctor", ie sick doctors sought him out.' Note on draft transcript, 21 June 2008. Professor Desmond Laurence wrote: 'Rosenheim, although not a clinical pharmacologist, was the first editor of the Department of Health's *Prescribers' Journal*. It was then entirely more appropriate that a physician should have edited this.' Note on draft transcript, 4 July 2008. See also note 117. See Biographical note on page 114.

<sup>68</sup> Professor Desmond Laurence wrote: 'Many senior doctors thought clinical pharmacology was a rash term for mindless prescribing. The senior physician once chased me round the medical school as he thought I had criticized his treatment of a patient. Max Rosenheim told me not to let it bother me.' Note on draft transcript, 21 June 2008.

<sup>69</sup> Frank Winton was professor of pharmacology at UCL from 1938 to 1961. For the history of the department, see [www.ucl.ac.uk/Pharmacology/history.html](http://www.ucl.ac.uk/Pharmacology/history.html) (visited 7 May 2008). See also Black (1994).

**Laurence:** One in UCH Medical School: there was just me and it gradually developed. It was always a fairly modest enterprise. I went to the joint post in 1954 from St Thomas' Hospital Medical School.

**McDevitt:** I think there are a number of different models that operated in the 1960s, during that transition phase. For example, there were places like Belfast, where they had had a department of pharmacology, and it certainly wasn't a research department as far as I was able to find out historically, and they really moved right over to appoint a professor of clinical pharmacology – Owen [Wade] will correct me – and effectively abandoned pharmacology as a subject. So, that was one model, I think, but what they did critically was to make it a clinical department and they gave the department its own beds. Now, another model, I think, was the one that existed in Scotland, where they always had chairs of materia medica in most of the medical schools, and there were clinical departments, but, I think, they also had departments of pharmacology, or certainly pharmacologists present. Then there were other places where a clinical pharmacologist was added on to a department of pharmacology, and that was often extremely difficult, because they often didn't have very much in the way of clinical access. So, I don't think there is a model that applies to all, and sometimes I think it critically influenced what happened beyond that, as to how the thing was set up.

**Prichard:** When I joined Desmond as his research assistant at the end of 1961, we had very little clinical base, though we were located in the clinical faculty. Our clinical activity at that time was a matter of performing a couple of outpatient sessions, mainly in the care of hypertension patients. This was in Max Rosenheim's hypertension clinic and attending his ward rounds. However, over a number of years the clinical commitment developed, and in 1966 I was given charge of beds and in due time ran a full clinical service. Of course, such commitment is very heavy in terms of time, the total number of sessions one has to perform, and I guess until Patrick Vallance came to UCH we were understaffed. A seven-tenths clinical commitment and teaching obligation didn't leave so much time for research. In spite of the commitment and pressure on research, I think it is very important that one has a clinical base, though the roots of the subject of course, scientifically, are in pharmacology. In the late 1960s and early 1970, Robin Shanks, the late Paul Turner and myself with others, including Colin Dollery, Duncan Vere and Desmond Laurence, set about establishing the Clinical Section of the British Pharmacological Society (BPS).<sup>70</sup> As our scientific

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<sup>70</sup> See, for example, Aronson (2006).

roots were in pharmacology, the British Pharmacological Society was where we felt the forum for clinical pharmacology in the UK should be. I guess it also had a fair amount to do with the fact that most of us were members of the BPS in any case. I think that's a very important point that deserves emphasis – if you are going to practise clinical pharmacology you do need your feet in the clinical area, but not forgetting one's scientific roots.

[Professor **Sir James Black** commented that Brian Prichard was being too modest. They first met in 1960, when Prichard was working with surrogate markers and in 1962 Black took him pronethalol, which Prichard gave to patients, gradually adjusting the dose until all the patients had pulse rates at rest at 60/minute before the trial monitoring their blood pressure. This was a trial of equal effects, not equal doses and their blood pressure slowly came down.<sup>71</sup> When propranolol came along in 1964, Prichard again tried to achieve a 60/minute heart rate, which was the first study of  $\beta$ -blockers in hypertension. The range from the smallest to the highest dose of propranolol was about ten-fold, which got Prichard into bad odour with his colleagues.<sup>72</sup>]

**Flower:** Brian, you have been severely censured for being too modest, but do you want to deny or confirm the fact that you got into bad odour with your colleagues?

**Prichard:** I thank Sir James Black, the pioneer of  $\beta$ -blockers, for his comments. I had a little trouble with ICI, who I had to cajole into making stronger tablets. At first they only produced 10mg tablets of propranolol. Some of my patients were taking 40 tablets a day, at least they told me they were.<sup>73</sup> I persuaded ICI to make 40mg and 80mg, and then 100mg for patients with angina and hypertension, and 250mg tablets of propranolol for hypertension patients. I think the important

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<sup>71</sup> Prichard *et al.* (1963). Professor Brian Prichard wrote: 'We started patients suffering from angina pectoris on a small dose of pronethalol and gradually increased the dose up to the maximum tolerated. Patients entered the double blind phase of the trail at the highest dose that was free of side effects. Pronethalol was found to produce tumours in mice and was withdrawn for that reason and was not well tolerated. Propranolol became available in January 1964 and was devoid of sympathomimetic activity. The reduction of blood pressure seen in normotensive angina patients with pronethalol was reported and described in hypertensive patients, as was the use of propranolol in 1964. Several papers followed with a series of 109 patients described in 1969.' Note on draft transcript, 20 September 2008.

<sup>72</sup> Prichard (1964).

<sup>73</sup> Prichard and Gillam (1969).

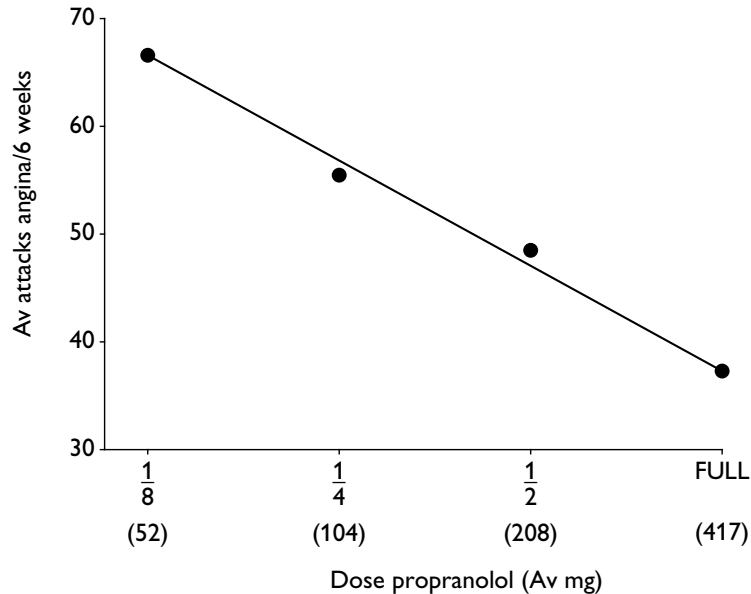


Figure 2: Dose–response curve to propranolol on the number of attacks of anginal pain.  
Adapted from Prichard and Gillam (1971).

principle of what Sir James has just referred to is that I always felt you should apply dose–response principles evaluating new drugs in patients, having been trained by performing dose–response curves to various agonists in the guinea-pig ileum for about three solid months.<sup>74</sup> This means once you have the principle of dose–response hammered into your brain, it never leaves you. We applied this to attacks of angina, and we did a 4-log incremental dose–response curve of propranolol plus placebo in angina pectoris, and obtained a beautiful straight-line dose–response relationship over the doses used: as shown in Figure 2.<sup>75</sup>

**Laurence:** I think I heard Brian Prichard say that he was my assistant. Well, it didn't seem like that to me. He always did exactly what he wanted.

**Professor John Reid:** Can we go back to the origins of clinical pharmacology and some of its most successful groups? I am struck, having been chairman of a large academic division of medicine for the last 10–15 years, by the relatively

<sup>74</sup> The relationship between the dose of a drug administered during a trial to measure direct drug effects and the response of the organism to the drug over time (mg/minute) as illustrated in a graph. See, for example, Aellig (1981).

<sup>75</sup> Prichard and Gillam (1971); Gillam and Prichard (1971).



small scale of some of these influential early groups. I went from Oxford to the Hammersmith Hospital in 1969. When Donald Davies joined him, Colin Dollery was the only clinical academic. Alasdair Breckenridge was a senior registrar and Jim Paterson and Michael Orme were registrars. Alasdair later joined the staff, but when he went to Liverpool I was recruited back from NIH on a Wellcome Trust senior clinical fellowship. What was an enormously influential group in drug metabolism and cardiovascular pharmacology was a very small team. I am sure the same is true at UCH and Bart's.

**Flower:** Brian, you mentioned Paul Turner a minute ago, so I am going to ask Mark Caulfield, who was present in Paul's department for many years and a very close colleague, to say a few words about him, and then I would like maybe to ask Duncan Vere to talk about things at the Royal London and how they got going, if that is appropriate, Duncan.

**Professor Mark Caulfield:** Thanks very much. It's a pleasure to talk about Paul. I wasn't there, obviously, when the department was formulated, because I was still at primary school, but I think that Paul was an incredibly kind and influential man in clinical pharmacology.<sup>76</sup> He was passionate about the subject, and believed that he really should put his entire endeavour into making sure that as many people got as enthusiastic as he was about the subject. And his influence was Sir Thomas Lauder Brunton, who is probably an early example of the medical transfer market that we now enjoy in medical schools, because we poached him from his lectureship in materia medica at the Middlesex in about 1897 to be the first lecturer in materia medica at Bart's.<sup>77</sup> And his principles were observation, measurements and experiment. There's a picture of him in the north wing of the medical school, and on his arm there is a Marey sphygmograph used to record changes in arterial tension, similar to one that you used to use, Patrick, and others, in measuring hand vein changes in vessel dilatation. He was very much an inspiration to Paul Turner.

Paul was influenced by him, but also by some of the people he came across earlier in his career. For example, Sheila Sherlock wouldn't let him have a day off, and even when he wanted a day off to plan his wedding, she said, 'Well, Turner, if you have finished all the ward work, off you go and draw graphs'.<sup>78</sup>

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<sup>76</sup> See, for example, Turner (1993).

<sup>77</sup> See Brunton (1897, 1906); note vase of foxgloves (from which digitalis is derived) in Figure 3. See also Medvei and Thornton (1974).

<sup>78</sup> Turner *et al.* (1962).



Figure 3: Sir Thomas Lauder Brunton, 1913. Oil on canvas portrait by Sir Hubert von Herkomer, presented to St Bartholomew's Hospital in 1960.

Basically, he got this fundamental training in observation, measurements and experiment from his early career. Turner went to work with Professor Quilliam (also known as Q) at Bart's where he and Mike Besser – whom some of you may have heard of vaguely – were contemporaries in Q's lab. And it looked like Mike Besser – you probably don't know this – was being earmarked for the first lectureship in clinical pharmacology, but he went off to the US for a while, and in that time Sir Eric Scowen appointed Paul Turner to the lectureship in clinical pharmacology. So, as a result of that, Mike became an endocrinologist.<sup>79</sup>

But Paul's enthusiasm for the subject was really manifest in his teaching. I trained at the London with Duncan Vere, Tony D'Mello and Ziggy Kruk,

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<sup>79</sup> See, for example, Delitala *et al.* (1983).

and the foundation in basic pharmacology there was fantastic. One of the things that was incredible was to watch Paul Turner teaching medical students, because he always taught them as if they were standing at the end of a bed with somebody that they had to treat and save. And so, in his teaching, he always had a strong connection with the students. When I came in 1989 – because I had applied for a job with Denis McDevitt – but Paul didn't shortlist me, probably very wisely, as he was ill at the time having had coronary grafts, and so what happened was that I got appointed in his absence. So, at my first meeting with him, he said: 'Your responsibility, Mark, is to make sure that with all the medical students, the teaching is really well organized; we pride ourselves here in making everyone a rational and safe prescriber when they get to the point of exit from this medical school, it is really important.'<sup>80</sup> And, as Charles George will attest, because he inspected my post – unfortunately one of the drawbacks of my post was that you spent most of your time doing clinical work or teaching as a result. But Paul also recognized the value of developing countries and the wealth of talent that was hidden there that needed to be drawn out and he had a long history of people coming from all over the world.

The other thing is that he wanted to create clinical pharmacology across multiple specialties, and so he always had fellows, and this may be one thing that in the modern day we would criticize him for, and that's perhaps the lack of a focused research strategy in one disease area. But he believed that one of the great things about clinical pharmacology was you could go where you wanted to, and so if you found something in one area that took you somewhere else, there was no physical barrier to your forming collaborations to go there. So he had cardiologists, oncologists, palliative care doctors, all training with him in the time that I was there. And although it was multiple disciplines, we all learnt something from each other. But the fundamental core principles that make an excellent clinical pharmacologist were there in every one of those people, and although they went on to do other things they took those with them. So although unfortunately, as the editorial in the 1969 *BMJ* says, we never quite managed to have a clinical pharmacologist in every district general hospital, he was hoping that he had put some clinical pharmacology into other specialties, and that's the way he worked.<sup>81</sup> He was a very Christian person in his outlook and he would always try to look after his colleagues and make sure that they were well served in their time with him. But I think his contribution to clinical

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<sup>80</sup> See, for example, Gorog *et al.* (1993).

<sup>81</sup> Anon. (1969).

pharmacology probably was in trying to spread it as broadly and widely around the world through the many people he trained, many of whom have gone on to industry as well as to academia.

**Flower:** We are going to come back and talk about the journals in a minute, as I think that is a very important topic. First, Duncan, do you want to say anything about the development of the subject at the Royal London?

**Vere:** Very briefly, it was a series of U-bends. What happened at the London was that I was seconded across to the department of pharmacology under Miles Weatherall; Andrew Herxheimer, Tony D’Mello and so on were there. And I spent some time there in pharmacology. But then I was elected to the staff as a physician, so with that went beds and outpatient sessions. It was a tremendous load of work, particularly as the clinic was on a Saturday morning in the East End of London. And then, of course, with that went registrar posts, and so John Dunne and Maurice Cuthbert came into those posts, in SHO and registrar posts, but as clinical pharmacologists in the making. And, of course, they have since gone on to much else in clinical pharmacology. But that was how it began, by a series of growths round U-bends. It was very difficult to find the time to teach clinical pharmacology, therapeutics and so on. We had 130 hours of teaching time in those days. Now this has all evaporated, gone. But that was what happened near the start.<sup>82</sup>

**Prichard:** I would like to make two points about Paul Turner. Paul was a devout Christian, and, in fact, when I went to India as the BPS (British Pharmacological Society) visitor, he suggested to Professor Molly Thomas in Vellore that I should take a service in one of the churches of South India.<sup>83</sup> While I had not preached in very many churches, it was as a result of Paul Turner that I had the privilege in India. But, another point to make about Paul is that early on in the Clinical Section of the BPS when I was secretary, I was doing preliminary work for setting up the *British Journal of Clinical Pharmacology*, and I was delighted when he agreed to be volunteered, press-ganged, into becoming our first editor of that journal.<sup>84</sup> He certainly made a great success of that task, setting the journal on a successful course.

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<sup>82</sup> See Vere (1987).

<sup>83</sup> Dr Jeffrey Aronson wrote: ‘Universally known in India as “Doctor Molly”.’ Note on draft transcript, 14 July 2008.

<sup>84</sup> See Aronson (2004).

**Dr Kenneth Hunter:** May I take up John Reid's point about how clinical pharmacologists, even though few in number – in his case he was mentioning the Hammersmith – cooperated together and, in a sense, were more than the sum total of their individual parts. Because I think the same was true at UCH, where I was a student. I became aware of clinical pharmacology as a house physician in the medical unit there, and I think one of the things that hasn't been emphasized enough by Desmond Laurence and Brian Prichard, was the tremendous influence of the professor of medicine, Max Rosenheim, at the time.<sup>85</sup> He was the one that encouraged clinical pharmacology. I am sure Desmond would say that he was given a very free rein and was able to do it, but it was very much helped by Max Rosenheim's stature and his tremendous influence. I remember as a house physician we used to have a weekly business meeting, where we went through all the patients that had been discharged and talked about them, and Desmond Laurence would come along to the meeting, and to other teaching meetings and so on, and gave a different input to the discussion as a clinical pharmacologist. I think it was the influence of clinical pharmacology that permeated through the medical unit certainly, and probably, in a sense, through the whole hospital, which was very important. And then I went back as a registrar, and registrars in medicine at that time could rotate through all sorts of firms, like neurology, and I was working in neurology and a post came up which was between neurology and clinical pharmacology, because levodopa was a new drug and the MRC wanted people to study that. That was a tremendous experience, working jointly, half in clinical pharmacology and half in clinical neurology, for a couple of years. I think it was the influence of clinical pharmacology going out into all the other departments that was terribly important.

**Flower:** Thanks very much, Ken. I don't want to be too 'London-centric' here, because obviously things were happening in other parts of the country. Phil, do you have any reminiscences about the development of the subject in Wales or in Cardiff in particular.

**Professor Philip Routledge:** I suppose my entrée into clinical pharmacology was in Newcastle, and I don't think there's anyone else here from Newcastle, so just to say a few words about that. Sorry, Robin [Ferner] is here. I think Mike Rawlins had an enormous impact when he came in 1974 to Newcastle. There was a department of pharmacology but no department of clinical pharmacology, and Dai Davies, the late Dai Davies, was ploughing a lone furrow in adverse reactions; and I think Mike's appearance crystallized those interests

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<sup>85</sup> See biographical note, page 114.

around the department of pharmacology and it became a joint department of pharmacology and clinical pharmacology.<sup>86</sup> I think the strength of it, as we have heard earlier, was the beds. There hadn't been beds attached to clinical pharmacology, and as soon as there was a clinical base, clinical pharmacology became attractive to junior doctors like myself, because they could see the relevance of it. So I owe my interest in pharmacology to Desmond Laurence's book as a medical student, which was a delightful book to read as one of those of the Hammersmith diaspora who came to clinical pharmacology in Newcastle.<sup>87</sup>

**Professor Walter Nimmo:** I came to clinical pharmacology from anaesthesia to work with Laurie Prescott. I had trained clinically in anaesthesia before moving into clinical pharmacology and then went back and forward once or twice. Training in clinical pharmacology was useful in anaesthesia practice and vice versa.

**Professor Robin Ferner:** Perhaps I can draw one or two threads together in fact, because I had gone back to UCL and then to UCH to study medicine, whereas I had started off as a chemist. And at UCL there were inspirational teachers of pharmacology. There was Heinz Schild, who was revered; I wouldn't say his lectures perhaps were as riveting as other members of staff. There was a young chap called Jim Black, in an interregnum I guess. Then there was the thrill of going to Desmond Laurence's lectures, which were fantastic and marked by newspaper clippings related to awful adverse effects, a habit which I have got into and, I gather, he has still got a drawer of newspaper clippings somewhere, which one might have access to. Brian Prichard – my memory is having rows with him – sorry, having an academic discussion with him – about the value of measuring blood pressure to 2mm of mercury, which varied from one reading to another by 10mm of mercury, and maybe today I will learn the answer. After house jobs at UCH, I then went to Newcastle, not with the clinical pharmacologists, but with Bob Souhami, and there were a number of dramatic and important teachers in Newcastle, of whom George Alberti and Mike Rawlins were two. As you have heard, although Mike may not have lectured a great deal, he got his staff to teach in small groups. So the threads I would draw together are: relatively small departments, as John Reid has said; very influential teachers, as Patrick Vallance and Mark Caulfield have said, and an exciting time.

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<sup>86</sup> See biographical note, page 113.

<sup>87</sup> Laurence (1966).

**Orme:** One or two things to draw together. First, following, I think, Denis [McDevitt] and others, about the importance of the clinical input. Certainly, as we are now moving into the 1970s, when I moved with Alasdair Breckenridge to Liverpool in the mid-1970s, the clinical experience for the first time was allowed. In contrast, in Manchester George Mawer was working at the time, but he was only allowed access to outpatient facilities, and perhaps as a result clinical pharmacology never took on there. So I would stress again the importance of inpatient facilities and beds. The other striking thing in Liverpool at that time, and Andrew Wilson's name has already been mentioned, but he was working and trying to work clinically, following Dilling, who has also been mentioned.<sup>88</sup> The problem was that he was really kept out of the clinical work by a variety of rather parochial clinicians in Liverpool, and the only clinician at that time who was active and helpful was David Price-Evans, whose name might have come up – another Welshman, Don, who was very productive. He wouldn't call himself a clinical pharmacologist, but I think that's what he was and in some ways still is, ploughing away in Riyadh, Saudi Arabia. I think the importance of the clinical input was significant.

The only other topic I would like to cover is the combination of pharmacology and clinical pharmacology. When Alasdair and I moved to Liverpool the pharmacology department was there, and we were placed in the pharmacology department, which gradually changed its name to pharmacology and therapeutics. The strengths of anything that we have achieved in the research side, I think, are based heavily on having a very strong pharmacology department with the basic sciences always there, and that allowed us, I think, to emphasize teaching. I guess we could talk all afternoon about teaching and maybe one of the things that might come up at the future meeting is the role of deans in this. There's something about clinical pharmacologists that seems to be a disease, that they would go on and become deans – there are several of us here in this room; obviously the influence there is on teaching. I don't want to sidetrack us into teaching at the moment, but maybe if you are thinking of a topic for the September meeting, the teaching side could be touched on. But just to stress, I think, the importance of working with pharmacology and clinical pharmacology together cannot be over-emphasized.<sup>89</sup>

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<sup>88</sup> Cohen (1972).

<sup>89</sup> For the transcript of the second Witness Seminar held on 25 September 2007, see Reynolds and Tansey (eds) (2008).

