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Version: Published Version

**Article:**
(2011) Homicide Forensics. Wellcome History. pp. 1-24. ISSN: 1477-4860

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Issue 47, summer 2011

# Wellcome HISTORY

## HOMICIDE FORENSICS

The scientific investigation of murder in 20th-century England

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# Bodies, traces and spaces

## *Feature: The shifting landscape of forensic homicide investigation in 20th-century England*

***Ian Burney***

Searching for evidence in the Crippen murder case, 1910.

*"When it is discovered that a murder has been committed, the scene of that murder should instantly become as the Palace of the Sleeping Beauty. Not a grain of dust should be moved, not a soul should be allowed to approach it, until the scientific observer has seen everything in situ and absolutely undisturbed."*

R Austin Freeman,
'A Message from the Deep Sea' (1909)

Cover image: Artwork illustrating forensic science. *Alex Williamson/Wellcome Images*

We are, by common consensus, living in a new paradigm in forensic investigation. Since the introduction of DNA profiling in the mid-1980s, the forensic landscape has altered dramatically. It has created new iconography (the white-suited and anonymous Scenes of Crime Officers, SOCOs), new challenges (hypervigilance against material contamination), new synergies (between academic biomedical research and applied forensic science) and a new set of spaces (especially the highly disciplined crime scene and its promise of yielding biotrace evidence).

This new forensic world has been the subject of a substantial body of critical scrutiny, which has drawn attention to the historical challenges facing the adoption of DNA profiling as a credible practicable forensic technology. Covering debates ranging from population genetics and abstruse probability theory to the processes of standardising laboratory protocols and agreeing universal thresholds of tolerance for accepting DNA matches as evidence, this literature has made DNA profiling the best-historicised forensic technique of the 20th century, perhaps of all time.

By contrast, we know very little about forensics in the decades preceding this genetic turn. This has resulted not merely in a gap in our historical knowledge but in a distorted understanding of the forensic era in which we now live – one that contrasts the scientifically advanced, mainstream discipline of contemporary biomedicine against earlier practices that are now dismissed as "untested assumptions and semi-informed guesswork" (Saks and Koehler, 2005). This is at best oversimplified and at worst dangerous, as it misrepresents the significance and complexity, in theory and in practice, of pre-DNA forensics, and obscures potential continuities between debates and difficulties in forensic practice across the 'great divide'.

My current research project on homicide investigation in 20th-century England, funded by the Wellcome Trust Medical History and Humanities programme, seeks to redress this ahistorical picture. It focuses on the shifting relationship between two models of forensic investigation: a body-centred forensic medicine inherited from the 19th century, and a trace-oriented forensic science that supplemented the pathological investigation of the whole body with an interest in the analysis of matter found on and around the body (blood, hair, fibres, 'dust'). The forensics of bodies and of traces both took on a new impetus at the start of the 20th century. The post-mortem encounter with the body, to be sure, has a long historical pedigree, but it was only in the first decades of the 20th century, in England, that the encounter between the body and the pathologist became a high-profile, celebrity-saturated practice – with Bernard Spilsbury (known as the 'people's pathologist') as its most prominent exemplar. However, alongside this there was another, in some respects opposing, trend developing. First discernible in the writings of turn-of-the-century continental theorists such as Edmond Locard and Hans Gross, a 'crime-scene' approach to criminal detection emerged that drew upon the practices and ideas from a variety of scientific disciplines (archaeology, entomology, serology and other forms of biochemistry), and a newly disciplined regime of police investigation – constituting a regime of detection in which pathology was no longer the exclusive authority.

Body-centred forensics depended on pathologists' success on two fronts, in two domains: first, securing the corpse as a source of forensic knowledge in the mortuary; second, gaining recognition for this knowledge in the courtroom. Both of these facets of forensic pathology entailed work on the part of its adherents, and both faced serious challenges. Pathologists, for instance, were forced to deal with the inherent instability of the corpse itself, which turned the problem of decomposition into a disciplinary concern in the forensic imagination, and which led to proposals such as specialised freezing chambers designed to suspend further decay of bodies and tissues. Furthermore, high-profile courtroom battles between Spilsbury and his contemporaries focused critical attention on the practices of pathology itself, which threatened to undermine the whole edifice of body-centred forensics and, at times, tarnish the reputation of its celebrity figurehead.

The 'crime-scene' approach to homicide investigation was grounded in a different set of imperatives: first, the need to suspend the crime scene

Modern crime scene investigation. *Marina Bartel/iStockphoto*

in time and space, with the aim of constructing an analytical space in which the body and its physical context could be subjected to a sequential and differentiated set of investigative practices undisturbed by decay, degradation or contamination. Nowhere is this more strikingly evoked than in the passage in R Austin Freeman's detective story that serves as the epigraph to this article. Freeman's self-consciously 'modern' approach to crime scene investigation was echoed in an emergent textbook literature: guarding the "Palace of the Sleeping Beauty" entailed, in Hans Gross's view, "the exclusion of everything happening after the moment when the crime is committed". The suspension of the moment of crime in time and space enabled the second feature of the forensics of things: the analytical 'excavation' of crime scene as 'archeological/ecological' space. This can to some extent be characterised as a shift from the body of the victim to the trace body of the criminal, using reconstructive techniques drawn from other scientific disciplines. "The criminologist," according to Locard, "re-creates the criminal from traces the latter leaves behind, just as the archaeologist reconstructs prehistoric beings from his finds."

By the 1930s–40s, trace investigation had become a standard and routine part of forensic investigation, and this in turn entailed changes in professional expertise and practice. The new emphasis on trace collection and analysis enabled criminal investigators to forge new evidentiary links between the victim's body, the perpetrator and the crime scene, and in this to assess the operation of a new analytic gaze, one that decentred the traditional forensic authority associated with the pathologist's autopsy. Homicide investigation was no longer oriented by the focused medical gaze of one medical authority; instead, a dispersed and multifaceted analytical gaze operated across several sites (crime scene, mortuary slab and laboratory), and belonged to a multidisciplinary structure that interrogated the visible and invisible traces of inorganic and organic matter swabbed from clothing, fluids, suspect weapons and the body (of both the victim and the accused).

The increasing complexity of trace analysis, then, demanded specialised knowledge and equipment beyond the conventional autopsy practices at the mortuary slab, and this imposed strategic and logistical demands that would transform the role and responsibilities of the forensic pathologist. In principle, forensic pathologists were relegated to the role of harvesting trace material from the body for analysis by other experts in other domains that might call into doubt the results of their own autopsy findings. However, in practice, pathologists still maintained overall command of the expanding forensic investigative matrix. For example, they were commonly put in charge of the new Home Office-sponsored police laboratories, which were themselves a core means of institutionalising a trace-oriented forensic model. This in turn presented sources of potential tension – between the forensic pathologist's established role as a custodian of a time-honoured medical practice, and the newer role as manager of routine, and tedious, laboratory work.

Bernard Spilsbury, pathologist.
After George Belcher, 1928. *Wellcome Library*

This new forensic enterprise also required new kinds of disciplinary framework that regulated and managed the crime scene, and these were tested and challenged by the practical exigencies of forensic murder investigation. The 1953 investigation of John Christie's serial murders provided one such test. Christie's home at 10 Rillington Place rapidly gained public notoriety as a 'chamber of horrors', and attending to the rhetorical and practical levels of this description will provide insight into the ways that murder investigation had been reshaped by new approaches to the crime scene, and by developments in trace detection (hair/semen analysis, body reconstruction, scene excavation). The forensic investigation – led, significantly, by a modern 'celebrity' pathologist, Francis Camps (1905–72) – transformed Rillington Place into a macabre archaeological site, the stage for a prolonged, meticulous and multidisciplinary search for and analysis of bioevidence. The Christie case shows how the new emphasis on trace collection and analysis enabled criminal investigators to forge new evidentiary links between the vicvtim's body, the perpetrator and the crime scene.

From the 1960s onwards, forensic pathologists grew increasingly vocal about their waning authority in murder investigations. The context for these laments was primarily structural: during this period many university forensic departments in England closed, with remaining academic appointments often funded by contracted-out services, leaving little time or incentive for conducting research. Another feature of this 'declinism' was the sustained critique of pathologists' working conditions (fees, career structure, etc.) and of the poorly resourced post-mortem theatres within which they worked. Such conditions, pathologists argued, not only impoverished their claims to forensic expertise but also impinged on their capacity to retrieve and deliver vital courtroom evidence.

Arguably, this 'declinism' feeds directly into the state of current thinking from across the DNA divide: that is, how difficulties, real and perceived, of forensic practice in the 1960s and 1970s presented a cleared stage for Alec Jeffrey's 'eureka' moment – a useful backdrop of stagnation that serves to enhance the new forensic paradigm.

In order to disrupt this logic, it is important to dig beneath the narrative of decline to view postwar developments in forensic techniques and practices as they appeared to actors beyond laments about professional structures and resources. Doing so makes it clear that many of the icons of post-DNA forensics – the white-suited SOCOs, concerns about 'chain of custody' and the management of the gap between crime scene and laboratory, questions about standards and thresholds for interpreting trace evidence, and the implications of a probabilistic model of forensic evidence based on statistical projections of the distribution of biocharacteristics among a given population (e.g. hair subjected to neutron activation analysis) – were all live concerns before the 1980s. Bringing the analysis up to the purported forensic watershed, then, invites reflection on past forensic practices, reflection that is not bound by – and might even place into historically informed analytical perspective – the imperialising allure of our own contemporary forensic imagination.

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# Arts and humanities, social sciences and medical humanities

*University of York*

***Mark Ormrod and Andrew Webster***

The University of York's Berrick Saul Building. *Stuart Brown on Flickr*

Arts and humanities disciplines are central to the academic excellence and aspiration of the University of York. In the 2008 Research Assessment Exercise (RAE), four of seven arts and humanities departments were in the UK top five of their respective disciplines, and all had a majority of research classified as internationally excellent. Since then, York has continued its strong record of commitment to arts and humanities, including the creation of a Humanities Research Centre with superb facilities in the new, purpose-built Berrick Saul Building.

There is a long and distinguished tradition of interdisciplinary research, and the University supports a series of specialist centres and institutes including the Centres for Medieval Studies, Renaissance and Early Modern Studies, Eighteenth Century Studies, and Modern Studies, the Institute of Railway Studies and Transport History, and the Institute for the Public Understanding of the Past. Medical humanities have been developed, particularly in the work of the Department of History. The Borthwick Institute for Archives, located in the University's JB Morrell Library, is the major public record office of the north of England and includes very substantial holdings relating to the history of medicine.

