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ORIGINS AND DEVELOPMENT OF FORENSIC MEDICINE AND FORENSIC SCIENCE

IN ENGLAND 1823-1946

This study traces the development of forensic medicine, forensic science and police science from their roots in nineteenth-century England and shows that the main factors which make up the present-day disciplines were in place well before the First World War. The elite practice of forensic medicine had evolved into the laboratory-based sciences of special pathology and Home Office toxicological analysis by the 1900s and it is shown that in creating forensic science in the 1930s on this elite medical model as an aid to police investigations, other science and medicine in court, particularly in the civil courts, were excluded from the meaning of the new term 'forensic science' and perhaps also from the far older and wider 'forensic medicine'. There is confusion in the public mind as to the difference between forensic medicine and forensic science, or whether one is included in the other. By outlining the history of the separate specialities the meanings of the terms is clarified, not only for the present day, but at each earlier stage.

Forensic medicine's role working for the state in criminal cases has always been badly funded, as the discipline has been unable to compete for public funds against more pressing needs. This has led to poor teaching and little or no original research. The creation of the Forensic Science Service was an attempt in part to salvage forensic medicine and to put it finally on an institutionalised footing, but this failed, and as the period of review closed in 1946 forensic medicine was still struggling for survival. Forensic science too looked set for failure as the government had made no provision for research or for training the new 'forensic scientists'.

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ORIGINS AND DEVELOPMENT OF FORENSIC MEDICINE AND FORENSIC SCIENCE

IN ENGLAND 1823-1946

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ORIGINS AND DEVELOPMENT OF FORENSIC MEDICINE AND FORENSIC SCIENCE

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degree or any other qualification in this or any other
institution and is the candidate's own work. It does not
100,000 words. Chapter 5, The emergence of the special path
was used as the basis of a paper which appeared in The Police S
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Chapter 1

Introduction

Norman Ambage's PhD thesis 'The origins and development of the Home Office Forensic Science Service 1931-1967'¹ traces the development of the Forensic Science Service from an idea in the mind of the Assistant Under Secretary of State for the Home Office in 1929 to the foundation of the Central Research Establishment at Aldermaston in 1967. This study takes an earlier look at the derivation of mid-twentieth-century forensic medicine and forensic science by examining their Victorian and Edwardian origins, and shows that the separate components of their modern practice were in place well before the First World War. The three main areas from which present forensic expertise are drawn are treated in separate sections in the chapters that follow. They are:

1. forensic medicine,
2. science - mainly analytical chemistry - applied as scientific testimony in court in so far as it was sponsored by central or local government; and
3. police science - photography, anthropometry (a series of personal bone measurements) and fingerprinting.

The first two distinctions are somewhat artificially imposed, for ease of discussion. In the Victorian era and beyond, the medical profession not only assumed a position at the top of forensic medicine but also

1. Lancaster University 1987.

dominated, or tried to dominate, other courtroom-oriented applications of science, such as the work of the public analysts, originally founded to stamp out poisonous food adulterations. Some medical men, such as Thomas Wakley, editor of the Lancet, Henry Letheby, MOH for the City of London, and Thomas Stevenson, the Home Office Analyst, were active in several areas and would not have seen distinctions between them, considering them all as within the purview of medicine.

Forensic medicine in London had had an elite from the 1820s and 1830s of lecturers and textbook writers, talking down to their grass roots readership, the general practitioners. In the 1880s this division was splitting into four separate areas. The general practitioner was at the bottom, closely followed by the Metropolitan Police surgeon, with the two elite, now laboratory-based, sciences of special pathology and Home Office toxicological analysis at the top of the pyramid. The general practitioner did not specialise in forensic medicine (or he would not be a 'general' practitioner). There was, and is, no name for the practitioner of forensic medicine at this level, which contributes to its low profile. The leading practitioners in the last century referred to themselves as 'medical jurists' or 'medico-legists', whereas the lowly GP was referred to in the textbooks as the 'medical witness'. The work of the three specialists was directed to serious crimes against the person, and focused the public attention on the meaning of 'forensic medicine' as associated with crimes. However, at GP level there was, and is, no clear division between the practice of forensic medicine in the criminal courts and in the civil. A student from Amos and Thomson's 1831 lectures on forensic medicine at the University of London, suddenly transported to a 1984 lecture by Professor D.J. Gee would find civil and criminal matters on

both agendas. For instance, he would find new sections on compensation, poisons legislation, toxicology, pathology and personal identification methods. On the other hand, he would find others reassuringly familiar: causes of death, abortion and infanticide, sexual offences, mental diseases and medico-legal aspects of marriage, divorce and disputed paternity. He would fail to find lectures on life and assurance policies or public nuisances and would be intrigued by the session on the medical profession and the General Medical Council.²

Anne Crowther and Brenda White describe the growth of non-criminal forensic medical practice from 1800 to 1914.³ In the early decades of the last century non-criminal teaching concerned inheritance problems of the rich, e.g., legitimacy and live, still or 'monstrous' births affecting the transfer of property. As life insurance became more common, so did attempts to defraud by concealment of relevant information. A practitioner would send in a report on his patient's health and lifestyle for insurance purposes and would be paid by the patient for so doing. The system was thus open to abuse, and by the middle of the century insurance companies were employing their own medical referees to send in the reports. This work could lead to court appearances if the validity of the policy were disputed. The growth of personal injury and accident claims most notably on the railways, and later at work under the Workmen's Compensation Acts of 1897 and 1906,

2. See Chapter 2 for Thomson and Amos' lectures, and the contents page of D.J. Gee Lecture Notes on Forensic Medicine, Oxford 1984 (4th edn).

3. M. Anne Crowther and Brenda White, 'Medicine, property and the law in Britain 1800-1914', Historical Journal, 1988, pp. 853-870.

led to more court fees for the general practitioner.⁴ This work has expanded in this century under the National Insurance (Industrial Injuries) Act 1946 and the Social Security Act 1975, and is now the most frequent cause of a medical court appearance.⁵ Although presumably people still defraud their insurance companies this no longer seems to be a textbook issue.

From the time of the appointment of the Home Office Analysts, in 1882, there was a tendency for the Senior Analyst (and then the pathologist) to be involved in difficult murder cases, and the Analyst began to expand his role as he was asked to examine the scene of crime and the accused's clothing and generally perform what we might now consider 'forensic science'. When the Metropolitan Police Laboratory was being planned it was this elite laboratory-based practice of forensic medicine which served as a model for the new 'forensic science'. As laboratory forensic medicine was mainly directed to helping the police/Home Office, the use of the term 'forensic medicine' became further distorted away from its general meaning of 'elucidating doubtful questions in courts of law'⁶ to mean medico-legal work for the police. It is the development of laboratory forensic medicine and its specialists that is the focus of Part One of the present study.

4. Ibid., pp. 857-66.

5. Gee, Lecture Notes, p. 52; D.J. Gee and J.K. Mason, The Courts and the Doctor, Oxford 1990, p. 80; Carol Goodwin-Jones, 'Science in harness? a study of the expert witness in the legal construction of reality', PhD, Cambridge University, 1985, p. 174.

6. A. Duncan, Snr, 'Memorandum to the Patrons of the University of Edinburgh', 1798, Edinburgh University Library Archives. Duncan 784/9/9.

Police surgeons were initially employed, from 1829, in a welfare role, looking after the health of police officers. In London this was on a salaried basis. They soon found themselves coping with sudden suspicious deaths and post mortems but the rise of the special pathologist at the turn of the century lost them this role to a large extent. Their role was further eroded when the NHS took over their welfare role in 1948 and left them to concentrate entirely on aspects of forensic medicine, examining the living. This shift of focus has led recently to some police surgeons preferring the term 'forensic medical examiner', further focusing the use of the term 'forensic medicine' to helping the police.

Ambage defines forensic science as 'the application of science to the detection of crime and the presentation of such evidence in courts'.⁷ This definition would include the work of the public analysts, still supporting local government prosecutions under the Food Acts, as a crime is defined as any action that is against the law, regardless of who prosecutes. This work has been going on since 1860, and the Excise started even earlier, prosecuting fraudsters under the Tobacco Act 1842 with the help of the Excise Laboratory founded for the purpose. Neither this kind of work, nor scientific evidence in civil cases are popularly considered 'forensic science' as they lack the essential idea of the police. J.B. Firth was one of the first forensic scientists recruited to the new service in 1938. In his memoirs he makes the assumption that 'forensic science' is different from other

7. N. Ambage, 'The origins and development of the Home Office Forensic Science Service 1931-1967', PhD, Lancaster University, 1987, p. 1.

science in court. After describing his work as an expert witness for many years with regard to water supplies, sewage and trade effluents, (writing in 1960) he adds: 'Until comparatively recently forensic science was only applied to major crimes such as murder'.⁸ He evidently does not see his earlier work as 'forensic'. Forensic scientist H.J. Yallop later considered that this police-oriented definition was too narrow. He argued that the pollution inspectorate and public analysts were 'just as much forensic scientists as those who work in ... "crime labs"'. Furthermore, there were forensic scientists whose practice was entirely in the civil field. He made a plea for a Forensic Science Society symposium with no 'police' papers.⁹ No more was heard of this plan. Although it could be argued that all laboratory science in court is 'forensic science' - as the work 'forensic' stems from the Latin term for a forum or court area - definitions are dictated by usage, by how the terms are actually used, not how they ought to be used. So forensic science is used in this study to apply only to the work of the Metropolitan and Home Office laboratories and similar work undertaken for the defence since 1935.¹⁰ Earlier scientific expertise in court is referred to by such cumbersome

8. J.B. Firth, A Scientist Turns to Crime, London 1960, p. 19.

9. H.J. Yallop, 'Forensic science -a broader basis', Journal of the Forensic Science Society, 1980, pp. 149-50.

10. A 1987 Home Office Forensic Science Service recruitment brochure lists the following: identification of blood, semen and other body fluids, plant and animal materials, drugs and petroleum products; examination and comparison of textile fibres, paint and glass fragments, toolmarks; examination of vehicle parts following accidents; analysis of organs, tissues and body fluids in cases of suspected poisoning; ballistics and document examination; scene of crime work.

phrases as 'courtroom-oriented science'. This applies even to the work of the Inspector of Explosives, whose successors are still combatting the Home Rule terrorists over a hundred years after their first mainland campaign.

After 1935 there is some confusion as to whether forensic science includes forensic medicine, whether they are separate, or whether forensic medicine includes forensic science. Ambage divides them by suggesting that forensic medicine deals with the body and forensic science with 'the bits'.¹¹ Another way would be to say that forensic science includes whatever work has to be done in a laboratory, leaving forensic medicine to the police surgeon and perhaps the forensic pathologist. There is no set definition. However, this examination of the history of each discipline involved should help to clarify the issue.

Many practitioners throughout the nineteenth and twentieth century in England and Wales use 'medical jurisprudence', 'legal medicine' and 'forensic medicine' interchangeably. Forensic medicine is probably the older phrase, stemming from the latin 'medicina forensis'. Both are used to the present day - the Diploma of Medical Jurisprudence of the Society of Apothecaries dates to 1962. Thomas Stevenson, the Home Office Analyst from 1882 to 1908 preferred 'legal medicine' or 'forensic medicine' to 'medical jurisprudence',¹² and 'forensic medicine' is therefore preferred here. In Scotland, where the subject was originally taught in the law faculty, different shades

11. Ambage, 'Origins', p. 2.

12. T. Stevenson, Lecture notes from 1881, in the Wills Library, Guy's Hospital Medical School, unpaginated.

of meaning are attached to 'medical jurisprudence' and as used in Scotland the phrase is not necessarily synonymous with 'forensic medicine'.¹³

There is very little full-length literature on the development of forensic medicine and science. Norman Ambage's thesis covers the foundation of the Forensic Science Service up to 1967 and is the only full-length examination of the topic. Forensic medicine is better served. Catherine Crawford's Oxford DPhil thesis (1983) looks at 'The emergence of English forensic medicine: medical evidence in common law courts to 1830' and her work is being continued chronologically by Michael Clark's as yet unpublished survey of English legal medicine since 1830 to the present day for the Wellcome Institute. Scotland is represented by M. Anne Crowther and Brenda White's history of forensic medicine in Glasgow, On Soul and Conscience,¹⁴ depicting 150 years of the University of Glasgow's Department of Forensic Medicine. Roger Smith's Trial by Medicine: Insanity and Responsibility in Victorian Trials¹⁵ covers this vital area of the history of forensic medicine. The present work completes the picture by providing an account of the origins of forensic medicine and science from 1823, when the first lectures in forensic medicine were given in London, to 1946, when pathologist James Davidson was replaced as head of the Metropolitan Laboratory by botanist H.S. Holden.

13. See M. Anne Crowther and Brenda White, On Soul and Conscience, Aberdeen 1988, Chapter 1, particularly p. 22.

14. Aberdeen University Press 1988.

15. Edinburgh 1981.

Ambage uses Oliver MacDonagh's theory of government growth, elucidated in his book A Pattern of Government Growth 1800-60: The Passenger Acts and their Enforcement (London 1961), as a loose framework for his study, which shows the growth of central control at the expense of local government.¹⁶ MacDonagh's work on the organic growth of government in the nineteenth century¹⁷ generated a considerable literature, and later studies have critically explored and expanded his original exposition. Of particular note is the work of Roy MacLeod¹⁸ and the papers he edited as Government and Expertise¹⁹. MacDonagh was primarily influenced by A.V. Dicey's Law and Public Opinion in England in the Nineteenth Century, published in 1905. In Dicey's analysis the legislative 'period of individualism 1825-1870' was followed by a 'period of collectivism 1865-1900',²⁰ whose real start was marked by the Education Act 1870. MacDonagh sought to explain how this change came about in a five-stage model.²¹ In the first, the

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16. Ambage, 'Origins', Abstract.
 17. O. MacDonagh, 'The nineteenth-century revolution in government: A reappraisal'. Historical Journal, 1958, p. 52.
 18. R.M. MacLeod, 'The Alkali Acts Administration 1863-84: The emergence of the civil scientist', Victorian Studies, December 1965; 'Specialist policy in government growth', Cambridge PhD 1967; 'The frustration of state medicine 1880-99', Medical History, 1967, pp. 15-40; 'The anatomy of state medicine: Concept and application', in Medicine and Science in the 1860s, ed. F.N.L. Poynter, Wellcome Institute 1968; 'Science and the Treasury 1870-85', in G. L'E. Turner, The Patronage of Science in the Nineteenth Century, Leyden 1976.
 19. Cambridge University Press 1988.
 20. A.V. Dicey, Law and Public Opinion in Nineteenth-century England, London 1914 (orig. 1905), p. 62.
 21. MacDonagh, 'Nineteenth-century revolution', pp. 52-67.

exposure of a social evil led to an attempt to legislate it out of existence. Representation from interested parties tended to weaken any consequent Bill with the result that any subsequent Act was permissive, but though this hypothetical Act had no teeth, at least a public responsibility had been assumed. The second stage began with the realisation that the evils had been left untouched because the problems of enforcing the law had not been thought through. This state of affairs resulted in special officers being brought in to enforce the law. It was this appointment of executive officers (stage three) which brought this revolutionary and self-perpetuating process to life, as the officers came to understand the failures of the existing statutes and the needs for further legislation. Side by side with this need came a need for centralisation to cope with practical day-to-day problems. The need for an authoritative superior also emerged for the 'definition of law and status and for protection and support against the anarchic "public"'. The creation of fresh laws and a superintending central body completed the third stage. The fourth stage saw a change of attitude on the part of the administrators, who realised that legislation had not provided a full solution, but that improvement was a 'slow, uncertain process of closing loopholes and tightening the screw ring by ring, in the light of continuing experience and experiment'. The fifth - mature - stage saw the executives, therefore, securing legislation which awarded them discretion to impose penalties and frame regulations, and which permitted them to do so with the help and advice of scientific experts.

This present study uses MacDonagh's thesis and the work of his successors to show that throughout its history forensic medicine never became part of this government growth and that it remained an

individualised, non-institutionalised discipline. In fact it declined when other government funded science in court, particularly the Inland Revenue Laboratory and the work of the Explosives Inspector, was thriving, amongst other reasons, because forensic medicine failed to become included in the Diploma of Public Health, despite the fact that both forensic medicine and public hygiene were part of the same discipline on the Continent. This failure to become a postgraduate discipline became more acute when the Home Office Analysts and special pathologists became the elite practitioners of forensic medicine, passing down their expertise almost on the old apprenticeship system. The fact that this elite was dying out was partly why the Forensic Science Service was created in the 1930s. The plan behind the new service included an attempt to institutionalise forensic medicine in a medico-legal institute but it failed. Forensic science also failed to thrive in its early years due to tensions within the system, and the government failed to fund research or training for disciplines oriented towards supporting state prosecutions.

Chapter 2

The emergence of English forensic medicine in London to 1840

Although government funding for forensic medicine supported its early continental development, a combination of unique circumstances brought it to the fore in London in 1830 without state funding; and it became established in the next decade as a teaching and practical discipline with only indirect public finance from court fees and Metropolitan Police surgeons' pay.

1. The state and forensic medicine

State funding for forensic medicine was never a high priority in England and Wales, and particularly not in the early nineteenth century, when medicine was controlled by the Royal Colleges of Physicians and Surgeons and the Society of Apothecaries. Yet state funding is a prerequisite for properly run forensic medicine insofar as the criminal courts are concerned because the client cannot pay the bill for his own post mortem and his nearest and dearest may decline to do so, having murdered him. The practitioner attending a deceased patient needs to be sure of receiving payment.

State funding from earlier times and cultures is suggested by surviving literature. The oldest extant book on legal medicine in any civilisation is the Hsi Yuan Chi Lu, or Washing Away of Wrongs, by Sung

T'zu, dated 1247.¹ It is a handbook of instructions for the investigation of sudden death with the legal and medical procedures to be followed in an inquisitorial judicial system. Section 5 for example, 'Discussion of miscellaneous doubtful and difficult cases', illustrates the work of a travelling inquest official, similar to our own coroner.² An 1823 treatise on forensic medicine assigns to Bavaria the origin of state intervention in forensic medicine in Europe three centuries later.

The Medical Jurist is first acknowledged, and his services formally required, in the celebrated criminal code framed by Charles the Fifth, at the Diet of Ratisbon, in the year 1532, known by the name of the 'Constitutio Criminalis Carolina'.... Medical men shall be consulted whenever death has been occasioned by violent means, whether criminal or accidental, by wounds, poisons, hanging, drowning or the like; as well as in cases of concealed pregnancy, procured abortion, child-murder, &c.³

This law, founded on an earlier local law, attracted the attention of physicians, lawyers and legislators in Germany, Italy and France, and treatises on forensic medicine began to appear in those countries, although superstition and witchcraft were given more space than

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1. Sung T'zu, Hsi Yuan Chi Lu (Washing Away of Wrongs), translated by Brian McKnight, Ann Arbor Center for Chinese Studies, University of Michigan 1981.
 2. Ibid., pp. 69-70.
 3. J.A. Paris and J.S.M. Fonblanche, Medical Jurisprudence, London 1823, p. 2.

chemistry in these early books.⁴ Growth of forensic medicine up to the nineteenth century can also be measured by the emergence of journals and academic teaching in the subject. After two short-lived attempts at reporting medico-legal cases, in Ansbach and Konigsberg in the mid-eighteenth century, the journal Magazin fur die gerichtliche-Arzeneikunde [forensic medicine] und medicinische Polizei was started in Stendhal, Saxony, in 1782.⁵ Jaroslav Nemec's well-researched bibliography gives this as the first journal devoted to forensic medicine and 'medical police', as public health or hygiene was known at the time. Other German-language journals soon followed in the same vein.

Chaille and others trace the teaching of legal medicine as far back as 1650 in Leipzig by Michaelis, but it was in revolutionary Paris that the French school of forensic medicine rose to dominate the burgeoning international discipline, which had - by the 1820s - teachers in Moscow, Leipzig, New York,⁶ Berlin,⁷ Edinburgh, Vienna⁸ and Paris.

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4. S.E. Chaille, 'Origins and progress of medical jurisprudence, 1776-1876', Journal of Criminal Law and Criminology, 1949, p. 397.
 5. J. Nemec, International Bibliography of Medico-legal Serials, 1736-1967, Washington 1969, p. 6.
 6. Chaille, 'Origins', p. 399.
 7. R.O. Myers, 'J.L. Casper, 1796-1864', Medicine, Science and the Law, 1960, p. 305.
 8. M. Anne Crowther and Brenda White, On Soul and Conscience, Aberdeen University Press 1988, p. 8; A.T. Thomson, 'Thoughts on medical education and a plan for its improvement addressed to the Council of the University of London', 1826.

2. Early nineteenth-century forensic medicine in Paris

In the seventeenth and eighteenth centuries the practice of legal medicine in Paris was the object of profound disdain, a second-class specialisation. Only one man, Antoine Louis (1793-1791), promoted the practice and left several '*mémoires medico-legales*' illustrating the experimental method. He was the 'grand consultant' of his time, champion of judicial errors, whose pre-Revolutionary public lectures at the Collège de Chirurgie had met with great success. But it was not until after his death that the chair of '*médecine légale et d'histoire de l'art de guérir*' of the Université de Paris was founded at the height of the Revolution by a decree of 14 frimaire, an III (4 December 1794). The first effective professor was Paul Mahon, from 1795 to 1801. A later, and more influential incumbent, was Mateo Jose Bonaventura Orfila, 1787-1853, who was medico-legal professor from 1819 to 1822 and then professor of chemistry from 1823 for nearly 30 years. He was dean of the medical faculty from 1831 to the July revolution of 1848.⁹

Orfila was born a Spanish subject on Minorca in 1787, and was a precocious child, especially in the study of languages and mathematics. He started his working life as a sailor, but after he was captured by pirates he resolved on a less dangerous career and went to study medicine in Valencia. Finding the teaching pitiable, he set up a laboratory in his room, obtained the original textbooks and taught

9. L. Thoinot, 'Histoire de la chaire de médecine légale de la Faculté de Paris 1795-1906', Annales d'hygiène publique et de médecine légale, 1906, p. 481 (opening lecture of the 1906-07 session). See also R.O. Myers, 'M.J.B. Orfila, 1787-1853', Medicine, Science and the Law, 1960, p. 179.

himself. He arrived in Paris to take his medical degree in 1811.¹⁰ In 1813, a lecture on the properties of arsenic went wrong as he experienced an unexpected colour reaction. Further experiments showed him that when arsenic was mixed with different substances different colour reactions were obtained both from each other and from arsenic on its own.¹¹ He discovered that the greater number of poisons known at the time could not be surely detected when mixed with animal or vegetable liquids.¹² The result was his Traité des poisons tirés des regnes minéral, végétal et animal ou toxicologie générale considérée sous les rapports de la physiologie de la pathologie et de la médecine légale, published in 1814. Orfila has been called the father of modern toxicology for his pioneering work in setting toxicology on a properly based scientific footing. What this meant practically was animal experiments, as explained by A. Wynter Blyth in 1906:

He took weighed or measured quantities of poison to administer to animals, then after death - first carefully noting the changes in the tissues and organs - [attempted] to recover by chemical means the poisons administered. In this way he detected and recovered nearly all the organic and inorganic poisons then known; and most of his processes are, with modifications and improvements, in use at the present time.¹³

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10. Thoinot, 'Histoire', p. 490.
 11. M.J.B. Orfila, General System of Toxicology, London 1815-17, pp. 110-12 (Translation of Orfila's 1814 Traité).
 12. Thoinot, 'Histoire', p. 495.
 13. A. Wynter Blyth, Poisons, Their Effects and Detection, London 1906, pp. 15-16.

General medical education - not just forensic medicine and toxicology - flourished in Paris with state support, unlike medical education in London where it was 'struggling with difficulty, and for the most part fitfully conducted by detached individuals'. In Paris:

The school of medicine there was very completely organised. The hospitals were combined under one administration, and ample means were provided for the practical studies of anatomy. All was directed by the central government. But through a great part of the time we have under review, France and the whole of Europe was closed to us by the long-continued war; and there had, therefore, been no interchange of scientific knowledge during many years between England and continental countries. At length, when peace was established, after the close of the Peninsular War, the medical men and students who visited the school of Paris found that some branches of medical science had been much advanced there; and they found a fully organised system of education. Happily too they could avail themselves of its advantages in full, for it is not with our studies as with those of some other professions.... There is but one anatomy, one physiology, one surgery for all the world. It soon became the custom for English students to complete their studies in the School of Paris.¹⁴

14. R. Quain, 'Observations on medical education', University College, London. Introductory lecture to Medical Faculty 1864-65, pp. 14-15.

3. Early nineteenth-century forensic medicine in Edinburgh

As with England, so with Scotland, and one such medical student broadening his education in Paris by attending Orfila's lectures in April 1821 was Robert Christison (1797-1882),¹⁵ who introduced toxicology and the experimental method in forensic medicine to Edinburgh, the birthplace of the discipline in Great Britain.

Christison's entry in the DNB records that he was greatly influenced by Orfila, and he wrote himself of having 'caught somewhat' of Orfila's spirit,¹⁶ but the practical influence on the young Scot in Paris was the chemist Robiquet, with whom he worked daily for five months.¹⁷ On his return to London he called in at his booksellers for his mail to discover that in his absence he had been nominated as candidate for the chair of Medical Jurisprudence and Medical Police at Edinburgh, though he was still only 23 years old. He attributed his eventual success to Robiquet's testimonial, as 'no other candidate was even so much of a practical chemist as to have stunk his neighbour with sulphuretted hydrogen gas discharged through the street-doorkeyhole'.¹⁸

The chair at Edinburgh had been started 14 years earlier in 1807 through the efforts of Andrew Duncan, who had been lecturing on the subject since 1795, having been influenced by continental pioneers such as J.P. Frank, whose System einer vollständigen medicinische Polizey

15. The Life of Sir Robert Christison, Bart, edited by his sons, London and Edinburgh 1885.

16. Ibid., p. 241.

17. Ibid., pp. 267-8.

18. Ibid., p. 279.

was published in Mannheim as early as 1778 to 1788.¹⁹ Duncan was a Whig in a Tory environment, and medical police was seen at that time as a radical idea, so he was unable for some years to persuade Senate to support his proposal to the Town Council, who were in control of university appointments. However, it was in the power of the Crown - which is to say the government - to create a professorship if it so wished. And he was able, during the brief ministry of the 'Talents' in 1806, to persuade them to patronise the chair, which was occupied by his son, Andrew Duncan, Junior, until he became professor of Materia Medica in 1821.²⁰

Duncan's successful memorandum recommending the appointment of a Regius Professor similar to those at 'Goettingen', 'Leipsick' and Paris began with a definition:

State medicine... comprehends both medical police and juridical medicine. The former consists of the medical precepts which may be of use to the Legislature or the Magistracy. The latter is the aggregate of all the information afforded by the different branches of medicine which is necessary for elucidating doubtful questions in courts of law.²¹

His proposed curriculum was wide. Criminal matters included determination of cause of death from examination of the body, abortion, rape and criminal responsibility. Civil matters included state of mind

19. Crowther and White, On Soul and Conscience, p. 9.

20. Ibid., p. 10.

21. Edinburgh University Library Archives, Duncan 784/9/9. (This definition is still the basis of the entry for forensic medicine in Chambers Dictionary.)

(madness, melancholy, idiotism), pregnancy and diseases (concealed, pretended, imputed). Matters for the Consistorial courts included impotence, uncertainty of sex and leprosy. However, a greater concern for Duncan was medical police - medical knowledge aimed at the 'promotion, preservation and restoration of general health'. In this category he saw medical police as relating not only to what became the domain of the medical officer of health ('health propagation' and education) but also to what became the domain of the public analyst almost a century later: air ('impregnation'), water ('necessity and purity'), food ('nutritious and economical') and drink ('adulteration, hurtful addition').²²

When Christison was appointed the emphasis changed from public health to medical jurisprudence. Crowther and White's history of the Glasgow Department of Forensic Medicine, On Soul and Conscience, observes the close relationship between forensic medicine and public health in Scottish medical education and they note that Christison's successors continued to teach both with varying emphases according to their own interests until 1920.²³

Christison tells us in his Life that attendance declined at his lectures from 15 to only one student until it picked up again to 90 in his first year as professor of Materia Medica in 1832 - a chair he held until 1877.²⁴ There could be several reasons for this increase of interest. The most practical was that on 16 November 1830 the Royal

22. Ibid.

23. Crowther and White, On Soul and Conscience, p. 10.

24. Christison, Life, p. 282.

College of Surgeons of Edinburgh passed a resolution that candidates for their diploma should attend a three-month course on medical jurisprudence beginning 1 August 1831 - a compulsory 'interest'.²⁵ A contributing factor to Christison's rising reputation and establishment interest in forensic medicine and toxicology was undoubtedly the publication in 1829 of his book on toxicology, the first original book in English²⁶ which received a series of six fortnightly leading articles and commentaries in the Lancet in the winter of 1830-31. He was also becoming known by his appearances as an impartial expert witness in criminal and civil actions, some of the latter being patent cases, though the most famous of the early criminal cases was that of Burke and McDougal at Christmas 1828.