Aberdeen General Hospitals										PRESCRIPTION SHEET			
PARENTERAL DRUGS — REGULAR PRESCRIPTIONS													
DATE COMMENCED	DRUG (Block Letters)	DOSE	TIMES OF ADMINISTRATION							METHOD OF ADMIN.	SIGNATURE	DISCONTINUED	
			XI A	X M	IX P	VIII M	VI A	V P	IV M			Other Times	DATE
A													
B													
C													
D													
E													
OTHER DRUGS — REGULAR PRESCRIPTIONS													
F													
G													
H													
I													
J													
K													
L													
M													
PARENTERAL DRUGS — ONCE ONLY PRESCRIPTIONS							DIET						
DATE GIVEN	DRUG (Block Letters)	DOSE	TIME OF ADMIN.	METHOD OF ADMIN.	SIGNATURE	GIVEN BY INITIALS	DATE	DETAILS	INITIALS				
N													
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OTHER DRUGS — ONCE ONLY PRESCRIPTIONS													
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X													
Y													
Z													
Ward	NAME OF PATIENT			AGE	UNIT NUMBER	CONSULTANT		DRUG SENSITIVITY					

**APPROXIMATE METRIC AND IMPERIAL EQUIVALENTS**

1 Milligram	=	1/1000 Gram
60 Milligrams	=	1 Grain
1 Gramme	=	15 Grains
30 Grammes	=	1 Ounce
1 Kilogram	=	2 1/2 Pounds
<hr/>		
1 Millilitre	=	15 Minims
30 Millilitres	=	1 Fluid Ounce
600 Millilitres	=	1 Pint
1 Litre	=	1 3/4 Fluid Ounces

Figure 4: Aberdeen Prescription Sheet, 1967. Source: Crooks *et al.* (1967): 235.

Wade: What is in my mind is to make a comment about prescribing. And, I want to pay a tribute to Jim Crooks. He, I and Dr William Wallace, a youngster in my department, looked at errors in prescribing in the hospitals where we were working in the early 1960s.<sup>90</sup> It was really after that that Jim produced the ‘Aberdeen’ prescribing form which is now so widely used in hospitals.<sup>91</sup> In the old days, doctors used to write a prescription in the patient’s notes, and the ward sister would make a list for nurses to administer the medicines – it was all very casual, and accuracy was becoming much more important with the arrival of antibiotics and corticosteroids, etc., in the postwar period. More precision was needed, and I think Jim Crooks played a very big part in this important development.

<sup>90</sup> Crooks *et al.* (1965); Wallace (1965); Crooks (1975); Wade (1966). See also note 44 and page 79.

<sup>91</sup> Crooks *et al.* (1967). See also Hamley *et al.* (1981); Wade (1996): 98–9.



**McDevitt:** Just to give an illustration of the basis of clinical pharmacology being in clinical medicine, and the importance of having not just access to beds, but preferably a ward unit that the department actually was responsible for. Something like 20-odd years ago, there was a meeting, not quite like this, but it was in America, and it was to review the first 20 years of clinical pharmacology in, principally, the UK and the US.<sup>92</sup> One of the things I was asked to do was to survey the senior registrars in training, and one of the questions that I asked them was to prioritize what their ideal career post would be. And the things that they put at the very bottom of the list were the things where they would not have direct responsibility for patient care.<sup>93</sup> I think that the success of clinical pharmacology in this country for a long time was the expectation that you would get a job where you would have your own patients to treat, and where you could encompass all the excitement of clinical pharmacology in your research career.

**Barnett:** Just to extend the concept of the importance of the clinical input of clinical pharmacologists. Because of the wide spectrum of medicine that clinical pharmacology covers, clinical pharmacologists became general physicians, and have continued to be that way, taking a holistic approach to the whole of medicine and therapeutics. This has continued for many years, but is now gradually fading. General medicine was retained in clinical pharmacologists who had clinical practice, simply because they didn't have another specialty, and because therapeutics covered all of medicine. I echo what Mike Orme was saying, that the issue about teaching and expressing what clinical pharmacology is across the general medicine horizon is still very, very important, and unfortunately it's failing so badly.<sup>94</sup>

**Flower:** I want to encourage anyone who wants to say anything about the development of clinical pharmacology in centres other than London to say their bit if they would like to do so, before we move on to the next topic.

**Grahame-Smith:** I would just like to say a word or two about what happened in Oxford, and Stan Peart can give the background of the views of the MRC at that time better than I can. But to cut the story short, after a fairly frightening interview and at least two post-interview interviews in Oxford, I was appointed to the chair of clinical pharmacology in Oxford and director of the MRC Unit of Clinical Pharmacology in 1972. Now, those of you who

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<sup>92</sup> For a discussion of the Anglo–American meeting, see page 15. See also Melmon and Turner (1986).

<sup>93</sup> McDevitt (1986).

<sup>94</sup> See page 30.

know about these things will know that you are not just appointed; you have to go through a long process of producing a full programme of research until you are 60, which takes quite a bit of doing. This was not easy because I was not in the mainstream of clinical pharmacology; I was still a clinical biochemical pharmacologist. And I was interested in the brain, because some of you may know that serotonin is in the brain, and it became a popular area of research for the next two decades. I really wanted to develop basic and clinical psychopharmacology in Oxford, and Professor Michael Gelder, who was professor of psychiatry, was very interested in clinical psychopharmacology and he too was attempting to get it going, and it was clear that there would be a place for collaboration between the department of psychiatry and the department of clinical pharmacology. So in fact, all the time that I was there, one of my main thrusts was basic and clinical psychopharmacology, doing basic experiments to elucidate mostly the effects of drugs upon the serotonin system and translate that into the clinical sphere and also at the same time training people in neuropharmacology, which they could then apply to their work in clinical psychopharmacology. That has been very successful, and Phil Cowen, professor of psychopharmacology in Oxford, Guy Goodwin, professor of psychiatry in Oxford, Dave Nutt, professor of psychiatry in Bristol and Professor Paul Grasby, professor of psychiatry at Imperial College, London, all went through the MRC Unit of Clinical Pharmacology, learning both basic neuropharmacology and clinical psychopharmacology. That was, I think, quite successful training for them and produced a lot of papers of one sort or another.

The other area that I was very interested in, in terms of biochemical pharmacology, was finding surrogate biochemical pharmacological markers for drug effects, and Jeff Aronson has spoken about sodium–potassium ATPase in red cells, which is a good example.<sup>95</sup> It never quite came to anything clinically useful in an everyday sense, except – and to me, this was a big surprise – we showed an adaptive response of red blood cells to long-term treatment with digoxin in humans. In other words, the red cell develops more sodium–potassium ATPase sites. For me, this triggered a great interest in neuroadaptive responses in the brain to chronic treatment with antidepressants, neuroleptics and almost every CNS drug that you can think of, because the brain is one of the greatest adaptive organs, par excellence. So those were the main themes of the unit's work over the years. However, I found it very difficult to establish an accepted and strong

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<sup>95</sup> See page 16; Eisner and Smith (1991).

identity for clinical pharmacology in Oxford. I remember treating a very well-known and distinguished professor of philosophy in Oxford after a mild stroke, who asked me: ‘What’s your specialty?’ in the way that they do in Oxford. I replied, ‘I am professor of clinical pharmacology’. ‘What’s that?’ So I said, ‘Well, studying how medicines work, what they do to the body, how the body deals with them, their effects and their side effects’. ‘Oh, you are the professor of pills’. Straight in, ‘professor of pills.’

When I first went to Oxford, I went to an induction party by the Rhodes Trust. I was introduced all round by the secretary of the Rhodes Trust as the professor of criminal psychology, which, of course, is very much more interesting at a cocktail party than the professor of clinical pharmacology. [**From the floor:** I shall use the line myself.] And then finally, just to give the flavour of Oxford and how difficult it can be, going to a private dinner and sitting opposite a very nice, very distinguished lady of the upper classes, who said, ‘How did you get here, young man?’ (because I was a young man). I went through the whole rigmarole and she said, ‘How did they know that you would be socially acceptable?’ So, these are some of the things that I came across in Oxford that are relevant to the teething troubles of clinical pharmacology.

But I have to say I had a row at the interview for the professorship, not a big row, but subsequently at the post-interview it was quite a row, because I insisted that I wanted to continue to do clinical medicine and this was contrary to some opinions in Oxford at the time. My reason was that I very much liked doing clinical medicine, and I don’t think that a clinical pharmacologist could hold his head up unless he knows, in fact, about the prescribing of drugs to people who are ill. Also, the clinical students will soon find you out if you are just a theoretician. You have got to know what you are talking about on a ward round or whenever you are teaching clinical students, you really must know the practical implications. I think it is extremely important to maintain this contact with ordinary, grubby, day-to-day medicine. Our problem is – and it hasn’t been said yet – that we are not organ-based. That’s why the subject finds its position difficult, because we are not organ-based. Those who fund the National Health Service would rather pay the pharmacists (cheaper) to look after the drugs, not the clinical pharmacologists. So there is still a serious problem, I think, in identity of the subject of clinical pharmacology and I don’t know how you overcome that.

**Flower:** I think it is best if we stick to criminal psychology.

**Aronson:** David didn't tell you, but he told me that when he was accused of being a criminal psychologist, someone asked him what did he specialize in? What would you say? Drugs.

I wanted to add something to what David said about Oxford. When we arrived we rapidly learned that there were two groups of individuals in the hospital, those who thought that we were rubbish and those who were keen to collaborate – it was quite a divide. And you knew which ones steered clear of us, and you knew which ones were keen. And we also realized that there weren't going to be jobs in clinical pharmacology, so we did what Mark described Paul Turner doing, which was to bring other specialists into the department to train them somehow in the use of drugs, and send them out to their disciplines, such as Nick Boon, for example, who is now a cardiologist in Edinburgh, and Chris Hawkey, now a gastroenterologist in Nottingham. We had nephrologists, psychiatrists and, as David has described, a whole host of people across the spectrum of different medical disciplines and we hope we seeded our discipline into those specialties. And, in turn, we were then asked to collaborate with others outside of the department: I published with gastroenterologists, cardiologists, nephrologists, psychiatrists, and so on, which has enriched my career enormously by those kinds of collaborations that do come if you bring others into your department and try to seed as we did and, as Mark Caulfield described, as did Paul Turner.<sup>96</sup>

**Reid:** I want to add something to David Grahame-Smith's comment before saying something about the Scottish medical schools and Glasgow in particular. I can confirm, as a student at Oxford in the preclinical and clinical school through the 1960s, that there was absolutely no clinical pharmacology. Most students would not have known what it was. There was no teaching on prescribing and no teaching of therapeutics. In spite of this, I managed to follow a career in clinical pharmacology via the Hammersmith. In Scotland it was very different. I do not know about Dundee, because it is the newest Scottish medical school, but I am certain that in Aberdeen, Edinburgh and Glasgow, clinical pharmacology grew out of materia medica and therapeutics as an undergraduate teaching responsibility. The universities funded clinical academic teaching posts: lecturers in materia medica and therapeutics for over 200 years in Glasgow. One of the early ones was professor of botany as well as professor of materia medica. The name changed to therapeutics in Edinburgh and Aberdeen in the 1960s because of local interest in drug regulation and safety, led by Alastair Macgregor and

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<sup>96</sup> See, for example, Willoughby *et al.* (1982); Williams *et al.* (1978); Brearley *et al.* (1993); Antia *et al.* (1995).

Derrick Dunlop.<sup>97</sup> Clinical pharmacology was late in coming on the scene, as it was more of an experimental and research discipline in the early days. The merger of undergraduate teaching, drug regulation and experimental medicine emerged as clinical pharmacology in the 1970s. However, it was firmly based in clinical practice with the professor of materia medica (and later clinical pharmacology) always having responsibility for beds in a main teaching hospital through the nineteenth and twentieth centuries.

**Professor Morris Brown:** I was going to follow on from David [Grahame-Smith]’s account of Oxford with an account of the whipper-snapper university’s [Cambridge] rise of clinical pharmacology, but John [Reid] got in the way. But that’s appropriate in a way, I suppose, because my first subconscious introduction to clinical pharmacology – although I have lost the accent – was getting a school prize awarded by [Derrick] Dunlop in Edinburgh Academy, and, of course, John [Reid] was my first supervisor at the Hammersmith when I came there. But Cambridge was very much a sort of new boy on the block, not just in clinical pharmacology, but in clinical medicine, in a weird sort of way. There’s been a clinical school in Cambridge for a long time, and I think that one of the final spurs to setting up clinical pharmacology in Cambridge was that there was a final MB in which clinical pharmacology had long featured as quite a major part, and the only teaching which went on in Cambridge for that was by an undergraduate pharmacologist with a lovely Lancastrian accent called Bill Grundy, who made sure that everyone passed, by telling them the questions before they got the paper.<sup>98</sup> But the university in particular – one can’t call it a preclinical school, because there still isn’t a preclinical school in Cambridge, they can’t get the departments to agree on that – but the university was rather against giving much money to a clinical school for clinical activities. So, clinical pharmacology came about after the retirement of one of the physicians at Addenbrooke’s, and it was one of the NHS physicians, David Rubenstein, who persuaded Addenbrooke’s that they should fund a chair in clinical pharmacology.<sup>99</sup> And we have still never had any university funding for clinical pharmacology in Cambridge. So my own philosophy, having come out of the department at Hammersmith, as John described, I suppose, has been more in the way of using drugs to investigate disease and physiological processes and that as I am sure you would say yourself, David, is challenging. But I very much also followed the Oxford philosophy

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<sup>97</sup> See, for example, Macgregor (1965, 1969).

<sup>98</sup> See, for example, Grundy (1968).

<sup>99</sup> Rubenstein and Wayne (1976).

that if we are not going to create many pure clinical pharmacologists, we have to influence people going into other specialties, and many of our training posts have been formally in clinical pharmacology and an organ-based specialty.

**Prescott:** I would like to follow up on what John Reid said about the Scottish medical schools, where there was a long tradition of departments of *materia medica* and therapeutics. These departments were often on an equal footing with the departments of medicine, in terms of clinical commitments and teaching responsibilities. This was perhaps even more so in the time of Sir Derrick Dunlop in Edinburgh, where the department of therapeutics probably eclipsed the department of medicine.<sup>100</sup> The strong academic tradition of *materia medica* and therapeutics was a great advantage and it certainly facilitated the introduction of clinical pharmacology as a specialty. I was appointed as senior lecturer in clinical pharmacology in the department of therapeutics in Edinburgh in 1969 with Professor Ronnie Girdwood, who was very supportive.<sup>101</sup>

**Professor Frank Woods:** Strangely enough, Sheffield is rather like the Scottish universities. The first professor of pharmacology and therapeutics in Sheffield was William T Cocking (1897–1911), who was appointed in 1890, and thereafter you had a succession of Sir Edward Mellanby (1920–33), Sir Edward Wayne (1934–53), Grahame Wilson (1954–67) and Robert Kilpatrick (1966–75, Baron Kilpatrick of Kincaig from 1996), all of whom had a very strong endocrine specialty, and, indeed, towards the end of the 1960s, the period we are talking about – the transition if you like – and the emergence of clinical pharmacology, the department of therapeutics had more beds than the department of medicine. Indeed, whereas I accept what colleagues say that it is important, as David Grahame-Smith has emphasized, for respectability, but also in relation to the quality and power of your teaching, to be seen to be delivering medicine at the bedside and in the clinic, also we found some difficulty because

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<sup>100</sup> Professor David Webb wrote: ‘Going back to earlier records [the *Edinburgh University Calendar*] it seems that the Christison chair, which I currently hold, and which was held by Sir Derrick Dunlop, was the first chair of therapeutics in the UK, instituted in 1919. The descriptor “therapeutics and clinical pharmacology” was only introduced much later, as indicated by Professor Laurie Prescott.’ E-mail to Dr Daphne Christie, 12 February 2007. See also Blackden (1968).

<sup>101</sup> Professor Laurie Prescott wrote: ‘In addition to general medicine, I also had a clinical base in the Regional Poisoning Treatment Centre where there were wonderful opportunities for research and teaching in high-dose human pharmacology. In the course of time, Ronnie Girdwood changed the name to the department of therapeutics and clinical pharmacology. I think it is important to remember that the long-established departments of *materia medica* and therapeutics in the Scottish schools laid the foundations for modern clinical pharmacology.’ Letter to Dr Daphne Christie, 12 July 2007.

we had too much clinical responsibility. And once it became clear that we were able to recruit high-quality non-clinical scientists, if I may call them that, as our equal colleagues, our opportunities for research, so far as I am concerned anyway initially, were hampered because of the weight of clinical work. I don't think it did us any harm in relation to teaching and respectability, but I think it did hamper some of the research development.

**McDevitt:** It's just to complete the Scottish picture, because of course Dundee was for a long time the clinical base of St Andrews University, and so it, like the other Scottish medical schools, had a chair of materia medica from the nineteenth century onwards. When Dundee University split away from St Andrews, in 1967, it changed the name of the chair to therapeutics.<sup>102</sup> But, in fact, similar to what's just been said by Laurie, there was tremendous power both in the chair of medicine and the chair of materia medica. It was actually alleged – and I can't confirm this – that Sir Robert Brockie Hunter, professor of materia medica, and Sir Ian Hill, professor of medicine, kept their names on every clinical bed in the Tayside region and made a point of going round the beds at least once a month and changing some of the treatments, just to make sure that their empire was preserved. Now, in fact, when Brockie Hunter went to be vice-chancellor of Birmingham in 1968, James Crooks was appointed to Dundee as professor of therapeutics, and he was a very influential figure, not just within Scotland, but also within the development of clinical pharmacology in the UK.<sup>103</sup>

Now, the other important aspect of the teaching responsibilities, which John Reid and Laurie Prescottt have spoken about, is that very often in the Scottish medical schools, departments of materia medica or therapeutics had access to final exams, as well as teaching. One of the other difficulties encountered by some of these new chairs of clinical pharmacology was in getting into the examination system and certainly getting into the examination system after about the third year; whereas in Scotland, traditionally, clinical pharmacologists examined right up until the final MB. And I think that gave them great influence.

**Routledge:** You asked me earlier to comment on Wales and I think this is an appropriate time, because Wales is a very new player on the block. I think it was when Alan Richens went to Cardiff in 1981 that clinical pharmacology started. He negotiated the beds, which was, I think, crucial. I think he did one other

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<sup>102</sup> See [www.archiveshub.ac.uk/news/02112106.html](http://www.archiveshub.ac.uk/news/02112106.html); [www.dundee.ac.uk/main/about.htm](http://www.dundee.ac.uk/main/about.htm) (visited 24 October 2007).

<sup>103</sup> For example, see note 90.

astute thing, which was to get an exam in therapeutics mandatory for the very first time, so that the students couldn't become doctors if they failed. Prior to that, they could scrape through on the medicine, but Richens developed the objective-structured clinical exam, based on the Dundee model, which seems now to be the model for most of the exams in Cardiff.<sup>104</sup> But I think that he recognized that if you want a subject to have prominence, it has to be examined and students will work at it. He's left that legacy, for which we in Wales are very grateful.

**Aronson:** I wanted to ask Phil a question about Cardiff, because I am not sure if Alan Richens set it up, but when I first visited Cardiff at that time, you had a contract unit for doing studies for pharmaceutical companies. This is something we haven't discussed, and I wondered how the presence of such a unit in your department, and perhaps Charterhouse [at Bart's] – I don't know if it was through Paul Turner's involvement – how did that influence the development of clinical pharmacology?

**Routledge:** I think it helped in many ways and I think people like John Posner and Tony Peck will have worked with Alan Richens in that unit. It did really give opportunities first of all for income generation for other research, but secondly, to develop strong links with the pharmaceutical industry. I think Dave Barnett mentioned earlier the importance of the Merck fellows. I was a Merck fellow and several others were and they did a marvellous priming job in getting those of us who were new to clinical pharmacology in the 1970s to broaden our horizons and come back with renewed interest in clinical pharmacology.<sup>105</sup>

**Laurence:** A word about Sir Derrick Dunlop. I am not sure whether he was professor of materia medica or therapeutics at Edinburgh, I think it was therapeutics. Anyway, I was involved in setting up, for the World Health Organization (WHO), the Technical Group on Clinical Pharmacology in the early 1970s and we produced a number of reports [see e.g. Figure 5].<sup>106</sup> They got in touch with me, particularly about the choice of chairman. So I decided to

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<sup>104</sup> Harden *et al.* (1975); Lowry (1993).

<sup>105</sup> See Baber (1991); Posner (1992).

<sup>106</sup> Professor Desmond Laurence wrote: 'The first WHO Technical Report on clinical pharmacology, chaired by Sir Derrick Dunlop, is a truly seminal document. Years later, for the first World Conference of Clinical Pharmacology at Wembley, organized by Colin Dollery, he had it reprinted for all the delegates, so good was it. Over the years, there have been numerous relevant WHO Reports, and also the famous Essential Drugs/Medicines Programme for developing countries.' E-mail to Mrs Lois Reynolds, 20 August 2008. See also note 152.



suggest somebody who was professionally allied to, but not actively professionally concerned with, the development of clinical pharmacology (which might lead to friction). I thought hard and my thoughts turned to Scotland. Of course, I had met Derrick Dunlop. I had heard him lecture: a man of extraordinary presence, charisma is certainly the right word for him. So I suggested him and gave my reasons. And of course, I knew that in an international meeting it was pretty certain that almost nobody would ever have met a character like that before. And the WHO got on to Dunlop and asked: ‘Would you consider this?’ And so he phoned me and said, ‘What’s all this about?’ And so I told him and I said I thought he could be a successful figure for bringing everybody together on this relatively new subject, and he said, ‘Well, you’ll keep me informed won’t you.’ And he did it, and it worked out as expected. On the first evening, Lou Lasagna, who I think was the vice-chairman, escorted us to the usual WHO buffet at the beginning of a Technical Group, and Lou Lasagna took Dunlop along and he said, ‘Sir Derrick, what would you like?’ and Dunlop pointed to a bottle of Scotch whisky, ‘The wine of my country.’<sup>107</sup>

**Vere:** Very briefly on Mark Caulfield’s remarks. Paul Turner was a remarkable colleague and friend indeed, and we agreed very strongly about joint training programmes. It was very difficult in the enactment. I found quite quickly, when I was chairing the committee of the Joint Committee on Higher Medical Training (now Joint Royal Colleges of Physicians Training Board) on clinical pharmacology, that other specialties regarded clinical pharmacology much as one might think of bird flu virus nowadays. A couple of brief examples of this: it seemed to me that the cardiologists were the people who really would be most likely to accept a joint training programme. This was obvious, but no. There was no response at all. The worst, though, was to come, because there was a dentist who was a very good clinical pharmacologist and I rang up the chairman of the surgical committee, and he turned out rather surprisingly to be a pathologist. And he said, ‘No, no, no.’ I said, ‘How about setting a precedent?’ And his reply was, ‘We have no precedent for setting precedents.’ And that was it; end of conversation. I still think that Paul was right.