The University of York is one of the UK's leading social science research centres, as demonstrated by our performance in the 2008 RAE, with over 60 per cent of social science research activity graded as world-leading or internationally excellent. A number of our departments, including Sociology and Health Sciences, are currently ranked top in the UK. This is matched by similarly high-quality teaching provision across the postgraduate and undergraduate levels, reflected in our receiving the Times University of the Year Award in 2010. York's social science departments include Social Policy and Social Work, Education, Economics, the York Law School, Health Sciences, Politics, Sociology and the York Management School, as well as a number of world-class centres such as the Centre for Health Economics (CHE), the Centre for Reviews and Dissemination (CRD), the Centre for Housing Policy, the Social Policy Research Unit, the Science and Technology Studies Unit and the Post-war Reconstruction and Development Unit. The department-based excellence is complemented by the resources and facilities of the Alcuin Research Resource Centre, which provides a central location for research and training in the social sciences, fostering interdisciplinary programmes that have regional, national and international impact.

The arts and humanities at York have led the way in developing partnerships with local, national and regional bodies in the public and private sectors to support research activity and enhance its dissemination. There is a particularly strong record of achievement in attracting Collaborative Doctoral Awards from the Arts and Humanities Research Council. The social sciences at York have extensive links with external partners across the private, public and third sectors, particularly in the areas of business and management, social policy, sustainability and health.

We have a number of interdisciplinary research collaborations, and are currently developing strong links on three fronts: health, environment and urban studies. These cut across the social sciences, humanities and biomedical sciences. For example, we have a wide range of social science–humanities shared interests across campus, including work on: the social patterning of health by socioeconomic position, ethnicity, gender and age; how evidence of effectiveness and cost-effectiveness is applied to health policy; communication within healthcare; the historical, economic and philosophical debates relating to the meaning of wellbeing; innovation and new health technology adoption; effectiveness and health technology adoption, etc.; international/global dynamics of health; and health services management and policy. Some of the key departments working in these areas include Health Sciences, the Centre for Reviews and Dissemination and the Centre for Health Economics, who have especially strong links with health policy within the region and Whitehall.

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# Animal bites in the Middle Ages

*University of York*

***Kathleen Walker-Meikle***

A physician treating a rabid dog bite. From *Apollodorus de Herbis*, 13th century. *Wellcome Library*

Bites and punctures, from both venomous and non-venomous animals, appear frequently in both medical and lay sources throughout the High and Late Middle Ages, understandably so in a society where humans lived in close contact with many animals, both wild and domestic. In December 2010, I started a three-year Wellcome Trust Medical History and Humanities Research Fellowship on a project titled 'The medical category "bites and punctures" in Latin medical literature in the 13th–14th centuries'.

The project examines how late medieval medical authorities formulated and responded to the problem of bites and punctures from wild and domestic animals, both venomous and non-venomous, such as snakes, bees, cats and dogs (rabid and non-rabid). Through this project, I hope to understand medieval theoretical and practical ideas on punctures and wounds caused by animals and animal toxicology, as animal bites of all kinds were often believed to contain noxious poisons that needed swift attention, and how animal bites were defined, situated and structured in regard to causes, symptoms and treatment in the learned medical tradition.

To provide a background to the subject, I began by examining works that mention animal bites and possible cures from Antiquity. After an brief excursus into Byzantine medical texts, I will work on animal bites in Latin texts in the West through the early Middle Ages before focusing on the impact of texts translated mainly from Arabic (also from Greek and Hebrew) into Latin in the High Middle Ages, and their subsequent elaboration, restructuring and use or disuse by medical authorities. This begins with the translations associated with Constantine the African at Monte Cassino in the later 11th century and proceeds through the translations of Gerard of Cremona (d. 1187) in Spain and beyond. Many of the translations are notable for the wide variety of animals discussed: for example, Avicenna speaks of the bites of crocodiles, cats, lions, men, sea-dragons, lizards, salamanders and assorted venomous snakes, among many others. Another focus will be on texts and commentaries used in university curricula, in faculties of both medicine and arts. In the case of the latter, animal bites appear in natural history texts. Another major source are the encyclopedias of the 13th century, produced by mendicant scholars. In the 14th century, there is an extraordinary growth of specific works on poisons, most of which discuss the bites of venomous animals.

Medieval authors suggested varied treatments for bites. The initial act usually was to distinguish between the bites of venomous beasts (snakes, scorpions and rabid dogs were included here) and non-venomous animals (hares, cats and non-rabid dogs, for example). A venomous wound could be recognised by the painful burning and swelling sensation at the wound. Bites could be worse if the animal was angry, having been provoked or teased by the patient, or if the animal came from a hot and dry climate. A particular focus was rabid dogs, as dogs were a domestic animal that lived in very close contact with humans. Many works describe in detail how to identify a rabid dog by its behaviour, which included drooling, red eyes, barking at its own shadow and not recognising its master.

Sea bathing was suggested as a treatment by many authors, for both people and dogs who might have (or not) rabies. The late 13th-century surgeon Henri de Mondeville commented that it was common to see on beaches in Normandy men and dogs being taken to the seashore for a bath, and then returned cured and docile. Other treatments included a variety of ointments to place on the wound and potions to drink. One recipe including splitting open chickens and laying them on the bite; another suggested an ointment made from pigeon droppings, garlic and salt, while a third mixed figs and pomegranates together to place on the wound. Of all the medicines taken internally, the most famous was theriac, a complicated medical compound that could trace its lineage back to classical Antiquity. In addition, cauteries and amputation were suggested by surgical authors, and there were also assorted prophylactic remedies to ward off animals such as wasps, bees, snakes and scorpions so that one might not get bitten in the first place.

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# Water and wellbeing in Hong Kong, 1945–80

*University of York*

***David Clayton***

A Hong Kong street, by Leonard Jan Bruce-Chwatt. *Wellcome Library*

Fresh water is becoming increasingly scarce. Demand has risen because of population growth and rising affluence, while supply is constrained by the 'natural' hydrological cycle and by the rate of technological change in water management. Extreme weather brought about by climate change will exacerbate this mismatch. The effects of scarcity are uneven. Poor households in non-temperate climatic zones suffer disproportionately. In low-income countries, they compete with farmers irrigating crops, with industrialists cooling and lubricating machines and with bureaucrats managing hydroelectric schemes. Weak states also lose out against neighbouring ones. Future technological change is unlikely to reduce the incidence of societal and inter-state conflict; ever since the mid-19th century, innovation in water management techniques has been limited. Can environmental history reveal low-carbon solutions that might mitigate scarcity and reduce the incidence of conflict?

During its golden age of growth (*c.*1945–80), Hong Kong experienced rapid falls in mortality from infectious disease and (after a lag) rising average incomes, a success story founded on export-led industrialisation supported by public investment in the social infrastructure. However, rates of investment in rainwater capture technologies, on which Hong Kong depended, lagged. One million refugees, rapid industrialisation, large-scale market gardening and improved hygiene increased demand in unpredictable ways. Bureaucrats using plans, markets via the price mechanism, and communities acting collectively responded in innovative ways to endemic scarcity.

Pilot research undertaken in the Hong Kong Public Record Office and in the UK National Archives has revealed abundant materials in policy and operational files; contemporary newspapers and periodical literature, the archives of private organisations and oral histories provide supplementary materials. These sources enable three inter-related fields of enquiry. First, institutional analysis will reveal the contribution of private and public systems of water supply, the origins of supply-side innovation (such as dry sanitation, salt-water flushing, recycling and reduced leakage rates), and the effects of rationing and resource pooling, the key demand-side strategies. It will show how austerity affected the trade-offs between public health and private affluence. Secondly, descriptive and inferential data analysis will enable the water intensity of modes of production and consumption to be computed. Hong Kong exhibited sharp dualism in the use of land and technologies: unregulated, insanitary squatter settlements coexisted with high-quality residential areas, and workshops using labour-intensive modes of production coexisted with capital- and fossil-fuel-intensive producers. The effects of water scarcity, notably on heath, are likely to have varied. Thirdly, a new collaborative international political economy emerged from the 1960s. Hong Kong imported vast volumes of water from a hostile neighbouring power, China. As states within a water basin normally compete over access to water, this merits thorough investigation.

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# Health, wealth and medical science

*University of York*

***Sue Bowden***

A global study of health in the 20th century is an ongoing research project based in the Centre for Historical Economics and Related Research at the University of York, involving colleagues based in York, elsewhere in the UK and overseas. The team includes economic historians, econometricians, health economists and development economists. The emphasis is on the interplay between the economy (what could be achieved given levels of growth and development) and medical science (what could be achieved in terms of prevention and cure given existing states of medical knowledge). By health we mean morbidity and mortality in the context of current medical knowledge and hence what was avoidable illness and death.

We have explored child illness and mortality in the UK during the depressed economic circumstances of the interwar years. Taking a cross-section approach that enabled researchers to explore child health in different parts of the country that experienced varying degrees of economic depression, this work found that improvements in living conditions and in medical provision reduced the risk of child mortality, but that variations in socioeconomic living conditions, medical provision, unemployment among males and female employment explained differences in the risks of mortality.

The team has conducted research on two global health issues in the postwar period: malaria and tuberculosis, which independently and together were the major causes of illness and death in many parts of the world between 1950 and 1980. As such, we have explored the relationship between the escape from poverty and prevailing levels of disease through a study of the economic significance of malaria eradication in the first half of the 20th century in Greece, Italy, Portugal and Spain. The findings emphasise the adverse effects of civil and international war on human capital accumulation in relation to disease eradication, and in particular the implications of unrest for the institutional and infrastructural frameworks necessary to eliminate disease. This work found evidence to support the thesis that the malaria eradication campaigns may have led to improved agricultural productivity, as a result of the associated land reclamation and agricultural expansion.

We have worked intensively on respiratory tuberculosis on a global basis between 1950 and 1980 – a discrete period of time when, in theory, medical science delivered in terms of prevention and cure and before drug-resistant tuberculosis emerged (largely a result of its interface with HIV/AIDS). To do this we have created new datasets that improve on those currently available, in terms of updated global information on morbidity, mortality and fatality. Using our new datasets we found that despite the advances of medical science, not only did respiratory tuberculosis remain a major cause of morbidity and mortality in many parts of the world but also there were significant differences across countries in the extent to which the potential promised by the advances of medical science were realised. To the extent that drugs existed that could cure the disease, deaths from respiratory tuberculosis between 1950 and 1980 were in theory avoidable. We believe that the history of tuberculosis provides important lessons about the fight against epidemic diseases in general, and offers valuable policy implications for the current tuberculosis epidemic in many low-income countries.