It was during preparation for giving evidence in this notorious case that Christison introduced the experimental method into forensic medicine. The anatomists' victim had been compressed into a tea-chest for delivery to Dr Knox. Christison wanted to know if the bruises found on the deceased at autopsy had been inflicted in life or after death and he tried to bruise another corpse to find out. He concluded that the bruises were occasioned not long before death but could not decide whether by natural causes or by blows. Cause of death was in fact by suffocation.²⁷

25. London Medical Gazette, 22 January 1831, p. 539.

26. A Treatise on Poisons, Edinburgh 1829.

27. R. Christison, 'Murder by suffocation. Injury of the spine after death imitating an injury during life. Experiments on the effects of blows soon after death', Edinburgh Medical and Surgical Journal, 1829, p. 236.

4. Forensic medicine in London 1821-31

Forensic medicine was untaught in London until the 1820s. Its birth came about due to a combination of political, social and economic circumstances which favoured its inception in the early stage of what MacDonagh called the 'period of Benthamism and individualism'.²⁸ It was, in part, due to the insularity of the professionally controlled Royal College of Physicians. At that time the profession of medicine was operated as a three-tier system of physicians, surgeons and apothecaries.²⁹ To be accepted by the most elite of the three, the exclusive Royal College of Physicians, an applicant had to have a medical degree from Oxford or Cambridge. There was no Oxford examination in the subject. The candidate took his BA, studied medicine elsewhere and was granted the degree as a formality. Cambridge had the same system until they instituted examinations in medicine in 1825, but there were still no facilities to learn medicine there.³⁰ The physicians examined patients, diagnosed and prescribed. They would not perform surgery or dispense drugs (the province of the surgeon and the apothecary respectively). In 1800 there were less than 200 physicians in England, most of these in London.³¹

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28. O. MacDonagh, 'The nineteenth-century revolution in government: A reappraisal', Historical Journal, 1958, p. 52.
 29. M. Jeanne Peterson, The Medical Profession in Mid-Victorian England, Berkeley, University of California Press 1978, pp. 10-11.
 30. W.J. Reader, Professional Men: The rise of the professional classes in nineteenth-century England, London 1966, p. 18.
 31. Peterson, Medical Profession, p. 10.

The surgeons had split from their association with the Barber-Surgeons Company of the City of London in 1745 and became the Royal College of Surgeons of London in 1800. Jeanne Peterson describes these moves as indicating 'the movement of the surgeons away from the craft guild traditions to the more elevated status enjoyed by the prestigious College of Physicians'. Once they had received the diploma of the RCS, surgeons performed the bulk of hands-on doctoring - setting bones, treating skin disorders, gynaecological complaints and so on.³²

The Society of Apothecaries were also involved in pulling themselves upwards from untrained shopkeepers dispensing medicines over the counter to be a professional body. In 1815 they were successful in getting the Apothecaries Act passed, which aimed at ensuring that only practitioners with the Licence of the Society of Apothecaries (LSA) could practise generally because; even if they had the diploma of the Royal College of Surgeons, without the LSA surgeons could not dispense drugs. The usual course for practitioners qualifying after 1815 was to become surgeon-apothecaries and take both diplomas in order to become what was (by the late 1820s)³³ being called a general practitioner.³⁴ So, although the Society of Apothecaries was the least elite of the three groups it effectively had in its hands the power of conferring on medical students the right to practise. The situation was different in Ireland and Scotland, where Dublin and Edinburgh had their own colleges of physicians and surgeons. The result was that a Scottish physician,

32. Ibid., p. 9.

33. Leader, London Medical Repository, 1826, p. 575; Lancet, 1831, p. 100.

34. Peterson, The Medical Profession, pp. 10-11.

with an Edinburgh University medical degree (both taught and examined), was not entitled to practise in London owing to the closed shop operated by the Royal College of Physicians.³⁵

John Gordon Smith (1792-1833) was such a Scot. He graduated from Edinburgh with the highest honours in 1810 at the age of 18 and saw service at the Battle of Waterloo. He then retired on half pay to London where he lived under the patronage of the Duke of Sutherland as his librarian. His Scottish qualifications prevented him from practising physic in London and he spent the next four years writing his Principles of Medical Jurisprudence, which came out in 1821.³⁶ The archives of the University of Edinburgh do not show names of students attending Duncan's lectures in medical jurisprudence, so Smith's interest in forensic medicine cannot be firmly shown to be rooted in his Scottish medical education, though it seems likely.

Perhaps on the strength of having produced a book on the subject, Smith became established by 1823 as possibly the first and only teacher of forensic medicine in London at that time, at the Webb Street School, St Thomas' Hospital. Unfortunately there was little interest in the subject by medical students as it was not an examination subject either at the Royal Colleges or in the Society of Apothecaries.³⁷ Smith's book

35. 'Any person who is not a member, fellow or licentiate of the Royal College of Physicians in London and who practises physic within seven miles thereof is liable to a penalty of £5 per month. This is also a misdemeanour at Common Law', according to Michael Ryan in 'Laws relating to the medical profession', London Medical Gazette, 1 September 1830, p. 240.

36. DNB.

37. Lancet, 7 February 1826, pp. 682-3, report of Smith's speech at the Webb Street annual dinner.

was poorly received, written in an anecdotal style with non-replicable experiments and useless references. It was condemned by the contemporary Scottish medical jurist William Dunlop, MRCS:

We may justly say that it is extremely deficient as a book of reference, and could not well have been made so without being greatly enlarged beyond its present size. Dr Smith, indeed, has evidently intended to make it an elementary treatise rather than a work for practical consultation, as may be inferred both from the size and style of the work, and from the paucity of his references to original documents.³⁸

It was superseded very soon by two books which set the style for future books and the teaching of forensic medicine. J.A. Paris, a London physician and a manager of the Royal Institution, and J.S.M. Fonblanque, a London barrister, brought out their Medical Jurisprudence in 1823, followed by the first British edition of T.R. Beck's Elements of Medical Jurisprudence in 1825. (The first American edition had come out in 1823.) Beck's book, which ran to seven editions by 1842, contained footnotes on every page; a detailed appendix gave the latest cases from the USA, Britain and the Continent, especially France; cases were cited properly with dates, names and places, and there were 230 pages of close type on poisons alone - for the detection of which Beck advocated chemical tests. Paris and Fonblanque could not compete with Beck or Orfila's still current work with regard to toxicology, but they gave a wider canvas to medical jurisprudence, embracing arson,

38. Introduction to T.R. Beck, Elements of Medical Jurisprudence, 2nd edition, London 1825.

nuisances and food adulteration. Like Beck, it was clearly annotated for use by barristers and medical men.

With a burgeoning of interest in the subject in London Smith wrote to Paris at the Royal Institution to offer them lectures on forensic medicine which began on 6 February 1826 and ran well into the 1827-28 session, when they alternated with Brande and Faraday's chemistry lectures.³⁹

Also in early 1826, Thomas Wakley, the reforming editor of the Lancet and a surgeon himself, attempted to organise dissenting surgeons into a body to reform the College of Surgeons. According to Wakley the College was a corrupt, self-elected body with too much power in too few hands, an evil caused by their royal charter, which Wakley wanted to see altered.⁴⁰ Following public meetings in London a pamphlet was put out surveying medical teaching in London, Paris, Vienna, Berlin, Leipzig and Maryland, no doubt with the intention of showing up the College of Surgeons as deficient. From the table produced for the campaign it could be seen that forensic medicine was taught and examined in several places on the Continent;⁴¹ and when Dr Anthony Todd Thomson, a Scottish physician practising as a general practitioner in London, addressed his 'Thoughts on medical education and a plan for its

39. Archives of the Royal Institution of Great Britain in Facsimile, London 1971-, Managers' Minutes, vol. 7, pp. 61, 64, 164, 216.

40. T. Wakley, Lancet leaders, 'Royal College of Surgeons in London', 21 January 1826, p. 684; 'Royal College of Surgeons, Edinburgh', 18 February 1826, p. 695; 'College of Surgeons, Dublin', 25 February 1826, p. 698.

41. 'A corrected report of the speeches delivered by Mr Lawrence as chairman at two meetings of members of the Royal College of Surgeons'. London 1826, Appendix xiii.

'improvement' in the same year to the Council of the planned University of London, it included 'medical jurisprudence' as a subject to be taught and examined, with obvious reference to Orfila's animal experiments in Paris and to the recent Lancet-inspired campaign.

Besides the lectures and regular examinations on this important part of medical study, the pupils should have opportunities afforded to them of trying the effects of poisons on the lower animals, and be exercised in the investigations necessary for detecting poison in every part of the animal body. They should also be examined judicially, in supposed cases of insanity, suicide, infanticide and murder, accustom themselves to deliver themselves with propriety when examined in a court of justice respecting real cases of a similar kind. This part of medicine has lately very deservedly attracted much of the attention of the profession, and certainly nothing can be more beneficial to the interests of the public than that it should be properly taught. If the New University look for a model for instruction in any of the branches of learning to be pursued within its walls in existing establishments, many on this subject will be found both in France and Germany.⁴²

Thomson, like Smith, was a Scottish physician and, having opted to retrain and practise as a general practitioner in London, would have seen university teaching as a way to regain his professional dignity. His efforts were rewarded and he became the first professor of Materia

42. A.T. Thomson, 'Thoughts on medical education and a plan for its improvement addressed to the Council of the University of London', 1826, p. 47.

Medica at the new university and a leading member of the medical faculty - but he was capable of being outvoted, as the failure of medical jurisprudence, as Thomson styles it, to be admitted as an examination subject shows. The university did plan to include the subject, and they published a pamphlet in 1827 which largely followed Dr Thomson's suggestions. However, medical jurisprudence was missing from the page advertising appointments and vacancies.⁴³

It was inevitably Smith who responded to this half-hearted inclusion of his pet subject, initially by giving to the library of the future university about 200 volumes on forensic medicine in February 1828.⁴⁴ As there were not 200 separate volumes written on the subject to that date Smith must have given them several copies of identical books. The most readily available to him would have been unsold copies of his own. The gift was followed up by a letter from him on the subject of medical jurisprudence⁴⁵ and he was appointed England's first professor of forensic medicine in July 1828; the university was to open its doors to students on 1 October.⁴⁶ His gift had no doubt been appreciated in the spirit in which it was intended.

As the Council did not propose to examine in the subject for reasons undisclosed in their minutes, Smith had the same problem as with his earlier lectures at the Webb Street School - no one came. And

43. 'Statement by the Council of the University of London', 17 July 1827, in the archives of the University of London, D.M.S. Watson Library.

44. University of London Calendar, 1830.

45. University of London Council Minutes, volume 1, 1829-35, in University College Records Office.

46. Council Minutes, 31 July 1828.

perhaps because the subject was not compulsory he does not seem to have been treated as a full member of the medical faculty, in the sense that he was not at their decision-making meetings.⁴⁷ Furthermore, his personal qualities and lecturing style generated criticism in the press:

He was rather inclined to make bluster serve for argument, and the rather rambling account of his own battle to do duty for the methodical exposition of his subject. His inaugural lecture was not very favourably received. 'Condensation,' said the Morning Chronicle, 'is not a virtue of Dr Smith's.'⁴⁸

Smith's appointment was not guaranteed and was unsalaried, his income depending on attending students' fees.⁴⁹ He therefore began a campaign to have the subject examined by the University and wrote to the Home Secretary, Robert Peel, requesting government intervention in this. He sent a copy of his letter to Peel to the warden of the University, Leonard Horner,⁵⁰ but a better target for his campaign would have been the medical faculty, who wrote to the Court of Examiners of the Society of Apothecaries in March 1829 proposing some amendments to their course of medical training. Forensic medicine was not listed among the subjects to be examined and, needless to say, Smith's signature was not

47. His signature does not appear on any medical faculty documents seen in the archives from around this period.

48. H. Hale Bellot, History of University College London, 1826-1926, London 1929.

49. Smith's letters to the University of London, 21 April 1829, in D.M.S. Watson library, University of London.

50. Smith's letters, 20 January 1829.

on the letter.⁵¹ After a fruitless request to the Council of the University Smith tried a different tack and wrote directly to the Society of Apothecaries' Court of Examiners. Their minutes record:

Dr Gordon Smith having addressed a letter to Court on the subject of medical testimony in Courts of Justice accompanied by a book entitled 'Hints for the examination of medical witnesses' - the Court resolved that the Secretary do write to Dr Smith to acknowledge his letter and to thank him for his book - and that a copy of the recent regulations of the Court be sent to him.⁵²

The regulations earnestly recommended students 'diligently to avail themselves' of instruction in forensic medicine, though it was not made compulsory.⁵³

That autumn the impecunious Smith tried to obtain the vacant coronership for Southwark and the City of London, but was unsuccessful. The examining committee stated that: 'it will not be expedient for this court to confine the qualifications of the Candidates for the Office of Coroner, either to the Legal, Medical, or any particular profession, but that any Gentleman of experience, respectable character, and liberal Education, is duly qualified to fill that office'.⁵⁴ Smith qualified in medicine at the age of 18 and became an army surgeon so plainly had no time to acquire a liberal education, i.e. at Oxford or

51. Court of Examiners, Society of Apothecaries, Minutes, volume 4, 1828-33 in Guildhall Library.

52. Court of Examiners' Minutes, 3 September 1829.

53. London Medical Gazette, 3 October 1829, p. 29.

54. Quoted in T.R. Forbes, Surgeons at the Bailey, Yale University Press 1985, p. 5.

Cambridge, as well. The mortification he felt at his defeat 'soon afterwards gave way to drinking and irregular habits, which greatly impaired his constitution, involving him in pecuniary difficulties.'⁵⁵

In the summer of 1830, despite what must have become common knowledge that medical jurisprudence was to be made compulsory by the Edinburgh College of Surgeons⁵⁶ the University persisted in ignoring his requests. The Council replied to yet another petition by him in July 'that they saw no reason to deviate from the recommendations of the Faculty of Medicine on this subject.'⁵⁷ However, at the end of August there was a surge of interest in the topic in London by the reading public because of the coincidence of two, at first, unrelated events. The first was that Thomas Wakley was about to start his narrowly unsuccessful campaign to be elected Coroner for Middlesex; the second was that Catherine Cashin, a young Irishwoman in her twenties, died after being treated for a possibly consumptive cough by Harley Street quack, John St John Long. Her family asked Wakley to attend the inquest on their behalf, which he did, asking the coroner's permission with due deference, before each of his questions to the witnesses.⁵⁸

Long professed to cure consumption by two methods; one was inhalation through rubber tubes from a mechanical contraption; the other was by rubbing on the back or chest of the patient a corrosive

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55. Inquest on Smith, Times, 17 September 1833, p. 3e. He was imprisoned for debt and died in the Fleet Prison 'by visitation of God' on 16 September 1833.
56. Smith refers to this in a letter written on 21 April 1829.
57. Council Minutes 5 July 1830.
58. Times, 23-31 August 1830; Lancet, 4 September 1830, p. 902.

mixture which raised sores and was supposed, by the suppuration, to relieve the inner problems of the lungs.⁵⁹ Although this might seem obvious charlatanism to us, Long had a large and fashionable clientele, many of whom supported him in court.⁶⁰ The coroner wanted to know if the rub had caused Miss Cashin's death. Dr Johnson, a physician, said he could not 'by analyzation' discover what the preparation was.⁶¹ The doctor who performed the post mortem at the home of the deceased was one of the first medical graduates from the University of London, Alexander Thomson, possibly the son of Anthony Todd Thomson, and had been instructed by the non-medical coroner not to open the head and spine, but only the abdomen and thorax. Consequently, when Thomson was asked by Long's counsel if death was occasioned by the wound on the back he was unable to say, but 'I should, I once repeat, have been able to state a decided opinion if I had been allowed to examine the spine and brain.'⁶² Nevertheless, the jury brought a verdict of manslaughter and Long was arrested.⁶³

Wakley used the case in his electoral campaign to illustrate the benefits of medical coronerships and forensic medical training for medical students. The first meeting of the campaign was at the Crown

59. Times, 24 August 1830, p. 3f.

60. Lancet, 6 November 1830, p. 206.

61. Times, 26 August 1830, p. 3a.

62. Ibid., 24 August 1830, p. 3f.

63. Ibid., 6 September 1830, p. 1e. St John Long was found guilty and fined £250, which he paid in cash and drove off in the Marquis of Sligo's curricle. The following February he was acquitted of manslaughter after the death of another patient under the same circumstances as Miss Cashin. See Wakley's outraged commentary in the Lancet, 26 February 1831, p. 724.

and Anchor Tavern in the Strand on 24 August 1830, the week of the lengthy inquest on Miss Cashin. The meeting was reported in the Lancet and a speech was made on Wakley's behalf by Dr Alexander Thomson detailing horror stories of miscarriages of justice caused by the inadequacies of the present system.⁶⁴ Bills were posted and reproduced in the papers promoting Wakley on the grounds that he was well qualified 'in the investigation of all subjects connected with medical jurisprudence'.⁶⁵ The affair thus brought the subject to the public eye, as a printed lecture of Smith's shows (though one should allow for exaggeration, as 50,000 people crammed into a public house seems excessive.):

It is but a short time since one of our most distinguished members of our legislative body asked me what is meant by medical jurisprudence? Were such a question to be put now, one might, with tolerable safety... refer the inquirer to the bill-stickers of London and Middlesex. To some in my situation it might appear to be a dream, or merely a picture drawn in the imagination - that a branch of medical study, unrecognised by any of the medical authorities in this kingdom, should have raised such a ferment in society as we have just seen it do; should have roused the attention of men of all classes; should have caused the assembling of 50,000 sensible and well-conducted persons, for no other purpose than to listen with eagerness to one of our profession while he described the nature, the vital importance,

64. A. Thomson Lancet, 28 August 1830, p. 868.

65. For example, Spectator, 28 August 1830.

even I may say, the political importance of medical
jurisprudence....⁶⁶

Miss Cashin's inquest was reported in the daily papers all week beginning Monday 23 August 1830; Wakley's poster came out after the Tuesday meeting at the Crown and Anchor and on the Thursday of the same week, while Smith's 'ferment' raged, the annual report of the committee appointed to consider the rules and regulations of the Society of Apothecaries was read to their Court of Examiners.⁶⁷ The report has not survived, nor was the discussion disclosed in the Minutes, but the Court's consequent announcement, on 9 September, included a three-month second-year course of lectures on forensic medicine, to be attended by all students commencing after 1 January 1831.⁶⁸ The Society could have been influenced by the Cashin case, or it could have been influenced by the general trend - Dublin College of Surgeons had already made forensic medicine compulsory, and Edinburgh was about to⁶⁹ - or it could have been decided on quite other grounds. Unfortunately the records are silent, but the sequence of events is suggestive of some direct influence.

Smith's enthusiasm rallied at the news and he wrote optimistically to the University on 29 September offering to start the lectures early for them at £4 per session. The Council were not so

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66. J.G. Smith, 'Introductory lecture on medical jurisprudence delivered at the theatre in Webb Street', Lancet, 16 October 1830, p. 97.
 67. Court of Examiners' Minutes, 26 August 1830.
 68. Ibid., 9 September 1830.
 69. London Medical Gazette, 22 January 1831, p. 539.

sure. Outgoing letters to Smith have not survived from this period but arrangements for Smith's autumn session appear in the Lancet on 25 September as 'not yet complete'.⁷⁰ Smith's status is unclear at this point. On 5 October he was lecturing again at Webb Street and yet he was on the premises of the University then or the following day as he wrote on 6 October to the Council that of the 200 books he had given to the library he had now seen one 'among the rejected rubbish of the library, and perceived that it does not now bear the University stamp'. He asked for it back. Despite growing interest in forensic medicine the snubs continued. On 22 October he wrote to the Council offering to 'deliver a public introductory lecture on 8 November' and asked them to announce it. Smith's bold request must have been met with a sharp refusal as he parried it on 28 October with a letter to Horner:

Sir, understanding that Dr Thomson, Senior, is giving out that I am insane, I think it appropriate to inform you that he said the same thing of you, at a meeting of the professors last year.

On 1 November he sent his resignation, which the Council accepted, with no discussion recorded in their Minutes, and asked Dr Thomson Senior to give the lectures with Andrew Amos, a barrister, the two to be joint professors. The London Medical Gazette announced their appointment on 25 December 1830 for the coming (compulsory) session: 'an arrangement which we think promises exceedingly well.'⁷¹ Thomson remained professor until his death in 1849.⁷²

70. Lancet, 25 September 1830, p. 9.

71. London Medical Gazette, 25 December 1830, p. 409.

72. Munk's Roll.

Now that the subject was compulsory for the LSA the lectures were better attended and thought important enough to be printed verbatim in the London Medical Gazette.⁷³ They consisted of eight talks, from January to August 1831 and covered (1) the giving of medical testimony; (2) confessions, witnessing at coroner's courts; (3) laws relating to childbirth, abortion, sterility etc.; (4) rape; (5) life and assurance policies, public nuisances; (6 and 7) insanity; (8) murder and manslaughter. The series closed to 'loud and continued applause'.⁷⁴ Amos, who delivered most of the lectures, like Fonblanque had the lawyer's approach to citing cases properly, as against Smith's anecdotal and personal style. He had worked out a careful course beforehand, and tied it into a legal framework that was wanting in Smith's work.

5. The Metropolitan Police surgeon

The legal move which was to have one of the greatest implications for forensic medicine was the Metropolitan Police Act of 1829. Not only did it create a new body of police, but it put the role of police surgeon on a firm foundation. There had been a surgeon employed for the welfare of the Bow Street Police⁷⁵ but now the Metropolitan Police Act created divisional surgeons whose primary role was the health and welfare of

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73. A. Amos and A.T. Thomson, London Medical Gazette, 29 January, p. 545; 12 February, p. 609; 12 March, p. 737; 9 April, p. 33; 14 May, p. 193; 2 July, p. 417; 16 July, p. 481; 6 August 1831, p. 577.
74. London Medical Gazette, 6 August 1831, p. 585.
75. R.D. Summers, History of the Police Surgeon, Association of Police Surgeons of Great Britain 1987, p. 1.

the police. But, as the first educated man on the scene of a possible crime, the police surgeon could find himself practising forensic medicine at a grass roots level. The need for greater training in forensic medicine arose just at a time when this was becoming more readily available.

One of these divisional surgeons was Charles Snitch, 'a surgeon in general practice in Brydges Street, Covent Garden'.⁷⁶ His apprentice was J.F. Clarke, who later contributed to the Lancet for many years and left unique memoirs of this period. His most vivid memory was the post mortem of an Italian street entertainer, a 14-year old boy murdered by the English bodysnatchers, Bishop and Williams in the autumn of 1831. This is the earliest first-hand account of a police surgeon's work, so worth putting in full:

I well remember seeing [Ferrari] on the dissecting table at the Little Windmill Street School.... The duty of examining the body fell on Mr Wetherfield... a surgeon residing at the corner of Southampton Street. Others present were - Mr Mayo, then lecturer on Anatomy at King's College; Mr Partridge, his Demonstrator; Mr Beaman, parish Surgeon; his assistant, the late D. Edwards; and myself, as the representative of the police Surgeon. The day selected for the post-mortem examination was Sunday. It was extremely hot, and the sun full upon the little room on the first floor, where we were assembled. I well recollect most of the incidents of the affair, which lasted a considerable time. The boy's teeth had been removed for sale to a dentist, and with this

76. J.F. Clarke, Recollections of the Medical Profession, London 1874, p. 98.

exception there were no external marks of violence on any part of the body. The internal organs were carefully examined; there was no trace of injury or poison. Mr Mayo, who had a peculiar way of standing very upright with his hands in his breeches pockets, said, with a kind of a lisp he had - 'By Jove! the boy died a natural death.' Mr Partridge and Mr Beaman, however, suggested that the spine had not been examined, and after a short consultation it was determined to examine the spinal column. Upon this being done, one or more of the upper cervical vertebrae were found fractured. 'By Jove!' said Mr Mayo, 'this boy was murdered.'

It appeared it was the custom of the murderers to strike their victim on the upper part of the spine, and when insensible to place him head foremost in a water-butt. More than forty years have elapsed since that day, but I have so vivid a recollection of it that I almost feel, on reflecting on it, the terrible weakness I experienced, the want of food, and the then horrible task which was imposed upon Edwards and myself of sewing up the body when the rest were gone!⁷⁷

In Edinburgh three years earlier Robert Christison had been called in by virtue of his office to give expert evidence in the case of the Scottish bodysnatchers, but in London there was as yet no established procedure, as the case of Bishop and Williams demonstrates. The

77. Ibid., pp. 101-2.

anonymous editor of the London Medical Gazette⁷⁸ was not slow to spot the parallels between the two cases and ran a leader comparing the London experience of forensic medicine unfavourably with that of Edinburgh. He was puzzled by the fact that although the matter of the London bodysnatchers had come to light when they tried to sell the body to King's College, the expertise of King's lecturer on forensic medicine (Mr Watson) was not called upon, nor was Mayo, lecturer on anatomy, who conducted the post mortem, nor was Anthony Todd Thomson (though the rivalry between the religiously based King's College and the secular University of London would account for this⁷⁹). Medical evidence was given by Beaman, the parish surgeon and confirmed by Frederick Tyrell, of St Thomas' Hospital, who was not even present at the post mortem.⁸⁰ So although forensic medicine was being taught, it was not yet established in the capital in the same way that it was in the more tightly knit community of Edinburgh.

6. Forensic medicine becomes established

In London medical education was more loosely packaged than at Edinburgh. Students had to present certificates of attendance for the relevant period to the Society of Apothecaries in order to qualify to

78. The London Medical Gazette was founded in 1827 to rival the Lancet by several leading London surgeons including John Abernethy, 1764-1831, of Barts, who had unsuccessfully tried to prevent Wakley from publishing his lectures. See Edwina Sherrington's 1973 D.Phil thesis, 'Thomas Wakley and Reform, 1823-62' pp. 21-36, and Ruth Richardson's Death, Dissection and the Destitute, London 1987, pp. 42-3 and note 60 on p. 312 for details of the dispute.

79. N. Harte, The University of London, London 1986, pp. 67-8.

80. London Medical Gazette leader, 31 December 1831, p. 480.

sit the examination. But these lectures could be attended where the student wished, and need not be at the teaching hospitals but could be at private dispensaries and crammers. By October 1831 forensic medicine was being taught at the University of London; King's College; Webb Street, Southwark and Little Windmill Street Schools; and the hospitals of London, Aldersgate Street, St George's and Guy's.⁸¹ In addition, private tuition could be obtained from Dr Michael Ryan,⁸² Dr Southwood Smith and Mr J.T. Cooper. The lecturer at Guy's was Alfred Swaine Taylor (1806-1880), who came to dominate the forensic medical scene in London via his appearances in controversial court cases and through his much reprinted and revised Manual and Principles and Practice of Medical Jurisprudence (see Appendix 3). Cameron's Mr Guy's Hospital, states that Taylor was not only 'first lecturer in the school' but erroneously states that this was the 'first lectureship in the subject in London', which this chapter shows was not the case.⁸³ Other sources, such as the DNB, Munk's Roll, and the scholarly pamphlet by Alain Besson, former assistant librarian of the Royal College of Physicians,⁸⁴ refer to Taylor as 'professor'. At Edinburgh the professorship of Medical Jurisprudence and Medical Police was an established entity of an endowed chair, but in Taylor's case, and

81. Lancet, 1 October 1831, p. 9.

82. Ryan was editor of the London Medical and Surgical Journal.

83. H. Cameron, Mr Guy's Hospital, London 1954, p. 386. This error is also perpetuated in the entry for Medical Jurisprudence in the 1911 Encyclopaedia Britannica.