**Flower:** We have 15 minutes before tea, and Desmond mentioned the WHO report; and somebody, I think it was David, mentioned the MRC’s involvement, so I wondered whether anyone might like to say a few words about the impact

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<sup>107</sup> Professor Desmond Laurence wrote: ‘He was a great success, and drank my “duty free” bottle of whisky in the evening when we planned the next day’s business (he said his wife required him to come home with his bottle unopened).’ Note on draft transcript, 21 June 2007. See Figure 5.

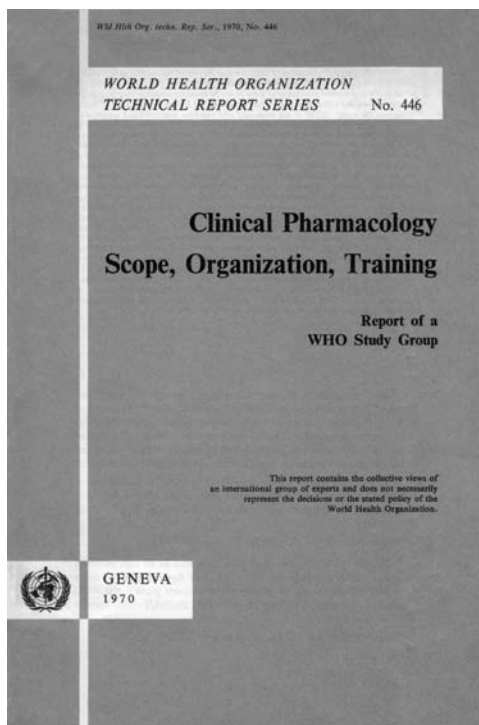


Figure 5: WHO Technical Report no. 446, 1970.

of the MRC in clinical pharmacology or that of the WHO report or the Royal College of Physician's report of 1969?<sup>108</sup> What influence did these have on the subject? Does anyone feel able to speak to that for a minute or two?

**Laurence:** I think the WHO Technical Report has exerted an immense influence.<sup>109</sup> I well remember when the International Conference on Clinical Pharmacology came to London at Wembley. Colin Dollery was the moving spirit and he had, I forget the year of that conference [**From the floor:** 1980], he had the WHO Technical Report reproduced as a conference paper, which I think is a sufficient testimonial for it.<sup>110</sup>

**Orme:** Just a brief comment following on from Desmond on the WHO. I don't know whether we would like to go beyond 2000 in our terms of reference, but one of the worries that I have had about WHO is that since that report there

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<sup>108</sup> See notes 24 and 25.

<sup>109</sup> World Health Organization, Study Group (1970). See also Gross (1986); note 152.

<sup>110</sup> Dollery (1978); Turner (ed.) (1980).

has been an almost total silence from the WHO, in spite of attempts in the late 1980s to get it brought up to date. But if there is some good news, I gather that the new WHO Director [Dr Margaret Chan, from 2006] is having a new broom and one of the things that they seem to be more interested in is not neglected diseases, but clinical pharmacology. So whether anything will come of this – the trouble is the WHO is a rather strange organization, but maybe things are a little bit more positive than they were during the last 25 years.

**George:** I think those were incredibly important reports and they did outline the training programme and the potential career contributions you could make following a training programme. It also meant that there would be a certain number of physicians who carried senior registrar status; and then the fly in the ointment came along, which was the Department of Health's Joint Planning Advisory Committee (JPAC), which had obtained some figures from Paul Turner that suggested that rather than there being 24 posts in clinical pharmacology, there should only be 12 for the whole of the UK. I managed to draw on Denis McDevitt's article, which had been printed in *Clinical Pharmacology and Therapeutics*, and then to do a rapid survey round the UK departments of clinical pharmacology and went to JPAC with a proposal that we should actually have 24 posts.<sup>111</sup> And everybody accepted my figures, and the late John Swales at the tail-end of the meeting said: 'Why don't we be generous and give them 25?' And everybody went away happy, except the man from the Department of Health.

**McDevitt:** Just an example against Charles's background of 25 posts in England. When JPAC came out, and when they were starting to approve senior registrar training posts, we managed to ask them to approve our department for two posts in clinical pharmacology, but also because general medicine was part of the system, we had it approved for two posts in general medicine as well, and we managed to persuade the powers that be in Northern Ireland that we should have four posts.<sup>112</sup> So, for a period of quite some years, we actually had four senior registrar posts within our department, and we used them basically to bring people through to do MDs. Dennis Johnston, who's now the head of clinical pharmacology in Belfast, trained under that system. But a lot of them did what other people have been doing; they did, say, two or three years with us, and developed a particular interest and went off to become consultants in

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<sup>111</sup> See McDevitt (1986); Reid (1997).

<sup>112</sup> See Glossary, page 123.

a different specialty. But we were particularly fortunate at that stage that we managed to buck the system.

**Herxheimer:** I would like to make a slightly different comment, which concerns the start of clinical pharmacology. Clinical pharmacology is the offspring of a union between pharmacology and medicine and these have not been equal partners. The initiative, as we have heard, the power, has always lain with medicine, and so pharmacology has played a hugely important maternal role, but the father has really determined the career of the offspring. I think that if we look at all the stories that we have heard from different places, we can see that is how that interaction has played out in its different variations. For example, the JPAC posts are entirely from medicine; pharmacologists played no part in that.<sup>113</sup> Pharmacology was nothing to do with it; it's like once you have recognized the importance of clinical pharmacology in a medical context, then the child has left home and the career is determined by the male ancestry. I think that's very impressive, and I think it's self-perpetuating, because medicine has the power everywhere, both in education and in health services and other places where clinical pharmacology is needed. So, we are left with that structure and we have to make it work.

**Flower:** That's a good point; would anyone like to talk to that?

**Fowle:** I'm ex-Wellcome Foundation. When I joined Wellcome I became a consultant physician at the same time, and I have listened to the conversations from dedicated clinical pharmacologists who ran departments, and I wonder what they thought they were running them for, because if you have to turn out clinical pharmacologists, you have got to find a place to put them; not just teach other clinical pharmacologists. And at the time that I became a consultant the burning question from the other physicians interested whether you were going to join them or not, was: 'Are you going to help me with my load of peptic ulcers?' Have we forgotten just what a huge lot of medical outpatient work was considered very dull by physicians? And, they weren't very welcoming to somebody who was going to be a clinical pharmacologist, who would, they thought, just tell them how to use digoxin. I can remember that from when I was a senior registrar working for Walter Somerville.<sup>114</sup> I could not imagine Walter Somerville accepting advice from a clinical pharmacologist on how to use digoxin on his patients, and I suspect the same thing applied to physicians

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<sup>113</sup> See, for example, Hurst (1990).

<sup>114</sup> See Tansey and Reynolds (eds) (1999).

in other specialties. And when I toured Australia and saw how many universities had departments of clinical pharmacology, dedicated to turning out graduates of clinical pharmacology, I wonder where they thought they were going to get a job.

**Flower:** Any Australian graduates here?

**Laurence:** Let us not forget the considerable role of clinical pharmacologists from this country in developing the Essential Medicines Programme of the WHO, particularly in getting it off the ground.<sup>115</sup> And just a tip for somebody who wants to flatter a physician who's doubtful about clinical pharmacology, is to say, 'Well, when I am ill I want a physician to come through the door, not a clinical pharmacologist', and that cheers them up.

**Flower:** We are now going to discuss various matters, but I would like to kick off by asking Charles George to talk a little bit about the significance of specialized societies dealing with clinical pharmacology, and clinical pharmacology meetings which have stimulated the area, publications which have had an important influence, and so on.

**George:** Perhaps I should declare an interest; I am a non-executive director of the BMJ Publishing Group, which is not only concerned with the *BMJ* but also has a stable of 19 specialist journals, and of course they are very important to learned societies for obvious reasons. The first is that they enable people who presented at the meetings of the Society to tidy up their manuscripts and submit them to a journal which is ethical and which actually will publish some of their papers, either soon afterwards or subject to modification. In the case of the Clinical Section of the British Pharmacological Society that came into being in 1970, and Paul Turner was the first secretary of the editorial board of the journal in 1974, and did a sterling job, with assistance from other members of his group, Alan Richens and Anne-Marie Hedges, who acted as sub-editor and did a phenomenal job over many years. The proximity of the editorial offices in John Street to St Bartholomew's Hospital, of course, aided and abetted the way that they ran the journal for many years and even though Alan subsequently moved to Cardiff, in 1974, he paid at least a weekly visit to John Street to run it the same way. I inherited the journal in 1985 and ran it from 1985–87, and if I made any contributions at all, it was to make it demonstrably possible to run it outwith London, and Elizabeth Whelan kept me busy with a liberal supply

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<sup>115</sup> See WHO, Expert Committee (2007). See also Glossary, page 122.

of manuscripts.<sup>116</sup> These I farmed out to other members of the editorial team and it seemed to go reasonably well. Looking back on the journal in its early days, the methods section seemed to me to be a very successful thing among the profession.

We clearly made substantial profits, not only for the publisher, but also for the British Pharmacological Society; not only from the journal itself, but also from the various reprints, which were popular among some pharmaceutical companies. And in particular, I think the journal supplement, which we started – and we had a very good mechanism in those days to make sure that it wasn't just the organ of the pharmaceutical company, but there was a member of the editorial board who was responsible for editing the proceedings of those meetings held by or sponsored by pharmaceutical companies – I think that was a model that was used by other societies in due course. It was very good in terms of producing revenue for the society and there's no doubt that when the contract with Wiley–Blackwell comes to an end in due course, others will no doubt be courting you for the *British Journal of Pharmacology*.

In addition to that, I have had the privilege of working on a number of other bodies. I worked on *Prescribers' Journal*, which was a very cosy thing. I think we can be a little critical of *Prescribers' Journal*, in that it was a bit late in producing guidance, but it was very readable, despite the fact that it was largely written in committee, by committee, which was rather a strange way of operating. But I enjoyed my time there and on the advisory board.<sup>117</sup>

My other activity was to work on the *British National Formulary (BNF)* as chairman of the Joint Formulary Committee. Owen Wade, of course, has written the history of this in the *British Medical Journal* in 1993, but he and I were co-chairs of edition 12 of the new-style *British National Formulary* and I continued until the year 2000 edition, number 39.<sup>118</sup> This was a fantastic time. Quite how I became chairman is an interesting story, but I think I was a nuisance, as is my wont. I particularly remember writing that I thought the advice on management of snakebite was inappropriate, and Owen Wade wrote back to me saying, 'No, you have got it wrong'. So I wrote back and said, 'No,

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<sup>116</sup> Dr Jeffrey Aronson wrote: 'The publisher Elizabeth Whelan has been associated with the *BJCP* since 1983, when the journal was transferred from Macmillan to Blackwell.' Note on draft transcript, 14 July 2008.

<sup>117</sup> See Glossary, page 125.

<sup>118</sup> Wade (1993, 2003).

you have got it wrong', and the advice was subsequently modified in the light of experience, particularly of the late H Alistair Reid, who worked in Liverpool and Malaysia.<sup>119</sup> So during my time, I suppose the circulation increased to over 200 000 copies twice a year of the paper version. It did grow in girth, but it also grew in stature and we managed to get it so that medical students received it twice during their training, although there were some problems when there were new medical schools coming along and expansion of student numbers, but Liam Donaldson, the CMO, with some reluctance, agreed to put some pressure to ensure that they got the requisite number of copies. So, a great organ.

The *Monthly Index of Medical Specialities (MIMS)* of course is in my brief, but I only touch it to mention the fact that it's not an organ that I have found helpful. It encourages A–Z prescribing, by which you start with the prescribing of a product which begins with the letter A and you work through B, C and eventually you get through to Y, which stands for 'why not try this'. But it's not very logical therapy. And finally, of course, I should declare that in November last year BMJ Publishing bought the excellent publication *Drug and Therapeutics Bulletin*, because they thought it was very important to preserve, despite the fact that the Department of Health no longer wished to sponsor it in England.<sup>120</sup>

**Flower:** Thanks, Charles. We are going to come back to the *Drug and Therapeutics Bulletin* in a minute, but Jeff has a question for you.

**Aronson:** Thanks for that advert for the *BMJ*, Charles. Can you remember when it was that you persuaded the Department of Health to send copies of the *BNF* to the medical students, because as you know last year, or very recently, the Department of Health has said they will no longer do that?

**George:** I met Sir Liam Donaldson, on 24 May 1999.

**Professor Trevor Jones:** There are three other publications that I think are worthy of record. The *Merck Manual*, which I know is very American, but terrifically good, is almost small enough to go in your white coat pocket. Unlike the other two: *Martindale's Extra Pharmacopoeia*, which I think as a quick guide is a super place to start, and, if I may say from my days at the Association of the British Pharmaceutical Industry (ABPI), the *Medicines Compendium*. It is now available on the Web to everybody, lay as well as professional. I think these

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<sup>119</sup> Reid (1976).

<sup>120</sup> For further details, see discussion on pages 51–2.

publications are good places to start. They are not research-based publications but essentially canonical records of the drugs that we use.<sup>121</sup>

**George:** Yes, I think *Martindale* is an excellent publication. They use exactly the same evidence base, but the way they present the information is very different. I still think it's slightly unfortunate that *Martindale* starts with adverse effects, which doesn't seem to me quite the right way round.<sup>122</sup> I am dissatisfied with the interactive section of the *BNF*, but there are a limited number of times you can bang your head against a brick wall. I agree with you that the *Merck Manual* is also extremely useful, and the *ABPI Compendium* is much better now that people have tightened up their sections on poisoning, which were pretty awful at one stage.

**Flower:** It didn't include polonium in those days as far as I remember; a grave omission.<sup>123</sup> I would like to come to you, Andrew, in a minute about the *Drug and Therapeutics Bulletin*, but I wonder, since we are talking about the *British Journal of Clinical Pharmacology*, whether Geoff Tucker would like to say something about the journal, which obviously contributed a lot to the cohesion of the clinical side of the society, if I can call it that. Do you have any recollections you would like to share, Geoff?

**Professor Geoffrey Tucker:** I would just like to add the fact that there is more than one non-clinical pharmacologist here today. Although I am not a clinician, I had stewardship of the *BJCP* from the late 1980s through the 1990s, which I think was a particularly difficult time for clinical pharmacology. It coincided with the inexorable rise of the DNA stamp collectors, in almost inverse proportion to the demise of clinical pharmacology, I think, so it was a particularly difficult time to get things funded in our area and to get them published. But one of the saving graces, I think – and I want to bang the drum here for the non-clinical contributors to the clinical section – is the tremendous input we had from people interested in drug metabolism and pharmacokinetic–pharmacodynamic modelling through that period, because that was when we really began to understand the enzymology of drug metabolism, with implications for

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<sup>121</sup> See, for example, Berkow (ed.) (1982). For a brief history of the British Pharmacopoeia, see Dunlop and Denston (1958); Wills (1986). See also <http://emc.medicines.org.uk/> (visited 19 October 2007).

<sup>122</sup> Professor Desmond Laurence wrote: 'Yes, indeed. I tried to change this, but they would not listen.' Note on draft transcript, 21 June 2007.

<sup>123</sup> This is a reference to the poisoning of Aleksander Litvinenko, the former KGB agent, in London with polonium in November 2006. See Anon. (2007); Singh (2007).



understanding drug interactions and the beginnings of understanding genetic variability in things.<sup>124</sup>

And, to emphasize what Don [Davies] was saying earlier, I would like to make a plug for the non-clinicians out in the provinces who have made significant contributions to British clinical pharmacology. For example, Kevin Park and Dave Back in Liverpool, Andy Renwick in Southampton, a few of us in Sheffield and others in Glasgow. If it wasn't for these individuals and their scientific input, the *Journal* would have been pretty thin in the 1980s and 1990s.<sup>125</sup>

**Reid:** On the subject of the *BJCP*, I don't want to spoil what is such a congenial afternoon, but I have distinct memories at the Hammersmith in the early 1970s of people being less than enthusiastic about the setting up of a new *British Journal of Clinical Pharmacology*. I wonder if anyone else has any recollections. I do not think it was quite as cosy as we are saying today. There were a number of influential people who wished to keep clinical pharmacology in the *BJP* and to avoid setting up another journal.<sup>126</sup>

**Prichard:** It was during my time as secretary of the Clinical Section of the BPS that I was responsible for the negotiations setting up the journal, as I remarked earlier.<sup>127</sup> The opposition came from the main body of the Society. I was unaware of any of it from the clinicians or from Colin Dollery at the Hammersmith Hospital.<sup>128</sup> He seemed to me to be supportive at the time. There was some opposition from the committee of the BPS and the Society as a whole. They were worried it would be a financial drain on the Society; we managed in the end to reassure the sceptics. The other source of opposition was from Professor Franz Gross, who was the editor of the *European Journal of Clinical Pharmacology* and felt we didn't additionally need a *British Journal*.<sup>129</sup> I dealt with that by a bit

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<sup>124</sup> See, for example, Lennard *et al.* (1984).

<sup>125</sup> Back *et al.* (1984); Renwick *et al.* (1988); Lewis *et al.* (1991); Donnelly *et al.* (1989).

<sup>126</sup> Professor John Reid wrote: 'There were a number of opponents to the founding of the *BJCP*, who expressed their views at the annual general meeting of the British Pharmacological Society. As far as I know, the minutes of the annual general meeting were not formally published!'. E-mail to Mrs Lois Reynolds, 7 July 2008.

<sup>127</sup> See page 27.

<sup>128</sup> See note 126.

<sup>129</sup> Professor Franz Gross (1913–84) was a founder editor of the *European Journal of Clinical Pharmacology*. See Gross (1978); see also Glossary, page 122.

of masterly inactivity, not being over-diligent in replying to the correspondence from Germany, because I didn't want any ammunition to get into the hands of the Society at large. I was quite convinced it was very important for the development of British clinical pharmacology to have our own journal. As I said earlier, I was delighted that Paul Turner agreed to become the first editor, the first secretary of the board. In response to a question from Paul at that time, I remarked that I had no ambitions in that direction, and I was convinced he would do the task well, as he did.

**Aronson:** Two things I wanted to say. The first was to say that Mark Caulfield talked about Paul Turner, and everybody knows Paul Turner was the first secretary, as the post of editor-in-chief was then called. If you look at the first issue or two, maybe even more, a lot of the papers came from Bart's, and it was quite clear that Paul worked very hard to try to get high-quality material into the journal to kick it off, and I think he did a brilliant job, and of course it did eventually attract work from other institutions. But a lot of the early stuff came from Bart's.

The other thing is to say that I think Geoff Tucker has understated his role here. He put into my hands in 2003 a really thriving journal, despite all the problems that he describes, making a large amount of income for the Society, which we use to fund all our worthwhile activities. We now have two European editors and an Australasian editor, who were all in place, and, of course, a reviews editor, when Geoff was in post, and now we have a North American editor. It really is thriving, and I think he has understated his contribution to that; it really is a credit to the Society and a credit to the previous editors, chairmen of the editorial board, that it is now thriving the way that it is.

**Flower:** If I could make a general remark about your behaviour, you are all being far too modest – that is coming through very strongly to me as chairman. Andrew, I think it is time for you to talk about the *Drug and Therapeutics Bulletin*, without being modest.

**Herxheimer:** When I was at the London Hospital I was still doing research, looking at the effects of this drug or that drug on whatever function. And then I came to the conclusion that it was really a bit of a waste of time to spend six months or longer doing that, while there was so much that was known that nobody was using, that was just going to be published, sit there and gather dust. And what was really needed was for the information to be got to every prescriber. I had been in the US and seen the *Medical Letter*, which was new in

1959, and Owen Wade had imported the *Medical Letter* to Northern Ireland with British names at right-angles in the margin, and distributed it in Northern Ireland.<sup>130</sup> I felt we ought to have this for the whole of the UK. How could that be done? So I persuaded the Consumers' Association to try it. And I translated a couple of issues from American (i.e. drug names and spelling) into English and that seemed to be not very difficult and so we started the British edition of the *Medical Letter* by subscription, and gradually got a small circulation started. The Americans were very interested in checking that no commas or anything else were different and they wanted to see everything before it was published and that became rather difficult, before e-mail and so on. We also needed articles about things that didn't exist in America, so we had articles of our own, and then eventually we became separate. The subtitle of the *Medical Letter* was 'Medical Letter on Drugs and Therapeutics', and so we called it the *Drug and Therapeutics Bulletin*. In 1962 we had started from the US edition of *Medical Letter* and became independent in the UK in 1963. We had a small circulation, a few thousand people, and then at one point we persuaded the Department of Health that junior doctors should get it, and so that was the bulk subscription. The bulk subscription in Northern Ireland was there all the time, it was an extremely important and welcome support for the whole activity. And as this went on for many more years, there were more and more medical students and junior doctors, but the Department of Health decided that it didn't want to take anybody off the list. So eventually, in the 1970s, when David Owen was Health Minister and Jennifer Jenkins (Roy Jenkins' wife) was the chair of the Consumers' Association, she asked him at a dinner at the Jenkins': 'How about sending it to all the doctors in the country?' He thought that was a good idea and it happened. That arrangement continued until the middle of last year (2006). Throughout, the *Bulletin's* assessment was impartial, with many referees; the drafts were sent to the drug companies and drafts sent to people in the Medicines Control Agency, and so on, for comment. We considered all the arguments, but we had the final word. There was no need to engage in long arguments and correspondence. And the motto of the *Bulletin* was that you had to be able to read the whole issue without having to sit down, so it was kept as short as practicable. I am afraid it's no longer possible to read the whole thing standing up, but it's still desirable. We had an advisory council who were very distinguished and did a lot of work, but what was unique, I think, was that the Consumers' Association would publish something which was only for a small section of the public, not for consumers at large, and that was pretty odd. The

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<sup>130</sup> See Glossary, page 124.

argument was, of course, that if doctors prescribed well, then all consumers would benefit. But sadly this attitude did not survive the most recent changes in management in the Consumers' Association.