The research on respiratory tuberculosis morbidity and mortality in Europe in the postwar period demonstrated the fight against respiratory tuberculosis was won as a result of improvements in living standards related to economic growth, as well as owing to the provision of medical care and the development of public health systems. Using our new datasets, we found that by 1970 Europe could be divided into three groups of countries: those where the risks of dying once diagnosis was confirmed remained high (Spain, Italy, Austria, Hungary), those where the risk of fatality was low (England and Wales, Finland, Poland, the Netherlands, Iceland, Yugoslavia, Norway) and an intermediate group (East Germany, Northern Ireland, Romania, Sweden, Portugal, Denmark, Luxembourg). The research found that success in the fight against respiratory tuberculosis was a function of medical advance and of an institutional framework in which the pioneering advances of medical science in both prevention and treatment could be applied.

*The malaria eradication campaigns may have led to improved agricultural productivity, as a result of the associated land reclamation and agricultural expansion*

More recently, we have been examining morbidity, mortality and fatality from respiratory tuberculosis on a global basis between 1950 and 1980. Again, new datasets have been created to this end. We have found a tripartite divide in terms of all three dimensions of the health problem: significant gains in high-income countries, a growing problem in newly industrialising countries and a signal lack of improvement in many low-income countries, notably in Africa. We further explored the potential offered by medical science in these decades and considered how and why the interventions science and medicine made possible for identification, prevention and cure, while being highly effective and viable in developed-economy environments, were constrained in low-income countries given the costs of implementing these interventions, in terms of transport, storage and the existence of trained personnel. We further found that

where resources were limited, and the health problem was infinite, the costs of identifying, preventing and curing tuberculosis were not possible for many developing economies in this period.

We are currently pursuing two issues: the effects of urbanisation, migration and overcrowding on the risks of infection and the relationship between nutrition on the development of active symptoms of the disease, again on a global basis. Bringing our work up to the present, we are exploring the relationship between objective and subjective health measures and the social determinants of health. The purpose of this is to discover those variables that are important for objective health status and those that are important for subjective health status. The data we have collected are also providing us with an opportunity to measure the relationship between subjective and objective health evaluations for a given set of individuals across countries in the present day.

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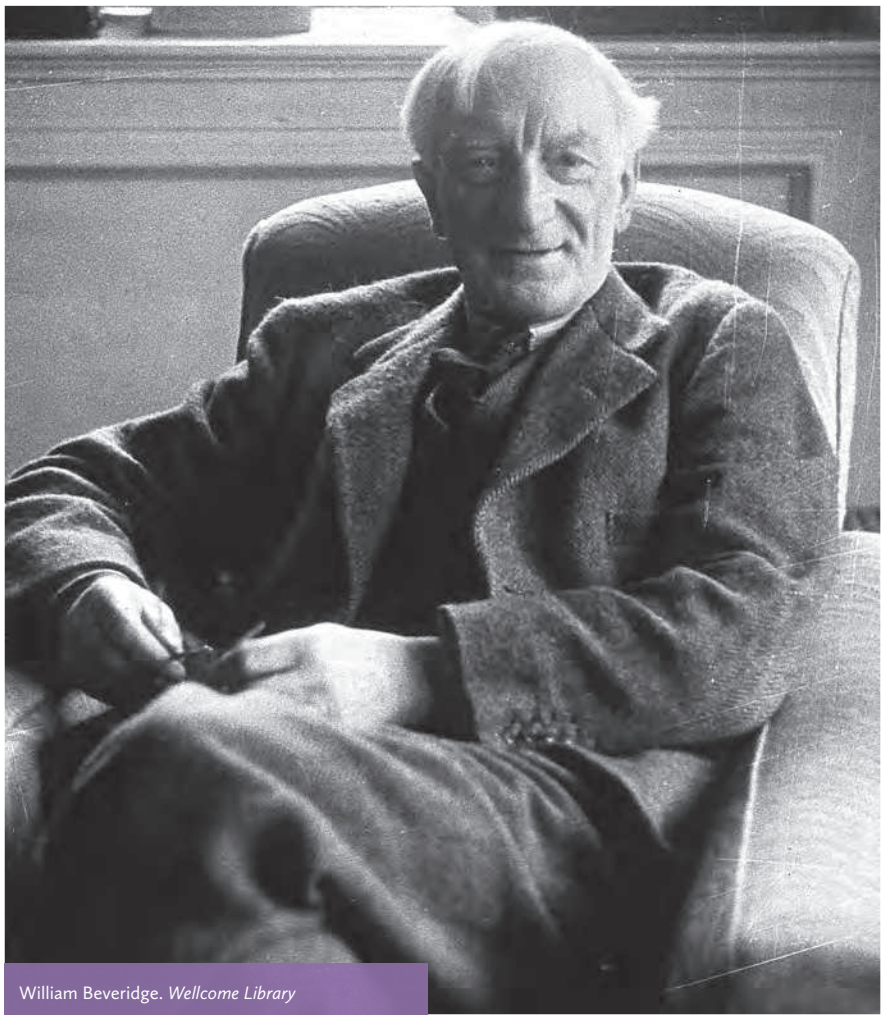
# Biology and social science

*University of York*

***Chris Renwick***



William Beveridge. *Wellcome Library*

My research explores how the historical interaction of biological and social ideas has shaped the identity and practices of British social science. I first examined this field in my doctoral work, which argued that British sociology was founded on a series of late 19th- and early 20th-century debates about its relationship with biology. However, having published a number of articles and recently submitted a monograph manuscript to the University of Chicago Press, I have widened my research to consider mid-20th-century developments – in particular, how the economist William Beveridge attempted to reform social science at the London School of Economics during the 1920s and 1930s.

Beveridge used his directorship of the LSE to establish a project called the Natural Bases of Social Science, which was funded by the Rockefeller Foundation and included a controversial department of social biology. Although it aimed to change the way social science was practised in Britain by 'cross-fertilising' biological and social science, Beveridge's project has received little scholarly attention. For example, while Ralf Dahrendorf's history of the LSE (1995) and Jose Harris's biography of Beveridge (1977, 1997) both examine the project, neither closely considers its substantive and methodological content or its wider significance in the history of British social science. As a consequence, we have a poor understanding of the kinds of change that the project was meant to initiate, why it failed to achieve them and the impact that it had on the direction of social science in the UK.

My research will therefore make an important contribution to our understanding of British social science by deepening our knowledge of a series of events that helped shape its current intellectual identity and practices. The programme will do so by using historical methods on the archival sources held by the Rockefeller Foundation in New York State. These substantial holdings, which are not available online or on microfilm, contain key documents relating to the Natural Bases of Social Science project. These documents include extensive correspondence between Beveridge

and officers of the Foundation, committee minutes, diaries, progress reports and a previously unknown manuscript entitled 'Suggestions for Program in Social Sciences in England with Comments on Past Rockefeller Foundation Policy', which was written by Beveridge in 1937. Building on what I have learned from the correspondence of Lancelot Hogben – who led the LSE's department of social biology – and archives at the LSE, the materials held by the Rockefeller Foundation will provide me with both essential information about the project and contextual details that are necessary for interpreting its development. This will enable me to complete the process of recovering the methodological and substantive content of the social science that Beveridge's project aimed to create and the reasons for its failure. In doing so, my work will reconstruct an alternative but forgotten vision of how to relate biological and social science, which will enrich our understanding of current debates about the issue.

A note on my upcoming book, titled *British Sociology's Lost Biological Roots*. For some time, the social sciences have been under attack from those who believe that biology, not society or culture, provides the best explanation of human behaviour and social organisation. Evolutionary psychologists speak disdainfully of a 'Standard Social Science Model', picturing the human mind as formed through nurture alone; social scientists react by decrying the reductionism of biological views. With positions so polarised, it is easy to forget that the social sciences and biology were not always regarded as separate spheres. When, how and why did the split come about? My book seeks answers in the debates about sociology in late 19th- and early 20th-century Britain, where rival visions of the relationship between biology and society competed to shape the burgeoning discipline's future. Charting the emergence of sociology in Britain from the mid-1870s to the early 20th century, when L T Hobhouse, who battled to separate the biological and social sciences, was awarded Britain's first chair of sociology and editorship of the *Sociological Review*, the UK's first sociology journal, this book casts fresh light on the roots of current debates about the place of biology in sociology. Moreover, by recovering the visions for sociology of Hobhouse's rivals, including the Scottish biologist and sociologist Patrick Geddes and the eugenicist Francis Galton, the book contributes to historical and sociological debates by showing how the history of British sociology can inform current discussions about the future of the relationship between the social and biological sciences.

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# Sociology, biomedicine and health

*University of York*

***Andrew Webster***

A surgical team at work. *Wellcome Library*

The University of York's Science and Technology Studies Unit (SATSU) has three research themes: the sociology of the biosciences, social informatics, and governance and regulation of new technologies. Within the area of health (the sociology of the biosciences) it has an active research programme directed at understanding the influences shaping the clinical, regulatory and commercial development of the new biosciences, especially in the fields of regenerative medicine/stem cells, the new genetics and pharmacogenetics. It also has an interest in e-health (such as telemedicine) and its implementation in clinical and non-clinical settings.

In regard to regenerative medicine, SATSU has coordinated a national programme (**www.york.ac.uk/res/sci**), funded by the Economic and Social Research Council (ESRC), covering contemporary economic, clinical and regulatory issues. This programme explored the dynamics of translational medicine, innovation and regulatory issues at an international level. One of our projects has examined the growth of biological standards in the field and how these are stabilised across science labs, and the long-term implications this has for issues such as patient safety. In addition, SATSU coordinates a major European Commission FP7 grant (REMEDiE) on regenerative medicine as well as another on xenotransplantation

and citizen participation in policy making. A related ESRC project on the emergence of commercial cord blood banking began in January 2009; this will examine new forms of consumption, parental responsibility and the changing balances between public and commercial bioscience.

With respect to pharmacogenetics – the relationship between individual genetic variation and drug response – SATSU has been funded over the past five years by different bodies (the UK Department of Health, the Wellcome Trust, the EC) to examine the social, ethical and regulatory dimensions affecting the introduction of such technologies into healthcare systems. Our interest in genetics and therapeutic regimes is set within a wider sociological context of the sociotechnical construction of new technologies, particularly in the area of healthcare and the role of expectations and different conceptions of how particular technologies might be introduced, and how these may shape the development and introduction of genetics-based medical technologies. A recently completed project supported by a Hull York Medical School Pump Priming Award examined 'Molecular diagnostics and clinical effectiveness: innovation, communication and clinical decision-making' in the haematology field (in collaboration with Health Sciences and Hull/Leeds Haematological Malignancy Diagnostic Service contacts).