84. A. Besson, 'The medico-legal tracts collection of Dr A.S. Taylor, FRCP', Journal of the Royal College of Physicians of London, April 1983, p. 147.

elsewhere outside a university setting, a more general meaning of sole, or senior lecturer, would seem to be meant. To suppose that Taylor's role was formal, permanent, or carried a higher salary than senior lecturer would be to attribute to medical training greater degrees of academic bureaucracy and medical professionalisation than existed in the 1830s in London. The word 'professor', then, does not necessarily imply in this context that there was department, of which the professor was the head. Neither were there any separate forensic medical laboratory facilities at Guy's. Any laboratory work was done for many years in the chemical laboratory, as Taylor's surviving correspondence shows.⁸⁵

Despite the introduction of lectures in forensic medicine, the standard was poor and the teaching was purely theoretical. Wakley criticised the expert witnessing of Taylor and other surgeons from Guy's in an insurance case in 1832. The medical men, he said: 'appeared in the witness box more like interested advocates of the insurance company than impartial commentators on facts before them.' Wakley's leader added a quote from a Times leader on the case which endorsed his point of view: 'We never read any reports where medical evidence is given without blushing for the state of medical science in England'.⁸⁶ The case was an inauspicious beginning for Taylor, who, in common with

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85. There are a few letters in the library of the Royal College of Physicians and in the Greater London Record Office in the records of Guy's Hospital.
86. T. Wakley, Lancet leader on the trial of Kinnear v. Borrodaile and others (The Rock Ins. Office), 21 July 1832, p. 502.

the other medical witnesses for the insurance company, had not examined the body.⁸⁷

Taylor's first book, Elements of Medical Jurisprudence (1836), criticised the discipline and its practitioners generally in the introduction:

Within a very recent period, out of six trials for homicide by poisoning and cutting and maiming... five ended in acquittal because, as the judges observed in summing up the evidence, the opinions of the medical witnesses were of too speculative a character, and too conflicting with each other to justify the finding of a verdict of guilty.⁸⁸

There were two difficulties, training and payment, or lack of it. The Society of Apothecaries had made forensic medicine compulsory in 1831 but the Royal College of Physicians did not include it in their diploma until their reorganisation in 1836.⁸⁹ It appeared in the first MB examination papers for the University of London in 1840⁹⁰ - teaching of it until then at the university had been for the LSA.⁹¹ So, while it was gradually becoming accepted as a standard ingredient of

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87. Report on the trial of Kinnear v. Borrodaile and others (The Rock Ins. Office), Ibid., 14 July 1832, p. 472.
88. A.S. Taylor, Elements of Medical Jurisprudence, London 1836, p. 9.
89. London Medical Gazette leader, 'Important changes in the College of Physicians', 9 April 1836, p. 148.
90. Lancet, 14 November 1840, p. 277.
91. In fact, there was more teaching of forensic medicine in London then than there is now, comparing it with the Directory of Postgraduate Medical Qualifications, 1991, and London University Calendar, 1988-89.

professional medical training, it had no practical component, which put aspiring practitioners at a disadvantage, as William Cummin, a lecturer in the subject, wrote to the London Medical Gazette in 1834: 'For too many, if not most, of the teachers, the investigation of a real medico-legal case - through which alone real practical information can be derived - very rarely, or never occurs.'⁹²

The second difficulty was lack of state support. There was no system of payment for medical witnesses at inquests with the consequence that the most inexperienced medical man available would be sent to the inquest, as Michael Ryan's leader in the London Medical and Surgical Journal confirms:

Without remuneration, the medical man has been anxious to dispense with his attendance and has frequently sent his apprentice, or some other individual, certainly not competent to give evidence on an important question affecting, perhaps, the lives and interests of several persons.⁹³

Thomas Wakley, in addition to campaigning for medically qualified coroners (particularly himself), had been chronicling the controversy over payments for medical witnesses in the Lancet for some years,⁹⁴ and it was due to Wakley that the process of reform both in paying for medical witnesses and in electing medical coroners began. As MP for

92. W. Cummin, London Medical Gazette, 15 March 1834, pp. 951-2.

93. M. Ryan, London Medical and Surgical Journal leader, 'Medical Witnesses Bill', 27 August 1836, p. 996.

94. See, for example, a letter on 3 November 1832, p. 190, from surgeon Francis Bush who complained that: 'the ability to give a medical opinion is the result of education obtained at great expense, and the public can have no claim on it without paying for it a suitable reward'.

Finsbury from 1835, he was responsible for introducing the Medical Witnesses Bill, which allowed for payments to be made to medical men attending inquests (1 guinea, or 2 guineas if he had conducted the post mortem) at the coroner's request, plus certain expenses.⁹⁵ The Act was passed on the same day, 17 August 1836, as the Births and Deaths Registration Act.⁹⁶ Both Acts had implications for the future of legal medicine.

The Medical Witnesses Act provided for the fees to be met from funds raised for poor relief and was amended the following year in another Act which provided for payment to be met from the county rate.⁹⁷ This Act also had the unfortunate effect of setting the justices above the coroners by giving them power over the coroners' right to call medical evidence in the sense that if the justices at quarter sessions felt that an inquest had not been 'duly held', i.e. that it was not a suspicious death, then they could, and frequently did, refuse to reimburse the coroner for fees he had advanced to the medical witness.⁹⁸

The Births and Deaths Registration Act created the role of local registrar. Its declared purpose was to facilitate the proof of pedigree in claims of estate. There was no thought at the time that the Act would hamper the would-be murderer. However, the effect was to do just this, as a burial order could be obtained in one of only two ways, by

95. Medical Witnesses Act, 6 & 7 Will. IV c. 89

96. 6 & 7 Will. IV c. 86.

97. 1 Vict. c. 68.

98. J.D.J. Havard, The Detection of Secret Homicide, London 1960, pp. 48-9.

death certificate issued on registration, or by a coroner's order. It was not until the Births and Deaths Registration Act 1874 that the cause of death was required to be added to the certificate. Even though this was added nearly forty years later, and even though the 1836 Act applied only to burials in the established Church, the early impact was significant, as some 1850 statistics from Bristol show. Grindon, the Bristol coroner, held 91 inquests in 1836 (registration became effective in 1837), rising steadily to 221 in 1840, 'during which year medical evidence was given in 109 cases and post-mortem examinations carried out in 38'.⁹⁹

Another Act with implications for forensic medicine in court was the Prisoner's Counsel Act 1836, though its effect with regard to forensic medical and scientific evidence was gradual. Before the Act, if a defendant had counsel, the counsel was permitted to put questions to the prisoner's witnesses, cross-examine prosecution witnesses and make a statement on the prisoner's behalf to the jury. If he had no counsel the prisoner was allowed to put his own questions, cross-examine and make a statement.¹⁰⁰ After the Act 'all persons tried for felonies shall be admitted, after the close of the case for the prosecution, to make full answer and defence thereto by counsel learned in the law'.¹⁰¹ The difference was that now, after the prosecution was finished, a fairer balance was achieved by allowing the defence counsel to bring a properly structured case, with opening remarks. The Act was

99. Ibid., pp. 44-8.

100. H. Poland and W.B. Allen, The Criminal Evidence Act 1898, London 1898, p. 12.

101. 6 & 7 Will. IV, c. 114.

not well received. The Middlesex justices appointed a committee to look into the working of the Act with regard to the burden on taxpayers. The committee evidently felt that a more just system was a waste of time. Trials at the Central Criminal Court in 1835, before the Act, occupied 80 days, yet in 1836, after the Act, they occupied 87 days, with a difference of expense of £3000 because of keeping witnesses and jurymen 'inconveniently in attendance'. The chairman of the committee, reported the first issue of Justice of the Peace, 'expressed opinions unfavourable to the Act on account of the difficulty of obtaining convictions'.¹⁰² The Act led to a greater challenge to the prosecution case by the defence, a sine qua non for the development of forensic medicine - with no courtroom challenge the science would stagnate. The Prisoner's Counsel Act was only the first in a series of Bentham-inspired Acts which gradually made court cases fairer to the defence.¹⁰³

7. Motivations

In Early Victorian Government MacDonagh followed up his earlier reappraisal of the mid-nineteenth-century revolution in government by stepping back in time to preface his model with three explanatory aspects of the unprecedented social upheavals taking place in Great Britain and Ireland in the pre- and early Victorian period.¹⁰⁴ These

102. Justice of the Peace, 28 January 1837, p. 19.

103. See also the Criminal Procedure Act 1865 (28 & 29 Vict. c. 18) and Criminal Evidence Act 1898.

104. O. MacDonagh, Early Victorian Government, London 1977. This paragraph is distilled from MacDonagh's exposition in Chapter 1,
(Footnote continued)

technical, political and theoretical/sentimental forces both favoured and resisted change in an era of what he called 'positive and aggressive individualism', approximately 1825 to 1850. While on the one hand technical advances facilitated greater communication and the building up of a corps of trained and examined professional men, on the other hand technical knowledge limited what could usefully be done at the time. Politically, the government was transforming itself from a ruling to a legislative body with a legislative policy that continued from session to session. This policy needed government officials to maintain it and it needed to be underpinned with knowledge and statistics - achieved in the 1820s and 1830s by a much greater use of the Select Committee and the Royal Commission. But these political and legal changes were resisted by an element of old Toryism which had control of an ancient and inefficient system of local government and who resisted reform and centralisation - the JPs were evidently representatives of this element. The third factor, sentimental/theoretical, stemmed from Benthamism and the evangelical revival. MacDonagh took his cue from A.V. Dicey's Law and Public Opinion in Nineteenth-century England in which Dicey maintained, along with Napoleon, that 'opinion rules everything' - that legislation, and even the absence of legislation, depended in the nineteenth century upon the varying currents of public opinion.¹⁰⁵ The climate of opinion in the early nineteenth century favoured humanitarianism, the stirring

(Footnote continued)

pages 1-22 *passim*, 'Favouring and resisting forces' except where indicated.

105. A.V. Dicey, Law and Public Opinion in Nineteenth-century England, London 1914 (originally 1905), p. 14.

of the public conscience to action to solve some problem of society, whether slavery or child labour.

This macroscopic structure of technical, political and sentimental/theoretical favouring or resisting forces can be imposed as a framework which partially explains the smaller area of the emergence of forensic medicine in London as a teaching and practical discipline within the medical profession during this Benthamite period. The factor that MacDonagh's broad sweep leaves out is individual motivation - he brings in self-interest, as the vested interests of the Old Tories, to explain resistance to change, but does not consider that self-interest could be a positive factor, motivating the initiation of changes.¹⁰⁶

The development of forensic medicine in London was promoted by three people who it seems safe to assume were motivated at least in part by self-interest. John Gordon Smith and Anthony Todd Thomson had to teach because they were prevented from practising as physicians in London without re-training - their medical education, although superior to that obtainable in England, was not supported by degrees from Oxford or Cambridge. The topic they turned to was forensic medicine, a new speciality for London, but acknowledged in Edinburgh by a crown-sponsored chair. Thomas Wakley, the humanitarian, self-interested and campaigning founding editor of the Lancet, drew forensic medicine and the need for its training to the public's attention as part of his campaign to be elected coroner for Middlesex, a role which would have augmented his income and raised the status of the medical profession as well as its overt role of redressing the

106. MacDonagh, Early, p. 18.

evils of poorly conducted inquests. Informed public opinion may have then stimulated the Society of Apothecaries to make forensic medicine a compulsory subject for their Licence. Their actions were followed by the Royal College of Physicians and University of London in due course. Initially inspired by William Cobbett, Wakley - representing the sentimental/theoretical force as well as the political - later became an MP in 1835 in the reformed Parliament and introduced the Medical Witnesses Bill passed in 1836 which allowed fees for medical witnesses at inquests and thus acknowledged state funding of English forensic medicine for the first time. The Births and Deaths Registration Act, passed on the same day as the Medical Witnesses Act, created more work for the medical witness as more inquests came to be held, and the Prisoners' Counsel Act 1836, a Bentham-inspired humanitarian legal move,¹⁰⁷ enabled a structured defence case to be brought by Counsel on a prisoner's behalf.

The state's half-hearted acceptance of responsibility for financing forensic medicine was, and remains, the key political factor. Having accepted a minimal role in funding forensic medicine in 1836 via the Medical Witnesses Act the state contributed no more finance until the two Home Office Analysts were appointed in 1882. The discipline therefore stagnated in a period which saw the revolutionary rise of government-funded science and state medicine. Central government's lack of interest in the funding of forensic medicine would play a major

107. According to Dicey, Law, pp. 28, 88. He notes that a Prisoners' Bill to redress this wrong was denied in 1824 and 1826 and only succeeded in the reformed Parliament.

part in its marginalisation in the nineteenth century, as the next chapters show.

Chapter 3

State medicine and the marginalisation of nineteenth-century forensic medicine

It was an accident of history which had propelled forensic medicine into being in the 1820s in London, and its emergence may have had more to do with self-interest and personal economics than the public good (see Chapter 2). But, whatever the reason for its debut, the altruistic idea of medical police, or public health, did not travel south of the Scottish border with its continental companion and it was the 1860s before an attempt was made to rejoin the two in an integrated system of state medicine by Henry Rumsey and the British Medical Association. However, the centralising forces which favoured the public health movement mid-century did not at the same time favour the development of the more individualistic forensic medicine, resulting in its marginalisation to the edge of both state medicine and the medical profession as a whole. This chapter explores the reasons for this in terms of external historical and contemporary events as well as in terms of problems from within forensic medicine itself mid-century.

1. Public health v. forensic medicine

The term 'medical police', transliterated from J.P. Frank's System einer vollständigen medicinischer Polizey and similar titles,¹ was defined in Edinburgh by Andrew Duncan in his memorandum to the patrons of Edinburgh University requesting a professorship in medical jurisprudence and medical police as on the continent (see Chapter 2). Duncan's 'Heads of lectures' on medical police was derived from the work of Frank, as the idea spread throughout the German states to France, Scotland, the United States and Italy. The concept of medical police thrived best, however, in Germany and France, where there was public acceptance of state interference in everyday life, and did least well in more individualistic countries like Scotland and England.² In fact, the creation of the Edinburgh chair by a brief sympathetic government in 1806 was ridiculed by the incoming Tories a year later,³ and its creation so early may be regarded as something of a fluke.

Medical jurisprudence, or forensic medicine, became divorced from medical police as it crossed the border from Scotland. Although it was included in definitions of medical jurisprudence by Smith in 1821⁴ and

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1. R. MacLeod, 'The anatomy of state medicine: Concept and application', in F.N.L. Poynter (ed.) Medicine and Science in the 1860s, Wellcome Institute for the History of Medicine 1968, p. 201.
 2. G. Rosen, 'The fate and concept of medical police, 1780-1890' in G. Rosen, From Medical Police to Social Medicine, New York 1974.
 3. H.W. Rumsey, Essays on State Medicine, London 1856, p. 67.
 4. J.G. Smith, Principles of Forensic Medicine, London 1821.

Paris and Fonblanque in 1823,⁵ their contents pages excluded it from their universe of discourse, as did Beck in 1825⁶ and Thomson and Amos in 1831.⁷ The concept of medical police had to be re-invented in the late 1830s and 1840s by Edwin Chadwick as the budding sanitary movement struggled for public endorsement and legitimacy by means of Reports and Royal Commissions.⁸ However, the term did not evolve with the same meaning in England as it had in Scotland and on the Continent. The major difference was that input from medical practitioners on public health matters was largely missing in England due to the overriding influence of Chadwick, who was notoriously mistrustful of the medical profession. He favoured an engineering solution to combat poor public health, believing that infectious diseases were caused by improper sanitation rather than contagion.⁹ His short-lived General Board of Health, 1848-54, therefore re-created the concept of 'medical police' more as 'sanitary engineering' and it was retrieved for medicine only after John Simon and his associates were able to make their influence felt, most significantly in the late 1850s.

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5. J.A. Paris and J.S.M. Fonblanque, Medical Jurisprudence, London 1823, p. 1.
 6. T.R. Beck, Elements of Medical Jurisprudence, London 1825, Contents.
 7. See Chapter 2.
 8. For the manipulation of government committees to promote the ideas of the Benthamites and to give them legitimacy see S.E. Finer, 'The transmission of Benthamite ideas 1820-50', in Gillian Sutherland (ed.) Studies in the Growth of Nineteenth-Century Government, London 1972, pp. 11-32.
 9. C.F. Brockington, A Short History of Public Health, London 1956, pp. 23-6.

Henry Wyldbore Rumsey, a medical man, writing his Essays in State Medicine in 1856, favoured the European approach. He wanted to re-include forensic medicine in the concept of public health and to unite them under a central authority which should also pay for the practitioners' training.

The real public want is a Board or Council, representing the administrative skill and ability of a great nation, aided by its physicians, and enlightened by its philosophers; a body invested with sufficient powers to regulate, amend, and perfect the willing efforts to be made in every locality by judiciously constituted district authorities, and by a trained and scientific corps of officers.¹⁰

England at that time was the only 'great European state' without a policy of central administration of public health matters. Rumsey intended to correct this with a 'sanitary code', an agenda for state health under three headings, statistical, topographical and jurisprudential. The statistical would comprise the collection and analysis of statistics on population, mortality, births, marriages, sickness, dwellings, food and diseases. The concerns of the topographical would include longevity, water and soil analyses and climatic change, and for jurisprudence: 'provision should always be made for securing scientific evidence from the Medical Officers of superior skill and expertise' in cases of suspicious death, rape and other criminal and civil matters.¹¹ He lamented that the English law

10. Rumsey, Essays, p. ix.

11. Ibid., pp. 4-6.

'does not require the presence and aid of a scientific person, specially instructed and practised in forensic medicine - an expert, as the French call him - to enlighten the researches of the coroner and jury'.¹² He advocated legal and medical skills for coroners 'and for toxicological analyses, requiring greater skill than Officers of Health can reasonably be expected to possess, there should be three or four first-rate men, one or two in London, one in the north and one in the west, who might be called in by the Officer of Health with the sanction of the coroner, in extraordinary cases.'¹³ The state should take the responsibility of training this integrated body of medical expertise.

No ministry has hitherto confessed, if it has perceived, that the state is especially called upon to provide public technical instruction in those matters which no one can undertake to teach on his own risk with a prospect of adequate remuneration, but of which a right knowledge is indispensable to the public safety. Hence to this day we are without a public professor of hygiene or sanitary police in any university or capital of the United Kingdom.¹⁴

In his paper, 'The anatomy of state medicine', MacLeod suggests that Rumsey's work, coming in 1856 between the departure of Chadwick and the General Board of Health and the rise of Simon at the Medical Department of the Privy Council, 'offered a conceptual framework for the creation of a whole new field of medicine', but that, there being no machinery

12. Ibid., p. 354.

13. Ibid., pp. 360-1.

14. Ibid., pp. 67-8.

to advance Rumsey's objectives, he received no tangible support.¹⁵ In fact, Rumsey's work had no demonstrable effect on the course of events for the next ten years at least, as Simon and his team set about recommending reforms apparently independently of his views.

At the same time the British Medical Association was growing as a pressure group with an interest in public health and forensic medicine which dated back to its foundation as the Provincial Medical and Surgical Association in 1833.¹⁶ In 1868 the BMA founded a committee jointly with the Social Science Association to 'promote a better administration of the laws relating to Registration, Medico-legal Inquiries, and the Improvement of Public Health'. Edwin Chadwick was in the chair and members included Henry Rumsey, William Farr (the Registrar-General) and Ernest Hart (editor of the British Medical Journal) amongst others. The emphasis of the committee was more than 50 per cent medico-legal in that the stress on registration was in order to improve registration to show causes of death as the 'present system, which has doubtless led to the discovery of some murders, probably allows many to escape detection'.¹⁷ The committee sent a memorial to ministers and Members of Parliament, enclosing a memorandum written by Rumsey on the same subject, which again was heavily weighted to matters

15. MacLeod, 'Anatomy', p. 206.

16. Ibid., p. 210.

17. British Medical Journal, 16 May 1868, p. 489.

forensic,¹⁸ and was one of the factors leading to the 1868-69 Royal Sanitary Commission.¹⁹

Rumsey was also active that same summer on a committee of the General Medical Council convened at the request of the BMA/SSA joint committee to investigate the possibilities of a diploma or certificate of proficiency in state medicine.²⁰ The initial forensic bias of this committee was promising; as well as Rumsey it included Professor Robert Christison, an early and continuing practitioner of forensic medicine and toxicology and respected member of the GMC. The committee sent out a questionnaire to teachers and practitioners involved in public health and forensic medicine and others interested such as the Lord Chief Justice.²¹ Respondents involved in forensic medicine were William Augustus Guy, who, among his other roles, was professor of forensic medicine at King's College and author of Principles of Forensic Medicine; George Harley, professor of forensic medicine at the University of London; Henry Maudsley, who succeeded Harley in 1869; Henry Letheby, lecturer in forensic medicine and chemistry at the London Hospital; Alfred Swaine Taylor, lecturer in forensic medicine and chemistry at Guy's; and Professor Harry Rainy at Glasgow who was at that time engaged in trying to calculate the time of death from the

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18. First Report of the Royal Sanitary Commission, Appendix 5, Parl. Papers 1868-69, XXXII, p. 767.
 19. MacLeod, 'Anatomy', pp. 214-15.
 20. British Medical Journal, 4 July 1868, p. 16.
 21. General Medical Council, Resolutions of the GMC adopted July 9 and July 12 1869 together with the Second Report and Appendix of the Committee on State Medicine appointed June 27 1868, London 1869. (Hereafter GMC Resolutions.)

cooling of dead bodies.²² The questions, on what should be the content, length of course and examinations for a qualification in state medicine, began right away with a reference to forensic medicine:

1. Various subjects, such as Forensic Medicine, Toxicology, Morbid Anatomy, human and comparative, Psychological Medicine, Laws of Evidence, Preventive Medicine, Vital and Sanitary Statistics, Medical Topography, and Portions of Engineering Science and Practice have been suggested as those in which Examinations should be passed by candidates for a Diploma or Certificate in State Medicine. Would you state what are the subjects which in your opinion should enter into a programme for this purpose?²³

Of twenty-five responses to this question twenty-four approved of the topics listed with some additions and amendments, and with more emphasis on practical instruction. Question six: 'What are the deficiencies which you have observed in medical witnesses?' revealed ignorance of the laws of evidence and inability to distinguish fact from opinion as the main faults, followed by partisanship, assumption of knowledge outside their profession, and using technical language beyond the comprehension of the jury. Remedies for these (question seven) boiled down to better teaching, which could include an

22. M. Anne Crowther and Brenda White, On Soul and Conscience, Aberdeen 1988, pp. 20-1. If Christison is included the list represents a 'Who's Who' of Victorian forensic medicine.

23. GMC Resolutions, p. viii.

examination in the principles of reasoning and in the laws of evidence.²⁴

The committee had also canvassed the views of practitioners in Germany and Austria already working within a service of state medicine where forensic medicine and public health were fully integrated. Of five responses, the views of two, Dr Varrentrapp of Frankfurt-am-Main and Dr Pappenheim of Westphalia, were not encouraging, showing that an integrated system of forensic and public medicine would not work in practice, a view echoed by Taylor and some of the British respondents. Varrentrapp wrote:

We German physicians all agree, at least, in one point - i.e., that public health must be kept separate from forensic medicine, and that the government alone cannot forward public health; that here local authorities, medical corporations or societies must do the greatest part. I request you most earnestly not to trust the duties of forensic medicine and the superintendence of public health to the same persons. Either one or other of these duties will be done in a subordinate manner if trusted to the same man.²⁵

Pappenheim was equally alarmed:

This is too vast a territory, and too full of entirely heterogeneous objects to be embraced by one person with equal skill in each part. If anywhere, here, speciality is indispensably necessary; and it is one of the most important

24. Answers extracted from GMC Resolutions.

25. GMC Resolutions, p. 54.

faults of our German system that State Medicine is represented by one and the same person, as well in the service as in teaching. Profoundness of service suffers most apparently and very much by that fault, and therefore I entreat you to avoid it.²⁶

Taylor agreed. Under the answer to question one he wrote:

It appears to me that it would be impossible to combine all these sciences in one curriculum of study for a single diploma, or to find a class of men who, even if they passed an examination, would be competent to practise in such a variety of subjects.

Supposing that men could be found who would undertake the whole of these duties, it is difficult to perceive how they could at the same time perform satisfactorily to the public those which would devolve upon them ... as medical jurists or experts. Even with the best intentions, the mere question of time would be an insuperable obstacle. With too much thrown upon a practitioner, nothing would be well done. Apart from magisterial inquiries, there are about 25,000 inquests annually in England and Wales. With special practice as a medical jurist, a man would have enough to occupy his time and faculties in this department alone.

Under the designation of State Medicine, there is room for the creation of two classes of practitioners, 'Medical Experts' and 'Officers of Health', and there is enough in both departments to give full occupation to the two classes of members.²⁷

26. Ibid., pp. 55-6.

27. Ibid., p. 14.

In the end, this was exactly what happened, and medical officers of health remained separate from forensic medical experts. The foreword of the committee's report recommended a special certificate or diploma in state medicine for registered medical practitioners (i.e. at postgraduate level) and they further recommended that this qualification be included in any forthcoming medical Bill. The fact that forensic medicine was intended to be included in the definition of state medicine was buried on page 81-2 of the committee's Resolutions.

The influential Royal Sanitary Commission of 1868 likewise marginalised the forensic aspects of public medicine, despite a memorandum from Rumsey and his tireless co-workers suggesting medico-legal questions that they might put to witnesses (who included Rumsey himself and Robert Christison).²⁸ The only concession to forensic medicine was that Rumsey's original memorandum appeared, very much as an afterthought, in the Appendix to the Sanitary Commission's Report.²⁹ Rumsey seemed resigned to the failure of his grand plan. In 1870 he was made president of the BMA section on public medicine and gave a speech at Newcastle-upon-Tyne. The speech reflected the main concern of the medical profession at this time, which was the reform of medical education and the abortive Medical Acts Amendment Bill. Rumsey had wanted state medicine to be among the subjects covered by the Bill and regarded its exclusion as a slight, but on the matter of the Commission:

28. British Medical Journal, 5 June 1869, p. 526.

29. First Report of the Royal Sanitary Commission, Appendix 5, Parl. Papers 1868-69, XXXII, p. 767.

The scope of inquiry and the methods adopted for obtaining information were not, in every respect, such as were sought for by the joint committee of this and the Social Science Association [However,] ... enough, I think, has been obtained from the Government to secure very important results; and alleged deficiencies in the scheme of the Commission may be supplied by a future investigation.³⁰

The 1870 Medical Acts Amendment Bill got as far as a first reading in the House of Commons, which was more than any other of the twenty-three medical Bills achieved between the 1858 and 1886 Medical Acts.³¹

Ernest Hart, editor of the British Medical Journal, was also chairman and convenor of the Parliamentary Bills Committee of the BMA and his promotion of state medicine was competing with more pressing matters for committee time and pressure group activities such as notification of infectious diseases, registration of midwives, suppression of baby farms, lunacy laws, administration of anaesthetics and the like.³²

Forensic medicine had to compete for a corner of the space that state medicine was fighting for and lost. When the Diploma in State Medicine was designed in 1875 it was modelled on a Diploma in State Medicine offered in Dublin since 1870. This had examination papers on sanitary

30. H.W. Rumsey, Speech at Newcastle-upon-Tyne, British Medical Journal, 27 August 1870, p. 214-17.

31. P. Vaughan, Doctors Commons: A Short History of the British Medical Association, London 1959, p. 47.

32. Ibid., pp. 53-4.

law and engineering, vital statistics, meteorology, pathology,³³ chemistry and medical jurisprudence.³⁴ The only difference was that on crossing the Irish Sea medical jurisprudence sank without trace.³⁵

The main factor in preventing the administrative remarriage of forensic medicine and state medicine was undoubtedly the weight of experienced opinion against it, but there was an internal problem. The early separation of forensic medicine and medical police had resulted in forensic medicine being taught as an undergraduate discipline, as part of the MB of the University of London, whereas the Diploma in Public Health was intended to be at post-registration level. The two could not be joined administratively unless forensic medicine became a postgraduate discipline. Taylor hinted at this by suggesting in his answer quoted above that there should be two diplomas for candidates in state medicine who could then choose whether to become a 'medical expert' or an 'officer of health'. But this did not happen. There was, however, some remarriage - or at least cohabitation - of forensic medicine and state medicine at a personal level as some practitioners such as Henry Letheby in London and later Alfred Hill in Birmingham combined work in forensic medicine with roles of MOH and public analyst. Perhaps an early difficulty was finding enough experienced

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- 33. Pathology at this time was not the same kind of thing as present-day forensic pathology but had a more general meaning. See Chapter 5 for the start of forensic or 'special' pathology in around 1883.
 - 34. MacLeod, 'Anatomy', p. 221.
 - 35. See Cambridge University Reporter, 26 January 1875, for the curriculum of the DPH which excludes forensic medicine and MacLeod, 'Anatomy' p. 223.

men at a time when training in public medical roles was not yet formalised.

With the medical focus on public health in the 1860s interest in forensic medicine slipped into the background. The events of the time suggest three reasons for this. First, the Royal Sanitary Commission of 1868 specifically excluded London, the heart of forensic medical and toxicological practice and, perhaps due to the dominance of John Simon and the public hygienists, forensic medicine was lost from the public debate as described above. Secondly, toxicology faded from public view because there were no causes célèbres at the crucial period, thanks to the Arsenic Act 1851 and the Pharmacy Act 1868, which together made it more difficult for the domestic poisoner to obtain lethal substances, though accidental deaths and suicides by poisoning kept the medical witness in the coroners' courts.³⁶ The Arsenic Act 1851³⁷ was introduced in the Lords by Lord Carlisle with reference to 'recent occurrences with respect to the commission of the crime of poisoning ... a crime which the legislature was called upon to check as promptly as possible'.³⁸ The recent occurrences were the cases of Franklin and Randall and Ann Merritt. At Northampton Crown Court in 1848 Edmund Franklin and Edward Randall were indicted for manslaughter for causing the death of William Cornfield. They were caterers at a public dinner

36. See O. Anderson, Suicide in Victorian and Edwardian England, Oxford 1987. Anderson notes the lessening frequency of suicidal poisonings with decreasing availability of scheduled poisons (p. 176), but also notes that the public health movement paradoxically led to more poisons being made available due to wider use of cleansing agents (p. 363).