**Wade:** My only comment is that one of the people who helped a great deal with *Prescribers' Journal* and certainly with the *BNF* was Dr Ed Harris. He was Deputy Chief Medical Officer (DCMO, Department of Health, 1977–89) at that time, and, you know, it's nice to pay tribute to him for the help that he gave us.<sup>131</sup>

**Jones:** Just a reflection on the *Drug and Therapeutics Bulletin*. I think over the years it has been a tremendously valuable point of reference for prescribers, to the benefit of patients. But I have to say, during my tenure at ABPI in the latter years, a rather large number of folks in the industry thought it was a gift to the politicians to promote rather old 'generic' drugs, rather than an objective review of all available medicines. Of course, one has to recognize that the research-based companies needed to defend their own products, but I think it is a pity that the reputation of the *Bulletin*, in my opinion, has not been maintained, and doesn't look, in my opinion, as objective as it used to.

**Herxheimer:** The relationship with pharmaceutical companies was always a bit tense: companies didn't like their own products to be criticized. They were quite enthusiastic when other companies' products were being criticized, and that's just a fact of life. We were sued only once, which was very early on, when we concluded: 'No preparation for softening ear wax [including Cerumol drops] had been shown to be better than a simple vegetable oil'.<sup>132</sup> That action was very troublesome, but was settled on the steps of the court, with each side paying its own costs. So a softening occurred in that direction.

**Flower:** I thought you were going to say that you were sued by the olive oil manufacturers.

**Herxheimer:** But we did have rather legalistic letters threatening to sue us. I remember another occasion when the company insisted on having a meeting, which we hardly ever did; but they came and they talked about their side of the issue. We realized that their claims were even weaker than we had said they were, and so we made that point in the revised version of the article.<sup>133</sup>

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<sup>131</sup> See Griffin (2006); Wade (2003).

<sup>132</sup> Anon. (1968). For a recent review, see Burton and Dorée (2003).

<sup>133</sup> Anon. (1983). See also Anon. (2002).

**Barnett:** As one whose current occupation is well aware of the tensions between independent advisors and the drug industry, may I say that I found as a young man, which seems like a hell of a long time ago, growing up and understanding clinical pharmacology and therapeutics, the *Drug and Therapeutics Bulletin* to be an incredibly useful reference base, and it still remains that way. There have been some differences of opinion between the *Drug and Therapeutics Bulletin* and the way in which the National Institute for Health and Clinical Excellence (NICE) now carries out its business, but in principle it's the same concept, an independent review of the real evidence and independent advice on what's the best to do. I think that's the way it remains and I think NICE has taken on that banner now. But it also means that it is actually where clinical pharmacologists can make their point to everybody else, in a well-respected publication in the medical community, and long may it continue in whatever guise it takes on.

**Ferner:** I am going to take the opportunity, since the temperature is rising slightly, to attract the attention of both David Barnett and Iain Chalmers to the demise of *Prescribers' Journal*. Although Owen Wade and then Linda Beeley and Jeff Aronson were very influential and expert chairs of the committee of management of *Prescribers' Journal*, I was the last chair of that committee. In the way that the Department of Health have withdrawn funding from the *Drug and Therapeutics Bulletin* and also from the *Adverse Drug Reactions Bulletin*, which I think Phil Routledge may talk about, the Department of Health also withdrew funding from *Prescribers' Journal*, but in rather a circuitous way.<sup>134</sup> They gave the money that they had spent on *Prescribers' Journal* to NICE, and NICE, enthused by or inflamed by ideas of evidence-based medicine and systematic reviews, that can only have come from Oxford, criticized *Prescribers' Journal*. I think unfairly, because as you have heard from Charles George, although *Prescribers' Journal* hid behind named individuals, it was really a carefully researched, evidence-based, and readable guide to therapeutics, in his time at any rate. So for the excuse that there was no evidence behind it, and that the evidence that might have been behind it hadn't been reviewed, it was demolished. This is a small requiem for *Prescribers' Journal*.

**Sir Iain Chalmers:** One of the nice things about the transcripts of these Witness Seminars is that people have an opportunity to reconsider what they have said and to provide references to the evidence supporting them. I had absolutely nothing to do with decisions about *Prescribers' Journal*. Furthermore, I have never spoken or written about evidence-based medicine, because I haven't been

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<sup>134</sup> See Boseley and Hall (2006).

a prescriber since 1973 and I didn't feel I had any authority to speak about the topic. By contrast, I have views about evidence-based patient choice, because I am a patient.

**Flower:** I don't know whether Owen would like to say a few words about *BNF*; would you like to add anything to the discussion we have already had, Owen, since we are just talking about these publications?

**Wade:** The *BNF* had been in existence since it took over from the *National War Formulary* after the war, and it was produced every three years then.<sup>135</sup> It was Dr Edmund (Ed) Harris, deputy CMO, who enabled us to completely change the *BNF* so that instead of being 'a selection of drugs' as it then was, it included every medicine on the market that could be prescribed. I think the people I worked with and those who have succeeded me, like Charles George and Martin Kendall, have made it a tremendous success: it is widely used and well thought of. I never dreamt it was going to be as successful as it has been.<sup>136</sup>

**McDevitt:** I think the thing that transformed the *BNF* was the decision to publish it twice a year. Until that time it was largely irrelevant, because the things that you were wanting information about, which were usually the new drugs that you could find in *MIMS*, just weren't in it. Now every houseman and most other doctors, carry their copy of the *BNF* around with them. I think it has had an absolutely huge influence on prescribing. The only caveat I would make is that some medical students, because this was given to them free, felt that this was all they needed to learn clinical pharmacology and I would have to say that I totally disagree with that.

**George:** Could I just add that Ed Harris asked for the revised format of the *BNF*, because general practitioners, 80 per cent of them said that they used other sources of information and that the old small blue-style hardback thing was not meeting their needs. So whereas 80 per cent of general practitioners used to use other sources as their prime source of information, now 71 per cent say that the *BNF* is their main source of information about prescribing matters. And actually, it does profoundly influence the way in which they prescribe.<sup>137</sup>

**Aronson:** I think those last two comments sum it up. The fact that it was six-monthly rather than three-yearly. And the fact also that it gave so much more

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<sup>135</sup> See Figure 6, page 54.

<sup>136</sup> Wade (1993).

<sup>137</sup> Watkins *et al.* (2003).

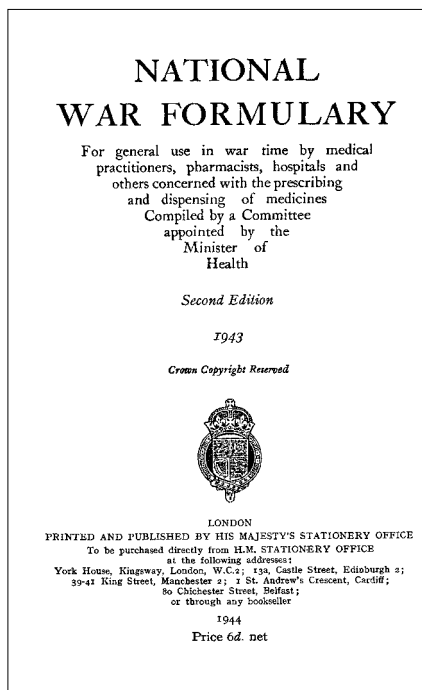


Figure 6: Cover of the second edition of the *National War Formulary*, 1943.

information that was also important. This [holding up a copy] is the *National War Formulary*, second edition dated 1943, I got it in a special issue – 76 pages.

The titles are in Latin. The measures are apothecaries'. Then 1946 – a huge change when the new *BNF* came out. But the change in 1981 was even more striking; it really was a huge change in the kind of information that was being given to doctors.

**Flower:** Does the *War Formulary* contain any useful advice about ear wax?

**Wade:** I think we owe a lot to Ed Harris. He and I discussed the business of getting it out six-monthly. We were fed up with doctors using *MIMS* all the time, and it was partly to compete with *MIMS* that we initially produced it six-monthly.

**Flower:** Does anybody else want to say anything about publications, formularies and pharmacopoeias, or journals, because if not I think we could move on.

**Herxheimer:** I would just like to add a footnote or postscript that at the Clinical Pharmacology Congress, the first one in London, we had an informal

meeting among about half a dozen people who were publishing independent drug bulletins in other countries. And that led to the start of the International Society of Drug Bulletins, which was then founded in 1986.<sup>138</sup> I think, in a way, that completes the story of the independent drug bulletins.

**Flower:** That's probably a good point at which to leave the topic of publications. I would like to move on and talk a little bit about the way in which clinical pharmacology, the academic departments, the enterprise, if you like, expanded its scope and about the different directions everyone took; cardiovascular, neuropharmacology, drug metabolism, psychopharmacology, and so on. Perhaps I will begin by asking if anyone has any views or ideas about the way in which developments in UK pharmacology impacted on the growth of clinical pharmacology overseas in the sense that lots of overseas fellows were trained in our medical schools, our hospitals, academic departments, and so on.

**Jones:** During my time with the Wellcome Foundation, I served on the US Burroughs Wellcome Fund, which is like the Wellcome Trust here but much smaller. George Hitchings and Trudy Elion and others were members of that Board as well.<sup>139</sup> It was a way of giving cash to bright young people to do their research in different areas, tropical diseases, etc. One of the areas was experimental pharmacology and nobody knew what that was, so very few people actually started to apply for grants. But, based upon what was going on here in the UK, we changed that to clinical-based pharmacology and I think that did stimulate a huge amount of further effort in the US in this discipline. I have to say that was at a time here when also, it seemed to me, that fewer people wanted to become clinical pharmacologists. When I got to the ABPI, several companies had put money into a pot to give to registrars in this discipline, and very few took up the cash. Now, that could have been due to something else. In the UK, postgraduates followed an MD route, then went back to their specialty, whereas in the US the MD PhD was allowing people to be experimental and do their

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<sup>138</sup> Dr Andrew Herxheimer wrote: 'The International Society of Drug Bulletins has grown to embrace 72 independent bulletins in 36 countries throughout the world and has gained international influence.' Note on draft transcript, 4 August 2007. See [www.isdbweb.org](http://www.isdbweb.org) (visited 11 October 2007); Anon. (2002): 25.

<sup>139</sup> Dr George Hitchings was director of the Burroughs Wellcome Fund from 1971 to 1994 and president from 1971 to 1990; Professor Gertrude Elion worked for Burroughs Wellcome as a research scientist from 1944 until her retirement in 1983 and a research professor at Duke University, Durham, North Carolina until her death in 1999. Sir James Black, Gertrude Elion and George Hitchings shared the Nobel Prize in Physiology or Medicine 1988 for their discoveries of important principles for drug treatment. See [http://nobelprize.org/nobel\\_prizes/medicine/laureates/1988/index.html](http://nobelprize.org/nobel_prizes/medicine/laureates/1988/index.html) (visited 9 November 2007).



clinical work at the same time. Here, unless you were on the clinical special path, two or three years out to do a PhD was probably going to disadvantage your career. But, I think that the US Burroughs Wellcome fund certainly increased clinical pharmacology activity in the US.

**Orme:** The question you raised was really about the influence of the British clinical pharmacology body on people coming here. I think other people are probably better qualified than me to talk about that, but just an anecdote which may give the wrong flavour, but certainly in the early days in Liverpool we had a German research fellow who came from Heidelberg to work with us for a year and a half, and unfortunately we totally changed his life, because we were Dr Herr, Dr Professor for the first two weeks and after that it was Christian names. And then when he went back to Germany he could not cope with the German hierarchical system and left to go to the US, where he has been doing very well. I can't mention names.

I would just like to say a word the other way round – in fact, the influence that the UK generally, in clinical pharmacology, has had in Europe.<sup>140</sup> As background, I helped to set up the European Association of Clinical Pharmacology and Therapeutics in the early 1990s and I am currently, at least for the next six months, chairman. And it's been quite striking the influence that the UK and Sweden have had in the way that the French societies have come together to produce a single clinical section. The same is happening now in Germany; the way in which the Spanish society has used some of the UK things, particularly around teaching; we have seen improvements in Italy and in some of the eastern European countries; and they all cite what is going on or what had been going on in the UK. And at times we have had to say to them, 'I am terribly sorry the UK isn't actually doing all that well in clinical pharmacology', for the reasons we have been discussing earlier on. But nevertheless they look to the UK in their professional work as to how to develop clinical pharmacology. We keep learning new things, not good things. Only a month ago, in discussion with a Spanish colleague, I discovered that the Spaniards had passed a law that says that all research ethics committees in Spain must be chaired by a clinical pharmacist, which doesn't seem to me quite the right way of going about things.<sup>141</sup> But,

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<sup>140</sup> Orme and Sjöqvist (1991).

<sup>141</sup> Directive 2001/20/EC of the European Parliament and of the Council of 4 April 2001 set the target for the implementation of good clinical practice in the conduct of clinical trials on medicinal products for human use by 2004. *Official Journal of the European Communities*, 2001;1;L 121/34. For Spanish committees, see [www.privireal.org/content/rec/spain.php](http://www.privireal.org/content/rec/spain.php) (visited 5 June 2008).

you know, we are not winning all the battles. However, certainly Europe is still looking to the UK in terms of matters of clinical pharmacology.<sup>142</sup>

**Flower:** I can support your point of view, because funnily enough when word of this Witness Seminar got around, I was approached personally by two Italian clinical pharmacologists, asking me if they could come, and they both said exactly what you have said – that they had always looked to the UK as the fountainhead of clinical pharmacology. When I pointed out that this seminar was meant to be about UK clinical pharmacology, they were quite disappointed.

**McDevitt:** To bring the process earlier than that, I can't exactly date it, but it was when I was secretary of the Clinical Section of the British Pharmacological Society – probably in the late 1970s – and it was really at the time when clinical pharmacology had got itself positioned within the clinical training programme in the UK as a clinical sub-specialty – we had a meeting in the Ciba Foundation in Portland Place, London, to which we invited representatives of clinical pharmacology from many European countries.<sup>143</sup> At that stage we were really the envy of all that was going on in Europe and the reason was because clinical pharmacology was being muscled out, on the one hand by medicine and on the other by pharmacologists, in most of Europe, with the possible exception of Sweden. When it came to trying to get the thing harmonized within a European scene, which I think was the basis of the meeting, the groups that sponsored the specialists to go to the European meetings were groups like the BMA, etc. So the clinical pharmacologists weren't getting a look in. And certainly at that stage what had happened within the UK was very much the envy of the other European clinical pharmacologists. In many ways, I think, a number of the other countries have moved on now, but at that stage they were largely in despair.

**Herxheimer:** One thing that happened in the 1960s – Brian [Prichard] thinks it is 1966 – was that there was a British Council meeting, a seminar on clinical pharmacology for people from other countries. And then there was another one, and that was very important, because there were people from Italy, Croatia, Tunisia with great enthusiasm, and that was very successful.

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<sup>142</sup> Professor Desmond Laurence's account of 'The initiation of research ethics committees in the UK' will be deposited along with other records of the meeting in GC/253 in archives and manuscripts, Wellcome Library, London. See also the *Report of the Ad Hoc Advisory Group on the Operation of NHS Research Ethics Committees* at [www.dh.gov.uk/assetRoot/04/11/24/17/04112417.pdf](http://www.dh.gov.uk/assetRoot/04/11/24/17/04112417.pdf) (visited 14 April 2006). For an earlier assessment, see Wise and Drury (1996).

<sup>143</sup> See Lee and Spufford (1993). See also [www.novartisfound.org.uk/hist.htm](http://www.novartisfound.org.uk/hist.htm) (visited 16 November 2007).

And a lot of those were very much influenced by that. I know especially about Croatia, because Professor Božidar Vrhovac from Zagreb really started from there.<sup>144</sup>

The other thing I want to mention is that in 1956, at the XXth International Congress of Physiology in Brussels, clinical pharmacology didn't exist.<sup>145</sup> I had met Wim Lammers, a young pharmacologist who then became professor of pharmacology in Groningen, and while he was there, he persuaded the professor of medicine that Groningen needed a clinical pharmacologist. Because all the Dutch universities are state universities, and, to be employed by a state university, you had to have a nationally agreed description of who was qualified to apply for a chair. So, by definition, no qualified Dutchman existed, and they asked me if I would be part-time professor of clinical pharmacology and start to introduce it. I said yes, and they created a chair of clinical pharmacology on one day, and the next day they split it into two twin chairs of clinical pharmacology. The senior one was Professor Meyler of *Meyler's Side Effects of Drugs*; he was running the place, he lived there, and I went there for a few weeks several times a year and that's how it started.<sup>146</sup> That was a very direct kind of descendant. Then later on, other Dutch universities started to have clinical pharmacologists and we trained a successor who then ran the department in Groningen. That's another bit of the European dimension.

**Chalmers:** I am encouraged to ask a question, because of this extension of the discussion into Europe. I am puzzled why the name Paul Martini hasn't been mentioned up until now.<sup>147</sup>

**Orme:** To respond to Iain as one of the erstwhile winners of the Paul Martini Prize, I did do a little bit of homework before I went to Germany and certainly his influence was very considerable. But I have to say I can't give you chapter and verse at the moment, but I will just vouch for what Iain is saying, he did have a major impact in Germany at that time.

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<sup>144</sup> See, for example, Orme *et al.* (2002). Dr Jeffrey Aronson wrote: 'Known to his friends as "Darko".' Note on draft transcript, 18 June 2008.

<sup>145</sup> International Congress of Physiologists (1956).

<sup>146</sup> Professor Leopold Meyler published his first edition of *Side Effects of Drugs* in 1952. Dr Andrew Herxheimer has been co-editor since the 6th edn (Meyler and Herxheimer (eds) (1968)). For a publishing history, see [www.elsevier.com/framework\\_products/promis\\_misc/meylerhistorynew2005.doc](http://www.elsevier.com/framework_products/promis_misc/meylerhistorynew2005.doc) (visited 3 June 2008).

<sup>147</sup> Shelley and Baur (1999); Grosse-Brockhoff (1964); Wiedemann (1994).



Figure 7: L to R: Per Lunde, Barbro Westerholm and Owen Wade, 1971.

**Vere:** Like many other departments, we had a continual trickle of people from overseas coming through London, doing various different kinds of attachment studies. They came from China, from India, from Nigeria, Kenya, and so on. And I know some who went back had a considerable influence in their own countries. The *Essential Drugs List* in Sri Lanka, for example, was carried through by one of them.<sup>148</sup>

The other thing which I think is worth mentioning is the BSc in London, where there were course units; one of the course units in many places was a unit in clinical pharmacology. Having the BSc students go through human experimentation in clinical pharmacology has, I know, had a considerable influence on the subsequent interests and training of those people. I certainly know of some surgeons who went through that and who clearly benefited from the exposure.

**Wade:** There was a WHO meeting in 1969, in Copenhagen, after which there was a lot of cooperation between me in Northern Ireland, Barbro Westerholm, who later became chief medical officer in Sweden, and Per Knut Lunde in Oslo, comparing the use of drugs in our three countries. This spread to some other countries in Europe. The Drug Utilization Research Group (DURG) started

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<sup>148</sup> The *Essential Drugs List* was first published in 1977 and the 15th edn became available in 2007. See [www.who.int/medicines/events/fs/en/index.html](http://www.who.int/medicines/events/fs/en/index.html) (visited 16 November 2007).

then, and it is has grown a lot since those days in Europe, Israel, Australia and even Russia.<sup>149</sup>

**Aronson:** I have an anecdote to match Mike Orme's and then a serious aspect to the same story. We have had many foreign students over the years in Oxford, from Russia, China, Australia, Brazil, I could go on and on, like Duncan [Vere] said. I am sure we have all done that. We had one student from Sri Lanka who went back after getting his DPhil and when I next saw him he said, 'You have made my life a misery'. I said, 'Why's that?' He said, 'You taught me to say no.' And, of course, over there you don't say 'no'. Somebody asks you to do something and you say 'yes', and then you don't do it. But, I expected him to say 'no' if 'no' was what he meant, and I would do the same with him, and that was very difficult for him to adapt back at home. The serious side of that story is when I went to visit him and discovered that there was an epidemic of self-poisoning with oleander seeds, mostly by young farmers, young men not doing well. Oleander seeds grow on a big yellow ornamental shrub. I said, 'The pharmacology of what these seeds contain suggests to me that repeated doses of activated charcoal may be beneficial.' So they did what may be, if not the largest, certainly one of the largest prospective randomized controlled trials of self-poisoning in any form. Within eight months they randomized 400 patients and reduced mortality from 8 per cent to 2.5 per cent and that has changed practice in Sri Lanka.<sup>150</sup> We are now doing another study in snakebite. I think this collaboration abroad has been very fruitful and very influential. I could tell other stories, but that's just one.

**Prichard:** I thank Andrew for mentioning the British Council courses. Professor Desmond Laurence was the director of studies and I had the privilege of assisting him. In fact, they were not just seminars but two-week courses in 1966 and 1981, where we took actual and potential clinical pharmacologists from overseas around various centres in the UK, both in London and, indeed, out of London, and we certainly penetrated Scotland on at least one, if not both, occasions.

Speaking of overseas fellows who have come here, I think one individual we should mention is Walter Aellig of Sandoz, Basel.<sup>151</sup> He was a research fellow

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<sup>149</sup> Shortly after the photograph in Figure 7 was taken, Per Lunde became responsible for the *WHO Essential Drugs Policy for Developing Countries* and Barbro Westerholm became the Chief Medical Officer of Sweden. See Bergman (2006). See also Wade (2006); [www.rcgp.org.uk/pdf/TNG\\_06Winter\\_DURG.pdf](http://www.rcgp.org.uk/pdf/TNG_06Winter_DURG.pdf) (visited 23 May 2008).

<sup>150</sup> de Silva *et al.* (2003).

<sup>151</sup> See, for example, Aellig (1981, 1994).

at UCH in 1968/9 and has been a tower of strength in supporting the BPS. The Sandoz Prize (renamed the Novartis Prize in 1997) was first presented by Professor Botand Berde; Dr Aellig took over in the late 1970s. He is also distinguished in that he gave the first communication of the inaugural session of the Clinical Section of the British Pharmacological Society in January 1970 at UCL. He was recently honoured by being elected to Honorary Fellowship of the British Pharmacological Society in 1998.

**Aronson:** I could add to that that Walter Aellig, a huge supporter of the Society, was also for many years a member of the editorial board of the *British Journal of Clinical Pharmacology*, and was very sad when he had to give it up at the end of 2003.