The Sociology Department at York is also deeply involved in two areas of health-related research: conversation analysis and medical sociology. A current project on 'Communication and risk in surgery' explores the communication dynamics of surgical teams as they perform procedures. By drawing from a qualitative method in sociology to study how we use language to establish and negotiate interpersonal relationships, we intend to identify key patterns in the talk of the surgical team at points at which issues of risk and patient safety become salient. By examining the linguistic and pragmatic procedures through which surgical teams identify contingent and routine difficulties, and coordinate group or individual responses, we will be able formally to describe those largely tacit or unseen interpersonal dynamics associated with high-risk moments in surgery. These kinds of findings can inform both evaluation of surgical procedures and training for members of surgical teams. We are currently in negotiation with anaesthetists and surgeons in one of the UK's leading university hospitals to secure access and data.

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# Society for the Social History of Medicine

*Since its inaugural meeting in 1970, the Society for the Social History of Medicine (SSHM) has pioneered interdisciplinary approaches to the history of health, welfare, medical science and practice. The SSHM is a lively international community consisting of those interested in a variety of disciplines, including history, public health, demography, anthropology, sociology, social administration and health economics.*

### Publications

- *Social History of Medicine* – a peer-reviewed journal produced by Oxford University Press. The journal is concerned with all aspects of health, illness, and medical treatment in the past and publishing work from a variety of disciplines.
- Gazette – a newsletter reporting on conferences and other news.
- Studies for the Society for the Social History of Medicine – book series published by Pickering and Chatto.

### Activities

- Conferences and other events.
- Student bursaries for conference attendance.
- The Roy Porter Student Essay Prize (£500) – winning essays may be published in *Social History of Medicine*.

### Membership benefits

- Subscription to *Social History of Medicine* (four issues per year) and the Gazette.
- Reduced registration fees at SSHM and European Association for the History of Medicine and Health conferences.
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### Details

- Contact the membership secretary, Catherine Cox, at catherine.cox@ucd.ie.
- Visit **www.sshm.org**.
- Find the SSHM on Facebook.
- SSHM membership is free for subscribers to *Social History of Medicine*: **shm.oxfordjournals.org**.

# Sensing pollution

*University of York*

***Mark Jenner***

I have worked on various aspects of the social and cultural history of health and medicine in England between *c.*1500 and *c.*1800. I have had a longstanding interest in the history of hygiene, health and the environment, with a particular focus on the history of sanitation and water supply in London. My work challenges the modernist assumptions of the historiography of public health, which generally treats all forms of cleansing, collective health promotion and disease prevention as no more than *hors d'oeuvres* served up before the reader gets on to the thoroughly modern main courses of network technology, bacteriology and social medicine. My work emphasises how concerns about public cleansing were intertwined with other forms of local social relations and systems of governance.

*I have tried to go beyond conventional cultural historical approaches to the senses, which tend to depend upon a strict dichotomy between nature and culture*

Chelsea Water Works, 1750. *Wellcome Library*

However, this work can also be seen as a longstanding dialogue with the writings of Mary Douglas, and I have always stressed that the histories of cleanliness and dirt are at least as much histories of perception as they are of administration. I have argued that representations of air pollution at the time of Charles II's Restoration were shaped by the political agendas of their authors, and have traced the connections between the religious ideas of 17th- and 18th-century doctors and their hydrotherapeutic writings. In a recent work, *Medicine and the Market in England and Its Colonies, c.1450–c.1850* (edited with Patrick Wallis), I have emphasised the socially embedded nature of medical commerce and suggested that campaigns about water quality in early 19th-century London were rooted in suspicions of the commercial practice and the monopoly held by the capital's water companies. Both of these strands are addressed in my soon-to-be-completed monograph *A Cleanly City: Cleanliness, dirt and public health in early modern London*.

I also have a longstanding interest in and sceptical engagement with the history and historiography of the body. In surveys of the field published a decade ago, I critiqued what seemed like a tendency for the field to objectify and reify what it was studying and called for greater attention to the problems and questions of embodiment. In recent work on taste, touch and smell, 'Tasting Lichfield, touching China: Sir John Floyer's senses' (*Historical Journal*, 2010) and 'Follow your nose? Smell, smelling, and their histories' (*American Historical Review*, 2011), I have developed this line of thinking with reference to the history of the senses. Pioneering work in this area was initiated by Bill Bynum and Roy Porter's collection *Medicine and the Five Senses*, but few medical historians have built upon these foundations. I have tried to go beyond conventional cultural historical approaches to the senses, which tend to depend upon a strict dichotomy between nature and culture, and focus instead on *sensing*, examining medical uses of the senses as forms of practice and as ways of being-in-the-world.

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# New uses for sugar in the British West Indies

*University of York*

***Sabine Clarke***

Norman Haworth, Nobel Prize-winning chemist. *Wellcome Library*

In the summer of 1940, officials at the Colonial Office in London conceived a new and radical vision of economic development for the British West Indies. The proposal was that instead of being consumed as a foodstuff, cane sugar produced in the colonies of the region could be used as a raw material to make fuels, medical products and synthetic goods such as plastics. The hope was that by taking advantage of an expanding market for manufactured products, the British West Indian colonies would see a revival in their economic fortunes.

The price of cane sugar had reached an all-time low in 1934, and officials were pessimistic about the long-term future of an industry that produced a commodity in oversupply. During the 1930s there had been strong criticism of the social deprivation that existed in the colonies and there was concern that further decline in the sugar industry would led to nothing but "unemployment, distress and misery" for the populations of the region. While distress was not limited to workers in the sugar industry, and sugar was no longer the principal export of all the Caribbean colonies, it remained the largest employer. Riots across the region in the 1930s demonstrated to the British government that discontent among workers in this industry could threaten the stability of entire territories, and even the integrity of the Empire as a whole.

Historians have noted how the economic and social problems of the British West Indies during the 1930s were important in allowing for the reform of policy that led to the 1940 Colonial Development and Welfare Act, but the nature of economic plans for the British West Indies after 1940 has received little attention. It has sometimes been stated that officials abided by the recommendations made by Lord Moyne's commission, which had investigated the social and economic problems of the region in 1938. With regard to the problems of the sugar industry, however, this claim is mistaken. In their emphasis on diverting cane sugar to new industrial uses, and in proposing to foster industrial development in Britain's Caribbean colonies, plans conceived by officials after 1940 marked both a departure from the commission's recommendations and a significant break with the policies of the past.

A failure by historians to acknowledge the novelty of new plans for the British West Indies is most likely the result of a more general neglect by scholars of the role that scientific research had come to play in official thinking by 1940. The Colonial Office's plans to transform the economies of the British West Indies were predicated on finding new uses for sugar through scientific research it was sponsoring. This was an ambition made possible by the creation of a substantial research fund as part of the 1940 Act. An allocation of £1 million each year from 1945 worked to elevate the Office to the position of the second largest sponsor of scientific research in Britain, after the Department of Scientific and Industrial Research. The period after 1940 saw a strongly technocratic turn in colonial policy; a number of new research committees were formed at the Colonial Office, populated by scientists drawn from Britain's most prestigious research establishments. There was an emphasis on recruiting specialist researchers to the colonial service, and around 40 research institutions were operating across the Empire by 1952.

*Cane sugar produced in the colonies of the region could be used as a raw material to make fuels, medical products and synthetic goods*

In making and executing its plans to find new uses for British West Indies sugar through scientific research, the Colonial Office was inspired by the interwar production of motoring fuels and organic chemicals based on molasses as a raw material. One legacy of intense interest and activity by government, business and scientists in the fields of microbiology and organic chemistry after World War I was significant experience and expertise in Britain in the generation of products derived from alcohol produced by fermentation. The Office was lobbied by a number of individuals, including the scientist Chaim Weizmann, to support the development of molasses-based industry, and there was ardent support from others for programmes of research into microbiology and sugar chemistry. The Nobel Prize-winning chemist Norman Haworth informed the Office that as a potential raw material to produce synthetics, sugar was purer than molasses, it was abundant and it could compete with coal and oil in terms of price. As a consequence of this endorsement, the Office funded Haworth's work at Birmingham University and created two new laboratories in Trinidad to investigate the uses of sugar and its by-products and for work in microbiology. Aside from the aim of acting as a spur to economic development in the British West Indies by creating new products to be exploited by industry, these laboratories were intended to be a demonstration of Britain's commitment to modernising the colonies. Officials claimed that locating this research in Trinidad would enable the island

to take its place in the international exchange of knowledge that was characteristic of scientific research.

The laboratories in Trinidad can also be seen as an attempt to assert the role of the British Empire and British expertise in directing development in the British West Indies. The late colonial period saw a number of alternative models and sources of advice for Caribbean development, including those of the USA, which promoted its experts and development ideas through the Anglo-American Caribbean Commission. British officials found their vision of economic development was marginalised in the 1950s as Caribbean politicians and intellectuals increasingly privileged the regional context over the imperial when seeking models of industrial development, with many turning to Puerto Rico's 'Operation Bootstrap' as a source of inspiration.

In the end, the search for new uses for sugar furnished little in the way of new products and industries during the late colonial period, with the exception of a blood plasma substitute named Dextran. A number of factors contributed to the failure of this programme, including the reluctance of sugar companies in the British West Indies to diversify when the prospect of independence for Britain's colonies made their future uncertain.