37. 14 Vict. c. 13.

38. Parl. Debates, House of Lords, 1851, I, col. 1163.

who coated a blancmange and surrounding 'foliage' with arsenite of copper to make it look like a cucumber. They were sentenced to three months imprisonment. According to the Times the case 'excited a very great sensation'.³⁹ Two years later, in 1850, Ann Merritt was sentenced to penal servitude for life for administering arsenic to her husband. The prisoner bought two pennyworths of arsenic enclosed in two separate papers each marked 'poison'. The papers looked like effervescent powders and the defence claimed that the deceased had taken them in mistake for soda powders.⁴⁰ The Act would prevent such cases occurring again as arsenic would henceforth be sold coloured with soot or indigo and only to persons known to the pharmacist or introduced by someone known, who had to sign a poisons book. The Earl of Mountcashell, during the first reading, regretted that the Bill was confined to the sale of arsenic and did not extend to other poisons. He did not think the Act would prove a deterrent.⁴¹ However, Glaister lists arsenic cases from 1832 to 1899 and, though probably not an exhaustive list, a rough guide to the declining popularity of arsenic for the domestic murderer can be seen by the fact that in the 18 years to March 1851 he quotes 17 cases, whereas in the 18 years following the Act, to 1868 and the Pharmacy Act, he can find only 7.⁴² The Pharmacy

39. Times, 20 July 1848, 7b.

40. G. Lathom Browne and C.G. Stewart, Trials for Murder by Poisoning, London 1883, pp. 364-72.

41. Parl. Debates, House of Lords, 1851, I, col. 1163.

42. J. Glaister, Medical Jurisprudence and Toxicology, Edinburgh 1921, p. 683.

Act⁴³ embraced the Arsenic Act and introduced the scheduling of poisons which Jacob Bell, of the Pharmaceutical Society, had suggested in 1856 after the trial of William Palmer.⁴⁴ The new Act widened the use of the poisons register to restrict the sale of other fashionable substances such as antimony and strychnine. It had the disadvantage of listing deadly poisons for the studious murderer to choose from, but for the moment the domestic poisoner paused in his (and her) endeavours, and there were no notorious cases to engage the press from Pritchard in Edinburgh in 1865 to Mary Ann Cotton in Durham in 1874. Had there been a Crippen or a Palmer in 1868 there might have been more support for and interest in postgraduate training in toxicology and the emphasis of the Royal Sanitary Commission might have been geared more to forensic medicine. The third factor in the obliteration of forensic medicine from view was that the reporting of cases was less prominent in the medical journals after the Palmer case in 1856. There were two contributory factors to this. One may have been the realisation that Taylor's February reports on the inquests of Palmer's exhumed relatives prejudiced a fair trial for Palmer in July for the murder of his friend Cook. The other was that the publicity led to the copycat murder in Leeds by William Dove of his wife. It was very noticeable, in the Lancet particularly, that the trial of William Smethurst in 1859 did not receive pre-trial publicity, and from the 1860s to the 1880s at least, despite the doubling in size of the Lancet and the British Medical Journal, reporting of medico-legal matters was restrained.

43. 31 & 32 Vict. c. 121.

44. Pharmaceutical Journal, 1 August 1856, p. 118.

2. Absence of group identity

Another reason for the marginalisation of forensic medicine, from within the discipline itself, was that it did not fit easily into the pattern of medical specialities which were emerging in the 1860s to 1880s and which were predicated on the minimum premise of live patients. The new specialities, like ophthalmology and orthopaedics, developed along with single-illness journals, hospital departments and even hospitals,⁴⁵ but there were no fees to be encouraged in this way from forensic medicine, and no hospitals to be built. The first specifically forensic medical society was the Edwardian Medico-Legal Society formed in 1901, with its Transactions, now the Medico-Legal Journal. The Victorians had to rely on the three main medical papers, the Lancet, the British Medical Journal and the Medical Times and Gazette. The Medical Times and Gazette was a result of the merger in 1851 between the Medical Times and the London Medical Gazette. A.S. Taylor was editor of the Gazette from 1845 to 1851, so for a brief period there was a small degree of dedicated coverage, but the medical journals failed to retain the early interest in forensic medicine that Thomas Wakley had generated when he edited the Lancet from 1823 to 1861. Guy's Hospital Reports, the first of the hospital reports, started in 1836 and regularly published medico-legal and toxicological papers, but it is not possible to determine how widely read the journal was outside the hospital.

Taylor's Manual and Principles and Practice of Medical Jurisprudence, regularly published and still current, had to serve as

45. M. Jeanne Peterson, The Medical Profession in Mid-Victorian England, University of California 1978, p. 259ff.

an informal journal for the enthusiasts in forensic medicine and toxicology who would send Taylor details of a suitable case for inclusion in the next edition. This had the advantage of keeping the textbook as fresh as 'journal science', but the disadvantage was that the textbook did not act as a forum for debate on issues of concern in the sense that views on controversial matters were not aired equally by practitioners but were handed down paternalistically from the top.

The absence of a specialist journal or society for Victorian forensic medicine indicates a lack of group identity which is also demonstrated by the confusion of titles for the discipline and its practitioners. Legal medicine, forensic medicine, juridical medicine and medical jurisprudence were practised by medical witnesses, medical experts, medical jurists, toxicologists and even 'medico-legists'. In fact, forensic medicine had stagnated. There were no significant legislative changes since the 1836 Medical Witnesses Act introduced payment for witnesses. The next change was that this Act was written almost word for word into the Coroners Act 1887.⁴⁶ In addition, the 1887 Act permitted a further exhaustive forensic examination providing the coroner had the agreement of the local authority who had the duty of fixing fees, allowances and disbursements paid by the coroner.⁴⁷ This was very different from the development of its potential partner in state medicine. The work of the MOH was first defined under the

46. 50 & 51 Vict. c. 71, ss. 21-23.

47. Ibid., s. 26.

Public Health Act 1848,⁴⁸ and by the time of the Royal Sanitary Commission twenty years later Simon was able to list a variety of Acts under which he and his officers operated, such as the Diseases Prevention Act 1855, Nuisance Removal Acts, Public Health Act 1858, Sanitary Acts 1866 and 1868, Vaccination Act 1867, Pharmacy Act 1868, to name but a few.⁴⁹ By 1893 A. Wynter Blyth's Lectures on Sanitary Law took up 297 pages to cover the same ground.

There was legislation directly relevant to forensic medicine, but in the absence of a medico-legal pressure group, this was campaigned for by other groups, with the support of the leading London medical jurists. A.S. Taylor, for example, was an honorary member of the Pharmaceutical Society,⁵⁰ which was active in getting the Pharmacy Act passed, and he gave evidence before the 1875 First Royal Commission on Vivisection which led to the Vivisection Act 1876 (he was against 'purposeless cruelty').⁵¹ Taylor was also a witness to the Select Committee on the Adulteration of Food, Drink and Drugs in 1855 in which Henry Letheby played such a major role.⁵²

There could be several reasons why a group identity failed to emerge. One was the universality of forensic medicine - i.e. it was on

48. Reproduced in C. Fraser Brockington, Public Health in the Nineteenth Century, London 1965, Appendix II, p. 182.

49. First Report of the Royal Sanitary Commission, Parl. Papers 1874, XXXI, p. 811.

50. A list of members appeared annually at the start of the volumes.

51. E. Westacott, A Century of Vivisection and Anti-Vivisection, London 1949, p. 46.

52. See Chapter 7. When Simon joined the General Board of Health in 1855, Letheby took over his role as MOH for the City of London.

the compulsory curriculum, and the coroner could summon any legally qualified medical practitioner near the place of death - so there was no opportunity at a grass roots level for anyone to specialise as the practitioner had no control over his own practice. The exception to this was the Metropolitan Police surgeon, but even here, as Chapter 5 shows, the coroner would call in whom he chose, however willing the police surgeon was to perform the post mortem. Another reason for a failure of a group identity to emerge may have been the poor fees allowed and the difficulty experienced in recovering them. Court work appears to have been unpopular with general practitioners, not helped by the fact that there was a fine of £5 for failing to obey the coroner's order to attend⁵³ and in fact it was something of a nuisance to some practitioners. The regular medico-legal agony column of the British Medical Journal frequently published letters from general practitioners having problems in recovering fees for court appearances. The Medical Witnesses Act 1836 covered inquests only. Payment of court fees for other appearances was by the parties concerned in civil cases and at the discretion of the local justices in the criminal courts.⁵⁴ An organised system of police surgeons was slow to develop in the provinces. In 1857, for example, in Lincolnshire, 6d per officer per

53. Medical Witnesses Act 1836, 6 & 7 Will. IV, c. 89, and Coroners Act 1887 S. 23.

54. The earliest country-wide scale of charges appears to have been introduced, or more probably, formalised in 1881 in Powers and Duties of the Principal Secretary of State for the Home Department, Part II, Criminal Justice Business. Medical witnesses were allowed 10s 6d for loss of time in attending magistrates' courts (1 guinea if they came from outside the area) plus 3d per mile travelling allowance. At the Assizes they were allowed 1 guinea plus 2s per night.

month was deducted from policemen's pay to ensure medical attention paid by the police authorities. This scheme was the particular brainchild of an innovative Chief Constable and may have been unique at that time.⁵⁵ Medical attention for the provincial police and medical witnessing in the police courts in non-serious cases seem to have been dealt with on an ad hoc basis and are little recorded. It is probable that forensic medicine in the hands of the mid-Victorian general practitioner was, in some instances, performed poorly, as the GMC committee concluded.⁵⁶ It was unlikely that a society would form to promote the interests of a compulsory chore.

There was no group identity at the leading edge of the discipline either, only individualism and rivalry. In the 1860s the major textbooks were W.A. Guy's Principles of Forensic Medicine, first published in 1844 and often reissued, and its rival, Taylor's Manual of Medical Jurisprudence.⁵⁷ Guy was a more rounded public figure than Taylor, who was single-minded in his pursuit of forensic medicine and toxicology. Apart from being professor of forensic medicine from 1838 to 1872 at Kings College, London, Guy was a founder of the Health of Towns Association and a keen statistician, president of the Statistical Society of London 1873-75 and worked closely with John Simon at the Privy Council, ending his career as vice-president of the Royal

55. S.C. Pearson, 'Captain P.B. Bicknell: 45 years a Chief Constable', Police History Society Journal, 1993, forthcoming.

56. GMC Resolutions, 1868.

57. Taylor's own copy of Guy's work in the library of the Royal College of Physicians has sections marked in Taylor's hand of sections derived from his own work and not acknowledged.

Society.⁵⁸ However, Guy was also noted for not appearing in the witness box himself, despite having written a standard textbook. Munk's Roll explains: 'Although frequently consulted on medico-legal cases, his distrust of juries, combined with a natural sensitiveness, prevented him from appearing publicly in court'. So when Taylor brought out his bulkier companion volume to the Manual in 1865 he entitled it Principles and PRACTICE⁵⁹ of Medical Jurisprudence as if to emphasise this point. Although Guy's textbook continued to be published for many years in association with David Ferrier, Guy's successor, Guy himself started to move away from forensic medicine towards public hygiene when he became King's first professor of hygiene in 1869. If anyone was in a position to unite forensic medicine and state medicine as public health it was Guy, but he did not do so, and in fact kept them apart by publishing a separate book, Public Health: a popular introduction to sanitary science, which came out in two volumes in 1870 and 1874.

Henry Maudsley, professor of medical jurisprudence at University College, 1869-79, was carving a separate niche for himself in what is now called forensic psychiatry. The ten years that he held the chair coincided with his co-editorship of the Journal of Mental Science, and the time that Maudsley was connected to the journal - the organ of the Medico-Psychological Association - was the time that it took more of an interest in medico-legal questions relating to criminal insanity than

58. L. Goldman, 'Statistics and the science of society in early Victorian Britain: an intellectual context for the GRO', Social History of Medicine, Vol. 4, number 3, December 1991, p. 423.

59. My emphasis.

either before or afterwards. It was also during this time that Maudsley's book Responsibility in Mental Disease was published, in 1874. But after his resignation in 1879 he did not develop his interest in the medico-legal aspects of psychological medicine, and indeed he withdrew from much public activity at that time, although he was only 44.⁶⁰

These two leading practitioners did not, therefore, threaten Taylor's position and standing as a toxicologist at Guy's, unlike Henry Letheby at London Hospital and the two men clashed in public in controversies over the trials of William Palmer in 1856⁶¹ and Thomas Smethurst in 1859⁶² when Letheby was for the defence. He never wrote a textbook on forensic medicine and died at 60 in 1876, so he never acquired the same standing as Taylor as a toxicologist, but he was well respected in the medical college, to whom he bequeathed £1000 for a prize in chemistry and chemical pathology.⁶³ Taylor took the rivalry with Letheby too seriously to entertain notions of joining together for the common good. Part of the problem may have been that Taylor was alone in needing forensic medicine and toxicology. He was the only

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60. M. Collie, Henry Maudsley: Victorian Psychiatrist, Winchester 1988, Chapter 5, 'Insanity and the Law'.
 61. See E.R. Watson, ed., Trial of William Palmer in the Notable British Trials series, Edinburgh 1952.
 62. See L.A. Parry, ed., Trial of Dr Smethurst, in Notable British Trials series, Edinburgh 1931. The Introduction contains a lengthy discussion on the controversy over Taylor's handling of the case, both in his poor methodology - his materials became contaminated with arsenic - and in his obvious bias against the accused.
 63. Information supplied by the librarian of London Hospital Medical College.

practitioner in the country to practise it as a sole speciality and it was shown earlier that he strongly believed that it should be practised as a sole speciality or else it would suffer from want of attention. The GP had his daily practice, the London police surgeon had his regular salary and a welfare role looking after policemen. Letheby and the other practitioners at the elite, toxicological, end of the discipline had multiple public roles as MOH or later as public analyst but Taylor had no income that was not derived directly from teaching, writing and practising forensic medicine. So although he is remembered as its leading English practitioner in the mid-nineteenth century, when set into his contemporary context he appears, certainly in his later years, to be an isolated figure in an age of multiple interests and appointments for the talented.

Lack of state support for forensic medicine was not just a question of competing for funds with public health. There was a more fundamental problem, addressed in greater detail in the next chapter. English forensic medicine grew in the twentieth century to be a support for police and state prosecutions. It could not, therefore, develop fully in this direction until the police and the state adopted more active roles in the prosecution of offenders. The police developed this role only after the County and Borough Police Act 1856 (see Chapter 9) and serious state prosecutions under a public prosecutor were only instituted in the 1880s, a decade which also saw the appointment of two Home Office Analysts to support these prosecutions. Meanwhile, with no possibility of postgraduate specialisation for its practitioners, forensic medicine remained in the doldrums and the gap between the grass roots and the elite Home Office levels widened so far as to be almost two separate fields of expertise.

Chapter 4

The Home Office Analysts

As Taylor neared retirement the toxicological end of forensic medicine was beginning to pull rapidly away from its roots. Taylor had brought out his handbook on poisons in 1848, updated and reissued in 1859, but the subject was becoming too complex to deal with satisfactorily in a textbook on forensic medicine. Separate texts began to be published which went into much greater detail than those written by the medical jurists, the first being T.G. Wormley's Microchemistry of Poisons (New York 1867). Forensic medical textbooks after this date were more likely to be called Forensic Medicine and Toxicology¹ acknowledging this separation, but there was no postgraduate specialisation in this offshoot, nor any general call for such knowledge as long as the Home Office could occasionally call in A.S. Taylor or, from the 1870s, his successor at Guy's, Thomas Stevenson. Recognition by the government of the need for greater toxicological knowledge to support the prosecution of serious poisoning cases was triggered by the Lamson case in 1882.

Dr George Lamson was a morphine addict who poisoned his crippled 19-year-old brother-in-law with aconitine. Charles Meymott Tidy, lecturer in chemistry and forensic medicine at the London Hospital, assisting the defence, had requested that he be permitted to attend Stevenson's analysis of the victim's vomit, urine and organs, but this

1. For example, W.B. Woodman and C.M. Tidy, 1877; Dixon Mann 1893-1908 (four editions).

was refused by the Home Office.² A week after the trial, in March 1882, the Home Secretary, Sir William Harcourt, was asked in the Commons 'whether, in cases of suspected poisoning, when an analysis is directed to be made, he would consider whether it would not be more satisfactory that the suspected person should have an opportunity of being represented professionally at such analysis'. The Home Secretary delayed replying until he had consulted the 'official analyst' (Thomas Stevenson) on the subject.³ Instead of answering the question Harcourt sidestepped the issue and replied that he quite understood the sentiment that the analysts who carried out the experiments should not be appointed by the Crown as the prosecuting body, and that he 'proposed to ask the President of the Royal College of Surgeons and College of Physicians yearly to appoint two independent experienced men of science to refer to in cases of this kind for the purposes of performing these experiments'.⁴ The Royal College of Physicians appointed Thomas Stevenson⁵ and the Royal College of Surgeons appointed Charles Meymott Tidy.⁶ The fees and expenses for the analysts continued to be paid for by the Home Office⁷ after their more formal appointments made by the Royal Colleges, and their 'independence' would appear to stem from their nomination by the Colleges and from the fact

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2. BMJ, 1 April 1882, p. 471.
 3. Parl. Debates, House of Commons, 12 March 1882, col. 1141.
 4. BMJ, 1 April 1882, p. 471.
 5. BMJ, 17 April 1882, p. 632.
 6. BMJ, 24 April 1882, p. 747.
 7. Personal communication from Home Office Departmental Record Officer.

that they were apparently free to appear for the defence, as Tidy did in the Maybrick trial in 1889.⁸

Stevenson had been demonstrator in chemistry at Guy's from 1864 and lecturer from 1870 when he took over from Odling. It was at about this time that he first started to be used by the Home Office in criminal trials,⁹ gradually taking over from Taylor, whom he succeeded as lecturer in forensic medicine in 1878.¹⁰ Both men were consulted on a case by case basis, sometimes at the highest level,¹¹ and in the Lamson case Stevenson was called in by a personal letter from Sir Adolphus Liddell, the Permanent Under-Secretary of State for the Home Office, asking him to make an analysis of the deceased's viscera.¹² Until his formal appointment then, he seems to have been the 'unofficial' rather than the 'official' analyst, as Harcourt styled him. However, as time went by and use of his services became more routine, he would normally be called in by a numbered Home Office order, or by the Director of Public Prosecutions.

The first Director of Public Prosecutions took office in 1880 but he was a reluctant prosecutor and it was not until Sir Augustus

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8. H.B. Irving, ed., Trial of Mrs Maybrick, Notable British Trials series, Edinburgh 1927, pp. 203-15.
 9. H.L. Adam, ed., Trial of Dr Lamson, Notable British Trials series, Edinburgh 1913. Stevenson's evidence, p. 82.
 10. Guy's Hospital Medical School Minutes, Wills Library, Guy's Hospital. Taylor's resignation was noted on 22 November 1877.
 11. Taylor noted in 'Cases and observations in medical jurisprudence', Guy's Hospital Reports for 1864, that he had been called in to investigate a possible poisoning by arsenic 'under the order of Secretary Sir George Grey' (p. 173).
 12. T. Stevenson, Lecture notes, unpaginated, Wills Library, Guy's Hospital, HO letter 11385 received 8 December 1881.

Stephenson, the Treasury Solicitor, added the role to his own in 1884 that the office began to develop. Under regulations in force from 1886 to 1946 the DPP was enjoined to prosecute in any case punishable by death or where it was in the public interest.¹³ So the creation in England of a public prosecutor for serious criminal trials was developing at the same time as Home Office analysis as a scientific support for these prosecutions.

England was late to establish such a system, and this undoubtedly contributed to the stagnation of forensic medicine described in the last chapter. In places where a public prosecution system was already set up, such as France and the German states, there was also greater state control of medicine and there had therefore been ample opportunity for long-standing relationships to build up between the state and the state-appointed forensic physicians. State control in France dated back to the Revolution, as Chapter 2 demonstrated, and in Prussia Johann Ludwig Casper, professor of forensic medicine at the University of Berlin from 1839, was also forensic physician to the courts of justiciary until his death in 1864.¹⁴ With greater state

13. The Office of the Director of Public Prosecutions as a separate entity was set up in 1908 when most of the criminal work was split off from that of the Treasury Solicitor but the actuality did not change. So although the Office of the DPP date 1908, the office (i.e. role) of DPP was created under the Prosecution of Offences Act. The involvement of the Solicitor in Home Office matters dates back to over the role of the Home Office Solicitor.
Law Officers of the Crown, London 1964, -
The Case for the Crown: The Inside Story
pp. 17-22.)

14. J.L. Casper, A Handbook of Fo
1864, New Sydenham Society, Vo.
of original volume 4.

funding, there was, as a consequence, more original Continental research into forensic medical matters than in England, where it was poor to non-existent. In Scotland, although it had a public prosecution system, the medical profession was run, as in England and Ireland, by the Royal Colleges. However, the more close-knit medical and legal communities of Edinburgh and Glasgow encouraged the development from time to time of close relationships between the expert witnesses and the prosecutor. In Edinburgh, for example, Robert Christison had ensured that the professor of medical jurisprudence would be called by the prosecution in serious cases, though Glasgow had to wait until the era of John Glaister senior, from 1898, before it could rival the dominance of Edinburgh in medico-legal matters.¹⁵ In England there was no state control of forensic medicine and the Home Secretary plainly thought this undesirable, preferring to pay 'independent' professional advisers who were free, like barristers, to act for the defence. This peculiarly English approach fostered looser relationships than were found in Scotland and the Continent. However, after the state had accepted formally its responsibility for prosecuting serious cases we begin to see the Senior Analyst taking on a broader role as he was called upon by the state to perform essentially non-medical investigations, and as the century changed we see him being given more public responsibilities generally.

15. M. Anne Crowther and Brenda White, On Soul and Conscience: The Medical Expert and Crime, Aberdeen 1988, p. 12, and see also Chapter 2, 'John Glaister I: The Professor'.

1. The broader role of the elite practitioners

Non-medical, even non-chemical, items were already beginning to appear in the forensic medical textbooks by 1882 under the heading '*Personal Identity*'. Guy had been the pioneer of this approach. His textbook, The Principles of Forensic Medicine, had always had a section on personal identity of the living, as opposed to the section common to most textbooks on the identification of the dead. In the first edition of 1844, then in 1861 and 1868, there were paragraphs included on hair dyes and distinguishing marks such as scars. Expert interest in the identification of the living was given a boost well before the introduction of Bertillonage and fingerprinting (see Chapter 9) by the long-running Tichborne case during which Arthur Orton, the son of a Wapping butcher, claimed to be the missing heir, Roger Tichborne. The case occupied public attention for eight years, first in the civil courts, and ended with Orton being jailed in 1874 for 14 years penal servitude for perjury. Frederick Piercy, the portrait painter, had performed some photographic experiments, superimposing glass plates of Orton and Tichborne's likenesses, and had proved to Guy's satisfaction that the two men were not the same, though this evidence was not given in court. Guy's 1875 edition devoted a lengthy appendix to the case and Piercy's experiments¹⁶ and by 1881 the discussion had migrated to the main text, now expanded to include details not just of scars but of tattoos, facial features and footprints.¹⁷

16. W.A. Guy and D. Ferrier, Principles of Forensic Medicine, 1875, p. 686ff.

17. W.A. Guy and D. Ferrier, Principles of Forensic Medicine, 1881, pp. 11-12.

By this time the other textbooks were also including non-medical items. Guy had conceded as early as 1861 that 'some advantage is occasionally derived from an examination of the gun or pistol' when examining gunshot wounds. Woodman and Tidy's 1877 textbook went into much greater detail of what later became ballistics, and spent about a hundred pages on details of explosives and other military weaponry.¹⁸ Tidy's sole sequel in 1882 also included comparison of hair and fibres and even recommended the use of a chemist to analyse inks in forgery cases, although the firearms section was not repeated.¹⁹

These non-medical items were not necessarily derived from the personal experience of the author, which was probably minimal. They were inclined to be repeated from continental textbooks with the exception of the Tichborne case, which received wide reports in all. Although personal identification plays a role in modern forensic science, the basis of it is scene of crime work generally, and Stevenson came closest to this kind of work in 1887 during the Lipski case in the East End of London. Israel Lipski was accused of killing a young woman by pouring nitric acid down her throat. He was found under her bed, apparently unconscious, with nitric acid spilt on his clothes and was hanged for her murder. Stevenson examined both Lipski's jacket and scrapings from the floorboards of her room and found that the

18. W.B. Woodman and C.M. Tidy, Forensic Medicine and Toxicology, London 1877.

19. C.M. Tidy, Legal Medicine, pp. 195 (hair and fibres), 239 (inks). The copy in Cambridge University Library, acquired in 1883, is little read apart from the usual well-thumbed sections on sex offences and hermaphrodisim, and the index pages remain uncut. It is cited less often than Taylor or Guy and Ferrier and may have been of little interest at the time. It did not run to a further edition.

nitric acid was diluted with sulphuric acid in proportions suitable for making explosives, but not for commercial use. The police bought samples of nitric acid from every supplier in the area and Stevenson's analysis showed that only one shop mixed it with sulphuric acid in this proportion. Lipski, who used nitric acid for his trade as an umbrella stick maker, was a customer. Stevenson not only gave evidence at the trial, but was consulted by the Home Secretary following Lipski's appeal.²⁰

There may have been other similar cases, but Stevenson's biography was never written. On the other hand, Stevenson's successor, William Willcox, who became Senior Analyst in 1908 on Stevenson's death, left copious case notes which were used in his son's biography. Willcox too was expected to do more than just medical work. In 1909, for example, after a shop fire in Whitechapel Road, he was asked to report on some pieces of glass from a window and some wood from a staircase. The shopkeeper was heavily insured and was also a discharged bankrupt, but despite strong suspicion the evidence was not conclusive enough to warrant a charge of arson.²¹ There are several other cases in the book and its title, The Detective-Physician, shows the slant of the work.

The Home Office Analyst was also expected to take a wider public role. In 1900, for example, Stevenson, who combined his Home Office role with being Public Analyst for Surrey, Bedfordshire, St Pancras and

20. Stevenson's obituary, Analyst, 1908, pp. 385-8; M.L. Friedland, The Trials of Israel Lipski, London 1984, pp. 111-15. Friedland casts doubt on Lipski's guilt throughout the book.

21. P.H.A. Willcox, The Detective-Physician, London 1971, p. 16.

Shoreditch as well as being MOH for St Pancras, was involved in the investigation of an epidemic of peripheral neuritis²² and more serious symptoms amongst the beer drinkers of Manchester which pointed to arsenic poisoning.²³ The Manchester Brewers' Association commissioned a panel of experts, including Stevenson of Guy's and his junior analyst Arthur Pearson Luff of St Mary's,²⁴ who found that arsenic was present in the sugar supplied only by Messrs Bostock and Co.²⁵ A Royal Commission was then set up which traced the origins of the sugar to contaminated sulphuric acid used in its preparation.²⁶ The formidable array of witnesses to the Royal Commission included Drs Ernest Septimus Reynolds of Manchester, who first described the symptoms, Stevenson, Luff, Dixon Mann of Owen's College, Liverpool analyst James Campbell Brown and Government Chemist E.G. Hooper.²⁷ By Willcox's era the Home Office Analyst had the standing not just to be a witness to a Royal Commission, but to be one of Commissioners himself, as Willcox was in 1909 when he sat on the Committee on Coroners.²⁸ (See the next chapter for further details.)

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- 22. Pins and needles in the hands and feet.
 - 23. Lancet, 24 November 1900, p. 1492.
 - 24. See Appendix 2. Tidy had died young in 1892.
 - 25. Lancet, 22 December 1900, p. 1815.
 - 26. First Report of the Royal Commission on Arsenical Poisoning from the Consumption of Beer and from Articles of Food or Drink, Parl. Papers, 1901, IX, p. 270.
 - 27. Ibid., p. 283. See also its continuation at Parl. Papers 1904, IX, p. 1, Minutes of Evidence for the list of witnesses.
 - 28. See Report of the Departmental Committee into the Law Relating to Coroners and Coroners Inquests and into the Practice in Coroners Courts, Parl. Papers 1909, XV, p. 387.