**Davies:** The chairman said we have been too modest. I should mention a two-week workshop in clinical pharmacology that we ran at the Hammersmith for about 12 years from 1969, I think, which not only trained leaders in academia but also many people who took senior posts in the pharmaceutical industry. The other event that immensely increased the UK's international reputation in clinical pharmacology was the first clinical pharmacology congress at Wembley [International Union of Pharmacology (IUPHAR) in 1980], which Colin Dollery took on, I think, when plans to hold it in the US fell through, and, we can say – modestly – that it was a very great success and a great shop window for British pharmacology.<sup>152</sup>

**Herxheimer:** I want to add to what Duncan [Vere] said, which reminded me that at the London Hospital we had student projects in the normal course for all students. They each had to do a little project, and lots of those were clinical pharmacology projects. And they were really very exciting and enjoyable. They were long before ethics committees were thought of. Some of them were actually published as little papers. I remember two being published in the *Lancet* and I thought that was extraordinary for student projects.<sup>153</sup> And that sensitized the students to clinical pharmacology thinking. Anybody else have that kind of experience?

**Flower:** I think that is a very important point. When I was a student of physiology, we did all the experiments on ourselves, in the way that students just can't do these days in most undergraduate centres, for various reasons. I think it's an enormous detriment to our educational system actually.

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<sup>152</sup> The World Conference on Clinical Pharmacology and Therapeutics, London, Wembley Conference Centre, 9 August 1980, see Turner (ed.) (1980); See also Breckenridge (1991, 1993). See also note 110.

<sup>153</sup> Benson *et al.* (1966); Herxheimer *et al.* (1967).

**Aronson:** The 1967 *Lancet* medical education paper by Quilliam and Turner describes a large number of experiments that they expected their students to do on themselves.<sup>154</sup> For example, mydriasis and miosis in the eye, and using agonists and antagonists; you are right, we can't do that any more.

**George:** You can, but you have to structure your curriculum to it, and one of the special study modules in Southampton is a fourth-year study in depth, and quite a number of students each year opt to go for clinical pharmacology. Provided you get your organization right, you can actually make sure that it's properly ethically approved, etc.

**Reid:** The BPS clinical pharmacology section is currently awarding prizes each year to medical schools for students doing research projects in clinical pharmacology. These become poster presentations at the December meeting of the BPS. There is some very high-quality work presented. At least two of our Glasgow students have won prizes in the last few years.<sup>155</sup>

**Aronson:** You are right, John, but these students are not doing the kind of research project that Quilliam and Turner described – demonstrating the actions of drugs on themselves – they are actually doing research projects in patients and so on. But you are absolutely right, they are of high quality.

**Prescott:** Alas, times have changed. I remember the days when we gave our students single doses of amphetamine and barbiturates in their practical classes so that they could experience the drug effects and identify which agent they had been given. To conduct such experiments now would be unthinkable. I have vivid memories of another practical class, which was supposed to show the effect of prior induction by phenobarbitone on the hexobarbitone sleeping time in mice. The whole class ended up chasing mice all over the laboratory and it was hilarious.<sup>156</sup>

**Flower:** Before we leave this debate, does anybody else want to chip in a last comment? One thing I mentioned earlier concerned the relationship

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<sup>154</sup> Quilliam and Turner (1967).

<sup>155</sup> Dr Jeffrey Aronson wrote: 'A prize is awarded each year to the best student research project at each university that enters.' Note on draft transcript, 18 June 2008.

<sup>156</sup> Professor Laurie Prescott wrote: 'The students had another very valuable learning experience when they inhaled amyl nitrite after breaking the little glass "pearls" in which it was formulated at the time. Pearl drops apart, this produced an immediate and very dramatic cardiovascular response, which they measured on each other and that they would never forget. Sadly, these days are gone forever thanks to the health and safety regulations.' Letter to Dr Daphne Christie, 12 July 2007.

between clinical pharmacology, as it became known, and ‘clinical pharmacy’. I was talking with Stuart in the tea break and he had a couple of comments about this, so I thought it would be a good point to bring him in.

**Dr Stuart Anderson:** I think I could describe myself as a very early clinical pharmacist. I was a student of pharmacy at Manchester in the 1960s, when it was a four-year degree course, and I spent my vacations working in a hospital pharmacy. That experience convinced me that the proper place for the hospital pharmacist was much more on the ward than it was in the pharmacy counting tablets: that clearly all this new knowledge I was acquiring was of far greater benefit perhaps to these new medical students and junior doctors, who were struggling with prescribing on the ward. And I was supported in that view, if you like, by a number of things that were being published. They included various reports on prescribing errors and the design of prescription charts, and these were very often collaborations between clinical pharmacologists and senior pharmacists. And they came from hospitals like the London with Chris Barrett, the Westminster with John Baker and Aberdeen with Graham Calder, working with clinical pharmacologists. At the same time, I was conscious of other reports, the editorials in the *Lancet* and so on, which appeared to be claiming a broader advisory role for clinical pharmacology, staking out the ground, if you like.<sup>157</sup> What I saw as the area that clinical pharmacy might evolve into was very much this same kind of territory. Anyway, when I graduated, obviously as a very junior hospital pharmacist, it was one of my first jobs to see if we could do something along these lines. And there were many obstacles. I have to say the biggest obstacle was usually chief pharmacists themselves, who were often resistant, but also there was in those places considerable hostility, I would say, from some clinical pharmacologists. For me the atmosphere changed completely when I moved to Alder Hey Children’s Hospital, Liverpool, when I was appointed principal pharmacist there in 1974 and clearly there were a lot of problems around paediatric therapeutics, not least children’s doses and so on. The group of people I worked with there was the senior registrars, who had the clinical pharmacology role, if you like, which resulted, of course, in the *Alder Hey Book of Children’s Doses (ABCD)*, which carried on for quite a number of years.<sup>158</sup> I don’t recall any involvement from the clinical pharmacology unit; Mike [Orme] might know otherwise. I would be interested to know whether paediatric clinical pharmacology had emerged at that stage.

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<sup>157</sup> See Appendix 1, page 77.

<sup>158</sup> See Anderson *et al.* (1976). First edition published 1973.



I moved to the Westminster Hospital in 1978, where I was chief pharmacist for a while, and things there were different again. The professor of clinical pharmacology and therapeutics then was Ariel Lant, who had been working very closely with the very dynamic district pharmaceutical officer, John Baker, and they were already developing the district drugs guide, which became quite a substantial book. And my understanding is that the Westminster *District Drugs Guide* became very influential in the design of the re-launched *BNF* in 1981.<sup>159</sup> By the time I had moved to St George's in 1983, the relationship between clinical pharmacology and clinical pharmacy had become one of complete collaboration. In fact, Joe Collier was on my appointment panel at that stage, and the two professionals – the hospital pharmacist on the one hand and the clinical pharmacologist on the other – were essentially a team, working together on the drug and therapeutics committee, on the design content of the St George's *Pharmacopoeia*.<sup>160</sup> So, there was a gradual transition really.<sup>161</sup> I am interested to hear that in certain areas clinical pharmacists appear almost to have the upper hand.

**Barnett:** I think the interface between clinical pharmacy and clinical pharmacology is a very important one. When I was appointed as a senior lecturer I went into the doctor's dining room and met a rather senior obstetrician/gynaecologist who asked me what I did, and as I was new, I said I was a clinical pharmacologist and he said, 'My God, they are letting the pharmacists in here now'. I didn't know whether that was a compliment or not. The point is I do remember the important interface between clinical pharmacist, clinical pharmacy, and research pharmacy in San Francisco and clinical pharmacology. People like Malcolm Rowland, who came to San Francisco, subsequently went to Manchester, championed the pharmacokinetic approach within pharmacy departments then, as opposed to the UK, where this development was confined to departments of clinical pharmacology. I think this interface is very important, and is extended now to ward pharmacy. Certainly in my university, my clinical work, the interface between clinical pharmacy and clinical pharmacology is absolutely essential at all levels.

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<sup>159</sup> Westminster and Associated Teaching Hospitals Kensington, District Drugs Committee (1981). For details of the *Guide*, see Sutters *et al.* (1993).

<sup>160</sup> Dr Stuart Anderson wrote: 'The 13th edition was in 1995, by which time it had been re-named as a formulary.' Note on draft transcript, 11 July 2008. See Wandsworth Health Authority, Drugs and Therapeutics Subcommittee (1985).

<sup>161</sup> Dr Stuart Anderson wrote: 'The relationship progressed from initial suspicion and hostility, through cooperation and collaboration, to one of equal partnership.' Note on draft transcript, 20 June 2007.

**Wade:** I want to comment on the cooperation with pharmacists, which has been so important as far as the *BNF* is concerned. It is produced by the staff of the Royal Pharmaceutical Society and that's one of the reasons it is such a good production.<sup>162</sup>

**Tucker:** With regard to British pharmaceutical scientists, Malcolm Rowland, Grant Wilkinson and (not to be modest) I have helped to underpin quantitative clinical pharmacology coming from the direction of pharmacokinetics.

**Orme:** First, to respond to Stuart. He's right that at this time the department at Liverpool did not have very much input into Alder Hey; I guess we were finding our feet. His successor at Alderley, Tony Nunn, worked with us in our department very closely and indeed we have actually trained a paediatric clinical pharmacologist, Imti Choonara, who is currently professor at the University of Nottingham in Derby.<sup>163</sup> So we do have some input, but it was a bit late, Stuart. To respond to the general theme of the clinical pharmacist, I certainly totally agree with those people who said it must be a collaboration. Unfortunately, there are one or two of my colleagues in Europe who have got a real bee in their bonnet about the role of clinical pharmacists, and you only have to mention the word and they go ballistic, which is totally unhelpful, because collaboration works. But to revert to the Dutch problem. The title clinical pharmacologist is not protected there, so in fact most clinical pharmacists have the title clinical pharmacologist – it is not a medical title in the Netherlands, it's a general title, so you have to define what you are talking about. In practice, if you talk to the Dutch – in fact, they do collaborate pretty well – but it's when looked at from outside, you might say, 'Well, clinical pharmacists have taken over clinical pharmacology' – they haven't as we understand it, but it's easy to see why people think that is happening.

**Grahame-Smith:** In Oxford, over the years that I was there, the tension between pharmacists, clinical pharmacists and clinical pharmacologists was diffused very, very effectively, by the Drug and Therapeutics Committee. Pharmacists sat on the Drug and Therapeutics Committee, clinical pharmacologists sat on the Drug and Therapeutics Committee, and physicians and surgeons, and people who had got the time to do it, sat on the Drug and Therapeutics Committee [laughter]. There was a wide representation of medicine, pharmacy and clinical pharmacology. And frankly, once it was established and running, all

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<sup>162</sup> See Glossary, page 125.

<sup>163</sup> Choonara *et al.* (2004).

the tensions disappeared, and the pharmacists and the clinical pharmacologists got on well together and they mapped out their own areas of influence and so on, without it being written down or discussed. It just happened naturally, that they saw that there was different expertise in each group. I don't know whether the Oxford Drugs and Therapeutics Committee still goes on, whether the pharmacists play their part in it, and whether interprofessional relationships are still good.<sup>164</sup>

**Aronson:** Yes, it's still the same in Oxford, David.<sup>165</sup>

**McDevitt:** I start with an anecdote. I once went to Saudi Arabia and came face to face with a clinical pharmacist who had trained in America and he represented the extreme end of US clinical pharmacy, whose view was doctors should diagnose and pharmacists should prescribe – doctors don't know anything about drugs. But I think there is another dimension to clinical pharmacy, beyond the ones that have already been mentioned. In most hospital setups there are a lot of pharmacists and very few clinical pharmacologists, so they can't afford to be in competition. Certainly in Dundee we had ward pharmacists who didn't just go to the ward and count up the pills, but as a generality they went on the ward rounds with the doctors and they were there to provide information about drugs, which a lot of doctors, clinical pharmacologists excepted perhaps, wouldn't have known. And it greatly enhanced the quality of prescribing.

**Flower:** As an ex-head of a school of pharmacy, I am glad to hear that.

**George:** Really to emphasize again the importance of information pharmacists, not only because they actually have access to the information and have the time to do it, but I have to say from my standpoint, when I got to Southampton one of the most arduous things was people asking me questions about things which were much more to do with pharmacy than clinical pharmacology, and the arrival of information pharmacists took a huge burden off my back so that I could get on with some research.

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<sup>164</sup> Professor David Grahame-Smith wrote: 'Drug and Therapeutics Committees go back a long way. In Oxford, a Standing Committee on Medicines was first established on 10 July 1975, became the Drug and Therapeutics Committee in 1994 and finally the Medicines Advisory Committee in 1997. I suspect this mirrors generally the history of these local groups throughout the country.' Note on draft transcript, 7 July 2008. See, for example, Jenkins and Barber (2004).

<sup>165</sup> Dr Jeff Aronson wrote: 'It is now called the Medicines Advisory Committee and has executive powers.' Note on draft transcript, 18 June 2008.

**Caulfield:** We have had a very profitable interaction with both the School of Pharmacy and the pre-registration pharmacists in North-East Thames region for a number of years; Paul Turner started that and we continued it after he retired. At the School of Pharmacy, we taught a module, and in fact actually on that module on clinical pharmacology, which was very popular, there were about 20–30 students from the School of Pharmacy who used to come over every year. And we used to do the type of human pharmacology experiments that Laurie was talking about, which we used to do with the second-year medical students as well. For some curious reason that I never really understood, in the mid-1990s the School of Pharmacy went in a different direction with a new curriculum and decided that that module, which coincided with reduced clinical pharmacology staff numbers, so it was stopped.<sup>166</sup> Recently we have been asked whether we could reinstate it, or a variation on the theme.

The pharmacy ward rounds were very good. All the pre-registration pharmacists came in from all over the North-East Thames and we used to do drug ward rounds, and we used to do the same for medical students. And the other interface that we have, which we preserve with the pharmacy, is a very strong relationship on an initiative about safe prescribing. This is in addition to the drugs and therapeutics committees, where not only do our senior people sit, but also our trainees. In the safe prescribing initiative, there's a multidisciplinary team of pharmacists, senior nurses and specialist registrars (SpR), who look at 'near misses' and critical incidents in prescribing to see whether any educational needs should be met there, as this is quite a serious issue for us now. We have a very strong interaction still with pharmacy, and it has been a long tradition both at Bart's and the London for that to occur.

**Dr Linda Beeley:** I was an NHS clinical pharmacologist in Birmingham and ran the West Midlands Centre for Monitoring Adverse Reactions to Drugs, where I employed three pharmacists, to do all the work basically.<sup>167</sup> But, I think it was very useful training. I used to have quite junior pharmacists who would come through for about six months and work with me doing various things connected with drug monitoring, producing information and bulletins, which we sent round the West Midlands. And then they would move on to other jobs, but I think it provided a useful training experience for quite a few pharmacists.

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<sup>166</sup> See, for example, Florence (2002).

<sup>167</sup> Dr Jeff Aronson wrote: 'Now run by Robin Ferner.' Note on draft transcript, 14 July 2008.

**Flower:** I would like to stop the discussion on that subject now, because I am aware of the fact that we are heading towards the finishing line, and during the coffee break David Gordon told me he wanted to make a comment about clinical pharmacologists.

**Professor David Gordon:** This relates to one or two of the things we have talked about in the last hour or so. I wonder whether the specialty – I cannot claim to be a clinical pharmacologist – is in a state of concern about what it is doing? It goes back about five years ago when I was invited to a debate at the Royal College of Physicians, about the nature of the undergraduate medical curriculum. Defending the GMC Education Committee were, of course, Sir Graeme Catto, the president of the GMC since 2002, and Roger Green, a member at the time. When I arrived I discovered that the entire opposition was made up of clinical pharmacologists, a kind of horde of clinical pharmacologists, who had come to descend on the undergraduate medical course and to tell us – deans of medical faculties, deans of medical schools – that we had got it wrong, because we weren't teaching enough clinical pharmacology.<sup>168</sup> Now that was a very good debate, and a good discussion, but deans of medical schools do get a kind of sense of *déjà vu* when they hear that, because it goes back to anatomists saying we don't teach enough anatomy, and surgeons saying we don't teach enough surgery or anatomy, and so on. Every subject can say that we don't teach enough of it, and yet this keeps recurring. The latest instance I can think of was an article in the *BMJ*, I think, where the same point was made, rebutted pretty firmly, I have to say, in the correspondence column by the dean of the East Anglia Medical School, and I think we have to await real evidence of whether or not students are being taught enough clinical pharmacology.<sup>169</sup> But are you all feeling a bit defensive? I am just wondering.

**Flower:** I didn't know what question you were going to ask, David, but you did say you were going to be provocative. As it happens, this was the topic that I wanted to wind up with and I wanted to ask a fairly generic question about where we are all going. I can see David Webb attracting my attention – unless it is an isometric stretch.

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<sup>168</sup> Dr Aronson wrote: 'I wrote about this in an article (Aronson (1998)), I preferred the term "interaction".' E-mail to Mrs Lois Reynolds, 19 August 2008.

<sup>169</sup> Aronson *et al.* (2006). For the rapid response e-letter from Professor Sam Leinster, dean of the University of East Anglia School of Medicine, Health Policy and Practice, and Dr Yoon Loke, senior lecturer in clinical pharmacology there, see [www.bmj.com/cgi/eletters/333/7566/459](http://www.bmj.com/cgi/eletters/333/7566/459) (visited 22 September 2008).

**Professor David Webb:** I am not feeling defensive, but I was one of the authors of the piece that you refer to, and I have to say that some of us were in the process of putting together evidence at the time. Without this evidence it will be difficult to pursue the case for clinical pharmacology, but I think the argument we have actually been launching recently is not so much about clinical pharmacology, but more about the ability of junior doctors to prescribe. I think prescribing is the key. Interestingly, there has been a widespread recognition, unofficially, by every colleague that I talk to, that junior doctors have a problem with prescribing, and that's fairly obviously in part because medicine has got so much more complex over the last ten or 20 years. I think we, as clinical pharmacologists, are probably concerned that the inability for us to teach a strand of training in pharmacology and therapeutics has also contributed to that problem. Now, I believe we do have some evidence, and I am not sure whether I am allowed to talk about it, but we had a meeting recently with the GMC and that was chaired by Peter Rubin and we have agreed to put together a working party to look at prescribing issues and how they might be addressed.<sup>170</sup> I think there is a concern not just about doctors' abilities to prescribe, but also that their attitude has moved to a position where they don't actually think it matters if they get it right or not because there are pharmacists who can pick up on this, and I believe that we will have a very worrying loss of professional strength if we reach that position. So I think there is a concern that may well now have to be met.

**Barnett:** I want to echo that, because I think it's really important. At one extreme, it would be impossible to believe that we would train surgeons without the skills to use a scalpel, and it seems unbelievable to me that we would train doctors who do not have the skills to use their pen properly and prescribe appropriately. However, I believe that there is a concern that this collaboration with clinical pharmacists, particularly with ward pharmacists, may potentially de-skill junior doctors. I think we may be reaching a point where doctors diagnose and pharmacists prescribe, and that is totally inappropriate for the twenty-first century.

**Reid:** Can I come in again. I don't disagree with anything that's been said by David [Webb] and David [Barnett], nor David Gordon either, but I think this is not a matter for evidence. We have heard already about the pioneering work 30 or 40 years ago, about how diabolical prescriptions were. Pioneering

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<sup>170</sup> In January 2007 the General Medical Council (GMC) convened the Safe Prescribing Working Group. See the recommendations and outcomes of the Safe Prescribing Working Group at [www.chms.ac.uk/publications.htm](http://www.chms.ac.uk/publications.htm) (visited 8 July 2008). See also Glossary, page 125–6.

work could be done again now to show that it's pretty awful, but what really is important is the perception here. Most of our final year medical students have a very low feeling of comfort in prescribing. Almost all the senior nursing staff on the wards have no confidence in the junior doctors' prescribing; the pharmacists have no confidence in junior doctors' prescribing. And the junior doctors don't have any confidence either. So, whatever the evidence base, there's a perception here which is undermining therapeutics and is a risk to patients, because – again echoing what David Barnett was saying – there's no way someone straight after passing MBChB should be allowed to go out and operate in any unsupervised way. They are prescribing potentially very dangerous drugs with drug interaction potential. I think we are not giving them enough formal grounding, as a result of some of the changes in the curriculum over the past 10 or 15 years.

**Webb:** I think it's pretty clear that assessment drives learning. And I believe one of the problems we have at the moment is that if medical students realized that they had to be good prescribers, and they were put to a test in prescribing, they would become good prescribers, in the same way that they meet any test that they are put to. So I think that assessment clearly has to be a major part of the way forward.

**Caulfield:** I think learning is driven absolutely by assessment. We purged a lot of things in the revision of the curriculum and its integration into teaching. Some of those needed to go from the curriculum because the knowledge base we required of medical students was not entirely germane to the practice of medicine.<sup>171</sup> There is one thing that you can do on day one as a doctor and that is kill someone with a pen if you are not a safe prescriber or you haven't got a *BNF*. You probably won't be able to kill them with your lack of knowledge of anatomy, although that's possible if you are a surgeon. It's much easier to kill people with drugs, and I think the whole prescribing arena has become so complex now that it is impossible to be safe without a very strong foundation in clinical pharmacology. If students are not exposed to an assessment that they can see is palpably in a specific area, geared to make them safe prescribers, they will often not learn the last component or a bit of a question, which, if they don't quite answer it, nothing bad happens, because they will pass on knowing the physical signs and how to take a history from the patient. I shared the concern of Aronson *et al.* when they wrote that article, and I do believe that there is a way forward on that. In London we have put together a group, initially

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<sup>171</sup> Mucklow (2001).

under the chairmanship of Mike Farthing, to look at integrating the way in which medical schools that are still part of the University of London assess safe prescribing.<sup>172</sup> Hopefully we can come to a common route to assess students using a mixture of a driving-test based Foundation Year 1 computer exam that has been developed by pharmacists at King's, though it is not yet perfect. There are other computer-based learning and safe prescribing assessments which we have just been piloting at Bart's and the London.<sup>173</sup> Now all of our finalists have to do an assessment in safe prescribing using a computer-marked exam, which produces multiple scenarios for the same question, so you can have batches of 30 or 40 students turn up for a session, do it, yet will never be able to tell the others anything other than the subject area of the exam. We are moving back to assessing the subject directly in a way that is meaningful and which will act as a hurdle prior to exit from the medical school, and we think that this is the only way forward. We have structured it so that it is not an impediment to exit, by actually holding the assessment away from the qualification date, and repeating it many times with support for learning along the way. I understand that the heads of medical schools' reactions to these sorts of things (eg the *BMJ*) is an inward groan, but I think this is a serious problem and they should actively take it on board now.