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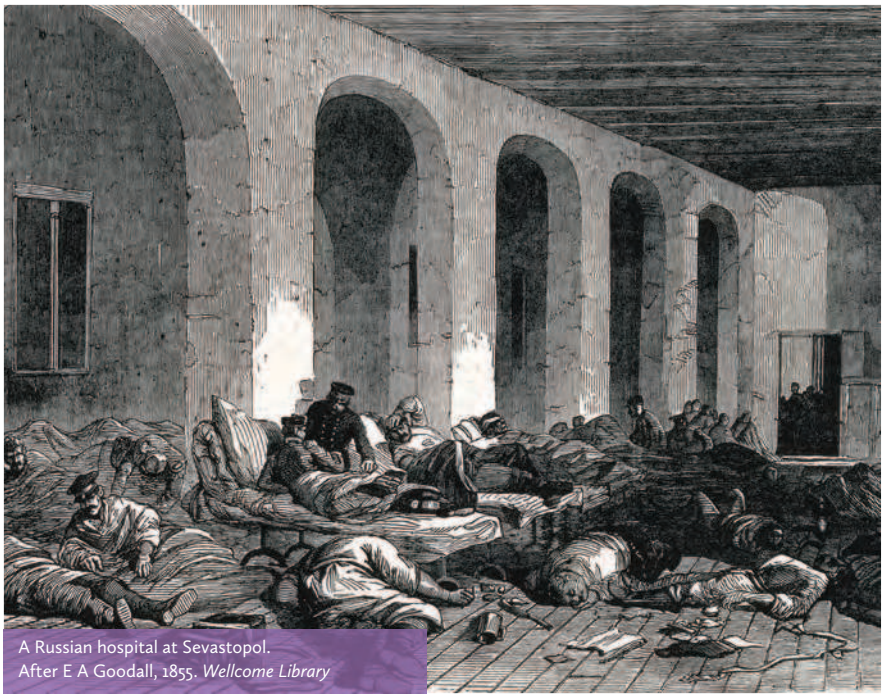
# The Sisters of Mercy

*University of York*

***Shane O'Rourke***



A Russian hospital at Sevastopol. After E A Goodall, 1855. *Wellcome Library*

The first shots of the Crimean War brutally demolished the austere façade of order, authority and discipline that Nicholas I had painstakingly constructed in Russia over the previous 30 years. The war mercilessly exposed the rottenness of the entire Nikolaevan system. In a particularly acute and bloody fashion, the rottenness was evident in the army's medical service, which collapsed under the strain. The military hospitals – corrupt, incompetent and deadly – encapsulated Nicholas's Russia. St Petersburg society was shocked by the stories of suffering emanating from the military hospitals in the Crimea, above all from Sevastapol, which achieved iconic status during the long siege.

Despite the shock and the manifest incompetence of the government, the upper echelons of society could only watch impotently as the suffering continued. Thirty years of authoritarian rule had effectively crushed any societal initiatives. In the midst of this paralysis, one woman, Grand Duchess Elena Pavlovna, boldly issued a call for volunteer nurses to go to the Crimea. She and sympathisers in the medical profession set about coordinating the recruitment, organisation and dispatch of nurses to the war zone. These women, known as the Sisters of Mercy, made a signal contribution to the army medical service and became a permanent feature of the army.

Elena's contribution to the foundations of the Sisters of Mercy has never been properly investigated, nor has there been a major assessment of the role of the Sisters of Mercy in the Crimean campaign. In addition, Elena's call for volunteers had ramifications far beyond the important sphere of military health. It audaciously trampled over gender, class and political boundaries. It was the harbinger of the new order to be introduced by Alexander II, who came to the throne in the midst of the war. One of the assumptions that lay behind the reforms was a more involved, active citizenry. This was to be a gradual process whereby the citizenry, or at least the educated portion of it, would be invited to cooperate in the development of the society. This was a fundamental change in the ethos of a Russian state that up to this point had regarded any independent initiative from society as sedition and had treated it accordingly. Elena's call for volunteers therefore represented a deep break with Russian tradition, and its implications went far beyond the stated objective of providing nurses for the army.

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# A house for research and teaching of the history of health

## *Oswaldo Cruz Foundation*

***Paulo Gadelha and Nara Azevedo***

Oswaldo Cruz by H Franz, *Revue Chanteclair*, 1911. *Casa de Oswaldo Cruz Historical Archives, Fiocruz*

The Oswaldo Cruz Foundation (Fiocruz) was established in May 1900 in Rio de Janeiro – under the name of the Federal Serotherapeutic Institute – with a mission to combat the major problems of Brazilian public health and develop experimental medicine. To this end, the Foundation took shape as a reference point for health promotion and social development, generating and diffusing scientific and technological knowledge, always focused on the pursuit of knowledge of the of the country's true condition. Attached to the Ministry of Health, Fiocruz is the most prominent institution of science and technology in health in Latin America.

At the main Fiocruz campus in Rio de Janeiro, nine of the fifteen technical-scientific units and all the technical and administrative support units work around the three historic buildings of the former Federal Serotherapeutic Institute: the Moorish Pavilion, the Pavilion of the Clock and the Stable. Other units and offices are located in the cities of Rio de Janeiro, Belo Horizonte, Salvador, Recife, Fortaleza, Manaus, Porto Velho Campo Grande, Curitiba and Brasilia, which gives the institution a national character. In 2009, Fiocruz opened an office for technical cooperation in Maputo, Mozambique.

Fiocruz houses a broad range of activities: development of research in many fields; provision of hospital and ambulance health reference services; manufacture of vaccines, drugs and diagnostics; education and training; information and communication in health, science and technology; quality control for products and services; and implementation of social programmes. In the 21st century, Fiocruz seeks to face the old and new health challenges with scientific and technological innovation programmes. There are over 8000 professionals dedicated to promoting science, health and citizenship.

Founded in 1985, the House of Oswaldo Cruz (Casa de Oswaldo Cruz) is a Fiocruz technical-scientific unit dedicated to preserving the institution's memory in all its dimensions and to other activities such as research, teaching, documentation and dissemination of the history of medicine, public health and biomedical sciences in Brazil. Its establishment and membership of a public health institution has been strongly linked to the process of democratisation in Brazil after 21 years of military dictatorship ended in 1985, a process in which the struggle for democratic reform of Brazilian public health was a crucial component. The House was a bold proposal: to include historical research and activities that aimed at preserving the memory of health and life sciences at an institution recognised, nationally and internationally, for its thorough dedication to biomedical research and public health. For this achievement, the activism of the group of sanitarians and doctors who ran Fiocruz from 1985 was decisive, as was their understanding that history and public health are closely interconnected in the search for knowledge of social, political and cultural processes related to the production of disease and health promotion. The preservation of memory and public health history were valued also as tools for analysis of historical processes that produce professional identities, to understand the present, support institutional strategic planning and reveal possible alternative paths of actions and health policies.

Research into the history of science and health began with the creation of the House of Oswaldo Cruz in 1985. In 2001, Master's and doctoral programmes in these subjects were established. Over its 25 years, the House has expanded the activities to many areas such as science education and dissemination, with the creation of the Museum of Life, information management and publishing of the scientific journal *History, Science and Health – Manguinhos*.

Taking a multidisciplinary perspective, the Department of Research in the History of Science and Health and the Postgraduate Program in History of Science and Health have trained teachers and doctors who have produced works on a wide range of subjects, among them: race, slavery and health; care and healing practices; social representations of illness; social thinking in health; medicine and its specialties; psychiatry and psychological knowledge; gender and science; microbiology and tropical medicine; career paths, nature and environment; travel and scientific expeditions; international relations in science and health; and actions and programmes of prevention, control and eradication of diseases.

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# Science, health and environment: the Brazilian Amazon

*Oswaldo Cruz Foundation*

***Dominichi Miranda de Sá***

The Amazon contains remarkable biodiversity. *Peter Schoen on Flickr*

When it comes to describing the Amazon, the rhetorical device used most often seems to be the superlative: the Amazon holds the world's largest hydrographic basin and the world's largest rainforest, it possesses one of the greatest collections of aquatic fauna and it is the biologically richest terrestrial biome on Earth. The chroniclers and clergy, travellers and naturalists who crisscrossed the region from the 16th to the 19th centuries helped to construct this view of a unique, magnificent natural world. La Condamine, Humboldt, Wallace, Agassiz, Spix and Martius wrote about the breadth, quantity, wealth and other exceptional qualities of the Amazon's soils, plants and waters.

In Brazil, the imagining of the Amazon has always been accompanied by a relentless endeavour to convert this natural setting into national resources. Recent research into the environmental history of Brazil has dated this idea back to the 18th century, when the notion of exploiting and putting the country's natural elements to rational use was already on the table. But it took the 1889 birth of the Republic to usher in an actual policy for the scientific exploration of Brazil's natural and regional diversity, with an eye on taking utmost advantage of such resources. At a number of government-run scientific institutions, including museums, botanical gardens and exploration commissions, studying the Amazon – that is, Brazil's northwestern frontier – rose to the top of research agendas. These institutions were involved in the systematic inventory of the region's nature, along with the shift from a frontier territory in expansion and a region of international border disputes into an area under true political rule by the state. In the first half of the 20th century, the Brazilian government sponsored a number of expeditions to explore the Amazon's fauna, flora and people.

Members of these commissions included naturalists specialised in botany, cartography, geology, zoology and anthropology, especially from Rio de Janeiro's National Museum. They gathered specimens, classified and catalogued collected material, wrote detailed scientific reports, gave conferences, and published texts on these expeditions and their findings. They also demarcated borders with other countries and delimited lands believed suitable for human settlement and for raising crops and livestock. With the region's rivers serving as geographic references, medical and environmental surveys recorded the geology of river beds, the flora along their banks, the presence of indigenous societies, and signs of economic activities in their vicinity. They defined indigenous lands and established differences between 'jungle' and 'forest' – the former considered unhealthy territory where malaria raged, while the latter started becoming the subject of discussions over environmental protection.

My work analyses the relationship between the production of medical and scientific knowledge, environmental intervention, and the political and social dynamics involved in modernisation processes in nation states. Of key interest is the historical study of field research conducted by the exploratory and settlement expeditions that accompanied communications and transportation infrastructure works, particularly those conducted in the Brazilian Amazon during the first decades of the 20th century. Other areas of focus include the history of the development of scientific knowledge, disciplines and issues involving the study of nature, such as: cartography and borders; medicine, disease and people; ecology, environment, climate, the physical milieu, and practices used in exploiting and preserving the natural world; and botany, geography, the study of river, and natural history.

Our research project suggests that if the Brazilian state's aim of 'productively settling' the northwestern portion of the country was not actually achieved back then, or if it has now been reshaped to fit new attitudes and agendas about our relation to the natural world, these government-promoted scientific surveys nonetheless played a decisive role in recognising the value of Brazilian naturalists. Above all, they broadened our understanding of vast areas of the Amazon – object of science, imagination, tourism, international political disputes and curiosity, and a central topic in debates on the sustainable use of natural resources and the preservation of ecosystems worldwide.

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# Yellow fever in Brazil: an unfinished history

*Oswaldo Cruz Foundation*

***Jaime L Benchimol***

Yellow fever was Brazil's biggest public health challenge in the 19th and 20th centuries. The virus still circulates in rural woodlands and knocks at doors in cities infested with the urban vector *Aedes aegypti* – but there have been no outbreaks in these environments, where dengue (a disease propelled by the same main vector) now rules. In October 1958, the 15th Pan American Sanitary Conference declared much of the Americas free of *A. aegypti*. And while yellow fever recovered lost territory after reappearing in the northern state of Pará in 1967, raising fresh fears, it is dengue that has made headlines since summer 1986. The transition from one disease to the other is an enigma we still do not fully understand.