2. Dominance of the medical profession in Home Office Analysis

The widening scope of forensic medicine and toxicology to embrace non-medical expertise, particularly analytical chemistry, was the result of the assumption by the medical profession that only medical men were suitable for this kind of work, a view endorsed implicitly by the Home Secretary in asking the Royal Colleges to make the appointments in 1882. There were, however, other prominent analytical chemists apart from Stevenson who had courtroom experience but they were not as successful as medically qualified men in being appointed Home Office Analysts. The courtroom-oriented work of August Dupre is described in Chapter 8. He was a PhD from the University of Heidelberg, having studied under Liebig, and was a prominent analytical chemist. Like Stevenson he was active in both the Institute of Chemistry and the Society of Public Analysts and assisted Stevenson in performing the non-body chemical analysis in the Lamson case in 1881, yet he was passed over for appointment as Home Office Analyst because the Royal Colleges naturally looked to their own members for the appointees. This caused him some resentment, according to his obituarist, as Dupre had been working for several years as Chemical Adviser both to the Medical Department of the Local Government Board and the Explosives Department of the Home Office.²⁹ Some chemists also had legal qualifications, such as Otto Hehner,³⁰ yet when Tidy

29. Dupre's obituary, Analyst, 1907, pp. 313-16.

30. Otto Hehner, 1853-1924, Analyst, 1924, pp. 501-5.

died the relatively inexperienced Arthur Pearson Luff was appointed.³¹ John Webster, a non-medical chemist, was appointed as Junior Analyst in 1900, but he had to wait to 1915 to be appointed Deputy and another four years to 1919 before he was appointed Senior. His was the only non-medical appointment to the team.³² This assumption that only a medical man was competent to handle scientific evidence in criminal cases pervaded other areas of expertise such as anthropometry, which was in the less than capable hands of Dr John Garson (see Chapter 9), and in the establishment of the Forensic Science Service in the 1930s (Chapter 10).

3. Forensic medicine as a laboratory science

The more forensic medicine moved away from the healing arts, the more it became an elite experimental science. This was particularly true in the field not just of toxicology, but of blood and other body fluid analysis, which together might be classified as medico-legal chemistry. Despite the official endorsement of this science as Home Office analysis it was an amateur business. Taylor had trained in the days of the apprenticeship system and was more or less self-taught with respect to medico-legal chemistry (as was Orfila). Taylor taught Stevenson, and Stevenson taught Webster and Willcox. Willcox came over to Guy's

31. Arthur Pearson Luff, 1855-1938, gained a BSc in chemistry in 1883 and passed his MB in 1887, and became lecturer in forensic medicine at St Mary's Medical School in the same year. As well as his hospital appointment as physician (from 1905) and his role for the Home Office (1892-1908), he built up an extensive private practice specialising in gout and rheumatoid arthritis and retired from his hospital duties in 1913 (Z. Cope, History of St Mary's Hospital Medical School, London 1953, p. 183).

32. See table at Appendix 2.

from St Mary's in his spare time to learn the work first hand.³³ Willcox undoubtedly taught Gerald Roche Lynch, Senior Analyst from 1927, who was a St Mary's man from 1906,³⁴ giving an unbroken academic dynasty in teaching Home Office analysis right from the start to 1954. The handing down of this esoteric knowledge, master to apprentice, in Guy's and St Mary's chemistry laboratories, was necessary to give the aspirants the practical skills that would stand them in good stead under cross-examination, when they needed to be able to demonstrate their experiential superiority. This high-level expertise and experience were not normally available to the defence, as the Home Office Analyst, despite his 'independence' was almost always called by the Crown. The creation of an elite branch of forensic medicine as Home Office analysis, then, depended on the hospital chemistry laboratory and as a consequence left the general practitioner and police surgeon at a disadvantage. This disadvantage became more pronounced after the turn of the century as they lost their traditional role of conducting post mortems to 'special pathologists' who had pathology laboratory facilities at their disposal. These changes began to lay the foundations of pre-Second World War forensic science as not only laboratory based, but also medically dominated.

33. Willcox, p. 8. Webster moved over to St Mary's on Stevenson's death. See his obituary in the Analyst, 1927, p. 116. He died suddenly in 1927 aged 49.

34. Medical Directory, 1942.

Chapter 5

The emergence of the special pathologist¹

The nature of pathology changed radically during the Victorian period. As morbid anatomy it had been taught for many years in the London teaching hospitals, usually by someone in a junior, or stepping stone, position, but once pathological tests developed to diagnose diseases like leprosy (1875), tuberculosis (in 1882) and cholera (1883) the role rapidly increased in importance and status.² The emphasis in pathology was changing from the dead to the living and the pathologist was now no longer regarded as a morbid anatomist, but a 'student of disordered function'. At least, this was the opinion of Victor Horsley who became professor of pathology at University College Hospital in 1887.³ This chair, and others, were part of a rapid expansion in London teaching hospitals in the 1880s, as the new pathology spread over Britain from the continent.

Notwithstanding the current emphasis on the living, diagnosing cause of death was still a vital part of the function of the pathologist

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1. For early usage of this term see BMJ, 7 March 1903, p. 582, Taylor's Medical Jurisprudence, 1905, 1910, 1920, subheading on p. 1. For early usage of the term 'forensic pathology', see 1965 edition edited by Keith Simpson, Part I 'Forensic Pathology', p. 1. This chapter formed the basis of 'The special pathologist', The Police Surgeon, January 1991, p. 37.
 2. W.D. Foster, A Short History of Clinical Pathology, London 1961, pp. 53, 63, 65.
 3. W.R. Merrington, University College Hospital and its Medical School: A History, London 1976, p. 219.

and a small corner of this new pathology, as with the old, was occupied by the medico-legal autopsy. The new skills and techniques were adapted to medico-legal purposes on the Continent as early as 1876 by Rudolf Virchow, who wrote a handbook on medico-legal autopsy techniques. It was not translated or reviewed in the British medical press. His second edition, in 1880, was accorded a few lines in the Lancet, indicating a glimmer of interest in the subject in England.⁴

The pioneer of special pathology in London was Augustus Joseph Pepper, at St Mary's Hospital. Pepper was called in occasionally by the local coroner, Dr George Danford Thomas, from about 1883.⁵ They were both members of the Pathological Society, as their entries in the Medical Directory shows. In 1887, Pepper gave a series of four lectures to postgraduate medical students on medico-legal autopsy techniques. These were not noticeably derived from Virchow's handbook. Pepper seems to have created English medico-legal pathology independently. Three of these lectures, out of the four that were promised, were printed in the Lancet in the autumn of 1887.⁶ In the first lecture, on inquest practice and exhumation, Pepper recommended that inquests should always

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4. R. Virchow, Post Mortem Examination: A Handbook for the Guidance of Medical Jurists approved by the Minister for Ecclesiastical, Educational and Medical Affairs, Berlin 1880, translated by T.P. Smith. Reviewed in the Lancet, 20 March 1880, vol. 1, p. 453.
 5. Report of the Departmental Committee into the Law Relating to Coroners and Coroners Inquests and into the Practice in Coroners' Courts, First Report, Part II, Evidence and Appendices, Parl. Papers, 1909, XV, p. 547, evidence of A.J. Pepper, St Mary's Hospital; see also Lancet, 17 March 1883. vol. i, p. 476, where a letter from A.J. Pepper shows that he gave evidence at an inquest on a child who died after a vaccination.
 6. A.J. Pepper, 'Lectures on practical legal medicine', Lancet, 17 August 1887, p. 399; 17 September 1887, p. 555; 5 November 1887, p. 903.

be accompanied by a post mortem and that the general practitioner should be 'fortified in these matters by the aid of an experienced pathologist'. By that he meant someone like himself with the facilities of a hospital pathology laboratory. The difficulty was that there was no easy way of securing fees for this pioneering work. There were two sources of income for the medical witness in criminal cases, the coroner and the Home Secretary. The coroner could pay in one of two ways:

1. Section 22 of the Coroners' Act 1887⁷ re-enacted almost word for word the Medical Witnesses' Act 1836, leaving the fees for attending and giving evidence at an inquest at 1 guinea and fees for performing a post mortem, with or without analysis of the contents of the stomach or intestines, at a further guinea. The Act assumed that the practitioner doing the post mortem would also do any analysis and give evidence. In other words, only one medical witness per case was possible under this section. There was a fine of £5 if the doctor failed to comply with the coroner's instructions.
2. Under Section 25 of the same Act the coroner's finances generally, until 1888, were under the superintendence of the Justices of the County in Quarter Sessions, and after the Local Government Act 1888 by the county or borough council.⁸ In London this was the Public Control Committee of London County Council (LCC). If the coroner wished to incur any additional expenditure, such as pay for extra pathological or toxicological analysis, he was obliged

7. Coroners' Act 1887, 50 & 51 Vict. c. 71.

8. Local Government Act 1888, 51 & 52 Vict. c. 41, S. 3.

under this section to obtain permission beforehand from the authority and then reclaim the money. It was this cumbersome procedure through which Pepper obtained his special fees. He noted that in one instance he had had to return a 5 guinea fee as it had not been allowed.⁹

The Home Secretary paid for expert witnesses via three routes:

1. He could authorise payment on a case for case basis to the special pathologist, and used Pepper from time to time. This arrangement was quite informal.¹⁰
2. From the time of their appointment in 1882 the Home Office Analysts, Thomas Stevenson and Charles Meymott Tidy, were paid directly from the Home Office for toxicological analysis on items sent them by the police in the chemistry laboratories of Guy's and London Hospital medical schools respectively.
3. Otherwise, fees and expenses were obtained from criminal courts other than the coroner's courts according to the schedule in Powers and Duties of the Principal Secretary of State for the Home Department: Part II, Criminal Justice Business, HMSO 1881.

The most common of these methods was the first one listed, the 2 guinea statutory fee from the coroner, and the general practitioner or police surgeon looked upon this fee as a way of indirect compensation for his loss of time and trouble when attending a death.¹¹ If there were

9. Committee on Coroners, Evidence and Appendices, Parl. Papers, 1909, XV, p. 549, evidence of A.J. Pepper, St Mary's Hospital.

10. Ibid., p. 547.

11. BMJ leader, 'Death certification: Defects of the present system and suggestions for their remedy' II, 1 December 1900, p. 1581.
(Footnote continued)

occasions when special pathological skills were needed, the attending doctor had every reason to hope that the coroner would go through the procedure of obtaining permission beforehand from the relevant authority so that the special pathologist's evidence would supplement, rather than replace, his own. The surgeons of the Metropolitan Police in September 1887, when the Act came into force, may have suspected that this would not occur and that the special pathologist recommended by Pepper in the 17 September issue of the Lancet therefore posed a threat to their livelihood as the first meeting of the Metropolitan Police Surgeons' Association was held in London shortly after these events took place.¹² Unfortunately the earliest minute books have not survived so the reason for the Association's foundation can only be conjecture, but the existing minute books¹³ show overriding concern with their relationship with the coroner and the reform of the coroner and death certification

(Footnote continued)

The police surgeon's salary was for attending to the health of divisional police officers. He would have a private or hospital practice in addition (see Parl. Papers 1893-4, XI, First and Second Report of the Select Committee on Death Certification, p. 382, evidence of Mr Horatio Nelson Hardy, FRCS, police surgeon for Dulwich).

12. British Medical Journal, 1 October 1887, p. 728. A list of founding officers shows that the president was Alexander Oberlin MacKellar, Chief Surgeon to the Metropolitan Police, who taught forensic medicine at St Thomas' Hospital, vice-president was Thomas Bond, lecturer in forensic medicine at Westminster Hospital, secretary was Horatio Nelson Hardy, police surgeon for Dulwich, and treasurer was George Bagster Phillips, an East End divisional surgeon who was involved in investigating four of the five Whitechapel murders in the autumn of 1888 (The Police Surgeon: Supplement, 22 May 1987, p. 38).
13. The Minute Books of the Metropolitan Police Surgeons' Association are held by the Police Surgeons' Association of Great Britain, in the keeping of Dr Myles Clarke, of Vine House, 8 Huyton Church Road, Liverpool.

system, especially from 1902 to 1912, when the solicitor John Troutbeck was coroner for the South-West District of London.¹⁴

1. The Troutbeck-Freyberger dispute

John Troutbeck had been coroner for Westminster since 1888 and was accustomed to using the pathological skills of Thomas Bond, surgeon for 'A' Division of the Metropolitan Police. His relationship with Bond was uncontroversial and lasted until Bond's suicide in 1901. In 1902 Troutbeck was given the additional burden of the South-West Coroner's District and he discovered that in Battersea more cases were being referred to the coroner than he felt were necessary¹⁵ in order that the doctor (possibly the police surgeon¹⁶) could claim his 2 guineas in lieu of unrecovered fees from the deceased. Troutbeck exercised his right to choose any medical witness he wished under S. 21 of the Coroners' Act 1887 and instead of using the general practitioner or police surgeon, he started to use the services of specialist Ludwig Freyberger.¹⁷

14. Who was Who.

15. Committee on Coroners, Parl. Papers 1910, XXI, p. 668, evidence of John Troutbeck.

16. 'I can only say that in a certain district in the Metropolitan area there is one divisional surgeon whose income has dropped by about £100 through his not being called at inquests' (Committee on Coroners, Parl. Papers 1909, XV, p. 480, evidence of Charles Owen Fowler, Deputy Coroner and Police Surgeon for Croydon).

17. Freyberger was an Austrian who had come to London about ten years earlier. He was an MD (Vienna), MRCP, barrister-at-law, honorary physician to the St Pancras and North Dispensary, pathological curator of the museum and registrar at the Great North Central

(Footnote continued)

By the early 1900s the growth of pathology as a laboratory-based discipline created limits to the diagnoses that could be made by the general practitioner on a rickety kitchen table at the home of the deceased, or at the local mortuary. A hospital pathology laboratory and a hospital-based practitioner were becoming necessary for the pathological, microscopical and bacteriological tests that might be performed in connection with the post mortem. So what might have been an occasional use of Pepper's skills in the 1880s had now developed enough for the LCC to recommend two experts to coroners as a local parallel to the Home Office experts at a special fee of 3-5 guineas per analysis. The pathologist was Charles Creighton, who had written the 1884 entry for 'Pathology' in the Encyclopaedia Britannica, and the toxicologist was Ludwig Freyberger, who was also an experienced clinical pathologist.¹⁸ However, rather than request the special fee in advance, Troutbeck habitually paid Freyberger the 2 guinea statutory fee and did not call the doctor in attendance, to the annoyance of the general practitioners of Battersea.

The payment of fees, or lack of them, for giving evidence was a constant complaint in the BMJ medico-legal agony column in the twentieth century as in the nineteenth. For example, in July 1902 a leader had called for an equitable system of remuneration for medical witnesses following a murder in Bungay. In this case the police surgeons had refused to examine a child at the request of the police because the fees

(Footnote continued)

Hospital and editor of the journal Treatment. He specialised in children's problems. (Medical Directory, 1903.)

18. Committee on Coroners, Parl. Papers 1910, XXI, p. 783, evidence of J. Ollis, Chief Officer of the Public Control Committee of the LCC.

were so low.¹⁹ The journal failed to appreciate the general usefulness of the medico-legal pathologist and took the part of the aggrieved practitioners, mounting a lengthy and vituperative campaign against Troutbeck and Freyberger starting in January 1903 when Dr Leonard McManus was called to a house in south-west London where a baby had died. McManus reported it to the coroner as a case of overlaying (i.e. a crime). Troutbeck called in Freyberger, whose report showed a laboratory-based diagnosis of bronchitis, pneumonia and an abscess in the thymus gland. McManus refused to attend the inquest and complained to the BMJ that Freyberger was acting unethically as it was his case (although McManus had not attended the child in life).²⁰ A leader ran:

It is only in cases of considerable doubt or difficulty, such as, for example, secret poisoning, that the services of a specially skilled pathologist are required, and he should not be employed to the exclusion of the evidence of the medical man called in at the time, or who has been in attendance on the deceased From a statement recently made by the chairman of the Public Control Committee of the London County Council, it appears that Dr Freyberger does not hold any official appointment under the Council and that the resolution of the Council merely recommended him to the coroners for employment should any special pathology work be necessary in the holding of an inquest. To this the medical practitioners of the South-West District do not object and

19. BMJ 19 July 1902, p. 200; BMJ 26 July 1902, p. 269.

20. Committee on Coroners, Parl. Papers 1910, XXI, p. 705, evidence of John Troutbeck. Even the account in the BMJ supports Troutbeck's version, see 10 January 1903, pp. 93, 104.

it has been stated that some members of the County Council have expressed the opinion that Troutbeck has exceeded the intentions suggested by the Council.²¹

The editor called for Troutbeck to modify the exercise of his discretion. In February another complaint followed of an infant who died after being prescribed a patent food by Dr Badcock which, it might appear, was inadequate to sustain life. Dr Badcock was not called in to do the post mortem. Troutbeck said he could not call him to be a judge in his own case.²² Whatever the rights and the wrongs of the situation, the Public Control Committee decided to avoid the conflict by setting up a panel of special pathologists, rather than having just Freyberger and Creighton.²³ They invited London hospitals to nominate the panel, which was published in the BMJ in August 1903. It contained seventeen names.²⁴ Neither Freyberger nor Creighton were listed as being on the staffs of London hospitals - which is to say that they were included by virtue of being on the original list and not by virtue of a hospital nomination.

The list did not avoid conflict, but fuelled it. Following letters in the Times the British Medical Association called a meeting of listed pathologists, which Freyberger did not attend, although he was invited. The pathologists resolved to support the attending general

21. BMJ leader, 'Medical evidence at inquests in London', 10 January 1903, p. 93.

22. BMJ, 7 February 1903, p. 344.

23. Committee on Coroners, Parl. Papers 1910, XXI, p. 783, evidence of J. Ollis.

24. BMJ, 22 August 1903, p. 418.

practitioner being called as an inquest witness and that the expert pathologist should be paid 5 guineas as a standard fee. Not only that, but they also resolved to decline to act without an assurance that these clauses would be observed.²⁵ Their plan appears to have been to ensure their fees by operating as a closed shop, as only personnel at hospitals on the list would perform autopsies. Guy's and Barts refused to nominate anyone for the list²⁶ and some names from other hospitals were later withdrawn.²⁷ The result was that if a body was brought into a hospital whose pathologist was not on the list, it had to be taken away to the mortuary.²⁸ However, their plan would not work while there was a pathologist like Freyberger willing to work for the 2 guineas.

2. Attempts to reform the coroner and death certification system

The campaign continued throughout the Edwardian period with gradually lessening vigour, and was essentially part of a wider dissatisfaction with the death certification and coroner system as a whole. The problem with death registration was that not every death was attended by a medical man, and not every death was registered. Another related point was that since the recent popularisation of cremation the evidence in what might turn out to be suspicious deaths could literally go up in

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- 25. Committee on Coroners, Parl. Papers 1910, XXI, p. 697, evidence of Sir Victor Horsley, University College Hospital.
 - 26. BMJ leader, 'The London County Council and specially skilled pathologists', 25 April 1903, p. 979.
 - 27. Committee on Coroners, Parl. Papers 1910, XXI, p. 697, evidence of Sir Victor Horsley.
 - 28. Ibid., p. 588, evidence of R.S. Trevor, pathologist at St George's.

smoke without a tightening of the regulations.²⁹ One of the problems with the coroner system, as far as the medical profession was concerned, was that ever since Thomas Wakley's campaign in 1830 they had been trying to make medical qualifications a criterion for election as a coroner. The Select Committee on Death Certification in 1893³⁰ made several recommendations. However, a medical coroner was not amongst them. The Committee aimed to improve death certification generally and gave some serious consideration to both ensuring that all deaths would be certified and that the practitioner could be sure of being paid for the work. To do this, they proposed an official called a Public Medical Certifier, who could also be the Medical Officer of Health and would need to be something of a detective as well as a skilled pathologist. It would be his duty to attend all deaths for a fee and either certify the death or report it to the coroner. The BMJ was not happy with this idea as it would take away the coroner's initiative and interpose a third party 'though whose hands the whole business must pass' which would lead to an inconvenient delay. The journal recommended that the coroner should hold all the threads and have the power to hold an inquiry without a post mortem, though 'the weakest point of the plan is that the coroner does not need to be a medical practitioner'. The LCC adopted the Select Committee's recommendations in 1895, adding that there should be a fee paid to the attending practitioner reporting the

29. BMJ leader on 'Death certification: Defects of the present system and suggestions for their remedy', II, 1 December 1900, p. 1579.

30. First and Second Report of the Select Committee on Death Certification, Parl. Papers 1893-4, XI, p. 193ff.

death to the registrar.³¹ This reflected the views of several of the medical witnesses to the Committee who recommended that fees be paid out of public funds for a certificate, or at least for identifying the deceased and verifying the death. The precedent quoted was the 2s 6d paid under the Infectious Diseases Notification Act 1889.³²

No action was taken by the government, and the debate continued at both the grass roots and the elite level, particularly at the meetings of the Medico-Legal Society, the first cross-discipline society of its kind in England. The reasons for its foundation in 1901 were given as being 'for the purpose of affording opportunities for discussing questions arising where medicine and law come into immediate contact'.³³ The fact that the reform of the coroner system was a major concern with the new society can be seen from the make-up of the first officers and council. The president was Sir William Job Collins, former Chairman of London County Council, and the council included the leading London 'medico-legists', as they styled themselves: Dr A.J. Pepper (St Mary's - pathology), coroners Dr George Danford Thomas and Dr Wynn Westcott, Professor Risien Russell (University College - forensic medicine), Professor W.R. Smith (King's College - forensic medicine), Dr F.J. Smith (London Hospital - forensic medicine) and Dr F.J. Wethered (Middlesex Hospital - forensic medicine). It is not surprising that the elite

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31. BMJ leaders on 'Death certification: Defects of the present system and suggestions for their remedy', I, 24 November 1900, p. 1509; II, 1 December 1900, p. 1579; III, 8 December 1900, p. 1647; IV, 15 December 1900, p. 1736.
 32. Select Committee on Death Certification, Parl. Papers 1893-94, XI, p. 319.
 33. BMJ, 23 November 1901, p. 1576.

practitioners and teachers of forensic medicine were unanimous in support of calling in skilled pathologists.³⁴ F.J. Smith, who succeeded Thomas Stevenson as editor of Taylor's Medical Jurisprudence, tried to soothe the general practitioners' ruffled feathers in the 1905 edition. Referring to the Troutbeck-Freyberger dispute and the consequent strike, he felt that despite the personalities and the low pay, the recourse to a special pathologist was the right decision: 'The GP cannot, from the mere nature of his professional duties alone, be expected to be familiar with all the niceties of pathology which legal medicine at any moment may demand from him'.³⁵

The Society kept the reform of the coroner system at the forefront of debate and in June 1906 John Troutbeck gave a paper on 'Reform in the present method of ascertaining the facts and cause of death'.³⁶ As a coroner he naturally saw a coroner-centred system. He 'heartily' supported the LCC's recommendations and suggested that a certain number of medical investigators per coroner's district be appointed. Troutbeck believed that police surgeons would be best for this job, though they should not also be allowed to engage in private practice. The medical investigator, rather than the registrar, would be notified of the death within six hours, and would investigate it immediately by inspecting the body and asking 'such questions as he may think desirable'. He would report it to the coroner if a formal inquest were then judged necessary. Furthermore, attached to each coroner's district should be an official

34. BMJ, 21 February 1903, p. 474.

35. Taylor's Medical Jurisprudence, 1905, Volume I, p. 18.

36. Transactions of the Medico-Legal Society, 1906, p. 93ff.

salaried pathologist who would perform the post mortem if the medical investigator had reported the death to the coroner. In the audience was George Bernard Shaw, who 'approached the subject as a layman with some experience of local government', he said. Shaw agreed with Troutbeck except for one point. That was the 'appointment of a medical investigator to visit every bereaved household within a few hours of the death, and cross-examine the relatives at the height of their distress as to whether they had not murdered the deceased'. He felt the public would not stand for it.³⁷

Following the discussion an extraordinary meeting was held in July 1906 and the Society resolved unanimously that 'the present methods of ascertaining fact and cause of death are imperfect, constitute grave public dangers, and call for early legislation, with a view to early amelioration of the law'. A deputation from the Medico-Legal Society represented this view to the Lord Chancellor,³⁸ yet it was another two years before a departmental committee of the Home Office was called in to inquire into the law and practice relating to coroners and inquests.³⁹ The medical input to the committee was provided by Senior Home Office Analyst William Willcox, of St Mary's. The committee was to some extent a St Mary's affair as Willcox's day-to-day colleagues Pepper

37. Ibid., p. 109.

38. Ibid., p. 116.

39. Departmental Committee into the Law Relating to Coroners and Coroners Inquests and into the Practice in Coroners' Courts, First Report, Part I, Parl. Papers 1909, XV, p. 385; Part II, Evidence and Appendices, Parl. Papers 1909, XV, p. 387; Second Report, Part I, Parl. Papers 1910, XXI, p. 561; Part II, Evidence, Parl. Papers 1910, XXI, p. 583; Part III, Evidence and Appendices, Parl. Papers 1911, XIII, p. 649.

and the young Bernard Spilsbury were early witnesses. Pepper was now being called in not so much by coroners for his 5 guinea special fee but on an informal basis by the Home Office, the Commissioner of Police or the Director of Public Prosecutions. Now that it was Pepper's turn he understandably saw a key role for pathologists. His proposal was that they be organised on parallel lines to the Analysts, that they should be connected to the large hospitals and appointed by the Home Office, or in provincial areas by the MOH to the county council.⁴⁰ Spilsbury, pathology lecturer and curator of the pathological museum, had already investigated thirty-three deaths under anaesthetic at St Mary's, making the post mortem examinations and microscopical analyses. He endorsed Pepper's views and brought up the necessity of more specialised assistance in cases which involved questions of the Workmen's Compensation Acts 1897 and 1900, which is to say civil as well as criminal cases. He recommended that the Home Office draw up a list for the whole country and the coroner should select a pathologist from that list. 'With the recent advances in all branches of pathology and toxicology, it is almost impossible, and certainly impracticable, for one and the same man to do the pathological work, and at the same time to be a toxicological and chemical expert'.⁴¹

The question of special fees was raised and the system that had developed enough for the LCC to recommend Creighton and Freyberger in 1902, by 1910 was widespread, but was apparently lacking in uniformity. The 1910 recommendations of the Committee ran:

40. Committee on Coroners, Parl. Papers 1909, XV, p. 547, evidence of A.J. Pepper.

41. Ibid., p. 549, evidence of B. Spilsbury.

With the exception of the statutory fees to medical witnesses, every local authority for the borough or county under S. 25 of the Coroners' Act 1887 fixes its own schedule of fees, allowances and disbursements in respect of witnesses [with] neither uniformity nor principle in the various scales. The Committee thinks that the Home Secretary should prescribe scales of costs for coroners' courts in the same way as for other criminal courts.⁴²

Section 21(2) of the 1887 Act which included the chemical analysis of the contents of the stomach or intestines as part of the post mortem was 'ridiculous' and should be repealed. 'Except in the simplest case an analysis is useless unless it is made by a toxicologist with all the appliances of a modern laboratory at his command'.⁴³ The coroner should have absolute discretion to call anyone he wants but 'is in a difficulty':

because, if the Act is strictly interpreted, he cannot pay both the medical witness who gives clinical evidence and the medical witness who makes and gives the post mortem examination. Every coroner should be empowered to call such medical witnesses as may be necessary for the proper determination of the case.

The Committee believed that this would remove the friction 'which from time to time arises between them and the medical practitioner'.⁴⁴ The

42. Committee on Coroners, Parl. Papers 1910, XXI, p. 572; also BMJ, 2 April 1910, p. 827-9.

43. Committee on Coroners, Parl. Papers 1910, XXI, p. 576.

44. Ibid., p. 577.

main recommendation of the Committee was that the appointed coroner should be a legal or a medical man.⁴⁵

The resulting Bill was printed in July 1910.⁴⁶ The coroner was to be a solicitor or a barrister. A registered medical practitioner could be appointed only if he also had legal qualifications. Provision was made for an inquiry without a subsequent inquest. The idea of a medical investigator survived:

Any County or Borough may appoint one or more medical investigators or pathologists to be paid out of the ... rates as County or Borough Council may determine; where the medical witness is not a medical investigator or pathologist appointed by the County or Borough he shall be entitled to receive such remuneration as the Secretary of State shall by regulation prescribe.

No death was to be registered without a certificate, the medical practitioner was to inspect the body personally and the coroner was to be informed if no certificate giving the cause of death was possible. The fine for non-compliance was reduced from £5 to £2. Provisions for the elite medical investigators and pathologists were therefore well taken care of, but for the general practitioners the situation had not changed for the better. They were still to be fined if they failed to attend a death, and although the fine was reduced to £2 it was now compulsory to attend every death with no guarantee of remuneration as

45. Ibid., p. 572. The election of Coroners had been abolished in the Local Government Act 1888.

46. It was reproduced verbatim in the BMJ on 9 July 1920, Supplement, p. 91.

the coroner still had the discretion not to call on them. The system they had wanted of being paid for identifying the deceased and certifying the fact of death was not mentioned in the Bill. Furious letters to the BMJ suggested that doctors would no longer work for nothing and they demanded a fee 'even if it wrecks the Bill'.⁴⁷ The Bill was presented by MP Sir William Job Collins, of the Medico-Legal Society, and had many good points but it was written from the point of view of the medico-legal elite without regard for the feelings of the general practitioner whose 2 guinea fee was a not insubstantial part of his income.⁴⁸ In fact the Bill never got further than being read a first time because a general election was called in November 1910. Sir William lost his seat by eight votes, from a fragile majority of ten.⁴⁹ The BMJ recorded that the 'probability of action is now remote' and that the Bill was 'practically dead'.⁵⁰

The journal published reminders from time to time that the Coroners' Act needed amending but nothing was done until 1926. At last the Coroners' Amendment Act, after ninety-seven years of campaigning,

47. BMJ 3 September 1910, letter from J. Price Williams, p. 660; other letters 13 August 1910, p. 410; 3 September 1910, p. 660; 17 September 1910, p. 818; 24 September 1910, p. 911; 11 February 1911, p. 337.