**Prescott:** Things have changed in other ways. In the olden days young doctors used to learn by the clinical apprenticeship system. Initially they had six- or 12-month junior appointments where they were an integral part of the ward 'firm'. During this time they learnt how to prescribe from the senior medical staff, who by this time had usually worked out how to use drugs safely. Their example greatly influenced the way in which trainee doctors prescribed drugs. Now, the training of junior medical staff is horribly fragmented and there is no longer any recognizable apprentice system. Young doctors rotate dizzily from one specialty to another throughout their appointments and no one seems to have continuing

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<sup>172</sup> Professor Michael Farthing chaired the Research Board of the General Medical Council's Education Committee from 2004 to develop and supervise all their research initiatives. From August 2007, the Education Committee became responsible for the content and standards for medical education from Foundation Year 1 up to the point of full registration, an outcomes-based framework for programmes for provisionally registered doctors. Further details at [www.gmc-uk.org/about/council/papers/2007\\_12/9%20-%20Work%20of%20the%20Education%20Committee%202006-2007.pdf](http://www.gmc-uk.org/about/council/papers/2007_12/9%20-%20Work%20of%20the%20Education%20Committee%202006-2007.pdf) (visited 9 June 2008).

<sup>173</sup> Professor Mark Caulfield wrote: 'At Bart's and the London, this has developed as a formative assessment where 120 students simultaneously sit the computer-based exam containing extended matching questions on safe prescribing. It is highly regarded by final year students and we hope it will shortly be adopted as a summative assessment.' Note on draft transcript, 6 October 2008. See Aronson *et al.* (2006).



responsibility for them any more. In such circumstances it is impossible for them to learn good prescribing by example. This makes it all the more important for us as clinical pharmacologists to ensure that they receive proper training.

**Aronson:** David Gordon made his point from the point of view of a dean of a medical school, and so it's worth saying that when we met the GMC a couple of weeks ago at the meeting which David Webb referred to, the representative of the deans of all the London medical schools expressed her concern about the problem in prescribing, and agreed that something needed to be done. So this is the perception of deans as well. It was also the perception of John Tooke when we met the Council for the Heads of Medical Schools, to take Mark Caulfield's point.<sup>174</sup> They were initially critical, but they agreed that there is a problem, and that something needs to be done about it. Incidentally, as David [Webb] hinted, we regard this as being different from the manpower problem in clinical pharmacology, which is a separate problem. David Webb and Simon Maxwell highlighted it in their very good leader in the *Lancet* last year, but it is a separate problem from delivering the teaching; whether we can or whether others can, pharmacists, nurses, and others, we have got to find ways of doing it.<sup>175</sup> It's the prescribing that's the problem. And I draw your attention to the last line of the key events which were initiated in 2006, as part of the 75th anniversary of the BPS: one of the initiatives that I hope the Society will do is a prescribing initiative,<sup>176</sup> and we have various ideas about changing the way we teach prescribing and the way we assess it, and we are going to be making some suggestions and doing something about that.<sup>177</sup> But we hope to be able to improve that.

**Ferner:** I agree entirely with what David Webb said about examination being crucial. I am impressed by the fact that Mark Caulfield has a computer to examine his students. Maybe that will be appropriate when computerized prescribing comes. We still retain in Birmingham a therapeutics exam, which I guess Owen Wade might recognize, which owes a lot to Professor Martin Kendall, and which involves actual real people, not patients – fortunately – as

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<sup>174</sup> Some time after this meeting Professor Sir John Tooke's report on Modernising Medical Careers (MMC), *Aspiring to Excellence*, was published, which suggested a reworking of many aspects of postgraduate medical education (PGME). See Glossary, page 124.

<sup>175</sup> Maxwell and Webb (2006). Breckenridge *et al.* (2006).

<sup>176</sup> See Glossary, page 125.

<sup>177</sup> See note 6. See also the 75th Anniversary Supplement of the BPS [*British Journal of Pharmacology* (2006) **147**: S1–307]; Cuthbert (2006); Aronson (2006).

many of the prescriptions would kill them. But there's a glut of junior medical staff, as you know.<sup>178</sup> The anger that David Gordon is worried about is not anger; I think it is sadness that somehow a discipline which is very different from, let us say, anatomy or physiology and is a crucial practical skill for people to learn, but which is not organ-based, should have been lost to a generation of doctors.

**Orme:** As an erstwhile dean, perhaps I should respond to some of these particular issues; David Gordon and I have discussed this on a number of occasions, also with David's predecessor (Professor Steve Tomlinson) in Manchester. In Liverpool we had a very didactic course where everything was measured in hours, and you had to have 300 hours of anatomy, and so many hours of this, and so many of that. The first two years was a total disaster. Students got browned off, they didn't remember anything, and it took them probably six months to recover. In my view, the course which we introduced was a considerable improvement. Now, not everyone would agree with that. Indeed, my senior colleague Alasdair Breckenridge and I debated this, and I know he is not entirely wedded to the idea of problem-based learning; but nevertheless, in terms of objectivity there is one particular study, which Andrew Herxheimer will probably know, because it was done by one of his colleagues in Amsterdam, comparing about 20 different European medical schools, those that had problem-based learning and those that did not. There wasn't much in the way of definite results. But the one definite result, in statistical terms, was that students from medical schools with problem-based learning produced better prescribers than those from schools which did not, or had, if you like, the old didactic system.<sup>179</sup> However, I will be the first to admit that not everything in the course was perfect. One of the things I regret is that, although I think students got a good exposure to pharmacology and clinical pharmacology in the various sessions in the course, they did not get adequate training in prescribing, much as it pains me to say so. I fully accept that assessment drives learning, and unless you have got a proper assessment system, then the students are not going to learn how to prescribe. So I think that is fundamental, but it can be built into problem-based systems. You don't necessarily have to have a factual multiple-choice question (MCQ) to test whether students can prescribe or not. So, I would hold my hand up and say, 'Yes, things are not perfect. We do need to have medical students taught how to prescribe throughout the course,

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<sup>178</sup> Hall (2008). See [www.telegraph.co.uk/news/uknews/1544307/Doctors'-training-system-'a-shambles'.html](http://www.telegraph.co.uk/news/uknews/1544307/Doctors'-training-system-'a-shambles'.html) (visited 3 June 2008).

<sup>179</sup> Bruijnen *et al.* (2000). See, for example, de Vries (1993); Queneau *et al.* (1993).

but particularly in their final year and there needs to be some form of assessment of their skills'.<sup>180</sup>

**Flower:** OK, David, the last comment is going to be yours, because I don't want to finish in the midst of an education debate.

**Grahame-Smith:** One of the things that I have pondered is the tension that I think now exists between prescribing led by evidence-based medicine and prescribing, as it were, *de novo* from a clinical pharmacologist's mind. Let me just explain this. Take the 'polypill': aspirin, a statin, maybe a bit of  $\beta$ -blocker, put it all together and anybody over the age of 55 gets it.<sup>181</sup> Now the young student, I think, will look at that and ask: 'Why the hell do we need to know any clinical pharmacology, we can give this thing to everybody', a little bit like the situation with statins.<sup>182</sup> Now, I see the oral contraceptive, and several other potent drugs, possibly coming off medical prescription and being bought over the counter at the pharmacy. Now, the young mind-in-training in medicine must look at this and say, 'What are these people called clinical pharmacologists going on about pharmacokinetics, pharmacodynamics, drug metabolism and benefit–risk ratios, when you can go and buy a lot of this stuff from the chemist's shop and do what you like with it?' Does anybody else perceive a tension there? Or has anybody experience of the youngsters saying, 'Why do we need to know all this if you can give this combination?' We are not there yet, but it's being mooted pretty strongly that a 'polypill' will stop everybody from having a vascular event.

**Prescott:** What David has just said is very true and very familiar. It seems that today you no longer need specialist knowledge to use drugs properly and anyone can do it. What we are seeing is surely the dumbing down of therapeutics.

**Flower:** Colleagues, it is six o'clock, and as I told you I had two jobs today, one was to get to tea at four o'clock and the other is to finish by six o'clock in time for a glass of wine. I think we have got there. I have really enjoyed this afternoon; you have been a wonderful, if somewhat over-modest, collection of witnesses, and I have enjoyed listening to what you had to say. Hopefully, everything will

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<sup>180</sup> See, for example, the UCL document on Medical School Examination Boards, including assessment requirements, compiled and edited by Professor Jane Dacre and Ms Gaynor Jones, at [www.ucl.ac.uk/medschool/about-medicalschool/mgt-structure/MBBS\\_3\\_Examination\\_Boards\\_0708.pdf](http://www.ucl.ac.uk/medschool/about-medicalschool/mgt-structure/MBBS_3_Examination_Boards_0708.pdf) (visited 15 July 2008).

<sup>181</sup> Wald and Law (2003). See also Collier (1984).

<sup>182</sup> See Reynolds and Tansey (eds) (2006): 7, 36, 47, 53–4, 74–86.

be captured faithfully on tape. Tilli, are there housekeeping announcements that you would like to make?

**Tansey:** I would like to thank you all very much for coming. It's been a very interesting afternoon, with some fascinating and amusing anecdotes, but also clearly some thoughtful reflections on serious issues. What happens now is that the tape recording of the entire meeting is transcribed, which will take between four and six months before the transcript comes through your letterbox. At that point we would ask for your help in translating the verbatim record into written text. We will add footnotes, bibliographies, biographies, appendices, glossaries, and hopefully that transcript will also help form the agenda for the second meeting, which we are going to hold on 25 September 2007. We will keep you informed. May I say once again, thank you all for coming to this meeting. And thank you to Jeff for suggesting it, and particularly to Rod for chairing it so ably.



## Appendix 1

## Clinical pharmacology: dates of key publications and events

Jeffrey Aronson

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<b>1946</b>	<i>British National Formulary</i>
<b>1954</b>	Gaddum J H. (1954) Clinical pharmacology. <i>Proceedings of the Royal Society of Medicine</i> <b>47</b> : 195–204.
<b>1960</b>	Dilling W J. (1960) <i>Clinical Pharmacology</i> , 20th edn, revised by Alstead S with Macarthur J G, Thomson T J, Anderson W F. London: Baillière, Tindall & Cassell, 1960.  Laurence D R. (1960) <i>Clinical Pharmacology</i> . London: Churchill.
<b>1961</b>	<i>Prescribers' Journal</i>
<b>1962</b>	<i>Drug and Therapeutics Bulletin</i>
<b>1963</b>	Committee on Safety of Drugs (Dunlop Committee) established
<b>1966</b>	Dollery C T. (1966) Clinical pharmacology. <i>Lancet</i> <b>i</b> : 359–60.
<b>1967</b>	Quilliam J P, Turner P. (1967) Clinical pharmacology. Its role and its integration into the education of the medical student. <i>Lancet</i> <b>ii</b> : 1081–3.  Anon. (1967) Future of clinical pharmacology. <i>British Medical Journal</i> <b>i</b> : 125.
<b>1968</b>	Medicines Act, which created the Medicines Commission and led to the Committee on Safety of Medicines (1971); the DHSS Medicines Division (later Medicines Control Agency) administers the Act.
<b>1969</b>	Anon. (1969) Clinical pharmacology as a specialty. <i>British Medical Journal</i> <b>ii</b> : 331–2.  Royal College of Physicians of London, Committee on Clinical Pharmacology. (1969) <i>Report of the Committee on Clinical Pharmacology</i> . London: Royal College of Physicians.

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1970	Establishment of the Clinical Section of the British Pharmacological Society  Anon. (1970) Editorial: the image of clinical pharmacology. <i>Lancet</i> <b>i</b> : 129.  WHO. (1970) <i>Clinical Pharmacology. Scope, organization, training. Report of a WHO Study Group</i> , World Health Organization Technical Report series no. 446. Geneva: WHO.
1972	Establishment of the Unit of Clinical Pharmacology, Oxford University, by the Medical Research Council
1974	First issue of the <i>British Journal of Clinical Pharmacology</i>
1981	New version of the <i>British National Formulary</i>
1986	Anglo–American Workshop on Clinical Pharmacology held at Airlie, Virginia, 15–18 May
1989	Establishment of the Medicines Control Agency
1999	Royal College of Physicians, Working Party. (1999) <i>Clinical Pharmacology and Therapeutics in a Changing World: Report of a working party</i> . London: Royal College of Physicians.  Establishment of the National Institute of Clinical Excellence
2003	Medicines and Healthcare products Regulatory Agency created from the merger of the Medicines Control Agency and the Medical Devices Agency
2005	Medicines Commission and Committee on Safety of Medicines disbanded; Commission on Human Medicines established
2006	75th anniversary of the British Pharmacological Society  BPS Prescribing Initiative <sup>183</sup>

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<sup>183</sup> Professor Owen Wade suggested that two further publications be added to the list: \*Goodman L, Gilman A. (1941) *The Pharmacological Basis of Therapeutics: A textbook of pharmacology, toxicology and therapeutics for physicians and medical students*. New York, NY: Macmillan Company.

‘I first read the book in 1947 when I was a house surgeon at Addenbrooke’s Hospital, Cambridge. It was a copy owned by Mr Hopkins, the chief pharmacist of the hospital and I used to read it at night in the pharmacy when I lived in the hospital as a resident house officer for six months. This book was an enormous influence in my life. Like so many books, the first edition, all of which was written by the two authors, was a much better read than its many further editions, which had a number of contributors. By an extraordinary coincidence, when Mr Hopkins retired and moved to live near his son, my eldest brother, David Wade, who had just retired as a cardiac surgeon in Edinburgh, bought his home in Kingston, just outside Cambridge, and David and his wife Agnes, lived there for many years.’

\* Crooks J, Calder G, Weir R D. (1967) Drugs in hospitals. *Journal of the Royal College of Physicians* **1**: 233–44.

‘Jim Crooks was a great friend and colleague of mine and after discussions with him, he and Dr William Wallace in my department (Belfast) made a detailed study of the prescribing of drugs; he in the Aberdeen General Hospitals, Wallace in the Belfast City Hospital. They both found ‘casual and inefficient handling of drugs’ which resulted in many errors of drug administration to patients. This was the basis of the development of the Aberdeen Prescription Sheet, which in one form or another is now used in all NHS hospitals in the UK. It was a very important development.

When this paper was published, some astute journalist working for the *Belfast Telegraph* commented on “all the erroneous drug prescribing in the Royal Victoria Hospital (RVH)”, which was where my university department was based. I had not seen the *Journal* and was taken by surprise to have a visitation from the senior physician of the RVH and two infuriated colleagues demanding that I must immediately deny that any such errors occurred in the RVH. Unwillingly, I agreed to the publication of a statement that the newspaper’s report was mistaken and there was no evidence of errors of drug administration at the RVH. Unwilling – and with my tongue in my cheek – because I knew that if Dr Wallace had done the study in the RVH, I was sure he would have found identical errors to those he had found in the Belfast City Hospital.’ Note on questionnaire ‘Toward a map of the history of academic departments of clinical pharmacology in the UK’, n.d.





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## Biographical notes\*

### **Dr Stuart Anderson**

FRPharmS FHEA (b. 1946) graduated in pharmacy from the University of Manchester in 1969. After experience in north Wales, he was appointed principal pharmacist in 1974 at Alder Hey Children's Hospital, Liverpool; chief pharmacist in 1978 at Westminster Hospital, London, and director of pharmacy in 1983 at St George's Hospital, London; moved to the School of Pharmacy, University of London, in 1993, and is now associate dean of studies at the London School of Hygiene and Tropical Medicine, London. He is a former president of the British Society for the History of Pharmacy and a former chair of the Society for the Social History of Medicine; currently vice-president of the International Academy for the History of Pharmacy.

### **Dr Jeffrey Aronson**

FRCP FBPharmacolS FFPM (b. 1947) trained in the University of Glasgow (1964–73) and the MRC Unit of Clinical Pharmacology, Oxford, under Professor David Grahame-Smith. He is currently reader in clinical

pharmacology at the University of Oxford and honorary consultant physician in the Oxford Radcliffe Hospitals Trust. He was president of the British Pharmacological Society (2008/9); vice-chairman of the Medicines Commission (2002–05); and editor-in-chief of the *British Journal of Clinical Pharmacology* (2003–07). He has been chairman of the British Pharmacopoeia Commission's Expert Advisory Group on Nomenclature since 2006; a member of the Formulary Committees of the *British National Formulary* since 2006 and the *British National Formulary for Children* since 2003.

For full curriculum vitae and list of publications, see [www.clinpharm.ox.ac.uk/JKA](http://www.clinpharm.ox.ac.uk/JKA) (visited 22 July 2008).

### **Professor David Barnett**

CBE FRCP (b. 1944) trained at Sheffield University. He was a Merck international fellow in clinical pharmacology in San Francisco, California, (1975–77); chair of the Specialist Advisory Committee for the Royal College of Physicians (1966–2000) and vice-chair of the Leicester Royal

\* Contributors are asked to supply details; other entries are compiled from conventional biographical sources.

Infirmery NHS Trust (1994–99). He is currently chairman of the Appraisal Committee for the National Institute for Health and Clinical Excellence and has been professor of clinical pharmacology at the University of Leicester Medical School and honorary consultant physician with a special interest in cardiovascular medicine at the University Hospitals of Leicester NHS Trust since 1984.

**Dr Linda Beeley**

FRCP (b. 1939) trained at the University of Oxford and then at the Radcliffe Hospital, Oxford. She held registrar posts at the Queen Elizabeth Hospital, Birmingham, and a lectureship in the department of clinical pharmacology, University of Birmingham. She was appointed consultant clinical pharmacologist at the Queen Elizabeth Hospital in 1980 and set up and directed the West Midlands Monitoring Centre for the Committee on Safety of Medicines (1980–93); a member of the Subcommittee on Safety, Efficacy and Adverse Reactions of the Committee on Safety of Medicines (1986–92); chairman of *Prescribers' Journal* (1984–89); and consultant to the *British National Formulary* (1980–97). She retired from the NHS in 1993. See Wade and Beeley (1976); Beeley (1992).

**Professor Sir James Black**

Kt OM FRCP FRS (b. 1924) was professor and head of the department of pharmacology, University College London, (1973–77), director of therapeutic research at Wellcome Research Laboratories (1978–84); and professor of analytical pharmacology at King's College Hospital Medical School, London (1984–93). He was chancellor of Dundee University (1992–96). He shared the 1988 Nobel Prize for Physiology or Medicine for 'discoveries of important principles for drug treatment' with George Hitchings (1905–98) and Gertrude Elion (1918–99).

**Dr Nicolas Boon**

FRCP FESC (b. 1950) was clinical lecturer and senior registrar at the John Radcliffe Hospital in Oxford (1983–86); consultant cardiologist at the Royal Infirmery of Edinburgh from 1986; honorary reader at the University of Edinburgh from 2005; honorary senior lecturer (1986–2005); and president-elect of the British Cardiac Society from 2005.

**Sir Alasdair Breckenridge**

Kt CBE RCP FRCPE FRSE FMedSci (b. 1937) following house jobs was lecturer and senior lecturer at the Hammersmith Hospital, London and the Royal Postgraduate

Medical School (1964–74); professor of clinical pharmacology, University of Liverpool (1974–2002); and has been chairman of the MHRA since 2003. He was a member of the CSM (1982–2003), serving as vice-chairman (1996–98) and chairman (1999–2003). He was also a member of the Medical Research Council (1992–96).

**Professor Bernard Brodie**  
PhD (1907–89) British born, educated at McGill University, Toronto, gained his PhD in organic chemistry from New York University (NYU) in 1935 and joined the pharmacology department there. He moved to NYU's Goldwater Research Service in 1941, working on antimalarial therapy for war use. He became head of the laboratory of Chemical Pharmacy in the National Heart Institute, Bethesda, MD (1950–70). His work included the fields of anti-malarials, analgesics, anti-arthritis and anti-arrhythmic agents and the control of CNS function. See Costa *et al.* (1989).

**Professor Morris Brown**  
FAHA FMedSci (b. 1951) trained at Trinity College Cambridge and University College Hospital, London. He was a MRC senior fellow, Royal Postgraduate Medical School (1982–85) and has been

professor of clinical pharmacology, Cambridge and fellow of Gonville and Caius College, Cambridge, since 1985. He was president of the British Hypertension Society (2005–07) and winner of the Lilly Gold Medal 2002; the British Pharmacological Society; Walter Somerville Medal of the British Cardiovascular Society 2006.

**Professor George Brownlee**  
DSc (b. 1911), pharmacologist, joined the Biological Standardization Labs of Pharmaceutical Society, London, and then the Wellcome Research Labs, Beckenham, from c. 1940, and later was head of the chemotherapeutic division. He was appointed reader in pharmacology at King's College, University of London in 1949; and professor of pharmacology (1958–78), later emeritus. He was editor of the *Journal of Pharmacy and Pharmacology* (1955–72).

**Sir Thomas Lauder Brunton**  
FRCP FRS (1844–1916) qualified at Edinburgh University. His MD thesis demonstrated that amyl nitrite would relieve the pain of angina pectoris and temporarily lower blood pressure. He returned to the Middlesex Hospital, London, in 1870 as a lecturer on materia medica and pharmacology. The following year he moved to a



similar post at St Bartholomew's Hospital, London, was elected assistant physician in 1875 and physician (1895–1904).

**Professor Edith Bülbring**

FRS (1903–90) German-born pharmacologist and physiologist, was educated at the universities of Bonn, Munich and Freiburg, and worked as a research assistant in pharmacology to Professor Paul Trendelenburg in Berlin (1929–32). She was dismissed in 1933 because of her Jewish background, and offered a post in J H Burn's new Pharmacological Laboratory of the Pharmaceutical Society of Great Britain, University of London (1933–38), then in the University of Oxford from 1938 as demonstrator, lecturer and later reader and professor (1967–71) in the pharmacology department. She became a naturalized citizen in 1948. See Brading (1993).

**Professor Mark Caulfield**

FRCP FMedSci (b. 1960) graduated in medicine in 1984 from the London Hospital Medical College and trained in clinical pharmacology at St Bartholomew's Hospital where he developed a research programme in molecular genetics of hypertension. He is currently director of the William Harvey Research Institute and the London Genome Centre at Bart's and the

London (since 2002); national co-ordinator of the MRC British Genetics of Hypertension Study (since 1996); principal investigator of the Genetics of Pre-eclampsia Consortium; and deputy chair of the London Biobank Regional Collaborating Centre (since 2002).