Hygiene became an important consideration of government policy owing to the 1849 yellow fever epidemic in Rio de Janeiro, capital of Brazil's slave-owning Empire. A vast arsenal of initiatives was advocated for reforming city landscapes as well as the human habits and creations associated with the miasmas polluting urban life.

In the summer of 1879–80, Domingos Freire announced the discovery of *Cryptococcus xanthogenicus*, supposedly the cause of yellow fever, and then gave abolitionists and republicans a vaccine that became widely used. Other fungi and algae were blamed as well, while bacilli became the prime culprit the following decade. In 1892, in hopes of wrenching the fever from Rio's soil, the President of the newly born Republic considered hiring Edmund Alexander Parkes, author of the *Manual of Practical Hygiene*, which systematised experiences in British and Indian cities.

Those years saw much speculation about insects' role in disease transmission, including yellow fever. These creatures (especially the flies buzzing through the miasma-filled air) were primarily seen as mechanical agents that transmitted microorganisms. New living links were fitted into the constructs designed to explain the extracorporeal transformation of the yellow fever microbe. Entwining soil, water, air, food, ships and housing, the outdoors was a composite urban–coastal agent, hot and humid, where fungi, algae or bacilli spent part of their cycles before infecting people, exclusively in certain seasons and geographical zones.

In June 1900, one year after the creation of the Liverpool School of Tropical Diseases and shortly after the deciphering of malaria transmission, Herbert Edward Durham and Walter Myers headed to the Amazon armed with Finlay's hypothesis of yellow fever transmission via mosquitoes. They stopped in Havana to observe the Walter Reed commission at work. Their September 1900 article leaves the impression that the Americans had not embraced the mosquito theory; the British instead would find its justification in northern Brazil.

In August 1900, Lazear began experiments with the *Culex* Finlay had identified, while Carrol and Agramonte advanced their priority studies on the alleged yellow fever bacillus. After Lazear's death, Reed initiated better-controlled experiments to prove that *Culex fasciatus* was host of the yellow fever 'parasite'.

Liverpool School researchers were busy with their work when this turnabout occurred, with Myers dying of yellow fever in January 1901. Their investigations soon slipped into the cauldron of conflicting bacteriological theories abounding in the medical field. The explanation lies in Durham and Myers's prior experiences, which led to a figure who unexpectedly ties Belém to Liverpool. When invited to take that journey, they were at Cambridge doing research related to that of Alfredo Antunes Kanthack, their recently deceased professor of pathology and bacteriology.

A prominent figure within the small group of pathologists who devoted themselves full-time to the microbial world, Kanthack had headed a team associated with David Bruce's research on nagana. Kanthack, Durham and Blandford had confirmed that the haematozoan identified by Bruce belonged to the genus *Trypanosoma*, about which little was known. They had studied its symptoms and lesions, especially the site of inoculation by the tsetse fly.

While in Cuba, Durham and Myers helped promote an alternative framing of yellow fever from the perspective of new discoveries about malaria, yet their involvement with immunology and serum therapy and the then understanding of tsetse disease may explain their falling back on the bacteriological approach during their time in Belém.

In April 1905, Wolferstan Thomas and Anton Breinl disembarked in Manaus to study yellow fever in the Amazon. Between the Liverpool School's fourth expedition and this one (its 15th), extremely dynamic processes were at play within tropical medicine. In Gambia, Dutton had demonstrated the presence of a trypanosome in the blood of humans with sleeping sickness. In 1903, Thomas became head of the Runcorn Research Laboratory, shortly before the School's 12th expedition left for Congo to conduct further research on trypanosomiases. With the collaboration of Breinl, Thomas showed these could be treated with atoxyl. Ehrlich was to visit Runcorn, and in 1910 his own research with atoxyl would lead him to Salvarsan, the first effective drug for treating syphilis.

It is somewhat intriguing that scientists investigating trypanosomiases were sent to Brazil right when this research was at its peak. Britain's commercial interest in the Amazon clearly played a role but I suggest a hypothesis that links the Manaus laboratory with this advanced frontier in tropical medicine.

In 1905, Schaudinn and Hoffmann announced the discovery of *Treponema pallidum*, which causes syphilis. Biomedical institutions worldwide dedicated their work to this and other spirochaetes. Analogies drawn between malaria and yellow fever led many researchers to believe the yellow fever agent was also a filterable, ultramicroscopic protozoan, a hypothesis defended by Finlay himself. Schaudinn suggested that a spirochaete might be the yellow fever agent, since it was

then thought that this organism and trypanosomes were related protozoans that crossed bacterial filters during certain phases of their cycles.

This hypothesis guided Otto and Neumann's research in Rio, at the height of the yellow fever campaign led by Oswaldo Cruz. In 1907, Stimson found *Spirochaeta interrogans* in a yellow fever victim. Schaudinn's theory gained much ground after the Japanese named a spirochaete as agent of haemorrhagic jaundice (leptospirosis). Disentangling this knot, we come to the Rockefeller Foundation's post-World War I campaign, partially based on *Leptospira icteroides* as the alleged yellow fever agent discovered by Noguchi.

The discrepancies that emerged as efforts were made to extend the campaign to Africa resulted in identification of the disease's viral aetiology in 1928. In Brazil, in 1932, Soper and collaborators found yellow fever in areas near woodlands devoid of *Aedes aegypti*, confirming the existence of other transmitters and hosts. A vast research programme on both sides of the Atlantic soon revealed the complex dynamics between urban and sylvatic yellow fever.

There are several hypotheses for why the disease has not spread in cities teeming with the mosquito that proved a fine host for its virus in the past, but none excludes the possibility that it will eventually spread. When people consider this frightening possibility, they are reminded of the 19th and 20th centuries' terrible epidemics. This affords us an opportunity to rethink questions that by their very nature demand a meeting of the biological and human sciences.

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# Tropical medicine in Brazil

## *Oswaldo Cruz Foundation*

***Simone Petraglia Kropf***

In the closing years of the 19th century, Patrick Manson announced that special education on tropical diseases was urgently required; given new knowledge about vector-borne parasites, this was presented as the most effective way of tackling the diseases that afflicted Britain's colonies. The theme of tropical diseases assumed a political dimension in Brazil too. There was, in this case, no colonial enterprise: Brazil had achieved political independence in 1822 and become a Republic in 1889. Tropical medicine in Brazil was accorded a different political role – it was expected to help the creation of 'a civilisation in the tropics'.

The dominance of microbiology and theories of vector-based disease transmission had diminished belief in the primacy of climatic and environmental factors as a cause of ill-health. However, the necessity for – and the usefulness of – creating a special discipline of tropical medicine within the faculties of medicine in Brazil was questioned.

During the first decades of the 20th century, the issue divided Brazilian medicine almost down the middle. Some argued that tropical medicine – since it provided new scientific knowledge on the parasitic causes of diseases and about the ways they were transmitted – was the best means of fighting diseases that affected the country, such as yellow fever, malaria and ancylostomiasis. Researchers at the Oswaldo Cruz Institute were in the forefront of this school of thought; indeed, their base was soon to achieve international recognition as a centre for research and education in tropical medicine. The discovery in 1909 by Carlos Chagas, a researcher at the Institute, of the American trypanosomiasis (Chagas' disease, caused by the protozoan *Trypanosoma cruzi* and transmitted by a bloodsucking insect popularly known in Brazil as *barbeiro*) was praised as an emblem of Brazilian competence in the new field of tropical medicine. In 1926, Chagas presented the opening lecture in tropical medicine at the Faculty of Medicine in Rio de Janeiro. Mentioning the work of Europeans involved in fighting tropical diseases in Africa for colonial interests, he emphasised that in Brazil the study of tropical pathology should be committed to the advancement of the nation itself. Chagas argued that the specialism was important not only for keeping step with international advances in medical knowledge, but also as an instrument of sanitary and social reform in the country.

At the same time, tropical medicine had many critics in Brazil. Afrânio Peixoto, the Chair of Hygiene at Rio's Faculty of Medicine, was a notable example. He argued that tropical medicine reinforced the prejudices associated with climatic determinism and old stereotypes created by Europeans who "defamed" the "torrid" countries as insalubrious lands unsuited to civilisation. Peixoto declared that there were no tropical diseases since there were no climatic diseases; for him, there were only "avoidable diseases" and Brazilian medicine had secure means of combating them.

Both visions shared common ground, in the shape of a belief in the ability of medicine to fight the impact of climate and the spread of diseases, and thereby assist national progress. Differences in attitude were rooted in the conflicts associated with the institutionalisation of medical sciences in Brazil during the first half of the 20th century. On the one hand, tropical medicine proved to be a means of affirming the usefulness of the research institutes such as the Oswaldo Cruz Institute, which were presented as the 'true' spaces for experimental and/or scientific medicine. Ranged in the other camp were those who presented hygiene as a discipline with 19th-century roots within the Faculty of Medicine and argued that this institution was also a space for science, and not merely a space for theoretical teaching. These disputes were expressed further in political struggles to acquire key positions within Brazilian public health structures (Chagas and Peixoto competed for the coveted position of Director of the National Department of Public Health, with Chagas acquiring the post in 1920).

Brazilian tropical medicine was much more than a discipline that was forged

and consolidated by developments in the international arena; the specialism developed in very particular ways in the country. Tropical medicine's advance was, after all, not linked to imperialist goals and ambitions in Brazil. Instead, it benefited from local medical and political impulses, most notably the republican modernisation project that called for wide-ranging sanitary and social reform.

Currently described as 'diseases of poverty' or 'neglected diseases', tropical diseases – their impact and management – continue to be a rich subject of study not least as they provide rich insights into the complex relations between science, health and society.

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# Health and development: Brazil in the eradication era

## *Oswaldo Cruz Foundation*

***Gilberto Hochman***

Since the late 19th century, Brazil has maintained a vigorous interaction with international health issues and organisations. Linked to epidemic circles of cholera, smallpox, yellow fever and plague, the focus of these engagements later expanded to cover rural endemic diseases. The mobilisation of public health projects was closely linked to challenges faced by the country in the fields of international commerce and immigration, to the need to integrate politically and culturally an immense country's territory that was seen to be still partially inhabited by a 'diseased and illiterate people', and to intense debates about the search for a positive identity of 'being Brazilian'.

The continued interplay between national health problems and the international health agenda was crucial. The cooperation with the International Health Board of the Rockefeller Foundation since 1915 also established lasting connections, particularly in the fight against ancylostomiasis and yellow fever; Carlos Chagas' activism in the Hygiene Committee of the League of Nations in favour of a concerted action against leprosy also ensured a lasting Brazilian role in the international public health agenda.