48. As a rough guide the Minute Book of the Metropolitan Police Surgeons' Association for 1907 shows that Dr Dodsworth received a total salary of £62. 3. 6. Quack doctor and dentist H.H. Crippen, living in Camden in 1910, was doing somewhat better. He was able to pay £50 per year rent for his large semi-detached house. (Letter in PRO MEPO 3/198 from R.D. Lown and Sons, leaseholders of 39 Hilldrop Crescent.)

49. Dods Parliamentary Companion, 1911.

50. BMJ leader, 'Coroners and death certification', 26 November 1910, p. 1732.

ensured that the coroner was either an experienced medical or legal man; it allowed the coroner to secure and pay for whatever medical assistance he needed, and a post mortem could be held without the necessity of an inquest.⁵¹ Its greatest defect, according to the BMJ, was its parsimony in its fees to the medical witness, which were raised to 2 guineas for post mortem and report, with 1 guinea for the first day in court and £1. 11. 6 thereafter.⁵²

The medical investigator and salaried pathologist disappeared in this Act. What had been a bone of contention throughout the Edwardian period had become a harmonious system by 1926, if not earlier. In fact, the attitude of the BMJ to the special pathologist changed and mellowed from 1903 to 1913 as his worth was proved in court. In 1903 the editor felt that his services would only occasionally be required, to support the attending general practitioner. The 1910 Second Report of the Committee on Coroners reversed the priority:

A post mortem examination made by a skilled pathologist will often give no result unless it is supplemented by clinical evidence, and therefore there should be power to summon and pay the medical practitioner or practitioners with clinical knowledge of the case in addition to the expert.⁵³

This was reported verbatim in the BMJ in April 1910, and the editor's comments on the Bill in July of the same year showed that he no longer

51. Coroners' (Amendment) Act 1926, 16 & 17 Geo. 5, c. 59.

52. BMJ leader, 'Coroners' law and the registration of births and deaths', 28 March 1926, p. 582.

53. As reported in the BMJ, 2 April 1910, p. 828.

felt that the police surgeon or general practitioner was capable of performing the post mortem,⁵⁴ as did a leader in 1913:

The practitioner who has been in attendance should be summoned to attend the post mortem examination in order that his clinical knowledge of the case may be available for the assistance of the pathologist.⁵⁵

This was a complete reversal of Pepper's 1887 advice that the general practitioner be 'fortified' by the pathologist.

It was not necessarily the case that the editor of the BMJ was influenced by the wisdom of the Departmental Committee. Pathology itself had come of age as a medical speciality in its own right during the 1900s. There had been a wave of improvements to the London teaching hospitals following the discoveries in the 1880s, but this was nothing compared to the rebuilding programme in the Edwardian period. This was particularly the case at St Mary's Hospital Paddington. In 1902 Almroth Wright (1861-1947) was appointed as lecturer in bacteriology and pathology and it was here that the anti-typhoid vaccine was developed, and Wright's 'great scheme of vaccine therapy',⁵⁶ which led to the department becoming a 'place of pilgrimage' as Cope's sympathetic history put it.⁵⁷ New laboratories were provided in 1907 and there was further expansion in 1909. Although the Inoculation Department, later

54. BMJ leader, 'Coroners' law and death certification', 9 July 1910, pp. 98-9.

55. BMJ leader, 'The Coroners' Act and the need for its amendment', 26 April 1913, p. 889.

56. Z. Cope, The History of St Mary's Hospital Medical School, London 1954, p. 103.

57. Ibid., p. 57.

the Wright-Fleming Institute, was under separate management from the rest of the hospital and the medical school⁵⁸ it might be supposed that their facilities were the best in London; and Cope noted that the new building for bacteriological research was continuous with and communicated with the medical school building⁵⁹ so the equipment and expertise were on hand should Pepper or his colleagues require it for medico-legal assistance.

The reputation of pathology as an indispensable courtroom discipline was finally made in October 1910 when Bernard Spilsbury gave evidence in his first major case, the trial of Dr H.H. Crippen at the Central Criminal Court at the Old Bailey. This case established not only pathology, but also Spilsbury's reputation both as a special pathologist and as an expert witness though this was at the expense of the pathological witnesses for the defence.

3. Spilsbury and the Crippen case

Browne and Tullett, in their journalistic biography of Spilsbury, call the Crippen case a landmark in the history of forensic medicine, but they do so without displaying any understanding of the history of forensic medicine in England, or of special pathology; though it seems true to say that the conclusion of the trial 'was to find the newcomer, Spilsbury, established as a coming man'.⁶⁰ This was not just in the

58. Ibid., p. 105.

59. Ibid., p. 107.

60. D.G. Browne and E.V. Tullett, Bernard Spilsbury: His Life and Cases, London 1952, p. 38. The errors and omissions in this poorly researched book are too numerous to mention.

eyes of the medical profession, but with the newspaper-reading public, thirsty for sensation.⁶¹

Crippen had poisoned his wife, Belle Elmore, and buried parts of her in the cellar of their London home in February 1910. He told friends that she had returned to her native America and had died there of pneumonia, but they became suspicious and a few months later alerted New Scotland Yard. What made the case such a cause c_lèbre was that Crippen and his mistress, Ethel le Neve, fled from London on 9 July following a routine visit from Chief Inspector Dew. Up until then it had been an ordinary domestic murder, but once a hue and cry was set up for the absconding couple they became public property and newspapers reported sightings all over the world until the authoritative telegram from Captain Kendall on the SS Montrose bound for Quebec was received at Scotland Yard on 22 July. Chief Inspector Dew and the press corps followed on the Laurentic, a faster ship, and not only did reporters on board the Laurentic keep readers agog with details of the chase, but Captain Kendall continued to keep the world informed of Crippen and Ethel's activities daily via marconigrams to the Montreal Star as the Laurentic slowly gained on her sister ship. A dramatic arrest and return to England followed, so that by the time the pair appeared at Bow Street Police Court Crippen was a star turn without having uttered a word.

Meanwhile, the build up to the trial in London - the finding of the remains in the cellar, the discovery that Crippen had bought

61. J. Goodman, The Crippen File, London 1986. This book tells the story of the affair through reproductions of contemporary press clippings.

hyoscine (a muscle relaxant), the extraction of hyoscine from the remains a few weeks later - apparently whetted the public's appetite for gruesome medical details, and they were not disappointed as a piece of the victim's flesh, now leathery by the time of the trial in October, was handed round the court on a tray to demonstrate that it contained an old abdominal scar where Belle had had an operation.⁶²

Pepper was the first medical witness. He had retired from the staff of St Mary's by the time of the trial but was still being called in from time to time as a consultant surgeon and on medico-legal cases. He had been present at the disinterment of the remains in the cellar along with Chief Inspector Dew and Dr Marshall, the Divisional Surgeon. Both Pepper and Spilsbury, who followed him into the witness box, were sure that the piece of flesh being handed around the court was from the abdomen and contained an old scar. If this had not been challenged by the defence medical witnesses, both experienced pathologists (but not in 'special pathology') from London Hospital, then Spilsbury might have played a more minor role, secondary to Pepper's, whose testimony was much lengthier than his junior colleague's. However, the leading defence witness, Dr G.M. Turnbull, director of London Hospital Pathological Institute, made a poor showing in the witness box.

Turnbull was an experienced pathologist - he had supervised over a thousand post mortems each year since 1907 as against Spilsbury's 33 deaths under anaesthetic in all - but he was a poor witness, and he was genuinely unable to determine whether the flesh, which had pubic hair

62. Pre-trial details of the case from the introduction to The Trial of H.H. Crippen, ed. Filson Young, Edinburgh 1920. Details of the following medical testimony from BMJ, 29 October 1910, pp. 1372-83.

attached, was from the abdomen or the thigh. It depended on whether a particular tendon was present. If the tendon was there the flesh was from the abdomen. Crown counsel Richard Muir humiliated Turnbull by asking the less experienced Spilsbury to point out the tendon to him in court, which he did. At first Turnbull was hesitant and said that he did not think Spilsbury had actually pointed out the tendon. Then he became confused and changed his mind, to the irritation of the judge, who made an impatiently expressed decision to proceed on the hypothesis that the flesh had come from the abdominal wall, as the prosecution had suggested.

With regard to whether it contained a scar or not - Turnbull and his colleague Dr R.C. Wall thought that the 'scar' was simply a pressure mark on flesh which had been buried folded. Their evidence for this was that they had found five hair follicles and a sebaceous gland in the slides that Spilsbury had prepared for the court. These do not occur in scar tissue. Spilsbury simply denied that these were present and offered to show the jury the slides. He said it only looked as if there were hair follicles and a sebaceous gland in the section because in stitching up the flesh during the operation the surgeon had included the edge of the outer skin into the stitch. Turnbull felt that Spilsbury had made a mistake: 'such an inclusion might be mistaken by somebody unaccustomed to the microscope'. This gave Muir, now evidently becoming a little heated, a further opportunity to humiliate Turnbull:

We are not talking about people unaccustomed to the microscope.

We are talking about people like Dr Spilsbury; that is the person I am talking about. Do not talk about people unaccustomed to the microscope. I am talking about people accustomed to the microscope.

Turnbull was bullied into agreeing that the much less experienced Spilsbury was right. When he was re-examined by the defence counsel he reverted to his original opinion that the mark was not a scar. Muir's speech to the jury, at the end of the trial, returned to Turnbull's poor performance:

Dr Turnbull has examined the piece microscopically, so have Dr Spilsbury, Mr Pepper and Dr Willcox. All Dr Turnbull can do is to say, in answer to me, that a person unaccustomed to the use of the microscope might make a mistake about it. As though I were talking about a person unaccustomed to the microscope! Did he mean to suggest in that innuendo that Dr Spilsbury was unaccustomed to the use of the microscope? Was that the suggestion? I hope not.

Competence as a pathologist is not the same as self-confidence as a witness. Turnbull's competence as a pathologist was demonstrated by his vast experience and his appointment as director of the Pathological Institute, but he was a hopeless witness. Spilsbury was a sure witness but his skills as a pathologist remained to be proved. His confident manner as an expert witness would often be remarked upon in future years. Yet whereas Mr Justice Darling admiringly called him 'that incomparable witness'⁶³, Mr Justice Shaw said more recently: 'He could persuade the jury to accept a bad scientific proposition more readily than others could achieve acceptance of a right view'.⁶⁴ Spilsbury's

63. Browne and Tullett, p. 38.

64. J.K. Mason, 'Expert evidence in the adversarial system of criminal justice', Medicine, Science and the Law, 1986, p. 10. Mason regards such a situation as 'positively spine chilling'.

reputation as a confident and sure-spoken witness was made by his own efforts at the Crippen trial, but his reputation as a competent pathologist and microscopist was successfully, although artificially, enhanced by Muir by presenting him in a glowing light in order to destroy the evidence of the main defence witness.

4. Edwardian training in forensic medicine

The elevation of the more complex areas of forensic medicine to the laboratory-based Home Office analysis and special pathology left the police surgeon and general practitioner, as far as criminal work was concerned, with only police and court fees for examining the living and for performing a more minor role at inquest. However, as the criminal side of general forensic medicine was declining, the better paid civil role of the physician in court was increasing as the GP was more often being called upon to assess injuries and industrial diseases under the Workmen's Compensation Acts of 1897 and 1906.⁶⁵ This increased work came in a decade which saw the virtual disappearance of training in forensic medicine for the would-be GP as the reorganisation of the teaching hospitals in the 1900s - which so benefitted pathology - more or less wiped forensic medicine off the medical curriculum.

The first casualty was the London University chair, which had been the first in England, founded with the original university in 1828. This came about through the reform of the medical curriculum in 1907 which created a two-stage model of medical training familiar today, a

65. There were sections devoted to this work in, for example, F. Smith's edition of Taylor's Medical Jurisprudence, London 1905, and in J. Glaister's 1910 (fourth) edition of Medical Jurisprudence and Toxicology.

pre-clinical classroom stage of two years followed by a clinical stage of three years at University College Hospital.⁶⁶ In the reorganisation J. Risien Russell (1863-1939), Professor of Forensic Medicine, was promoted to be Professor of Clinical Medicine, but still taught forensic medicine, which was a clinical stage subject.⁶⁷ As a consequence, it no longer had a professor. William Willcox shed some light on the fate of forensic medicine at the University, speaking as a former examiner for them in the subject, at a meeting of the Medico-Legal Society in 1922:

Soon after William Collins' address [in 1902] there was a meeting at the University of London and the antagonist to forensic medicine was not hygiene, but it was bacteriology and pathology, and there was a great fight. At that time there was a practical examination in forensic medicine at the University of London, a viva voce examination and a separate paper.... Fifteen or sixteen years ago the forensic medicine examination was practically, one might say, abolished from the University of London; the practical examination was done away with, and a joint paper in forensic medicine and hygiene was instituted, and there was a viva voce examination in these joint subjects. That combination of forensic medicine with another subject practically makes the examination worthless. However ignorant a candidate is in forensic medicine, it is almost impossible for him to be rejected in the subject.

66. Lancet, 31 August 1907, p. 603; ibid., 5 October 1907, p. 945.

67. Medical Directories for 1906 to 1910.

The other universities imitated the University of London to some extent.⁶⁸ Forensic medicine was still compulsory but it became considerably devalued. Negotiations to rectify the situation by having a teacher who could teach at all the London hospital medical schools came to nothing as this new role was 'intimately bound up with the institution of a professorship of forensic medicine at the University of London'.⁶⁹

There was no specialised training for the special pathologists on the LCC's list. The particular skills they needed to conduct medico-legal autopsies and to give expert testimony were self-taught. However, this rather weak position was, or should have been (in Spilsbury's case), strengthened by a sound background in the mortuary and in the (clinical) pathology laboratory. The informal training of the Home Office Analysts was also strengthened by a sound background of laboratory science. This was not just in medical school chemistry but in analytical chemistry generally. Analytical chemistry developed in England in some of its applications specifically in order to support the enforcement of certain laws, through the courts if necessary. These applications have a separate history from their two siblings of medical school chemistry and the medico-legal chemistry of toxicology and body fluid analysis originated by Orfila and his contemporaries. However, all these aspects of chemistry were united in the talented Thomas Stevenson and were passed on by him and others down the generations of

68. W. Willcox, 'Forensic medicine as part of the curriculum for all medical and legal students', Transactions of the Medico-Legal Society, 1922, p. 118.

69. Committee on Coroners, Parl. Papers 1910, XXI, p. 593, evidence of H.L. Eason, Dean of Guy's Hospital Medical School.

analytical chemists via the examinations that he instituted at the end of the last century. After this time there was probably more formal training at a postgraduate level in analytical chemistry than there was in any branch of forensic medicine. This training was, moreover, to some extent biased towards courtroom expertise. The next section therefore looks at the growth of analytical chemistry as a courtroom-oriented science and examines its sponsorship first by central government and then by local authorities.

Chapter 6

Early scientific testimony in the English legal system

Chapter 2 showed that forensic medicine emerged in London in the 1820s mainly through the activities of three self-interested medical men. The forces which motivated them to found English forensic medicine were not, however, present at that time to generate a corresponding 'forensic science'. As this chapter sketches, there was science in court as expert evidence, of an ad hoc nature, but science in court was a very different kind of thing from medicine in court, and science, mainly as analytical chemistry, did not become established in court until after the Tobacco Act 1842.

1. Scientific opinion evidence

The precedent for the acceptance of scientific evidence in a court case was set in a civil case in 1782, *Folkes v. Chadd*, where civil engineer John Smeaton gave disputed opinion evidence as to why Wells Harbour had silted up. Lord Mansfield ruled:

I cannot believe that where the question is whether a defect arises from a natural or an artificial cause the opinions of men of science are not to be received. Hand-writing is proved everyday by opinion; and for false evidence on such questions a man may be indicted for perjury. Many nice questions may arise as to forgery, and as to the impressions of seals; whether the impression was made from the seal itself or from an impression in wax. In such cases I cannot say that the opinion of seal-makers

is not to be taken. I have myself received the opinion of Mr Smeaton respecting mills, as a matter of science. We are of the opinion that his judgement, formed on facts, was very proper evidence.¹

Although Mansfield's judgement is quoted in every discussion on scientific evidence, it was not at all soundly based, being built in part on the shifting sand of handwriting evidence. It was the custom around the end of the eighteenth century for inspectors of franks in the Post Office to give handwriting evidence as to whether a signature were genuine. Peers and MPs could frank letters for free transmission until the 1840 reformation of the postal system,² and it was part of the daily duty of the inspectors of franks to check that incoming franks were written by the Member of Parliament in whose hand they purported to be. By extension of that skill they had acquired a general knowledge of comparing genuine with false signatures, even when they had not seen the defendant write. This, at least, was the claim of Mr Bonner, deputy inspector of franks at the trial of R. v. Cator at Maidstone in 1802. But the judge would not accept the evidence, quoting Lord Kenyon: 'Comparison of hands is no evidence. If it were so, the situation of a jury who could neither read nor write would be a strange one; for it is impossible for such a jury to compare the handwriting.' He followed Kenyon's ruling that handwriting evidence could be allowed

1. 3 Doug. KB 1782, pp. 157-61 (English Reports).

2. Jean Farrugia, A Guide to the Post Office Archives, London 1988, p. 80.

only if 'epistolary correspondence' passed between the party and the witness.³

The hardening of precedent from a guiding principle into a doctrine was a result of the Bentham-dominated drive for certainty in the law which influenced legal thought in the nineteenth century from the 1830s onwards, but it was not until the second half of the century that the concept of rules of precedent became firmly established.⁴ And indeed, the main rule of precedent, that every court is bound to follow any case decided by the court above it, could not come into being until the hierarchy of the courts system assumed something like its present shape, after about 1850.⁵ So even if a judge accepted the limited precedent of sticking to decisions made in his own court, like Lord Mansfield, he would not necessarily apply a judges' ruling from another court. Getting evidence accepted by the judge, then, depended on personal whim unless it was allowed by statute. Handwriting evidence, for example, despite Kenyon's ruling, had a chequered history of acceptance in court until it was finally allowed by statute in civil courts in 1854⁶ and in criminal courts in 1865⁷. The judge could be influenced not just by the dubious or untried nature of the scientific evidence itself but by the standing of the witness and clarity of

3. 4 Esp. p. 113ff. (*English Reports*).

4. J. Evans, 'Change in the doctrine of precedent during the nineteenth century', in Precedent in Law, ed. L. Goldstein, Oxford 1987, p. 35.

5. R. Cross, Precedent in English Law, Oxford 1977, pp. 22-23.

6. 17 & 18 Vict. c. 125. s. 27.

7. 28 & 29 Vict. c. 18, s. 8.

presentation. Before the rise of the professions in Victorian England 'divinity, physic and the law' were the only occupations a gentleman could enter and still maintain his dignity,⁸ and the law respected the evidence of practitioners of physic more readily, certainly, than that of the inspector of franks - there was no English judge's ruling that allowed medical evidence to be given in court, this being taken for granted. Smeaton died in 1792, before the formation of the Institution of Civil Engineers in 1818,⁹ but his fellowship of the Royal Society and his personal qualities gave him an early establishment respectability that may have been unique for a pre-professional. He also possessed both standing and clarity. An anonymous memorial volume published in 1844 regarded the engineer as 'an ultimate reference on all difficult questions connected with his profession.... In the courts of law he was frequently complimented by Lord Mansfield and others for the new light he threw on difficult subjects.'¹⁰

2. Scientific experimental evidence

Analytical chemistry emerged to become the main basic discipline of government sponsored courtroom science in the nineteenth century, once it had proved its usefulness, but the main case involving analytical chemistry in the pre-'governmental revolution' era of the 1820s was a civil case. This was reluctantly financed by the losing party and may

8. W.J. Reader, Professional Men: The rise of the professional classes in nineteenth-century England, London 1966, Chapter 1.

9. Ibid., p. 164.

10. Anon., Smeaton and Lighthouses, London 1844, p. 45. The most famous of his achievements was the Eddystone Lighthouse, built 14 miles out to sea from Plymouth on rocks covered at high tide.

have been the biggest, if not the only, civil case to use experimental evidence in the pre-Victorian period. It concerned the introduction of novel scientific evidence - from experiments conducted for the purpose of being brought as evidence. The ethical problems of doing this were not recognised in 1820, and the controversy arose from other matters.

Severn, King and Company v. Drew, or the Imperial Insurance Office aroused controversy as, although the court allowed the evidence, the witnesses were judged to have no standing and to have considerable lack of clarity in the presentation of the evidence. A sugar factory in the City of London burned down in the early hours of 11 November 1819 and the insurance company refused to pay up because a new process had been installed without the company notifying the insurers. All the leading scientific men of the day were engaged by plaintiff and defence to show that the process was (or was not) the cause of the fire. Their experimental evidence was considered irrelevant by the Times reporter, who suggested that the fire was accidental, caused by naked lights left burning all night in a place filled with combustible materials. The jury may have agreed with him as they found in favour of the sugar bakers after only half an hour's deliberations. The Lord Chief Justice commented on the lack of clarity in summing up. While he entertained the greatest respect for the 'men in chymical and scientific pursuits' called as witnesses:

They had, nevertheless, left the court in a state of utter uncertainty.... The constellation of brightness which had shone on them left them in a state of half-knowledge more full of doubt than a state of perfect ignorance. Those who walked in the twilight ought to proceed with caution. It must be a matter of general regret to find the respectable witnesses ... drawn up,

not on one side and for the maintenance of the same truths, but,
as it were, in martial and hostile array against each other.¹¹

Worse was to come. The judge may have treated the witnesses with respect but the losing party, the insurance company, was not so generous. Being liable for the costs of the case they objected to paying expenses and loss of time for the scientific witnesses, in view of the amount involved. Thomas Thomson, professor of chemistry at Glasgow, for example, had travelled three times to London and had paid someone to teach on his behalf in his absence. The matter came up for a judges' ruling and depended on whether a chemist was a professional man in the same way as a practitioner of physic or the law. If so, he would be awarded a payment for loss of time, whereas ordinary witnesses were allowed expenses only. After some deliberation their lordships decided that a chemist was a skilled mechanic of some description:

A witness attending the trial of a cause generally is entitled to no remuneration for loss of time, nor had any allowance for such loss been ever made to a mechanic of any description. It is true that evidence of persons of skill is not only admissible, but highly desirable, but are they to acquire knowledge by any experiments they think proper to make, at the costs of the Party?
... I think not.¹²

This precedent does not appear to have been challenged and may have lain unnoticed or forgotten until June Fullmer brought it to the

11. Times, 14 April 1820, p. 3c.

12. June Fullmer, 'Technology, chemistry and the law in nineteenth-century England', Technology and Culture, 1980, pp. 24-25.

attention of historians of science in her 1980 paper, when it may have assumed a retrospective importance greater than it enjoyed at the time. This could also be the situation with the Folkes v. Chadd ruling, stemming from an imperfect understanding of the nature of precedent in Georgian England. However, though they may not be important rulings legally, as indicators of contemporary attitudes they are very revealing.

There was only a slow transition from the old style of professional man practising medicine, divinity and the law to the present professional backed up by a professional association, a course of training, and above all, recognition by other groups of professional groups and the government. Chemistry was being taught in the 1820s, mainly as part of the medical curriculum, but was not yet differentiated into separate branches.¹³ The branch of analytical, or practical, chemistry only began to be taught in London in 1845 as the next chapter shows. The greater professionalisation of medicine compared to chemistry, and the chronological priority of medico-legal chemistry - as practised by Orfila in Paris - over its sister, non-medical analytical chemistry, were obvious causes of the dominance of forensic medicine over science in court in this early period. Nevertheless, the 'chemical philosopher' was recognised in 1823 as being of use in court cases in Paris and Fonblanche's wide-ranging Medical Jurisprudence:

The charge of arson may occasionally become the subject of scientific research, and the accused individual receive an

13. C.A. Russell, N.G. Coley and Gerrylyn K. Roberts, Chemists by Profession, Milton Keynes 1977, p. 29.

honourable acquittal at the hands of the chemical philosopher; by whose interposition the conflagration, unjustly imputed to malice, may be proved to have originated from a spontaneous process of decomposition.¹⁴

London physician John Ayrton Paris (1785-1856) was a witness on the winning side of the case of the sugar bakers, though, as arson was not suspected in that case he may have had in mind the destruction by fire of the Pantheon Theatre in Oxford Street, which burnt down because of great 'inflammation of a compound of Derbyshire wad [an ore of manganese] and oil used in painting the scenery'.¹⁵

3. Impact of the chemical revolution

The environmental impact of the 'chemical revolution' - without which, it might be argued, the industrial revolution could not have happened - was beginning to be felt in the 1820s as can be seen by Paris and Fonblanque's classifications of nuisances. These were (i) putrefaction or fermentation escapes: slaughterhouses, tanneries, starch manufactories, skinners, etc.; (ii) action of fire, gas or vapour inhaled: brewing, Prussian blue makers, soap makers; (iii) poison streams: starch manufactories, dyeing houses, etc., and (iv) noise: coppersmiths, anchor makers, proof-houses where cannon were proved, etc.¹⁶

14. J.A. Paris and J.S.M. Fonblanque, Medical Jurisprudence, London 1823, p. 402.

15. Ibid., p. 409.

16. Ibid. p. 330.

There were already existing some cumbersome laws to protect the public which depended on proving the nuisance (though the proof did not rely upon scientific evidence). If the nuisance was an infringement of a particular statute then the remedy would already be built into the statute, probably a fine if the injury were general, or reparation to the injured party if not. In some cases the injured party could take out an injunction, or could dispose of the nuisance himself.¹⁷ New laws presented different problems. The first specific anti-pollution law, against smoke emissions from steam-engine furnaces, was passed in 1821.¹⁸ Its wording was rather vague and excluded mines and the smelting of ores and minerals. Not surprisingly, it proved ineffective since private citizens hesitated to take their powerful neighbours to court and because some of the polluters were, in fact, the local justices.¹⁹

The adulteration of food was enjoying a field day with the introduction of new chemicals, yet was similarly dealt with by ancient laws. Generally an action could be brought if someone's health were impaired 'in consequence of an act of another, as by selling him bad wine'²⁰ or by selling adulterated bread, usually whitened by alum.²¹ The first Act to be framed expressly to protect the public from dishonest bakers, vintners, brewers, butchers and others, had been the

17. Ibid. p. 331.

18. 1 & 2 Geo. IV, c. 41.

19. C. Flick, 'The movement for smoke abatement in nineteenth-century Britain', in Technology and Culture, 1980, p. 30.

20. Paris and Fonblanque, Medical Jurisprudence, p. 374.

21. E.g. 31 Geo. II, c. 29.

Pillory and Tumbrel Act 1266,²² only repealed in the reign of Queen Anne. A first offender was dragged home on a hurdle through the streets of London from Guildhall with the faulty loaf dangling from his neck. Second offenders were dragged to the pillory.²³

Another witness appearing for the sugar bakers in 1820 was Fredrick Accum (1769-1838). He was a leading light in the new coal industry, and a founder, as a 'practical chymist', of the London Gas Light and Coke Company. He wrote fifteen books, including a classic text on gas technology in 1815,²⁴ but his most lasting claim to fame in England was as the author of a book which came to be known as Death in the Pot. Its actual title was A Treatise on Adulterations of Food, and Culinary Poisons, Exhibiting the Fraudulent Sophistications of Bread, Beer, Wine, Spirituous Liquors, Tea, Coffee, Cream, Confectionery, Vinegar, Mustard, Pepper, Cheese, Olive Oil, Pickles, and Other Articles Employed in Domestic Economy: and methods of detecting them. The nickname was from 2 Kings IV, verse 40, which prefaced the text: 'And it came to pass, as they were eating of the pottage, that they cried out, and said, O thou man of God, there is death in the pot. And they could not eat thereof.'

Accum was not the first to write on the subject of food and drugs adulteration, though he was the first to write engagingly. Wine adulteration, he said, was performed:

22. 51 Hen. III, stat. 6.

23. 'Adulteration', Encyclopaedia Britannica, 1876, I.