**Sir Iain Chalmers**

FRCPE FFPH FMedSci (b. 1943) has been editor of the award-winning James Lind Library since 2003. He was director of the UK Cochrane Centre in Oxford from 1992 to 2002, and director of the National Perinatal Epidemiology Unit, Oxford (1978–92). See [www.jameslindlibrary.org/](http://www.jameslindlibrary.org/) (visited 4 June 2008).

**Professor Joe Collier**

FRCP (b. 1942) was professor of medicines policy and a clinical pharmacologist at St George's Hospital and Medical School, London, where he has worked continuously since 1964 as student and teacher until his retirement in 2007. He is the editor of *Drug and Therapeutics Bulletin*, president of the International Society of Drug Bulletins, a member of the UK Medicines Commission, and a writer and broadcaster.

**Professor James Crooks**

CBE FRCP MFCM (1920–83) was professor of pharmacology and therapeutics at the University of

Dundee and was made a member of the Faculty of Community Medicine in 1978.

**Professor David (Dai)**

**Margerison Davies**

(1923–2002) qualified at the London Hospital in 1949 and after house jobs, took a junior registrar post at a sector psychiatric hospital, flirted with medical journalism, and spent three years as medical registrar at the Bolingbroke Hospital, south London, before returning to the London Hospital as senior registrar to Lord (Horace) Evans and then receiving room physician and, at the same time, medical correspondent of the *News Chronicle*. He was a consultant physician at Shotley Bridge General Hospital, Co. Durham (1962–86). When Michael Rawlins was appointed to the Ruth and Lionel Jacobson Professor of Clinical Pharmacology at the University of Newcastle upon Tyne (1973–2006), he joined him as honorary senior lecturer until appointed to the foundation chair of clinical pharmacology at the Chinese University of Hong Kong (1986–88). He served on the Committee on Safety of Drugs and Committee on Safety of Medicines (1968–86), and on the Prescription-Only Medicines Subcommittee of the Medicines Commission (1970–72). He started the *Adverse Drug Reaction Bulletin*

in 1966 and co-founded the *Adverse Drug Reactions and Acute Poisoning Reviews* (now *Toxicological Reviews*) in 1982. See de Glanville and Ferner (2003).

**Professor Donald S Davies**

FRSC FRCPATH HonFRCP (b. 1940) completed his PhD at St Mary's Hospital Medical School in 1965 and following a two year post-doctoral fellowship at the National Institutes of Health, US, joined the MRC Clinical Pharmacology Research Group at the Royal Postgraduate Medical School (RPMS), Hammersmith Hospital, London. In 1980 he was appointed professor of biochemical pharmacology at RPMS and in 1987 became director of the clinical pharmacology department as well as director of the department of health toxicology unit at Imperial College London.

**Professor Sir Colin Dollery**

Kt FRCP FMedSci (b. 1931) qualified at Birmingham and trained at the Hammersmith Hospital, London, where he has been a consultant physician since 1962. He was a lecturer in medicine (1962–65); professor of clinical pharmacology (1965–87); professor of medicine (1987–91); and dean (1991–96) at the Royal Postgraduate Medical School, Hammersmith Hospital until

his retirement. He was pro-vice-chancellor for medicine (formerly medicine and dentistry), University of London (1992–6). He has been a senior consultant in research and development, at GlaxoSmithKline (formerly Smithkline Beecham) since 1996.

**Professor Anthony Dornhorst** CBE FRCP (1915–2003) joined St Thomas' Hospital Medical School, London, as a house officer in 1938 and served in the Royal Army Medical Corps in Palestine, North Africa, Italy and Berlin. He returned to St Thomas' and was appointed reader in 1949 and consultant in 1951. He held the foundation chair of medicine at St George's Hospital Medical School, London, (1959–80); was a member of the advisory council of the *Drug and Therapeutics Bulletin* (1962–67) and a member of the Medical Research Council (1973–77). See Collier (2003).

**Professor Robin Ferner** FRCP (b. 1949) trained in chemistry and then in medicine, qualifying at University College Hospital, London, in 1978. He was senior registrar in the National Institute of Health and Clinical Excellence in Newcastle upon Tyne (1984–90) and has been a consultant physician at City Hospital, Birmingham, formerly

Dudley Road Hospital since 1990. In 1993 he was appointed director of the West Midlands Centre for Adverse Drug Reactions, and honorary senior lecturer in Medicine at the University of Birmingham. In 2006 he was made honorary professor of clinical pharmacology at the University of Birmingham.

**Professor Roderick Flower** FMedSci FRS (b. 1945) trained as a physiologist at Sheffield University, subsequently receiving a PhD in experimental pharmacology from the University of London and a DSc in 1985. After 12 years working in industry at the Wellcome Foundation, he left to take the chair of pharmacology at the University of Bath in 1985. In 1990 he returned to London to establish a new unit at the William Harvey Research Institute, Bart's and the London. During this time he was head, on a part-time basis, of the clinical pharmacology department, and was president of the British Pharmacological Society (2000–03).

**Dr Arthur Fowle** FRCP (b. 1929) trained at King's College Hospital, London, intending to practise cardiology. He joined Wellcome Research Laboratories, Beckenham, in 1965 as a clinical physiologist. Security of

tenure was promised if he became a part-time consultant physician in the NHS. In the interval, clinical pharmacology was recognized as the discipline which he practised. He became head of the clinical pharmacology department in 1968 and part-time consultant general physician in the same year. He retired from Wellcome in 1992.

**Professor Sir Charles George**

Kt FRCP FFPM FMedSci (b. 1941) studied medicine at the University of Birmingham and after junior posts in the West Midlands and Manchester trained in clinical pharmacology with Professor Colin Dollery and Dr Alasdair Breckenridge. He moved to the University of Southampton as a senior lecturer in 1974 and a year later became professor of clinical pharmacology there. He served two terms as dean of medicine (1986–90; 1993–8) and was chairman of the General Medical Council's Education Committee before he became medical director of the British Heart Foundation (1999–2004); president of the British Medical Association (2004/5) and has been chair of their Board of Science and Education since 2005.

**Professor Sir Abraham Goldberg**

Kt DSc FRCPGlas FRCPE FRCP FFPM FRSE (1923–2007) held posts at the University of Glasgow

(1956–99); was chairman of the Committee on Safety of Medicines (1980–86); foundation president of the Royal College of Medicine's Faculty of Pharmaceutical Medicine (1989–91); and editor of the *Scottish Medical Journal* (1962/3).

**Professor David Gordon**

FRCP FMedSci (b. 1947) is a general physician. He began his academic career in the medical unit at St Mary's Hospital Medical School. In a prolonged break from his conventional academic medical career he was a member of the staff of the Wellcome Trust, London, responsible for support of biological and medical research across a wide range of subjects, and for the career development of clinical and basic biomedical scientists. He worked at the University of Manchester (1999–2007), most of that time as dean of the medical faculty. He was chair of the Council of Heads of Medical Schools and also the president of the Association of Medical Schools in Europe. He has been visiting professor at the University of Copenhagen since 2007.

**Professor David Grahame-Smith**

CBE FRCP (b. 1933) was Rhodes professor of clinical pharmacology, University of Oxford (1972–2000), honorary director of the Medical Research Council Unit

of Clinical Pharmacology, Oxford (1972–92), honorary director of the Oxford University SmithKline Beecham Centre for Applied Neuropsychobiology (1989–99) and honorary consultant in clinical pharmacology and general internal medicine to the Oxford Radcliffe Hospitals (1972–2000).

**Dr Andrew Herxheimer** FRCP (b. 1925) worked in preclinical and clinical pharmacology at St Thomas' Hospital Medical School, the London Hospital Medical College and at Charing Cross and Westminster Medical School until 1991. He was founding editor of the *Drug and Therapeutics Bulletin* (1962–92), while simultaneously working with Consumers International. In 1986 he became the first chairman of the International Society of Drug Bulletins. He was also extraordinary professor of clinical pharmacology at the University of Groningen (1968–77). He is part-time consultant at the Cochrane Centre in Oxford (since 1992), and has been its emeritus fellow since 1995. In 1996 he and Dr Ann McPherson started the DIPEX project. See [www.dipex.org](http://www.dipex.org), [www.adverseeffectsmethods.com](http://www.adverseeffectsmethods.com), and [cochrane.org](http://cochrane.org); (sites visited 11 October 2007).

**Sir Harold Himsworth** KCB FRCP FRS (1905–93) was appointed professor of medicine and director of the medical unit at University College Hospital, London, in 1939 and was secretary of the Medical Research Council (1949–68). See Gray and Booth (1994).

**Professor John Hope** (1725–86) held the chairs of materia medica and of botany at the University of Edinburgh from 1761 to 1768, giving lectures on materia medica in the winter and on botany starting in May. He resigned as professor of materia medica in 1768 on appointment to the Regius chair of botany at Edinburgh. See Hope (1770).

**Dr Kenneth Hunter** FRCP (b. 1939) graduated in 1963, having trained at Cambridge and University College Hospital (UCH) Medical School. His postgraduate training included experience in clinical pharmacology at UCH and the Hammersmith Hospital, London. He became a consultant physician with a special interest in diabetes in Plymouth in 1977, was a councillor at the Royal College of Physicians (1994–97) and gave the Fitzpatrick Lecture in the history of medicine there in 2001.

**Professor Sir Robert Brockie Hunter (Baron Hunter of Newington)**

Kt MBE DL FRCP FRCPE FACP FIBiol FFCM (1915–94) qualified at Edinburgh University; was a founder member of the Committee on Safety of Drugs in 1963. He became professor of therapeutics, university administrator, principal and vice-chancellor of Birmingham University (1968–81).

**Professor Trevor Jones**

CBE (b. 1942) was research and development director of the Wellcome Foundation (1987–94). He is a founder member of the public–private partnership, Medicines for Malaria Venture (MMV) and a member of the World Health Organization Commission on Intellectual Property Rights, Innovation and Public Health. He was a member of the Medicines Commission (1982–94); director general of the Association of the British Pharmaceutical Industry (1994–2004); a member of council of the International Federation of Pharmaceutical Manufacturers & Associations (1994–2004) and the board of the European Federation of Pharmaceutical Industries and Associations (1994–2004). He is also deputy chairman of council and a visiting professor at King's College London; a director of Allergan Inc. US, ReNeuron Ltd,

BAC, BC, People in Health Ltd, VeronaPharma plc and NextPharma Technologies Ltd.

**Professor Martin Kendall**

OBE FRCP FFPM was professor of clinical pharmacology at the University of Birmingham Medical School, a member of the Commission on Human Medicines; chairman of the Formulary Development Committee; and clinical examiner for the Membership Exam of the Royal College of Physicians.

**Professor Louis Lasagna**

MD (1923–2003) qualified at Columbia University and joined the Johns Hopkins University in 1954 and later established a department of clinical pharmacology there. In 1970 he moved to the University of Rochester School of Medicine and Dentistry as chairman of the department of pharmacology and toxicology and in 1976 founded the Center for the Study of Drug Development, until he and the Center moved to Tufts University, Boston, MA, in 1984, where he was dean of the Sackler School of Graduate Biomedical Sciences until his retirement in 2002.

**Professor Desmond Laurence**

FRCP (b. 1922) qualified in medicine from St Thomas' Hospital Medical School, London, in 1944

and was appointed lecturer in therapeutics there in 1950. He was senior lecturer in pharmacology and therapeutics at University College Hospital Medical School jointly with University College London (1954–61) and professor there (1961–89). He served on the Committee on Safety of Drugs, Committee on Safety of Medicines and the Medicines Commission (1963–88). In 1967 he was a member of the Royal College of Physicians committee on the supervision of the ethics of clinical investigations and institutions, and subsequently served on the college's Committee on Ethical Issues in Medicine. For 26 years he served on research ethics committees as chairman or member.

**Professor Alastair Macgregor** FRCP FRCPE FRCPGlas (1919–72) qualified at the University of Glasgow; served as surgeon lieutenant in the Royal Navy Volunteer Reserve (1944–46); was clinical assistant at the Western Infirmary, Glasgow (1946–48); lecturer in therapeutics at the University of Sheffield (1948–52); senior lecturer in therapeutics at the University of Edinburgh (1952–59); and Regius professor of materia medica in the department of therapeutics and pharmacology at the University of Aberdeen (1959–72).

**Professor Paul Martini** (1889–1964) was chief physician and director of St Hedwig Hospital, Berlin (1927–31) and was professor for internal medicine at the University of Bonn (1931–59). He published *Methods of Therapeutic Examination* in 1932. His textbook *Principles and Practice of Physical Diagnosis* appeared in English in 1935. He was president of the German Society for Internal Medicine in 1948. The Paul Martini Foundation was established by the Medizinisch-Pharmazeutische Studiengesellschaft in 1966 to promote pharmaceutical research in Germany through the support of students of clinical pharmacology.

**Professor Denis McDevitt** DSc MD FRCP FRSEd (b. 1937) trained at Queen's University, Belfast, and later at Vanderbilt University, Nashville, Tennessee. He was professor of clinical pharmacology at Queen's University, Belfast (1978–83); professor of clinical pharmacology at the University of Dundee (1984–2002); and dean of medicine, dentistry and nursing in Dundee (1994–97). He was secretary (1978–82) and subsequently chairman (1985–88) of the Clinical Section of the British Pharmacological Society, of which he is now an honorary fellow. He

was president of the Association of Physicians of Great Britain and Ireland (1987/8), a member of the Medicines Commission (1986–95; vice-chairman, 1992–95) and a member of the General Medical Council (1996–2003; treasurer, 2001–03).

**Professor Walter Nimmo**

(b. 1947) was educated at Bathgate Academy and qualified at the University of Edinburgh. His early medical career included the Sir Stanley Davidson lectureship in clinical pharmacology and a lectureship in anaesthesia at the University of Edinburgh. In 1979 he was appointed senior lecturer in anaesthesia at the University of Sheffield. In 1988 he was the founding managing director of Inveresk Clinical Research and chief executive of the Inveresk Research group of companies in 1996.

**Professor Michael Orme**

FRCP FMedSci (b. 1940) trained as a clinical pharmacologist in the UK and Sweden and worked for most of his career in Liverpool. He was dean of the faculty of medicine in Liverpool (1991–96) and has taken a particular interest in education. He helped to found the European Association for Clinical Pharmacology and Therapeutics in the early 1990s and was its chairman (2003–07).

**Professor Sir William Paton**

Kt CBE FRCP FRS (1917–93) was on the scientific staff of the National Institute for Medical Research (1944–52); reader in applied pharmacology at University College Hospital, London (1952–54); held the Vandervell chair of pharmacology at the Royal College of Surgeons, London, (1956–59); and was professor of pharmacology at the University of Oxford and fellow of Balliol College (1959–83). He was a member of the MRC (1963–67), a trustee of the Wellcome Trust (1978–87) and honorary director of the Wellcome Institute for History of Medicine (1983–87). His papers are held in archives and manuscripts, Wellcome Library, London, as PP/WDP, with further papers in GC/68/ and GC/154/A/11. See Rang and Perry (1996).

**Professor Sir Stanley Peart**

Kt FRCP FMedSci FRS (b. 1922) was professor of medicine at St Mary's Hospital Medical School, University of London, (1957–87), later emeritus. He was master of the Hunterian Institute, Royal College of Surgeons of England (1988–92); trustee of the Wellcome Trust (1975–94), deputy chairman (1991–94) and consultant (1994–98); and a Beit trustee (1986–2003). He delivered the Goulstonian lecture in 1959,



the Croonian lecture in 1979, and was a founder member of the Academy of Medical Sciences in 1998.

**Dr Anthony Peck**

FRCP FFPM (b. 1933) qualified at the Middlesex Hospital, London, and gained his PhD in 1967 from the University of London. In 1968 he was appointed assistant professor at the San Francisco Medical Center; was a clinical pharmacologist at the Wellcome Foundation (1969–94); part-time senior lecturer at the Middlesex Hospital (1969–98), later University College Hospital. He was also part-time senior medical assessor to the Medicines Control Agency (1994–2000).

**Professor Brian Pentecost**

OBE FRCP (b. 1934) qualified at St Mary's Medical School, London, in 1957, was consultant physician and cardiologist at the United Birmingham Hospitals (1965–93); dean of postgraduate medicine and dental education there (1987–91); and honorary professor of medicine (1991–98). He has been advisor in cardiology to the Department of Health's chief medical officer (1986–93), a member of the Committee on Safety of Medicines (1984–89; 1996–98), the Royal College of Physician's Linacre fellow (director of training,

1991–94) and medical director of the British Heart Foundation (1993–99).

**Professor Laurie Prescott**

FRCPE FRCP FFPM DCPSA FRSE (b. 1934) trained at Cambridge and the Middlesex Hospital, London. After junior hospital appointments in London, he was medical resident at the Boston City Hospital, Boston, Massachusetts, and then research fellow with Professor Lou Lasagna in the division of clinical pharmacology at the Johns Hopkins Hospital, Baltimore, Maryland. He returned to the UK as lecturer in therapeutics at the Aberdeen Royal Infirmary, Foresterhill (1965–69), and was senior lecturer, reader, and then professor of clinical pharmacology in the department of therapeutics and clinical pharmacology, University of Edinburgh (1969–97). He was honorary consultant physician to the Edinburgh Royal Infirmary and the Edinburgh Regional Poisoning Treatment Centre.

**Professor Brian Prichard**

CBE FRCP FFPM FESC FACC FBPharmacolS (b. 1932) started preclinical studies at King's College London in 1950 and qualified at St George's Hospital Medical School, London, in 1957. He was appointed research assistant in

clinical pharmacology to Professor D R Laurence at University College Hospital Medical School, London, in 1961, and became professor in clinical pharmacology at University College London (UCL) in 1980. He is past president of the International Society for Cardiovascular Pharmacotherapy, past vice-dean of the faculty of clinical sciences at UCL, and was foundation secretary of the Clinical Section of the British Pharmacological Society (1970–75) and has been chairman of the Institute on Alcohol Studies since 1993, a councillor in the London Borough of Wandsworth for over 40 years and a medical officer to Boys' Brigade camps.

**Professor Peter Quilliam**  
OBE FRCP (1915–2003) was professor of pharmacology at St Bartholomew's Hospital, London, from 1962 until his retirement, later emeritus, and was a co-founder of the charity, Help the Hospices. See Quilliam and Brown (2004).

**Professor Humphrey Rang**  
FRS FMedSci (b. 1936) was director of the Sandoz (later Novartis) Institute for Medical Research (1983–97); and professor of pharmacology at University College London (1979–83; 1995–2001), now emeritus.

**Professor Sir Michael Rawlins**  
Kt DL FRCP FRCPE FFPM  
FBPharmacolS FMedSci  
(b. 1941) qualified at St Thomas's Hospital, London, where he was later lecturer in medicine (1967–71); moving to the Hammersmith Hospital, London, as senior registrar (1971/2), a visiting research fellow at the Karolinska Institute, Stockholm, Sweden (1972/3) and was Ruth and Lionel Jacobson professor of clinical pharmacology at the University of Newcastle upon Tyne (1973–2006). He was a member of the National Committee on Pharmacology (1977–83); the CSM (1980–98; chairman 1993–98); Committee on Toxicity, (1989–92), the Standing Group on Health Technology Assessment (1993–5). He has been chairman of the National Institute for Health and Clinical Excellence since 1999.

**Professor John Reid**  
OBE FRCP FRCP(Glas) FRS(E)  
FMedSci (b. 1943) graduated in medicine from Oxford and trained in clinical pharmacology at the Royal Postgraduate Medical School (RPMS), Hammersmith Hospital, London. After a Medical Research Council travelling fellowship to the National Institutes of Health, Bethesda, Maryland, he returned to the RPMS as senior lecturer and later reader. In 1978 he was

appointed Regius professor of materia medica and therapeutics at the University of Glasgow and in 1989 translated to the Regius chair of medicine and head of the department of medicine and therapeutics. He is past president of the Association of Physicians of Great Britain and Ireland and of both the British and European Societies of Hypertension.

**Professor Alan Richens**

PhD FRCP FFPM FBPharmacol, a clinical pharmacologist in the area of antiepileptic drugs.

**Professor James Ritter**

DPhil (b. 1944) gained his first degree in animal physiology and a DPhil in pharmacology before completing clinical medicine at the Radcliffe Infirmary (Oxford) and training in Oxford, London and the Johns Hopkins Hospital Baltimore, Maryland, with specialist training in clinical pharmacology at Hammersmith Hospital, London. He has been head of the department of clinical pharmacology at Guy's, King's and St Thomas' School of Medicine (King's College, London); an honorary consultant physician at Guy's Hospital, then at Guy's and St Thomas' NHS Trust since 1988. He sat on the Subcommittee on Safety and Efficacy of the Committee on Safety of Medicines,

has chaired local and multicentre research ethics committees and chaired the Thames Specialty Training Committee in Clinical Pharmacology. He is editor-in-chief of the *British Journal of Clinical Pharmacology* (2008– ) and has co-authored the third and subsequent editions of Rang and Dale (1987).

**Professor Sir Max Rosenheim (Baron Rosenheim of Camden)**

Kt FRCP FRS (1908–72) qualified at Cambridge and did house jobs at University College Hospital (UCH) and Westminster Hospital, London. He became first assistant to the medical unit at UCH under Sir Harold Himsworth in 1940 and served in the Royal Army Medical Corps (RAMC) from 1941, reaching the rank of brigadier in the Allied Land Forces South East Asia. He returned to the UCH medical unit as deputy director and was appointed professor there in 1954. He was a member of the Medical Research Council and the Tropical Medicine Research Board (1961–64) and president of the Royal College of Physicians, London, (1966–72). See Robson (1982).

**Professor Phil Routledge**

MBE has been professor of clinical pharmacology at the School of Medicine, Cardiff University and consultant general physician at

the Llandough Hospital, Cardiff. He has been chair of the All Wales Medicines Strategy Group, head of Yellow Card Centre Wales; and chair of the All Wales Medicines Strategy Group.