As a result of its support for the Allies during World War II, Brazil came to forge even closer linkages in international health, highlighted by its close association with the World Health Organization, its Regional Office for the Americas (the Pan American Health Organization) and other UN agencies. Indeed, Brazil was closely attuned to the so-called 'sanitary optimism' marking the two decades following the end of the War. The availability of new preventative and therapeutic resources – insecticides, antibiotics, sulphates and antimalarials – stimulated governments as well as international organisations to formulate health programmes that aimed to control and eradicate the diseases of the so-called underdeveloped world. Science, medicine and technology were seen as a fundamental means by which poor countries could ascend to the pantheon of the so-called first world, thereby avoiding growth populism and socialism.

These trends ensured that rural endemic diseases such as verminosis, malaria, Chagas' disease and schistosomiasis remained at the top of the health agenda in Brazil. From the 1950s onwards, these diseases were presented as obstacles to development that could be removed with the new 'weapons' available in the armoury of health departments, such as DDT, chloroquine and penicillin. Plans for the recovery of the labouring capacity of the rural populations that were hungry, ill, poor and illiterate thus dovetailed with governmental projects for agricultural modernisation, national integration and industrialisation. Brasilia, the new modernistic capital built deep in Brazil's hinterland, was a powerful symbol of this postwar developmental project. By relating underdevelopment to the endemic diseases of rural areas, Brazilian public health became associated with the national capitalist development project.

Brazilian public health also entered the 'eradication era' in the 1950s, a move that was actively encouraged by regional and international agencies. The focus, initially, was on yaws and endemic goitre, and specific nationwide interventions were developed early in the decade. From 1958, Brazil joined international efforts such as the WHO's Malaria Eradication Programme, with financial assistance from the USA; the relationship between Brazil and the USA strengthened after the military coup of 1964, which initiated two decades of authoritarian rule. A hegemonic model was adopted for public health, based on in belief in centralised and well-structured programmes, making use of the new prophylactic and therapeutic methods. These programmes were marked by a systematic disregard for the cultural, hygienic and nutritional practices of the Brazilian rural populations, whose members were expected to passively receive the benefits offered by public medicine. The Brazilian government hoped that such 'backward' practices would be modified – or even eliminated – by the development of the country's interior. The problems produced by this approach were gradually revealed as the campaigns were developed, and the frustrations and failures were announced. Even though some critical voices could be heard, this model was hegemonic until the 1970s and it was reinforced with the success of smallpox eradication. Research into Brazil's postwar relations with the international health agenda era offers valuable clues about the limits and possibilities of developing more cooperative and innovative global health programmes in the country and across Latin America.

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# Health education in rural Brazil

## *Oswaldo Cruz Foundation*

***Nísia Trindade Lima and Marcos Chor Maio***

The relationship between public health and rural populations in societies that endured colonial domination and post-colonial inequalities is an important theme in global health history. One of the thorniest issues is health education, which has a history of the use of vertical campaign models based on guidelines taken straight out of Western medicine (usually without any recognition of folk healing practices).

The advent of so-called magic bullets such as chloroquine and DDT made the post-World War II era a time of optimism about scientific knowledge and its ability to achieve positive social outcomes. Health was also seen as a factor in economic development, while the habits and beliefs of rural people were identified as a hurdle to the processes of improvement. It was around then that the Institute of Inter-American Affairs – the principal US agency for technical assistance in the field of health – and the Institute of Social Anthropology signed an agreement that would engage anthropologists in health programmes in Latin America. Its guidelines relied especially on the research of Robert Redfield, above all his concept of 'folk culture', according to which rural people constitute a specific subculture characterised by routine resistance to modernisation.

Applying this concept in health research, anthropological studies emphasised the perception that reliance on available knowledge was the weakest link in the mechanics of health protection. One of the identified discrepancies was the fact that in many locations what health teams considered as advances were not interpreted the same way by the people themselves. This was true in relation to the malaria campaign in Peru, where DDT was used on a broad scale; although the malaria rate was reduced, inhabitants did not associate this development with DDT spraying. Similar examples were found in many other countries in Latin America, reinforcing the importance of analysing cultural contexts before the promotion of health initiatives.

In the Brazilian experience, there was nothing novel about identifying rural populations as backward. Research from the 1940s, such as the work by sociologist Emilio Willems, stressed the unequal development of Brazilian society while also advocating that the social scientist take on a role as a crucial actor in processes of change.

The guidelines of international bodies and the work of sociologists like Willems deeply affected the activities of the Special Public Health Service (Serviço Especial de Saúde Pública, SESP); this agency was created in 1942 as part of a cooperation agreement between the Brazilian and US governments. During the 1950s, SESP became a broad-ranging agency that incorporated social scientists in its health education work, primarily in the form of Brazilians with advanced postgraduate training in the USA. Sociologists and anthropologists were expected to guide this work by training other professionals and conducting community research. They also played the role of intermediaries, interpreting medical discourses for the general population. Yet their role was in fact much broader, especially as they observed problems in the field not always attributable to 'resistance' within rural populations; instead, problems of social mobilisation were more commonly linked to the ways in which the health programmes were conceptualised and run. Such observations were frequently made at the health centres set up by SESP in a number of municipalities (these institutions focused on maternal and child health). As these centres tried to devise innovative methods, such as courses for midwives, major points of tension developed between the population and health personnel; these conflicts became important objects of study by social scientists employed by SESP.

Studies produced in the 1950s point out that the training of SESP personnel was in tune with the cultural values of large urban centres but out of step with rural realities. Communities were, therefore, offered what was supposedly a less impersonal type of service through community health workers (*visitadoras*), who checked the overall health status of children and pregnant women, and also provided counselling to the population in general. Gaining people's confidence required a certain degree of familiarity – and this was not always present. Rates of staff turnover also often caused health workers associated with SESP to feel like strangers within the communities they were tasked with serving.

At the same time, these SESP workers were instrumental in shifting understandings of so-called cultural resistance – their critiques of the form of health programmes caused new notions of reform to take hold, wherein poverty was presented as the main block to bringing rural populations into the process of economic and social development. While these dissonant voices did not discard the precepts of health education, they favoured fostering the documentation of rural people's living conditions. They also grappled with challenges that remain with us to this day: the insertion of social policies that fight poverty in larger health national and international projects.

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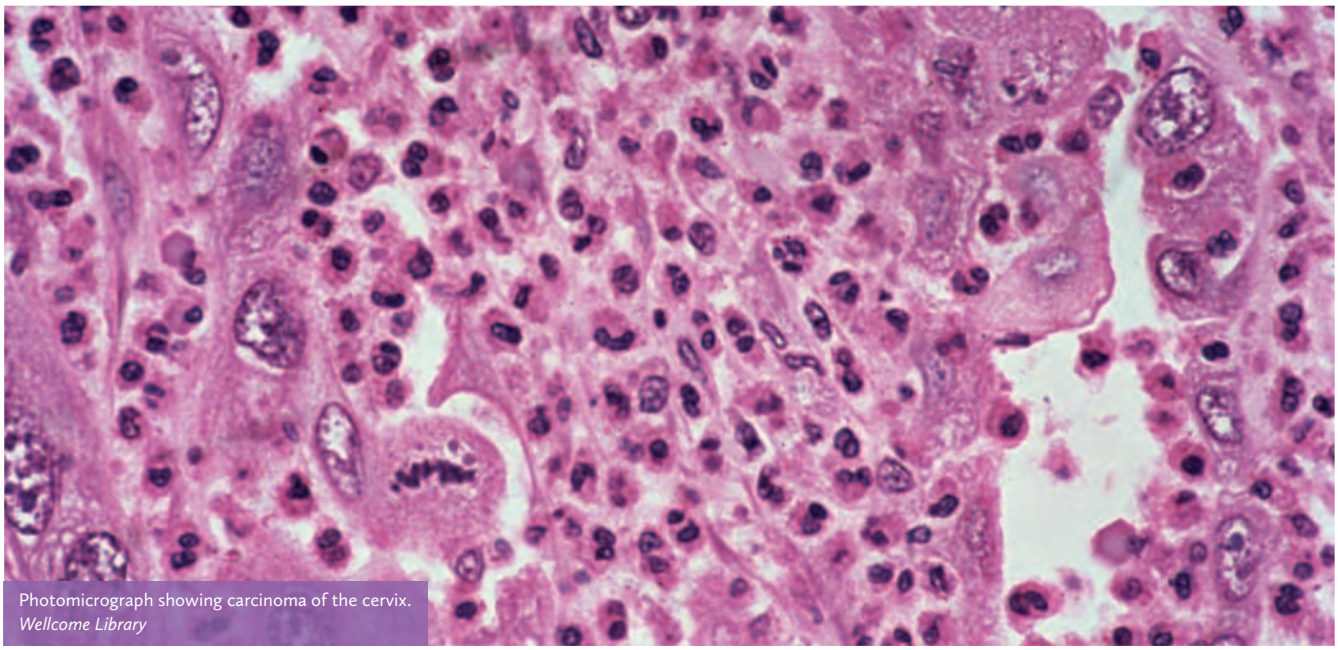
# Women, cancer and public health in Brazil

*Oswaldo Cruz Foundation*

***Luiz Antônio Teixeira***



Photomicrograph showing carcinoma of the cervix. *Wellcome Library*

The first responses to gynaecologic cancer in Brazil date from the beginning of the 1940s, with the development of gynaecology as an autonomous course separated from obstetrics, and the appearance of the first gynaecological care centres linked to medical schools that included cervical cancer prevention and treatment among their activities. From 1936, the gynaecology professor Arnaldo de Moraes implemented at the Rio de Janeiro Medical School a renovation of gynaecological practices based on recently developed knowledge. This led him to create the Instituto de Ginecologia (IG), where he encouraged research into the prevention of cervical cancer. The IG would rapidly become a centre for diffusion of preventative techniques; its model would be followed by other institutions in big cities, which in the 1950s began to develop clinics for cervical cancer prevention.

Recent work by Ilana Lowy at the Oswaldo Cruz Foundation and Yolanda Eraso at Oxford Brookes University have revealed the impact of German scientific work on Brazilian gynaecology; they have also described the scientific networks created by the IG and how this fostered a cervical cancer prevention model based on the combined use of colposcopic examination and exfoliative cytology (Pap smear).