24. Scribner's Dictionary of Scientific Biography, New York 1971.

By subterranean philosophers daily employed in the transmutation of liquors, and by the power of magical drugs and incantations, raising under the streets of London the choicest products of the hills and valleys of France.... Other artisans are regularly employed in staining the lower extremities of bottle corks with a fine red colour, to appear, on being drawn, as if they had been long in contact with the wine.²⁵

Accum quoted cases which had already been brought by 1820; ready-ground coriander seeds supplied to an ale-brewer were found to be mixed with *nux vomica* (strychnine) to give a bitter taste to the beverage;²⁶ ipecacuanha powder was adulterated with tartar emetic (antimony) as 'cheapness and not genuineness and excellence, is the grand desideratum with the unprincipled dealer in drugs and medicines';²⁷ The green colour of pickles could be enhanced by being boiled or left standing with a halfpenny in the mixture.²⁸ Cherry laurel leaves had been used to flavour custard which caused the children eating it to fall into a deep sleep for ten hours.²⁹ Here, plainly, was one evil raised to the public consciousness, the necessary precursor of an acceptance of responsibility by the government, but

25. Accum, A Treatise, p. 95.

26. Ibid., p. 11. We have only Accum's word that the cases had already been brought. They could be rumour.

27. Ibid., pp. 19-20.

28. Ibid., p. 297.

29. Ibid., p. 325.

despite the popularity of the book it failed to influence new laws and probably acted as a training manual for adulterators.³⁰

4. Resisting forces

Unlike the situation surrounding the introduction of forensic medicine, there was no self-interested prime mover to campaign on behalf of science in court in 1820. Wakley was not to start the Lancet for another three years and his campaigns after that date left little time for combatting food adulteration and pollution until his association with Arthur Hill Hassall in 1850 (described in the next chapter). Accum might have stirred up a campaign but his career in England was cut short in December 1820 after he was arrested for mutilating books in the Royal Institution Library (of which he was the librarian) and he fled to Germany to re-establish himself there with two technical professorships.³¹ Paris achieved something, as a manager of the Royal Institution, but this was to engage Smith for lectures in forensic medicine. Paris and Fonblanque's Medical Jurisprudence excluded chemistry for want of space, but even so it kept a wide agenda for forensic medicine that included non-medical items. Unfortunately it failed to run to further editions, being superseded by Beck's Elements of Medical Jurisprudence in 1825. Beck's book was more medically oriented and set an agenda that was copied by the leading textbook, Alfred Swaine Taylor's Medical Jurisprudence, for over a hundred years.

30. Thomas Wakley's evidence to the Select Committee on the Adulteration of Food, Drink and Drugs, Parl. Papers 1856, VIII, p. 170.

31. Scribner's Dictionary.

In the age of 'aggressive individualism', no one was aggressive enough on behalf of science in court.

Legally, whereas the laws and statutes which helped bring felons to justice were straightforward, the laws and remedies needed to protect the public against nuisances and food adulteration in an industrial age were old and cumbersome, or new and difficult to enforce, given vested interest. The legal profession itself was in need of reform, as Jeremy Bentham never tired of pointing out, and the making of the modern state in Victorian England included legal reforms as well as those described by MacDonagh et al.

Professionally, it was more difficult for men of science to be allowed to give opinion evidence in court, as medical men did without question, or to be accepted as fellow professionals by the legal profession. The main candidate for dominance as a courtroom science was what would later be called analytical chemistry. This could not emerge as a branch of chemistry until chemistry itself was at a later stage of technical development and professionalisation.

Politically, the government had not yet accepted responsibility for the welfare of the people, with protective statutes and enforcement officers in the shape of government inspectors. MacDonagh gives the benchmark for this as the Reform Act 1832.³² Significantly, it was the Anatomy Act 1832 which created the first government inspectors, followed by the Factory Act 1833.

The acceptance of responsibility for public well-being by the government came only gradually. The first statute which implied the

32. O. MacDonagh, Early Victorian Government, London 1977, p. 5 .

necessity of analytical chemistry in its enforcement was the Tobacco Act 1842, but it was not an Act which had the interests of the people directly at heart, it was concerned with extracting revenue.

Chapter 7

The growth of central and local government chemistry as a courtroom-oriented application of the science

The acceptance of responsibility for public well-being by the government came only gradually. The Adulteration of Foods Act 1860 which permitted the appointment of public analysts is a benchmark of this, as is the appointment of the Alkali Inspector under the Alkali Acts 1863. Both appointments implicitly recognised the need for expert chemical knowledge to enforce the laws for the welfare of the public. However, the first statute which implied the necessity of analytical chemistry in its enforcement was the Tobacco Act 1842. This was not an Act which had the interests of the people directly at heart; it was concerned with extracting revenue. It led to the foundation of the Excise Laboratory and government prosecutions with the technical support of analytical chemists moving in a different world, for the most part, from the practitioners of forensic medicine. The grass roots of this practice of chemistry in court was provided by the revenue officers stationed in towns and ports around the country and fortified in their duties with basic chemical training first at University College, then at the Royal College of Chemistry in its various incarnations.

A different kind of grass roots analytical chemist, also needed in court, was the public analyst, appointed widely after the 1875 Sale of Food and Drugs Act by local sanitary authorities. The history of the Revenue Laboratory and the public analysts became linked when the

Laboratory became a court of reference for disputed cases under the 1875 Act and it was after this Act that both the public analysts and, separately, the Revenue chemists began to formulate standards of purity for foods and drugs together with methods of determining them which could support both Inland Revenue and local government prosecutions.

Forensic medicine remained an individual practice in the last century, funded only minimally by central government and locally by the court system. It never became caught up in the nineteenth-century administrative revolution of government which could have fostered its growth as an arm of the state machine, as on the Continent. Government chemistry, on the other hand, flourished under state sponsorship and the Government Laboratory went from strength to strength. Its growth, however, does not conform to MacDonagh's model of organic governmental growth via an influential field executive, nor does the work of the public analysts, who worked independently of central government.

1. The civil scientist

The subtitle of Roy MacLeod's paper on the administration of the Alkali Acts 1863 is 'The emergence of the civil scientist',¹ suggesting that the civil scientist emerged with the role of the Alkali Inspector. But different departments of the administrative machine began to use technology at different dates. A case can therefore be made out for the emergence of the civil scientist some years earlier, by the Excise in 1842. But even before the public employee on a salary came the

1. R.M. MacLeod, 'The Alkali Acts Administration 1863-84: The emergence of the civil scientist', Victorian Studies, 1965, p. 85.

freelance consultant. Andrew Ure (1778-1857) formerly professor of natural philosophy at the Andersonian Institution (now the University of Strathclyde), came to London in 1830 to become one of the first scientists to earn his living as a consultant chemist.² He told the 1844 Select Committee set up to inquire into the working of the 1842 Tobacco Act that when he was a professor at Glasgow he was employed 'many years back' to analyse tobacco by the Excise 'and since I came to London I have been employed for the same purpose by the Excise here'. He was described by a member of the committee as the 'chemical investigator employed by the Government' and had been used more or less constantly by the Customs and Excise for twelve years.³ He had undertaken some tobacco analysis on behalf of the committee, as had Thomas Graham (1805-69), professor of chemistry at University College and first president of the Chemical Society, and Richard Phillips (1778-1851), chemist and curator of the Museum of Economic Geology.⁴

The investigative procedures used by Parliament of the Select Committee and the Royal Commission were little used before 1820 but in the 1830s were being used regularly to provide the government with exact knowledge before they took action to remedy the problem that had been identified. MacDonagh noted that the exposure of the actual state of particular events was probably 'the most fruitful source of reform

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2. Scribner's Dictionary of Scientific Biography, New York 1976.
 3. Select Committee on the Tobacco Trade, Parl. Papers 1844, XII, pp. 505-6.
 4. See their evidence to the Select Committee on the Tobacco Trade, pp. 409, 436, 505-6.

in nineteenth-century England' and that it would be difficult to over-estimate the importance of these inquiries.⁵

The 1842 Tobacco Act⁶ was aimed at protecting the revenue by legislating against the mixing of non-tobacco substances with the leaf. The law was to be enforced, through the courts if necessary, by the Excise Department, which consequently set up a small laboratory at its London headquarters in Old Broad Street in October 1842 staffed by just one man, Excise officer George Phillips (1806-77), who had studied chemistry and the microscopy in his spare time.⁷ He would probably have attended lectures at the Mechanics Institutes or the Royal Institution and would have made private arrangements for practical tuition. Compound microscopy was a new science. The view through the compound microscope had been beset by distortions and coloured fringes until the 1830s,⁸ and the next twenty years saw the foundation of modern cell biology, cellular pathology and histology,⁹ but in 1842 the world of the microscope was still being opened up. The Microscopical Society of London was formed only in 1839 and Taylor, in his Medical Jurisprudence was cautious as to the value of the microscope for the

5. O. MacDonagh, Early Victorian Government, London 1977, p. 6.

6. 5 & 6 Vict. c. 93.

7. P.W. Hammond and H. Egan, Weighed in the Balance: A History of the Laboratory of the Government Chemist, HMSO 1992, p. 11.

8. S. Bradbury, The Evolution of the Microscope, London 1967, p. 186.

9. Ibid., p. 204.

analysis of bloodstains¹⁰. So it was no slight on Phillips that he studied chemistry and microscopy in his spare time. On the contrary, it showed forethought and considerable enterprise. Indeed, the laboratory was immediately successful. 'Numerous seizures were made and prosecutions sustained upon the analysis of the samples.'¹¹

George Phillips worked alone at the laboratory to start with and was supported by the use of independent chemists like Graham and Richard Phillips (apparently no relation) on a great number of analyses, as can be seen from a government return showing that between 1844 and 1856 the Excise Department (which combined with Stamps and Taxes to become the Inland Revenue in 1848) spent £5200 on outside chemists.¹² This need not necessarily have been on expert testimony. In 1854 George Phillips, now principal of the laboratory, with several assistants, was asked to investigate some means of making alcohol 'unpotable', and the Eighteenth Report of the Commissioners for Inland Revenue recorded his contribution to the invention of methylated spirit.

Mr Phillips was fortunate enough to discover that an admixture with wood naphtha would meet the required conditions, and after a

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10. In the 1846 edition of the Manual he noted that 'the microscope has not, I believe, been much employed in these medico-legal investigations' (p. 331), but by 1852 he conceded that 'it is most usefully employed' when 'chemistry fails to aid the practitioner' (p. 265).
 11. 'Report by Mr George Phillips, Principal of the Chemical Laboratory of the Department under his charge', in the First Report of the Commissioners for Inland Revenue, Parl. Papers 1857 (Session I), IV, p. 120. (Hereafter First Report IR).
 12. Chemical Establishment (Excise Department), Parl. Papers 1854-55, XXX, p. 372. (Hereafter Chemical Establishment.)

further investigation by the ablest chemists of the day, Dr Graham and Dr Hofmann, this mixture, under the name of methylated spirit, was legalised as a duty-free spirit and has proved an immense boon to trades requiring a cheap spirit, besides putting an end to much of the illicit distillation which existed in the large towns.¹³

August Wilhelm Hofmann, a former pupil of Justus Liebig at the University of Giessen, had brought his master's practical laboratory method of teaching analytical chemistry to England as director of the new Royal College of Chemistry in 1845, and it was around this time that analytical, or practical, chemistry began to be taught for specific agricultural, pharmaceutical and medical purposes. The College, originally privately funded, was taken over by the government in 1853 when it was absorbed by the Government School of Mines and of Science Applied to the Arts (formerly the Museum of Economic Geology referred to above). The central role of Hofmann and the College in practical chemistry training can be seen by their published papers and by the later prominence of such former students as Warren de la Rue, Frederick Abel, William Odling and William Crookes, all to become presidents of the Chemical Society.¹⁴

In 1853 Hofmann wrote to Liebig that it was possible to earn between £8000 and £9000 per annum by acting as a scientific witness in a law court. Hofmann himself took part in some patent cases, including

13. Eighteenth Report of the Commissioners of the Inland Revenue, Parl. Papers 1875, XX, p. 581. (Hereafter 'Eighteenth Report IR'.)

14. C.A. Russell, N.G. Coley and Gerrylynn K. Roberts, Chemists by Profession, Milton Keynes 1977, pp. 77-82.

Fox Talbot's action in 1856 against Laroche.¹⁵ Even allowing for exaggeration this was quite a sum in a decade when Hofmann was paying his two assistants at the Royal College of Chemistry £50 each per annum.¹⁶ The DNB suggests that Ure received 2 guineas per analysis, which would have made Hofmann considerably more expensive to consult. Ure seems to have charged about the same as the medical witnesses who were paid their 1 guinea for post mortem analysis plus a further guinea for inquest attendance under the Medical Witnesses Act 1836, though if Ure received an extra sum for loss of time, despite the earlier judges' ruling, he would have earned more. A letter from A.S. Taylor survives from 1853 indicating that he charged 6 guineas per analysis and 5 guineas inquest attendance.¹⁷ So there were wide variations of fees for expert witnessing, with 1 guinea - the normal medical consultation fee - as the lowest.

It is very difficult to assess what individuals were paid and how much the money was worth in spending power. A professional man in London mid-century was judged by his address rather than his fees, which are difficult to come by¹⁸ - the upwardly mobile house moves of the leading medical practitioners recorded in the medical directory

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15. W.H. Brock, 'The spectrum of science patronage', in G. L'E. Turner, The Patronage of Science in the Nineteenth Century, Leyden 1976, p. 186.
 16. Ibid., p. 178.
 17. 16 February 1853 to C.J. Woods Esq., in Library of the Royal College of Physicians.
 18. Dr Arthur Hill Hassall, examined in a parliamentary inquiry into the water of London in 1851, was asked by a hostile counsel where he lived. 'Luckily, my address was a good one, or the inference might have been unfavourable.' See A.H. Hassall, Narrative of a Busy Life, London 1893, p. 69.

correlate positively with the increasing lengths of their entries. At the other end of the earning scale, in 1851 a working man could buy breakfast on a stall in Piccadilly of thick bread and butter with a cup of coffee for tuppence halfpenny, and lunch for a halfpenny on baked potatoes.¹⁹

2. Accepting responsibility

The workman's coffee at that time would almost certainly have been adulterated with chicory, if not with roasted beans or peas. The legality of these additions was moot, and was debated by the House of Commons in May 1850. Chisholm Anstey, MP for Youghal, summed up the problem.

The Act of 43 George III prohibits the adulteration of coffee and cocoa under a penalty of £100 and a forfeiture of the article.

But the Act was to be put in operation by means of the Commissioners of the Excise. Now it was singular that ... the Commissioners ... had not prosecuted for the adulteration of coffee. On 4 August 1840 as complaints were being made to the Excise by the coffee dealers in Liverpool that that article was adulterated to a great extent by mixing chicory with it the Lords of the Treasury issued a Minute prohibiting any prosecution and

19. 'How to spend a holiday shilling', *Punch*, 1851 p. 5. If he felt extravagant the workman could then spend a penny to see the boa constrictor in High Holborn 'worn as a necklace by the proprietor'.

stating that no fraud had been committed as long as the duty on the chicory had been paid.²⁰

Anstey wanted this Minute rescinding, arguing that the revenue from coffee was decreasing because of its greater adulteration. The Chancellor of the Exchequer argued that chicory was not prejudicial to health, nor were peas, beans or carrots, the other adulterants. The buyer had to beware. In fact, he added, consumption was increased by the admixture of chicory because the cheapest ground coffee cost 1 shilling per pound instead of 1s 4d for coffee beans and the mass of people consumed the cheaper article.²¹ The adulteration of coffee came under the scrutiny of the Commons not because they were concerned for the welfare of the people, but, as in their sponsorship of the Revenue Laboratory, the collection of taxes.

Dr Arthur Hill Hassall, a London medical practitioner and keen microscopist had, in the early months of 1850, contributed to the Lancet a memoir on the analysis of the London water supply.²² This was at the time a novel application of the microscope and the memoir had been reprinted as a pamphlet in April, with engravings by draughtsman Henry Miller of the microscopical monsters lurking in the drinking water. Hassall's autobiography, written 43 years later, states that he then turned his attention to coffee.

20. Parl. Debates, House of Commons, 23 May 1850, col. 269.

21. Ibid.

22. A.H. Hassall, 'Memoir on the organic analysis and microscopical examination of the water supplied to the inhabitants of London and the suburban districts', Lancet, 1850, I, p. 230.

So numerous and persistent were the complaints of the adulteration of that article that a chemical commission was appointed by the Government to examine and report upon this subject. In due course their report was furnished and in reply to enquiries by certain members of the House of Commons, the then Chancellor of the Exchequer, Sir Charles Wood, said 'I hold in my hand the report of three of the most distinguished chemists of the day who state that neither by chemistry nor in any other way, can the admixture of coffee with chicory be detected.²³

This cannot be confirmed by Hansard. The only statement made by the Chancellor in the relevant session was that summarised above, and no chemical commission of three distinguished chemists is indexed in the Blue Books to report on coffee adulteration, though Professors Hofmann, Graham and Miller reported on the supply of water to the metropolis - another of Hassall's interests - in 1851.²⁴ Possibly his memory was at

23. Hassall, Narrative, p. 44.

24. 'Chemical report on the supply of water to the metropolis', Quarterly Journal of the Chemical Society, 4, 1852, pp. 375-413, report dated 15 June 1851. For the government's fight against drinking water pollution and other nuisances see A.S. Wohl, Endangered Lives, Public Health in Victorian Britain, London 1983. Water pollution cases were seldom brought to court, there being only nine prosecutions per year between 1876 and 1885 under the 1876 Rivers Pollution Act. One difficulty was pinpointing the blame when a river might flow through land belonging to several possible polluters under several different local authorities (Wohl pp. 244-9). Another problem, still unsolved by 1914, was the establishment of acceptable tests for standards of water purity (Wohl p. 256). A.S. Taylor at Guy's and W.B. Carpenter (the forensic medicine professor at University College) were consulted by the Board of Inland Revenue two years later in 1853 with regard to coffee and reported that coffee mixed with chicory was not injurious to health, was sometimes preferred to coffee alone, and could be easily detected by the microscope in any percentage. (See Taylor's evidence to the Select Committee on the
(Footnote continued)

fault writing so long after the event.²⁵ Whatever the nature of the prompt, Hassall was moved to prove that 'nothing was more simple and certain than the detection of the admixture in question by means of the microscope'.²⁶ His report was read to the Botanical Society in August 1850 and was reported in the press, followed in some cases by leading articles.²⁷ The result was that Hassall became a Victorian equivalent of the Consumer's Association and the Lancet its Which?:

The next event to record was the receipt of a summons from the late Mr Thomas Wakley, the Founder and Editor of The Lancet and then MP for Finsbury. He said 'I have observed what you have been doing, but you will never effect any lasting good until you are able to publish the names and addresses of the parties of whom the articles were purchased, giving the results of the examination in all cases whether good or bad. Do you think it would be possible to do this without an amount of risk which might be ruinous?...' It was ultimately arranged that a series of articles on the adulteration of food should be regularly published in The Lancet under the title devised by Mr Wakley of 'The Analytical Sanitary Commission', these articles to be illustrated, each to contain a number of analyses of samples

(Footnote continued)

Adulteration of Food, Drink and Drugs, Parl. Papers 1856, VIII, p. 37.)

25. The misremembered incident is reproduced without checking in R.C. Chirnside and J.H. Hamence, The 'Practising Chemists', London 1974, p. 28, and in Hassall's biography by E.A. Gray, By Candlelight: The Life of Dr A.H. Hassall 1817-94, London 1983, p. 99.
26. Hassall, Narrative, p. 44.
27. Gray, By Candlelight, p. 99.

actually purchased in London in the ordinary way of business, the names and addresses of those from whom the articles were obtained being given in full in all cases, whether the samples were genuine or adulterated.

In the ordinary sense there was no commission; everything was in my hands, the purchase of the samples, the composition and writing of the reports, their order and selection; while for the drawings and illustrations I employed Mr Miller the artist, to whom reference has already been made

It is obvious that such an undertaking involved considerable risk on both sides. The risk to Mr Wakley, as the proprietor of The Lancet, was very great; there was the serious risk of being involved in grave litigation and possibly of heavy, if not ruinous costs. On my part I risked all I possessed ... my scientific and professional reputation

The exact mode of proceeding was as follows: selecting some suitable locality Mr Miller and I used to sally out from time to time, usually in the evening, often on Saturday nights, in all weathers and in all seasons of the year; we were provided with a bag to receive the samples, paper and ink. Sometimes we entered the shop together, but more often I told Mr Miller what to buy and he made the actual purchases, while I was watching closely all that took place, so that I might be, if needed, a competent witness. On leaving the shop, the name of the vendor, the date and cost of the purchase, together with our initials were at once inscribed in ink on the wrappers of the packages

The next morning betimes, the samples were duly arranged and classified and their examination commenced, a series of

samples of the same article being taken for each report. But before any satisfactory examination of the samples could be made, it was necessary that the structure and microscopical characters of the vegetable substances themselves in their pure state, both as a whole and when ground and reduced to powder, should be studied and delineated; that they should be submitted if necessary to chemical analysis and that the probable adulterants of each article should be in succession subjected to similar scrutiny and analysis. Thus it was that the foundation was laid, on which the determination of the question of the purity or otherwise of the articles to be reported upon, could be safely and surely based .²⁸

The first report was published in the Lancet in January 1851 and was seized upon by the press, including Punch.

Our contemporary the Lancet has conferred a great boon on the public by establishing a new order of constabulary which may be called the Scientific Detective Police. The function of the Detectives is to investigate and expose the fraudulent adulteration of articles of food practised by a set of scoundrels under the name of grocers and other tradesmen. In his researches into rascality the Lancet's policeman is assisted by a microscope, which ... exerts a power far superior to that of the common bulls-eye. By the help of this instrument, an immense quantity of villainous stuff has been discovered in coffee and other substances sold for nutriment.... the Lancet seconds the

28. Hassall, Narrative, pp. 44-47.

exertions of its intelligent officer by spiritedly publishing the addresses of the rogues at whose swindling establishments the samples of rubbish were purchased.²⁹

Where chemistry was needed Hassall consulted Henry Letheby at London Hospital, who was to take over from John Simon, the great sanitary reformer, as medical officer for the City of London in 1855 after Simon moved to the General Board of Health.³⁰ Letheby's particular concern was the investigation of tobacco, snuff and opium.³¹ The Analytical Sanitary Commission lasted until 1854, with only occasional threats of proceedings against the Lancet, and it was only after the final appearance that Wakley disclosed to the public that the Commission had been undertaken by Dr Hassall.³² It should not be thought that the three men were branching out into the different field of analytical chemistry and microscopy, but rather that they would have assumed without question that anything that might improve the people's health was naturally within the sphere of medicine.

The first legislative change as a result of the campaign came in July 1852 when the Treasury did rescind the 1840 Minute resolving not to prosecute suppliers of adulterated coffee. Now chicory was to be

29. Punch, 12 February 1851, p. 65.

30. Hassall had also applied for the post, which carried a new salary of £400, half that paid to Simon. See Royston Lambert, Sir John Simon, London 1963, p. 209.

31. Hassall, Narrative, p. 48.

32. Ibid., p. 53-4.

sold unmixed with coffee and clearly labelled.³³ A government return three years later showed that prosecutions for adulterated coffee had dropped from 863 in 1853 to 31 in the half year to 30 June 1855 and that fines for the offences had more than covered the cost of implementing the change.³⁴ The fact that prosecutions declined did not necessarily mean that the adulteration had declined also. Hassall's writings suggested an alternative explanation for inactivity by the Excisemen:

Compared with the extent of the prevalence of adulteration, how seldom do they institute prosecutions? Another reason [for their inefficiency] is that they do not sufficiently employ the resources of science for the discovery of adulteration. They rely too much upon the information of the Excise inspectors, and too little upon science, upon the resources of chemistry, more particularly of organic chemistry and especially upon a knowledge of vegetable structure as revealed by the competent observer by means of the microscope.³⁵

Hassall went on to add that the Exciseman either almost lives at the manufactory and because he gets friendly is 'frequently brought to connive at practice contrary to his duty', or in other cases visits the factory and his absence affords 'many opportunities' for adulteration, 'while retail dealers are seldom troubled with visits of the Excise'

33. Chicory, Return to an Order of the Hon. the House of Commons, 15 November 1852, Parl. Papers 1852-53, XCIX, p. 46.

34. Chicory, Return to an Order of the Hon. the House of Commons, 27 July 1855, Parl. Papers 1854-55, L, p. 351.

35. A.H. Hassall, Food and its Adulterations, London 1855, p. xxxii.

officers at all'.³⁶ He was slighting of the skills of the Excise laboratory, referring to the 'lamentable deficiency of the Excise chemists at that time', and to the fact that there were 'no microscopists attached to the Board possessing the requisite knowledge and skill'.³⁷

This was unfair. George Phillips and seven other Excise officers had been sent to University College in 1845 for some formal chemical training.³⁸ The system was continued for some years, so that during the time of Hassall's interest in the 1850s students were spending an average of two sessions there,³⁹ following which they were given specialist training by Phillips to be able 'to attend, in any part of the United Kingdom, such Excise prosecutions as require[d] scientific evidence'.⁴⁰ University College sponsorship was not confined to the London based Excisemen. On average fifteen officers a year were sent there,⁴¹ most of whom were posted around the country.⁴² The main function of the laboratory in the 1850s was seen by Phillips as still the prevention of the adulteration of tobacco and snuff (by sugar or

36. Ibid., p. xxxiii.

37. Hassall, Narrative, p. 50.

38. In fact, though Phillips was sent, he never attended classes, though matriculated as ordered. See Hammond and Egan, Weighed, p. 70.

39. Chemical Establishment, p. 372.

40. First Report IR, p. 120.

41. Chemical Establishment, p. 372.

42. George Phillips' evidence to the Select Committee on the Adulteration of Food, Drink and Drugs, Parl. Papers 1854-55, VIII, p. 431.

molasses and various kinds of woods respectively). However, the work was broader than that. Apart from helping to discover methylated spirit, Phillips was also instrumental in developing a method of determining the original gravities of beer, which was then used by the Revenue.⁴³ The laboratory had also analysed 11,070 samples of coffee between 1853 and 1856 following the rescinding of the Treasury Minute. This compared with a total of 1551 samples of tobacco in the whole twelve years since 1844. Other substances analysed frequently enough to appear in the annual report were pepper, beer, tea and hops, so Phillips' experience was extensive.

Where it failed Hassall's needs was in the narrowness of its application. Hassall found adulterations much more widespread than in the substances analysed in the Revenue laboratory. The most common were arrowroot, anchovies, bread, butter, beer, bottled fruits and vegetables, coffee, chicory, cocoa/chocolate, confectionery, custard, curry powder, flour, gin, ginger, isinglass, lard, milk, mustard, oatmeal, pepper, pickles, potted meats and fish, preserves, spices, sugar, sauces, tea, tobacco and vinegar.⁴⁴ Not all of these were dutiable. Duty-free items included bread, confectionery, milk, oatmeal, pickles, potted meats and fish, preserves and sauces.⁴⁵ An earlier Lancet campaign in 1831 by W.B. O'Shaughnessy had tried to prevent the addition of poisonous colours to confectionery, but to no

43. First Report IR, p. 121ff.

44. Hassall. Food, Contents.

45. Ibid., xxxi.

avail.⁴⁶ These included emerald green, chrome yellow, vermillion or cinnabar, and prussian blue,⁴⁷ poisonous pigments now only commemorated in artists' colours.

Hassall and the Lancet were not the only activists in the cause of solving the problem. Another medical man, John Postgate, a Birmingham surgeon, also had an interest in food adulteration, having learnt its secrets as an 11-year-old grocer's boy.⁴⁸ It was Postgate rather than Hassall or the more politically conscious Wakley who persuaded MP William Scholefield to ask for a Select Committee, which met in 1854-55 and led, after nine abortive bills, to the 1860 Adulteration of Food Act.⁴⁹

Of the Committee, Mr Scholefield, MP for Birmingham, was the Chairman, than whom there could not have been a better. The enquiry was of a searching and practical character.... After myself [Hassall] one of the first witnesses was Mr Thomas Blackwell of the well known firm of Crosse and Blackwell, and his evidence produced a great effect on the Committee, it was so straightforward; he acknowledged frankly that the practices I had described as to the greening with copper of many jams, preserved fruits and vegetables, the colouring of red sauces and potted

46. See W.A. Campbell, 'Vermilion and verdigris - not just pretty colours', Chemistry in Britain, June 1990, p. 558.

47. Ibid., Table, p. 558.

48. Plarr's Lives of the Surgeons. See also 'Sticky breeches and poisoned lozenges', New Scientist, 22/29 December 1990, p. 31, for an article about his great-grandfather by Professor John Postgate.