**Professor Heinz Schild**

FRS (1906–84), pharmacologist, qualified at the Munich Medical School. He worked in Sir Henry Dale's lab (1932/3) and stayed in Britain working with Professor I de Burgh Daly at Edinburgh, and with S H Gaddum in Egypt; returning in 1937. He was interned in 1939 and on his release returned to the evacuated University College London department of pharmacology in Leatherhead, Surrey, from 1941. He became a British citizen in 1948. His method for obtaining the real equilibrium constant for antagonist binding contributed to the understanding of ligand receptor binding.

**Professor Sir Eric Scowen**

Kt FRCP FRCS FRCPE FRCPATH FRPharmS FRCGP (1910–2002) qualified at St Bartholomew's Hospital Medical School, London, and was house physician to Professor Francis Fraser, the first professor of medicine at Bart's, leaving in 1937 for Columbia University, New York, as a Rockefeller fellow. He returned in 1938 as a reader in medicine at Bart's, where he remained throughout

the war, serving as one of the Prime Minister's physicians. He was physician there from 1946 and helped plan the rebuilding of the Medical College in Charterhouse Square, appointed as its warden in 1951. In 1955 he became director of the medical professorial unit at Bart's, and professor of medicine, University of London (1961–75). He was chairman of the British Pharmacopoeia Commission (1963–69); member of the Committee on Safety of Drugs (CSD) (1963–71); chairman of the CSD's Subcommittee on Toxicity; twice chairman of the Committee on Safety of Medicines (1971–76; 1977–80); member of the Committee on the Review of Medicines (1975–78) and chairman of the Council of the School of Pharmacy (1970–80).

**Professor Robin Shanks**

CBE FRCP FACP (b. 1934) was senior pro-vice chancellor, Queen's University, Belfast, (1995–98). He was professor of clinical pharmacology at Queen's University, Belfast, (1972–77), Whitla professor of therapeutics and pharmacology, Queen's University, Belfast, (1977–98), and dean of the faculty of medicine (1986–91).

**Professor Reginald Stephen**

**(Sam) Stacey**

(d. 1974) qualified at St Thomas' Hospital Medical School, then

joined the medical unit there until appointed as professor of pharmacology and therapeutics at the College of Medicine, Baghdad, Iraq. He returned to St Thomas' as reader in 1948 and professor (1958–70) where he was known for his work on blood-platelet function and 5-hydroxytryptamine (5HT). After retirement he joined the Wellcome Research Laboratories, Beckenham. See Anon. [S.E.S.] (1974). His papers, including descriptions of the development of courses of study in pharmacology and therapeutics, cover the period 1931–74 and are held as MS826 at Senate House Library, University of London.

**Professor E M (Tilli) Tansey**  
HonFRCP FMedSci (b. 1953)  
is convenor of the History of Twentieth Century Medicine Group and professor of the history of modern medical sciences at the Wellcome Trust Centre for the History of Medicine at UCL.

**Professor Sir John Tooke**  
Kt FRCP FMedSci (b. 1949) has been professor of vascular medicine, University of Exeter, since 1992; dean of the Peninsula Medical School since 2000; honorary consultant physician in diabetes and vascular medicine, Royal Devon and Exeter Healthcare NHS Trust since 2000; executive dean of

the Peninsula College of Medicine and Dentistry, and chairman of the Council of Heads of Medical Schools, since 2006.

**Professor Geoffrey Tucker**  
FRCP(E) FRCA FFPM  
FBPharmacolS FBTS FCCP  
(b. 1943) trained as a pharmacist and received his PhD from the University of London in 1967. He was research assistant professor at the Anesthesia Research Center of the University of Washington, Seattle (1967–73); and after various appointments at the University of Sheffield, he was professor and head of the academic unit of clinical pharmacology, later emeritus. He has been editor (1988–94) and chairman of the editorial board (1995–2002) of the *British Journal of Clinical Pharmacology*; received the Lilly Prize from the British Pharmacological Society in 2000 for contributions to clinical pharmacology; and is chairman and co-founder of Simcyp Ltd, a University of Sheffield company specializing in the prediction of pharmacokinetics in populations since 2001.

**Professor Paul Turner**  
CBE FRCP FFPM (1933–94)  
qualified at the University of London and trained at Middlesex Hospital, the Royal Free Hospital,

London, and Edgeware General Hospital. He joined the staff of St Bartholomew's Hospital, London in 1963 as a lecturer in clinical pharmacology, later reader; was professor of clinical pharmacology at the University of London; and consultant physician at St Bartholomew's Hospital (1972–93). He was chairman of the Department of Health's Committee on Toxicity (1976–91) and president of the Medical Society of London (1991/2). See Gillam (2000).

**Professor Patrick Vallance**

FRCP FMedSci (b. 1960) trained at St George's Hospital Medical School, London, and qualified in 1984, where he was appointed as consultant and senior lecturer (1990–95). He left to take up the chair of clinical pharmacology at University College London. In 2002 he became head of the division of medicine and in 2006 left to join GlaxoSmithKline as head of drug discovery. He chaired the Wellcome Trust pharmacology and physiology grants panel and was registrar of the Academy of Medical Sciences.

**Professor Duncan Vere**

FRCP FFPM (b. 1929) trained in medicine at the London Hospital Medical College and completed a postgraduate research fellowship

there. He was medical officer at the RAF Institute of Aviation Medicine; senior lecturer in medicine and consultant physician at the London Hospital; reader and then professor of therapeutics at the London Hospital Medical School and was appointed head of the department of pharmacology and therapeutics there in 1969. He was a member of the Committee on Safety of Medicines, the Committee on Dental and Surgical Materials and the Medicines Commission (1970–90), and a member of the Nuffield Enquiry into Pharmacy, St Christopher's Hospice Research Committee.

**Professor Owen Lyndon Wade**

CBE FRCP HonFRCPI (b. 1921) trained at Cambridge and University College Hospital, and joined the MRC's Pneumoconiosis Research Unit, (1948–51) under Charles Fletcher and Archie Cochrane. He worked with K W Donald in the early days of cardiac catheterization (1951–57) and spent a year as a Rockefeller fellow at Columbia University, New York, with Robert Loeb. He was appointed to the chair of pharmacology and therapeutics at Queen's University, Belfast (1957–71) and to the chair in clinical pharmacology at Birmingham University (1971–86), serving six years as the dean of the faculty

of medicine and dentistry and three years as pro-vice-chancellor. He was a member of the Joint Formulary Committee responsible for the *British National Formulary* (1963–86) and chairman of the Joint Formulary Committee (1978–86). He was chairman of the Subcommittee on Adverse Reactions of the Committee on Safety of Drugs. He was also a founder member of the World Health Organization Drug Utilization Research Group. See Wade (1996): 110; Figure 7.

#### **Dr Mark Walport**

FRCP FRCPATH FMedSci (b. 1953) trained at Cambridge and the Middlesex Hospital Medical School; after junior appointments at the Hammersmith, Guy's and the Brompton Hospitals, he became an MRC training fellow in the MRC Mechanisms in Tumour Immunity Unit, Cambridge, gaining his PhD in 1986. He was head of the rheumatology section in the Royal Postgraduate Medical School (1985–97); head of the division of medicine at Imperial College London (1997–2003); and has been director of the Wellcome Trust since 2003. He was awarded the Roche Rheumatology Prize in 1991 and the Graham Bull Prize in Clinical Science (Royal College of Physicians) in 1996; and was a governor of the Wellcome Trust

(2000–03). He is a co-author of *Immunobiology: the Immune System in Health and Disease* (Janeway *et al.* (1997)) and was chairman of the editorial board of the *British Medical Bulletin* (2002–04). A founder fellow of the Academy of Medical Sciences (1998), he was appointed a member of the Prime Minister's Council for Science and Technology in 2004 and the Office for Strategic Coordination of Health Research (2007–). He chairs the Academic Careers Subcommittee of the UK Clinical Research Collaboration and Modernising Medical Careers (2004–) and co-chaired the independent review on the use and sharing of personal information in the public and private sectors for the Ministry of Justice (2007/8).

#### **Professor Miles Weatherall**

FIBiol (1920–2007) qualified at Oxford in 1943 followed by house jobs at the Hammersmith Hospital, London, and started pharmacological research in Edinburgh under Professor J H Gaddum, later becoming a lecturer there. He moved to the London Hospital Medical College, University of London in 1949 with the responsibility of introducing a new department and became professor of pharmacology there (1958–66). He moved to the Wellcome Research Laboratories

at Beckenham, Kent, in 1967 as head of the therapeutics research division and became director of establishment (1974/5–79), and served on the Medicines Commission (1979–81). See Hanley *et al.* (1970); Waters (2007).

#### **Professor David Webb**

FRCP FRSE (b. 1953) trained as a cardiovascular physician and clinical pharmacologist with Professor Joe Collier at St George's Hospital and Medical School, London, before moving to Edinburgh, where he was appointed to the Christison chair of therapeutics and clinical pharmacology in 1995, and has subsequently led Edinburgh's department of medical sciences (1998–2001), the Wellcome Trust Cardiovascular Research Initiative (1998–2001), and the Centre for Cardiovascular Science (2000–04). He was clinical vice-president to the British Pharmacological Society (BPS) (1996–98), chair of the Royal College of Physicians Committee on Clinical Pharmacology (1998/9) and chair of the BPS committee of heads and professors of clinical pharmacology (2004–07). In 2004 he became UK counsellor to the clinical division of the International Union for Pharmacology and chairman of the Scottish Medicines Consortium. In 2006 he was appointed vice-president of the Royal College of Physicians of Edinburgh.

#### **Professor Richard Tecwyn Williams**

FRS (1909–79) was professor of biochemistry at St Mary's Hospital Medical School, London (1949–76), and dean (1970–76). Following Sir Archibald Garrod's work on the role of enzymes in drug metabolism, he developed detoxication chemistry as a science in its own right, and established the two-phase drug metabolism in animals. In 1931 he published the structure of gluconuronic acid, and spent the rest of his career examining the fate of foreign compounds in the body. See Neuberger and Smith (1982).

#### **Professor Andrew Wilson**

CBE FRCP FRCPGlas (1909–74) was Weir assistant in materia medica, University of Glasgow, (1933–37); lecturer in pharmacology and therapeutics, University of Sheffield and clinical assistant, Sheffield Royal Infirmary (1939–46); lecturer in applied pharmacology, University College London, and University College Hospital Medical School (1946–48), reader in the University of London (1948–51); professor of pharmacology, University of Liverpool (1951–74); and chairman of the British National Formulary Committee.



**Professor Frank Woods**

CBE FRCP FRCPE FFPM

(b. 1937) was professor of pharmacology and therapeutics at the University of Sheffield from 1976, becoming Sir George Franklin professor of medicine in 1989 and director of the division of clinical sciences (south), University of Sheffield, and served as dean of the faculty of medicine (1988–98). He was awarded a CBE for his services to the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment and was chairman of the General Medical Council's Health Committee.

## Glossary\*

***British Journal of Clinical Pharmacology***

A ‘daughter’ journal to the ***British Journal of Pharmacology*** whose first issue was published bi-monthly in February 1974 with G M Wilson as chairman of the editorial board and Paul Turner as secretary and first editor. Originally published by Macmillan, it transferred to Blackwell in 1983. From 1975, 12 issues were published a year. See Cuthbert (2006).

***British Journal of Pharmacology***

The BMJ Publishing Group agreed to sponsor the new BPS journal of four issues a year, originally entitled the ***British Journal of Pharmacology and Chemotherapy***, the first published in spring 1946 edited by H R Ing. Macmillan Ltd became the publisher in 1968 and the title shortened to the ***British Journal of Pharmacology***, succeeded in 1983 by Blackwell, increasing in size to 24 issues a year in 1995. See Cuthbert (2006).

***British National Formulary (BNF)***

A listing of medicines that replaced the ***National War Formulary***, in which names of the preparations were in Latin, the doses in minims

and grains. It was founded in 1948, closed in 1976 and started again in 1981. Wade (1993). For details of 50 editions of the ***British National Formulary***, see [www.bnf.org/bnf/extra/current/popup/BNFcommemoration.pdf](http://www.bnf.org/bnf/extra/current/popup/BNFcommemoration.pdf) (visited 9 November 2007).

**British Pharmacological Society (BPS)**

Established as a ‘daughter society’ of the Physiological Society in 1931 by Walter E Dixon FRS (1871–1931), J A Gunn (1882–1958) and Sir Henry Hallett Dale OM FRS (1875–1968). It met once a year until 1946 when the launch of the ***British Journal of Pharmacology*** increased its activities and from 1968 there were four meetings a year. There had been some discussion at the BPS AGM in 1968 about retaining British in the title. The 50th anniversary was celebrated by a short history [Bynum (1981)] and its 75th with a special supplement [***British Journal of Pharmacology*** (2006) 147: S1–307]. See Cuthbert (2006); Aronson (2006); Dollery (2006).

\* Terms in bold appear in the Glossary as separate entries

### **Clinical Section, BPS**

A section of the Society devoted to clinical pharmacology was formed at the end of the 1960s, proposed by C T Dollery, D R Laurence, B N C Prichard, R G Shanks, J R Trouce, P Turner and D W Vere. The section had two of the four **BPS** scientific meetings a year for papers on clinical pharmacology. For further details, see [www.bps.ac.uk/site/cms/contentChapterView.asp?chapter=106](http://www.bps.ac.uk/site/cms/contentChapterView.asp?chapter=106) (visited 7 May 2008).

### **Drug and Therapeutics Bulletin**

A *Which?* publication that began as the UK edition of the US *Medical Letter on Drugs and Therapeutics* in 1962, changing its name a year later. It was independent of the pharmaceutical industry, Government and regulatory authorities with no advertising or commercial sponsorship and was distributed to all prescribing doctors in the UK from 1966 to 2006, paid for with a grant from the Department of Health (DoH). It held its first conference in 1984 and co-founded the International Society of Drug Bulletins (ISDB) in 1989. See Anon. (2002).

### **essential medicines**

The first 'model list' of 208 essential medicines was created in 1977 for developing governments

to select medicines for local public health needs to be incorporated into national lists, which preceded the famous 1978 Alma-Ata declaration on *Health For All*. The list is revised every two years by a group of experts; the March 2007 list contains 340 medicines. See WHO, Expert Committee (2007). See also [www.who.int/medicines/services/essmedicines\\_def/en/index.html](http://www.who.int/medicines/services/essmedicines_def/en/index.html) (visited 26 October 2007). For a comparative list over the 30 years, see [www.who.int/medicines/publications/essentialmedicines/compar\\_table\\_who\\_edls.xls](http://www.who.int/medicines/publications/essentialmedicines/compar_table_who_edls.xls) (visited 3 June 2008).

### **European Journal of Clinical Pharmacology**

Founded by Hans Dengler, Franz Gross and Hartmut Dost in 1968 as *Pharmacologia Clinica* with Springer Verlag. Two years later it was renamed the *European Journal of Clinical Pharmacology (EJCP)* with Hans Dengler, Franz Gross and Luzius Dettli as co-editors.

### **Imperial Chemical Industries Ltd (ICI)**

Formed in 1926 from the merger of four chemical companies: Brunner, Mond; Nobel Industries; United Alkali; and British Dyestuffs, selling chemicals, explosives, fertilizers, insecticides, dyestuffs, non-ferrous metals and paints. The 1993 demerger of ICI

Pharmaceuticals, created in 1957, and their agrochemicals businesses formed Zeneca (merged with Astra AB to create the pharmaceuticals company AstraZeneca in 1999; the agrochemicals business joined Novartis to form Syngenta in 2000). In 2008, ICI became part of AkzoNobel, a coatings manufacturer, selling decorative paints and performance coatings, and supplying specialty chemicals. Notable pharmaceuticals produced by its research group were sulfamethazine, the first sulfonamide antibiotic; Paludrine in the 1940s when supplies of the natural quinine treatment for malaria were threatened by hostilities; halothane (1951, an anaesthetic agent); Inderal (1965, a  $\beta$ -blocker), brodifacoum (1974, a rodenticide), Tenormin (1976, a  $\beta$ -blocker) and tamoxifen (1978, frequently used to treat breast cancer). See Reader (1970, 1975).

#### **International Union of Pharmacology (IUPHAR)**

Founded in 1959 as a section of the International Union of Physiological Sciences, it has been an independent body since 1966, renamed the International Union of Basic and Clinical Pharmacology in 2006. International meetings are generally held every three years, the first in Stockholm, Sweden in 1961; the second

in Prague, Czechoslovakia in 1963. From 1990, the meetings alternate with the world congresses of the International Union of Biochemistry and Molecular Biology (IUBMB) and the International Union of Physiology (IUPS).

#### **Joint Planning Advisory Committee (JPAC)**

A committee established in 1985 to advise the Department of Health and Social Security on national targets for the total number of senior registrar posts by specialty group and on regional quotas, with 17 members, and five observers from the Association of Medical Research Charities, the Welsh Joint Consultants Committee, the Department of Health, the Welsh Office and the Scottish Home and Health Department. The Committee continued until 1990 when it was replaced by the Specialist Workforce Advisory Group (SWAG) and later by the Advisory Group on Medical Education Training and Staffing (AGMETS). See Anon. (1985). See, for example, Salter (1995).

#### **Kempner's rice diet**

Dr Walter Kempner from Duke University, Durham, North Carolina, investigated the effect of diet on disease, including hypertension and diabetes, and

found that these conditions were rare when rice was a staple. Rice, fruit, juices, sugar, plus vitamin and iron supplements made up the regimen. For details, see Dunlop (1950). See also [http://archives.mc.duke.edu/mcakempnerw\\_pdf](http://archives.mc.duke.edu/mcakempnerw_pdf) (visited 26 June 2008).

#### **Medical Letter on Drugs and Therapeutics**

Founded in the US as one of two newsletters (the other being *Treatment Guidelines from The Medical Letter*) in 1959 by Dr Harold Aaron and Arthur Kallet, also co-founder of the Consumers Union. See <http://medlet-best.securesites.com/html/who.htm> (visited 9 November 2007).

#### **Merck Fellowship in Clinical Pharmacology**

An award from the Merck Company Foundation to promote and strengthen the discipline of clinical pharmacology. Four fellowships have been awarded annually since 1965, later renamed the International Fellowship in Clinical Pharmacology, supported by the Merck Foundation. See also Sjöqvist *et al.* (2007).

#### **Merck Manual of Diagnosis and Therapy (Merck Manual or Merck's)**

An alphabetical listing of agents of therapeutic value based on the US Pharmacopoeia, along

with symptoms and diseases, first published in 1899 as *Merck's Manual of Materia Medica*, in its 18th edition (2006). Full text is freely available at [www.merck.com/mmpe/index.html](http://www.merck.com/mmpe/index.html) (visited 9 November 2007). See Morowitz (1976).

#### **Modernising Medical Careers (MMC)**

A policy statement from the UK Departments of Health in 2003 outlining reforms to postgraduate medical education, including a shorter specialist foundation training period of two years, a computerized central selection process for training posts and revision of the non-consultant career grade. After the online Medical Training Application Service for junior doctors failed in 2006, Professor Sir John Tooke was appointed by the Secretary of State to investigate MMC procedures. His 2008 report, *Aspiring to Excellence*, suggested further reforms of postgraduate medical education. The report is at [www.mmcinquiry.org.uk/Final\\_8\\_Jan\\_08\\_MMC\\_all.pdf](http://www.mmcinquiry.org.uk/Final_8_Jan_08_MMC_all.pdf) (visited 20 June 2008). See also Delamothe (2008).

#### **Monthly Index of Medical Specialities (MIMS)**

Established in 1959 by Medical Publications as a free service to

prescribing medical professionals by cooperating pharmaceutical manufacturers, whose editorial team was independent of pharmaceutical companies.

#### ***Prescribers' Journal***

Designed to provide the physician with early and reliable information about new pharmaceutical products for use in general practice or in the hospital setting. It superseded *Prescribers' Notes*, first introduced in February 1952, which aimed to promote economy in prescribing habits as well as information on prescribing matters.

#### **Prescribing Initiative**

An initiative of the British Pharmacological Society that began after a series of events in which members of the Society highlighted problems with practical prescribing and its teaching. The first event was a press briefing at the Royal Institution's Science Media Centre in July 2006, which was followed by the publication of an editorial in the *British Medical Journal* (Aronson *et al.* (2006)). This led to the formation of a working party, organized by the General Medical Council, at which the Society had representation; the problems were discussed and changes proposed to the 2008 version of *Tomorrow's Doctors*. The Society agreed to fund a research registrar, for one year

initially, to carry out a systematic review of the literature on methods of teaching practical prescribing, to formulate a curriculum, and to survey teaching methods current in the UK. This initiative began in February 2008. See, for example, [www.newscientist.com/article/dn9574-experts-warn-on-dangerous-drugprescribing-errors.html](http://www.newscientist.com/article/dn9574-experts-warn-on-dangerous-drugprescribing-errors.html); [www.dailymail.co.uk/news/article-396399/Hundreds-dying-doctors-lack-training-prescribing-drugs.html](http://www.dailymail.co.uk/news/article-396399/Hundreds-dying-doctors-lack-training-prescribing-drugs.html) (visited 16 July 2008).

#### **Royal Pharmaceutical Society of Great Britain**

The professional and regulatory body for pharmacists in England, Scotland and Wales. See [www.rpsgb.org.uk/](http://www.rpsgb.org.uk/) (visited 16 November 2007).

#### **Safe Prescribing Working Group**

The General Medical Council (GMC) convened a meeting of interested parties to discuss prescribing errors in junior doctors. The Safe Prescribing Working Group was asked to determine what a Foundation Year 1 doctor must know on his or her first day with regards to prescribing; to suggest ways to support the development of this knowledge through undergraduate education and foundation training, including assessment; and to consider ways to support junior doctors in their

prescribing. The recommendations and outcomes of the Safe Prescribing Working Group are available on the Medical Schools Council's website at [www.chms.ac.uk/publications.htm](http://www.chms.ac.uk/publications.htm) (visited 8 July 2008)

### **Wellcome Foundation**

The umbrella organization formed in 1924 by Henry Wellcome to absorb his libraries, museums, research laboratories and the pharmaceutical company of Burroughs Wellcome & Co. Sir Henry Wellcome's will created the medical charity, the Wellcome Trust, which managed the Foundation until it was floated on the stock market and merged with Glaxo in 1995 (GlaxoSmithKline from 2001). For the history of the years to 1940, *see* Church and Tansey (2007).

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