By the end of the 1960s, the Pan American Health Organization (PAHO) started to consider cervical cancer as an important public health issue in Latin American countries, and suggested an expansion of screening programmes aimed at controlling the illness across the region. Prevention campaigns started to appear in response, and followed the US and European models that used cytology as first exam and colposcopy in cases where the slide analysis showed anomalies (which enabled greater coverage). The Cervical Cancer Control Program in Campinas, São Paulo, was the first large-scale effort in Brazil. Implemented in 1965, with technical support from PAHO, it worked in collaboration with municipal and state health centres, hospitals and other philanthropic medical institutions, and achieved unprecedented population coverage. At the end of the 1960s other institutions in São Paulo State started to elaborate campaigns for the control of cervical cancer, and used the Campinas methodology as a blueprint. From 1973 onwards, with the creation of the National Program for Cancer Control, these campaigns began to receive a high level of support from the Ministry of Health. However, gaps remained in these initiatives.

The late 1980s marked a turning point. Further health reforms culminated in the creation of the National Health System (Sistema Único de Saúde), which was able to ensure that the profile of cervical cancer control programmes started to change. From 1995, as consequence of the demands of the feminist movement, the Ministry of Health organised a project for wide-ranging community screening for cervical cancer based on cytological examinations. The project was carried out by the National Cancer Institute (Instituto Nacional de Câncer) and developed the basis for the creation of the national cervical screening programme in place today. Such developments illustrate how seriously Brazilian government and civil society organisations now view cervical cancer as a public health problem.

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# Brazil's international scientific relations

## *Oswaldo Cruz Foundation*

***Magali Romero Sá***

The Oswaldo Cruz Foundation's Moorish Pavilion. *Casa de Oswaldo Cruz Historical Archives, Fiocruz*

My work examines the policies for tightening scientific relations with Latin America adopted by Germany, France and the USA in the first half of the 20th century. Understanding these initiatives is vital to an assessment of international relations during that period in their broadest sense as well as the changes that took place in science and in medical practices as they internationalised in the interwar period. Within this setting, Brazil, and especially its capital city of Rio de Janeiro, attracted scientists and constituted a centre of intellectual exchange, becoming a Latin American hub in the texturing of relations with European countries and the USA.

The period in question was marked by international competition over niches of scientific penetration in Latin America, with foreign nations moving into the region's industry and commerce and into its academic and institutional arenas (sectors that were gaining strength in various Latin American countries). The USA and Germany were France's chief rivals here, and these disputes grew more heated as policies and initiatives involving scientific exchange programmes acquired a more international tone. Brazilian scientists were active participants in the process of knowledge circulation and scientific cooperation. Germans, French and Americans involved with teaching and training Latin American physicians and scientists developed their own strategies and produced specific networks and distinctive results.

The German pharmaceutical industry maintained close ties with post-World War I medical and scientific initiatives towards Latin America. It supported efforts to encourage exchanges with foreign countries with the aim of opening new markets and expanding the scope of its action. There were strong convergences of interests between medical and scientific ambitions and the pharmaceutical industry. Even though German scientists did not always deliberately act as agents promoting the German pharmaceutical industry, they did favour enormously the opening of new economic opportunities for companies that in turn contributed by strengthening the scientific activities weakened by the War and the disturbances that followed the Treaty of Versailles.

The Bayer pharmaceutical company played an important role in the process, especially through the close relations it developed between its laboratory scientists and researchers from various European and Latin American institutions, primarily in research, development and experimentation with drugs to treat tropical diseases. Walter Kikuth, a researcher from Hamburg's Institute for Maritime and Tropical Diseases who conducted investigations on veterinary medicine at the Oswaldo Cruz Institute's protozoology laboratory in Brazil in 1927–28, is of special interest to the present study. In 1929, he was hired by Bayer, where he continued the research he had begun in Brazil and developed important drugs for fighting tropical diseases, most notably Atebrine, a synthetic antimalarial drug widely used by Brazil's Health Department.

Bayer relied on Renato Kehl, a Brazilian eugenicist and physician of German descent, who acted as the company's direct intermediary in relations with the Brazilian government and scientific community. A respected figure in Brazilian scientific circles, Kehl was the son-in-law of Belisário Penna, an important figure in public health circles who later became Minister of Education and Public Health for a brief period. Kehl headed the country's eugenics society and founded the journal *Boletim Eugênico*. He published articles and books of international renown and was the main proponent of eugenics in Brazil. As scientific director of Bayer in Brazil starting in 1923, he was the main promoter of the company's products nationwide through its magazines *O Farmacêutico Brasileiro* and *A Vida Rural*, which he edited. Together with *Revista Terapêutica* – published in Portuguese in Leverkusen, Germany, for circulation in Lusophone countries – these magazines were also used to disseminate his eugenic beliefs. Bayer not only lent its full support to publicising eugenics through its three magazines, it also headquartered the Central Brazilian Commission on Eugenics, founded by Kehl in 1931.

In 1932, Kehl became partner of the newly founded Instituto Behring de Terapêutica Experimental, of which 80 per cent of the shares belonged to the Behring-Werke, of Marburg, and the remaining 20 per cent to Kehl and the German manager of Bayer in Brazil, Hermann Kaelble. The German physician Walter Menk, a former employee of the Institute of Maritime and Tropical Medicine in Hamburg, was named Technical Director of the new company in Brazil.

Kehl's actions contributed significantly to the pre-eminence of the Bayer industry in the Brazilian market, as well as Germany's efforts to recover its prestige, influence and commercial hegemony after World War I. A study of Brazil in scientific network during the interwar period highlights the significance of a wider reflection about the complexity of geopolitical, economic and ideological interests in north–south relations.

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# Amythaon's poultice

*Work in Progress*

***Klaus-Dietrich Fischer***

Amythaon's poultice is an item absent from *Der Neue Pauly* but present, like so many recipes in ancient collections, in The *Encyclopedia of Ancient Natural Scientists: The Greek tradition and its many heirs*. In the relevant article, Paul T Keyser makes it clear that he favours Max Wellmann's view that Amythaon was an ancient doctor, assigning his lifetime tentatively to the years between 120 BCE and 80 CE. Keyser does not even dismiss the statement in Cassius Felix (writing just before the middle of the fifth century CE) that the Amythaon in question was the father of Melampous ('Blackfoot'), whose tribe settled in what is now the USA. I will suspend judgement here, and move to territory I am more familiar with, i.e. Greek and Latin texts about recipes.

Amythaon's poultice (*malagma*, and sometimes *epithema*) seems to be first attested in Galen, e.g. in *Compound Drugs arranged by Places* (XIII 967 Kühn); Oribasius (second half of the fourth century CE, at syn. 3.57) gives us a faithful copy of this text, which Galen in turn had excerpted from Asclepiades the Pharmacist. Later, Aetius (first half of the sixth century, at 10.11) repeats the recipe with (possibly) a minor variation in the amount of oil to be used. As far as the ingredients specified are concerned, our Greek and our Latin witnesses are in total agreement. Consequently, it would be unreasonable to doubt that all testimonies that I will discuss transmit the same recipe, a fact I would like to stress since in Aetius, for instance, a second *malagma Amythaonos* follows, which differs, and Paul of Aegina (first half of the seventh century, at 7.16.33, following Galen XIII 983 Kühn) lists yet another variety for a different purpose, i.e. stiff and distorted joints. The one I want to exhibit here is meant to cure in the first place a tension in the upper abdomen, but will also benefit a hardened spleen and, again, joints that can be moved only with difficulty.

Anybody not familiar with the field of ancient medicine will be surprised that the text of Galen we have to rely on is basically that printed in 1525, repeated without reference to further manuscripts by René Chartier a century later and the Leipzig professor of medicine Karl Gottlob Kühn almost two centuries ago. The only printed edition of book 10 of Aetius is a Latin translation made by a German Renaissance scholar, Janus Cornarius. For Oribasius and Paul of Aegina, the situation is much better; critical editions were produced by two Danish scholars, less than 90 years ago. This will serve as a reminder that the study of ancient medicine, and especially the study of Galen, is not at an end, but should, and must, go on.

Now I turn to our Latin witnesses. Of one of them, Philagrius (*circa* first half of the fourth century CE), the longest extracts survive only in Latin translation and were incorporated in the Latin version of the sixth-century Byzantine doctor Alexander of Tralles. Two different Latin translations of Oribasius's *Synopsis* were in all likelihood produced before that of Alexander, but the discussion about where and when they were made, and which is the older and which the younger, has recently been reopened (Aa = Par. lat. 10233, called the older translation by the Swedish scholar Henning Mørland, and La = Laudunensis 424, Li = Leipzig, Stadtbibliothek, Rep. I 2$^{e}$ cod. 24, Stuttgart, Württembergische Landesbibliothek HB XI 8, which for the passage in question represent the so-called younger translation).

But Amythaon's poultice occurs additionally in two Latin collections of recipes, the *Physica Plinii Bambergensis* (83.2) and what I call the *Compositiones Mutinenses* (ms. Modena O.1.11), the latter printed in a really not very satisfactory way by Riccardo Simonini (I have revised his collation with the aid of a microfiche whose quality is in many places too poor to allow for better readings).

I will now present some conclusions of my study of the witnesses to Amythaon's poultice mentioned earlier. The Greek text of Oribasius printed by Raeder has *diatheseis* ('conditions') where Galen, Aetius (provided by Irene Calà) and the Latin versions of Oribasius, including in addition Cassius Felix and Modena, have 'tensions' (*diataseis/tensuras/distensiones*). It is evident that Raeder's Greek text must be changed. It seems likely that Cassius Felix's *distensiones* ('bulging') should likewise be amended to *tensiones* (for examples, see the concordance of Cassius Felix published by Maire and Fraisse). The pestle is called *tritorium* ('grinder', 'pounder') in the Latin Oribasius (and, incidentally, in the Latin Alexander), both in the younger and the older versions, and again in the Modena ms., while the translation of Philagrius uses the more classical word *pilum*.

*The study of ancient medicine, and especially the study of Galen, is not at an end, but should, and must, go on.*

It does not appear rash to conclude that the text of the recipe in the Modena ms. is connected with one of the Latin translations of Oribasius. And again, we find evidence in our Latin transmission that throws light on our Greek texts: Philagrius, Cassius Felix and the Latin Oribasius concur in their mentioning of the action of the compound on the spleen (as does the *Physica Plinii*: chapter 83 is *Ad splenem*) in a manner that 'dissolves' or 'disperses' (*diaforeticus*). The easiest (although not the only possible) way of accounting for this coincidence is the assumption that these elements were present in the original or a later but widespread version of Amythaon's poultice.

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Produced by the Wellcome Trust.
Assistant Editor: Tom Freeman
Design: James Stride, Bret Syfert
Publisher: Hugh Blackbourn

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