49. 23 & 24 Vict. c. 84.

meats with bole Armenian and other ferruginous substances were common and that their firm had themselves adopted them to some extent, not knowing they were objectionable, and they being at the time almost universal.⁵⁰

Thomas Wakley was another witness and evidently felt that Accum's book, written thirty-five years earlier, so far from achieving any reduction in adulteration, had acted as a training manual for adulterators:

I certainly do trace a great deal of adulteration to the publication of Mr Accum's work; and believe if your committee (if I may be pardoned for saying so) were to close this inquiry, and no legislation should follow, the evil would be increased to a magnitude which would be frightful, because you will show to every dishonest tradesman without imposing any check, the tricks which can be resorted to in order to make a profit by deceiving his customers.⁵¹

Wakley was wisely silent on O'Shaughnessy's earlier contribution to training adulterators in the Lancet. Other witnesses included George Phillips, John Simon, at that time still medical officer for the City of London, Alfred Swaine Taylor, Henry Letheby and Theophilus Redwood, professor of chemistry at the Pharmaceutical Society, who spoke on drug adulteration and must have been disappointed that this was not to be covered by the 1860 Act. A more important, if not fatal, drawback to the Act was that it was not compulsory and only permitted the appointment of public analysts by the Courts of Quarter Sessions, the

50. Hassall, Narrative, pp. 55-6.

51. Select Committee on the Adulteration of Food, Drink and Drugs, Parl. Papers 1856, VIII, p. 170.

Commissioners of Sewers of the City of London and the Vestries and District Boards of the Metropolis. The analyst appointed by the City of London was Letheby, who comments on the Act in his book On Food.

As the Act is only permissive, little or no effect has been given to it. Even in those places, as in the City of London, where it has been put into operation, and public analysts have been appointed, no good has resulted from it and it really stands upon the statute-book as a dead letter. Speaking for the City, I may say that every inducement has been offered for the effective working of the Act; for directly it came into operation in August 1860, an analyst was appointed, and the public were informed by circular of the intentions of the Act, and were invited to aid in its execution - the poor being allowed to submit suspected articles of food to me for analysis free of charge; yet, during the eleven years which have elapsed since the passing of the Act, there have been but 57 articles supplied to me for examination, and of these 26 were of bad quality or were adulterated In no case has there been any proceeding before the magistrate in accordance with the provisions of the Act; and therefore it has been of no practical value to the public.⁵²

3. The 1872 Adulteration of Food Drink and Drugs Act

The 1872 Adulteration of Food Drink and Drugs Act⁵³ attempted to improve the 1860 Act by incorporating the Pharmacy Act 1868 so that the

52. H. Letheby, On Food, London 1872, pp. 240-1.

53. 35 & 36 Vict. c. 74.

new Act included protection from the adulteration of drugs, and by placing the previously completely locally answerable public analysts under the Local Government Board, created in 1871. The main difference between the 1860 and 1872 Acts was that in the earlier Act the analyst waited for goods to be submitted to him⁵⁴ whereas in the 1872 Act an officer or inspector of the local authority or local police was empowered to procure and submit suspected articles to the analyst, who was bound by law to prosecute.⁵⁵ This led to authorities appointing one man, usually the Inspector of Nuisances or the Weights and Measures Inspector, to be the inspector under the new Act.⁵⁶ However, the appointment of analysts was not compulsory unless the Local Government Board required an appointment to be made. The Board did ask local authorities what steps they proposed to take with a view to appointing public analysts, but this gentlemanly hint was by no means universally acted upon.⁵⁷

The deficiencies of the new Act became clear in the 1874 Select Committee appointed to inquire into its working. These fell into three categories: the Act had a limited operation owing to the few numbers of analysts so far appointed; some of those who had been appointed were inexperienced and there were in any case no formal qualifications for

54. Adulteration of Foods Act, 1860, 23 & 24 Vict. c. 84, S. 4.

55. S. 6.

56. Select Committee on the Adulteration of Food Act 1872, Parl. Papers 1874, VI, Evidence of H. Owen of the Local Government Board, p. 278.

57. Ibid., Appendix 1, p. 623, letter from John Lambert to the District Boards and Vestries, the Town Clerks of Boroughs and the Clerks of the Peace of Counties, November 1872.

the position; there were problems at local level in procuring the samples and in prosecuting the malefactors. The current analysts wanted the appointments to be compulsory. A.H. Allen, public analyst for Sheffield, pointed out to the Committee that if the Act was in force in one town and not another, then the adulterated food would be sent to the neighbouring town for sale. Even where a local authority employed an analyst the Act could still be poorly enforced, especially where the Health Committee, who could have tradesmen sitting as members, did not give their officers instructions to submit samples, knowing that the inspector was bound by law to prosecute if adulteration was proved.⁵⁸ On the other hand, there had been some uncalled for prosecutions in the absence of fixed standards for the composition of foods and in the want of knowledge and experience in the analysts who did not, for example, appreciate the seasonal variations in the quality of milk.⁵⁹ Augustus Voelcker, chemist to the Royal Agricultural Society, was outright in his criticism of the analysts and declared to the Committee that not only was he not a public analyst but that he would refuse an appointment 'because it would classify me with a class of chemists who do not stand very high in the profession'. Furthermore, he believed there to be not more than a dozen competent analysts appointed under the Act.⁶⁰

These two problems - lack of fixed standards and lack of requisite knowledge by the analysts cropped up throughout the sittings

58. Ibid., A.H. Allen's evidence, p. 442.

59. Ibid., evidence of G. Barham, milktrader, p. 387.

60. Ibid., pp. 532, 563.

of the Committee in witness after witness. The lack of fixed standards was one that permitted no immediate solution. Food analysis was a young science. A.H. Allen had already written articles on the subject in the Chemical News⁶¹ and the development of the science over the next few years can be seen by the publication of his two-volumed Commercial Organic Analysis in 1879 and 1882.⁶² With regard to requisite knowledge, this problem was recognised by the Local Government Board, who, at the time of the Select Committee asked John Simon as Medical Officer of the Board and R. Angus Smith, Officer of the Board under the Alkali Acts to vet the applicants. This task was far easier when assessing medical officers of health, who had to have legally recognised medical qualifications, but there were no recognised chemical or microscopical qualifications to assist the Board with regard to public analysts.⁶³ The ease of assessing medical competence was perhaps a factor in the regular appointment of medical officers of health also as public analysts. In London postal districts in 1873 there were 45 medical officers of health and 19 public analysts, and of the latter 12 were also medical officers for the same or nearby boroughs.⁶⁴ Some witnesses felt that public analysts should have medical degrees primarily, whereas some felt that chemistry qualifications were paramount. Charles Meymott Tidy (MB) wanted to

61. Ibid., Allen's evidence, p. 439.

62. This became the industry standard and was constantly revised and re-issued until 1933.

63. Select Committee on the Adulteration of Food Act 1872, Parl. Papers 1874, VI, H. Owen's evidence, pp. 279-30.

64. Medical Directory, 1873; Return of Public Analysts Appointed under the Adulteration Act 1872, Parl. Papers 1873, LV, p. 1.

retain the word 'medical' as one of the qualifications of the analysts appointed under the Act,⁶⁵ Hassall (MD) regarded medical qualifications as an essential requirement.⁶⁶ On the other hand Charles A. Cameron (MD), professor of public health in Dublin and public analyst to sixteen Irish counties, was of the view that the fact that a candidate had medical qualifications led the authorities to appoint him, 'they being under the impression that every medical man is more or less of a chemist'. He suggested that a man may be a highly accomplished analyst without having medical qualification.⁶⁷ A.H. Allen (FCS) agreed and put chemical qualifications at the top of the required list. 'There is a great deal of difference between attending a course of lectures and being able to test urine and one or two things of that sort to being a really competent food analyst.'⁶⁸

Local problems stemmed not just from reluctance of vested interests to support the Act, as Allen had described but from the process of enacting it. The inspectors, buying samples, came to be recognised by the traders, especially in Tidy's district of Islington where the inspector under the Food Act was also the sanitary inspector.⁶⁹ This made procuring adulterated items impossible. Another problem was defining the meaning of 'adulteration' in court. For example, was the facing on tea an adulteration or not when the tea

65. Select Committee on the Adulteration of Food Act 1872, Parl. Papers 1874, VI, C.M. Tidy's evidence, p. 539.

66. Ibid., A.H. Hassall's evidence, p. 583.

67. Ibid., C.A. Cameron's evidence, p. 501.

68. Ibid., A.H. Allen's evidence, p. 442.

69. Ibid., C.M. Tidy's evidence, p. 536.

was mixed in China and sold as imported?⁷⁰ William Golden Lumley, QC, Counsel to the Board, recommended to the Committee that 'adulteration' be properly defined in a consolidating Act and the other Acts be repealed.⁷¹

4. A Court of Reference

A further difficulty arising in court was that defendants felt aggrieved that they could neither speak for themselves, as defendants in a criminal trial, nor appeal against the decision.⁷² To arbitrate in disputed cases, therefore, it was put to witnesses by the Committee that there should be a Court of Reference,⁷³ possibly the Inland Revenue Laboratory at Somerset House, now under the principalship of James Bell, Phillips having retired.⁷⁴ Bell had given early evidence to the Committee of his laboratory's competence to perform this function.⁷⁵ Some witnesses, such as Voelcker, approved of the choice, but others, like Tidy and J.A. Wanklyn, professor of chemistry at the London Institution (both with medical qualifications) objected.⁷⁶ Wanklyn expressed his disgust at the idea by stating that it would be

70. Ibid., Appendix 7, 'Paper delivered by Mr Holborn', p. 639.

71. Ibid., W.G. Lumley's evidence, p. 615.

72. Ibid., evidence of R.M. Holborn, grocer, p. 394.

73. Ibid., for example Sir Henry Peek to M Carteighe, pharmaceutical chemist, p. 409.

74. Eighteenth Report IR, p. 581.

75. Select Committee on the Adulteration of Food Act 1872, Parl. Papers 1874, VI, James Bell's evidence, p. 359.

76. Ibid., Index, pp. 683-4.

referring from a higher court to a lower.⁷⁷ The analysts' opinions of the Inland Revenue Laboratory's expertise were out of date. The laboratory had developed since Hassall's criticism of twenty years earlier. Bell had a deputy and fifteen assistants at Somerset House, plus nearly a hundred analytical chemists round the country, especially at ports.⁷⁸ Their training had become more rigorous, too, since the 1850s, as the Inland Revenue annual report for 1875 proudly commented:

Prior to 1859 the chemical portion of [the education of students in this Laboratory] was obtained at University College, but since ... that date, the instruction in the whole of practical and part of theoretical chemistry has been conducted in this Department. The students attend the courses of chemical lectures at the Royal College of Chemistry, and at the close of their course they undergo a searching examination by the Professor. The examination, which comprises theoretical and practical chemistry, is held annually on the days the Professor's own students are examined, and the same powders and papers are used. In addition the students of this Department are subjected to a lengthy viva voce examination, and hence their acquirements are more severely tested than those of the students at the Royal College of Chemistry.

The number of students instructed since 1859 has been ninety-two. Seventy-five obtained first, fourteen second and three third class certificates. Of those in the first class four

77. Pharmaceutical Journal, 15 August 1874, p. 122.

78. Parl. Papers 1874, VI, Dr Bell's evidence, p. 91.

obtained the maximum number of 100 marks, and twenty-six more 98 and upwards. These favourable results have caused the system of instruction to be highly commended by Professors Hofmann and Frankland

When the chemical instruction is completed, the students are then made acquainted with the microscope, and its use in detecting different forms of adulteration of dutiable and general commodities, and their knowledge is afterwards practically utilised.⁷⁹

The range of goods sent for analysis had also grown since the early days of the laboratory as other government departments began to appreciate its expertise. In 1874 a total of 14,243 samples was analysed: tobacco, snuff, wines and glucose for the Customs; medicines, beeswax and paints for the India Office; ship's stores for the Admiralty; lime and lemon juice for the Board of Trade; sealing wax and ink for the Stationery Office; eight unidentified items for the Foreign Office, and they also tested the strength of stamped newspaper wrappers for the Post Office. On their own behalf they analysed 420 samples of naphtha to test if they were suitable for using in methylated spirit, 220 samples of tobacco, 121 samples of snuff and 173 samples of coffee, 164 of which were adulterated (this investigation resulted in the seizure of a large quantity of roasted acorns). Twenty-eight cases were heard at the magistrates' courts 'attended by chemical officers from

79. Eighteenth Report IR, pp. 571-2. The report is anonymous so may have been written by the retiring Phillips or the incoming Bell.

this Department' followed by twenty-five convictions and fines totalling £1337.⁸⁰

The 1874 Committee overrode the analysts' objections and the Inland Revenue Laboratory was duly appointed under the Sale of Food and Drugs Act 1875 as a Court of Reference. It was written into the Act that a sample should be sent there at the request of either party.⁸¹

The Act went into greater detail than the earlier Acts in describing the offences that concerned it. However, it sidestepped confrontation with the word 'adulteration' by leaving it out of the title and text of the Act altogether. The minefield of appointing analysts with competence in medical chemical and microscopic knowledge (as under the 1860 and 1872 Acts) was evaded by requiring them only to have 'competent knowledge, skill and experience'.⁸²

5. The Society of Public Analysts

Voelcker's criticism of the standard of public analysis during the Select Committee stung six London analysts into action and just few weeks after the Committee closed, in August 1874, they invited a selection of their number to a meeting at a London hotel. The chair was taken by Professor Theophilus Redwood, an eminent pharmaceutical chemist and public analyst for Holborn, St Giles and Clerkenwell. His opening address gave as the reason for the meeting that 'certain remarks' had been made by an agricultural chemist which at least called

80. Ibid., pp. 569-79 passim.

81. Sale of Food and Drugs Act 1875, 38 & 39 Vict. c. 63, s. 22.

82. Ibid., s. 10.

for explanation. The objects of the meeting were therefore 'first, the refutation of unjust imputation; secondly, the repudiation of proposed measures of interference with our professional position and independence; and thirdly, the formation of an association having for its objects the promotion of mutual assistance and co-operation among public analysts'.⁸³

The six experienced analysts and founders of what came to be the Society of Public Analysts (SPA) largely formed the hub of the first council of the society. They were Charles Heisch, a founder of the Chemical Society and joint honorary secretary of the SPA; G.W. Wigner, joint honorary secretary of the SPA and first editor of the Analyst; A.H. Allen, council member; August Dupré, Chemical Adviser to the Home Office; Theophilus Redwood, first president of the society; and Thomas Stevenson, treasurer.⁸⁴ Hassall was invited to be a vice-president but health problems prevented him from taking an active part in the society, though he contributed his views at the founding meeting by letter, as did Henry Letheby, a surprising non-member.⁸⁵ The vice-president was Professor Wanklyn.

The standards of public analysis were raised very quickly once the association had formed. One bad analyst at least was weeded out of practice when the society published his name in a current periodical in connection with several cases where erroneous certificates had been

83. Pharmaceutical Journal, 15 August 1874, p. 121ff.

84. Chirnside and Hamence, 'Practising Chemists', pp. 7-18, passim.

85. B. Dyer and C. Ainsworth Mitchell, Fifty Years of the Society of Public Analysts, Cambridge 1932. As Letheby died in 1876 perhaps he was already in ill health.

given and the adulterations were later admitted to be innocent. The analyst resigned his office.⁸⁶

The 1875 Act had still not made public analysts compulsory, however, the numbers steadily increased as a response to the instructions from the Local Government Board so that by 1880 235 districts had made appointments.⁸⁷ This made only 76 analysts in all, as several districts were served by the same man.⁸⁸ Training these analysts was one of the aims of the new society and this was done informally through the Analyst, the society's organ from 1876. This training was to a great extent centred on the analyst's role in court, as the editor, G.W. Wigner, explained in the first issue:

It was found, however, as the society enlarged its borders, that as public analysts unfortunately could not entrench themselves within the quietude which ought to obtain in a Laboratory, but had occasionally to appear in Police Courts, a merely technical journal did not supply a sufficiently expansive vehicle for the communication of matter which, though not scientific, was of vital interest to public analysts as such.

Hence the object of the Analyst is not only to present to its readers the latest and best authenticated processes of analysis as they are perfected but to publish all cases of prosecution for adulteration, and such parliamentary and other

86. Dyer and Mitchell, 50 years, p. 7.

87. Editorial, Analyst, 1880, p. 203.

88. Ibid., table facing p. 96.

proceedings as may appear to touch the interest of Analysts in general.⁸⁹

The journal devoted considerable space to the specialised reporting of food adulteration cases which served to train analysts in court procedure (mainly magistrates' courts) and expert witnessing.

Chirnside and Hamence add that this early policy 'at the same time had the salutary effect of developing a critical approach to methods of analysis and to standards for genuine foodstuffs. Moreover, the legal knowledge acquired by the pioneers has been passed on through successive generations of public analysts'.⁹⁰

Meanwhile, the council of the society was considering how best to implement formal education for their members. There were still no recognised qualifications by the time a second Select Committee was appointed in 1894 to look into the working of the 1875 Act, and this was still sometimes a problem. Herbert Preston-Thomas, a General Inspector of the Local Government Board and formerly in charge of the Public Health Department, informed the Committee that a candidate for the public analyst post in Hackney had applied to become a member of the Chemical Society purely in order to allow him to put the letters FCS after his name. Membership of the Chemical Society depended on paying a fee and becoming elected. It did not depend on analytical knowledge.⁹¹

89. Chirnside and Hamence, 'Practising Chemists', pp. 62-3.

90. Ibid., p. 63.

91. Select Committee on Food Products Adulteration, Parl. Papers 1894, XII, H. Preston-Thomas' evidence, p. 29.

The SPA decided after some debate not to institute their own examinations⁹² and it was left to the more formal body of the Institute of Chemistry to take this task in hand. The Institute of Chemistry was formed in 1877 under the first presidency of Edward Frankland to be for chemists working in industry what the Royal Colleges of Physicians and Surgeons were for medical practitioners.⁹³ Membership depended on demonstrating skill as it did in the medical colleges and once the Institute had received its charter in 1885, the associateship of the Institute became the first professional qualification for analytical and consulting chemists, followed by the fellowship.⁹⁴

In 1893 the Institute created a two-stage examination for the associateship. The first stage was a general theoretical and practical examination for which candidates with a university degree in chemistry were exempt. The second stage was a practical examination in any branch of analytical chemistry. This was rationalised into five branches in 1896. They were A: Mineral Analysis, B: Analysis and Assay of Metals, C: Gas Analysis, D: Organic Analysis and E: Analysis of Water, Food and Drugs. The Institute, now established as the examining body for practising chemists, designed the Branch E examination and accompanying coursework in therapeutics, pharmacology and microscopy to lead to an Institute certificate indicating that the candidate was competent to practise as a public analyst. However, the Local Government Board would recognise only the associateship of the

92. Dyer, Fifty Years, p. 36.

93. Ibid., p. 131.

94. Ibid., p. 169.

Institute, the AIC, as a qualification in chemistry. They would not recognise Branch E as a qualification for public analysts. The problem was solved by Thomas Stevenson, who entered his term as president of the Institute in 1897, having just ended his term as president of the SPA. His solution was to devise a two-tier examination structure for would-be public analysts. As well as the Branch E examination, candidates would sit for an Institute certificate in therapeutics, pharmacology and microscopy. Current associates and fellows would have to take the certificate only, but future candidates would take both.⁹⁵ The Local Government Board accepted the Institute certificate in 1899 without restricting potential public analysts to this qualification.⁹⁶ The examination involved a practical in microscopy, written questions in pharmacology and therapeutics and a practical and viva in the recognition of drugs. The first examination paper is reproduced below:

1. Examine by the microscope the precipitated sulphur and report as to its purity.
2. Examine by the microscope the starch and report as to its source or sources.
3. State the maximum safe doses for an adult of each of the following substances: corrosive sublimate, zinc sulphate, extract of nux vomica BP, chloral hydrate.
4. What effects might be expected to result from the daily taking of small doses of ergot?

95. Ibid., p. 172.

96. R.B. Pilcher, The Institute of Chemistry of Great Britain and Ireland, London 1914, p. 299.

5. How is potassium nitrate used in the preparation of food?

What effect does the salt produce in the human organism?⁹⁷

The courtroom orientation of the examination can be seen not just by the questions but by the fact that three of the four pre-war examiners were also Home Office Analysts, Stevenson (1899-1901), A.P. Luff (1901-05) and W.H. Willcox (1909-13).⁹⁸ The scope widened under Willcox to include fertilisers, feeding stuffs and soils, the whole examination lasting a week. Questions in the 1913 paper included the detection of poisons in beer and of lead in excreta.⁹⁹ The Branch E examination survived for many years and became a compulsory qualification for public analysts in 1955. It was replaced by a postgraduate diploma in 1966.¹⁰⁰

6. Demands for centralisation

The improvements under the 1875 Act did not see universal success. In some areas of the country far fewer prosecutions were being brought than others. The actual number of districts was reduced after the 1888 Local Government Act as the newly created county councils were now given authority to provide public analysis for the smaller boroughs in their area (less than 10,000 population), whose right to appoint

97. Proceedings of the Institute of Chemistry, 1899, I, pp. 35-6.

98. Pilcher, The Institute, p. 299. The fourth was F. Gowland Hopkins, discoverer of vitamins and future president of the Royal Society, who had worked with Stevenson at Guy's.

99. Proceedings of the Institute of Chemistry, 1913, IV, pp. 22-4.

100. Russell *et al.*, Chemists by Profession, p. 277.

analysts was thus taken away.¹⁰¹ The SPA were alarmed at this erosion of their role and A.H. Allen, in his presidential address in 1889, called on members to stand together and make a determined and united effort to resist any attempt 'in some quarters' to reduce still further the already insufficient remuneration of their members.¹⁰² By the time of the 1894 Select Committee on Food Products Adulteration there were still 45 of 234 districts covered where the Act was enforced poorly or not at all.¹⁰³ These were mainly far distant from London - such as Devon, Merioneth and Sunderland, where Mr Wood was paid only £5 per annum for his services.¹⁰⁴ Vested interests were at the root of the problem as local authorities were reluctant to prosecute members of the authority. The Local Government Board had no powers to enforce execution of the 1875 Act.¹⁰⁵ The analysts therefore wanted more central control. George Embrey, public analyst for the City and County of Gloucester, wanted local authorities to be compelled to purchase a certain number of samples per annum and where this did not happen, he wanted to be able to appeal to a central authority 'to pull up the

101. Select Committee on Food Products Adulteration, Parl. Papers 1894, XII, H. Preston-Thomas' evidence, p. 9.

102. Presidential address, Analyst, 1889, p. 23.

103. Select Committee on Food Products Adulteration, Parl. Papers 1894, XII, H. Preston-Thomas' evidence, p. 9. There were 61 analysts in administrative counties, 61 in county boroughs, 68 in large non-county boroughs, 3 other, 1 City analyst and 40 in the London parishes.

104. Ibid. p. 11.

105. Ibid., p. 28.

laggards'.¹⁰⁶ This view was reiterated in a later session by Otto Hehner, a leading light of both the Institute of Chemistry and the SPA, who wanted additional inspectors appointed by the Local Government Board if counties refused to comply with the Act.¹⁰⁷ The analysts were supported by the vested interests of the dairy trade, campaigning for the greater regulation of the sale of margarine.¹⁰⁸

Preston-Thomas, of the Local Government Board, was not in favour of more centralisation. He preferred to see the local authorities improved. 'There are already a good number of government inspectors for many things'.¹⁰⁹ The Committee was also unhappy with greater centralisation. Sir John Leng pointed out to Hehner that municipal authorities complained at being overridden by the central boards ' and in the provinces especially there is a growing feeling against centralisation'.¹¹⁰

The analysts wanted more than just compulsion on the lax authorities. They were still smarting under the imposition of the Inland Revenue Laboratory as a Court of Reference and proposed to the Committee that there be a new Board of Reference, paid for by the Local Government Board, comprising the Chief Chemical Officer of the

106. Ibid., G. Embrey's evidence, p. 79.

107. Select Committee on Food Products Adulteration, Parl. Papers 1896, IX, O. Hehner's evidence, p. 601.

108. Select Committee on Food Products Adulteration, Parl. Papers 1894, XII, evidence of James Long, p. 107; T.C. Smith, pp. 186-7; Christopher Middleton, p. 129.

109. Select Committee on Food Products Adulteration, Parl. Papers 1894, XII, H. Preston-Thomas' evidence, p. 31.

110. Select Committee on Food Products Adulteration, Parl. Papers 1896, IX, p. 639.

Government Laboratory, three public analysts nominated by the Local Government Board, and a nominee from the Board of Agriculture. It would be the duty of the Board of Reference to examine and report on the composition of food and drugs, to investigate analytical processes and devise new ones, to set forth definitions and to fix standards and limits of purity.¹¹¹ The vested interests were dead against this idea. Joseph Fry, cocoa manufacturer, for instance, objected to a Board of Reference setting the standard of what constituted good cocoa. He would be at the mercy of the Board and the secrets of manufacturing and the advantages of experience and skill in his trade would be taken away from him.¹¹²

When the 1899 Sale of Foods and Drugs Act was passed there was no central Board of Reference to be appointed. The Inland Revenue Laboratory remained the Court of Reference as before.¹¹³ However, the Act was now made compulsory and central inspectors were empowered to take samples for analysis and force local authorities to prosecute if necessary.¹¹⁴ There was no central control over the remuneration of public analysts, which the Committee had recommended, but the analysts had been able to influence the Act, via the Committee, to include

111. Dyer and Mitchell, 50 Years, p. 96.

112. Select Committee on Food Products Adulteration, Parl. Papers 1896, IX, J. Fry's evidence, p. 690.

113. Sale of Food and Drugs Act 1899, 62 & 63 Vict. c. 51, S. 21.

114. Ibid., S. 2, S. 3.

flavouring, colouring and condiments as foods to be included under the
Act.¹¹⁵

7. A changing role

By the time of the sitting of the 1894-96 Select Committee much of the adulteration had been stamped out, thanks not only to the activities of the public analysts, but also via the work of the Inland Revenue Laboratory as a Court of Reference. Bell, the principal, had published The Analysis and Adulteration of Food from 1881 to 1883, which gave methods and standards where they were available, but other standards became known only informally, evolving as a result of referrals under the 1875 Act.¹¹⁶ This annoyed the SPA, who felt that standards should be communicated to them and some acrimonious correspondence passed to and from the Society to the Laboratory, and eventually came to the attention of the Select Committee where the dispute was aired. The Committee reported that without going into the correspondence it seemed to them that the Laboratory should notify the public analysts of their standards and methods of analysis without being asked.¹¹⁷ The ill-feeling evaporated after Bell retired in 1894. The Inland Revenue and Customs Laboratories were then combined to become the Government Laboratory under a new principal, chemist Thomas Edward Thorpe,

115. Ibid., S. 26.

116. Select Committee on Food Products Adulteration, A. Wynter Blyth's evidence, Parl. Papers 1895, X, p. 437.

117. Select Committee on Food Products Adulteration, Parl. Papers 1896, IX, Report, p. 503.

professor of chemistry at the Royal College of Science.¹¹⁸ Thorpe was an honorary member of the SPA by 1900 when a joint conference was set up between the two bodies on methods of analysing margarine.¹¹⁹

Standards both of purity and of methods of analysis were prerequisites for successful prosecutions and this side of the analysts' work came to be their major function, although they did not lose sight of the fact that the public analysts' duty 'lies solely in the direction of the detection and prevention of fraud'.¹²⁰ Because of the growth of analytical work, and their committee work in improving standards and methods of analysis, they found that their workload was becoming ever more onerous. New regulations came in after, for example reports into preservatives and colouring matters, canned meats, and arsenical poisoning,¹²¹ but their remuneration remained at the same, or even reducing levels. There were still corrupt councils who were unwilling to enforce the Act. These authorities could not dismiss the public analysts without the approval of the Local Government Board, so they adopted a variety of devious tactics to force them out. One method was to reduce the pay. Another was to appoint the analyst annually and then not renew his contract. Another was to appoint two analysts and to give all the work to the analyst who was no trouble to them. The analysts petitioned the Local Government Board to intervene. They wanted the Local Government Board to have control not just over

118. Thirty-seventh Report of the Commissioners for Inland Revenue, Parl. Papers 1894, XXVIII, p. 289.

119. Presidential address, Analyst, 1900, p. 63.

120. Presidential address. Analyst, 1911, pp. 47-8.

121. Presidential address, Analyst, 1910, p. 79.

the appointment, but also its conditions and remuneration. They wanted the right of appeal to the Board in all matters affecting their office, and when fresh legislation increased the work of the public analysts, they wanted some arrangement made to readjust their emoluments.

Sometimes the public analyst has to issue certificates condemning goods sold by the local authority from whom he derives his appointment. He needs security of tenure on his appointment so that he may perform his duties impartially and independently.¹²²

The Local Government Board were sympathetic, but powerless.¹²³

8. Public analysts and medical officers of health

The public analysts had pointed out in their memorial to the President of the Local Government Board that their position was analogous to that of the medical officers of health, who were also under the Local Government Board and it was implied that the medical officers received greater support from the central authority as officers of the Board.¹²⁴ The appointment of medical officers of health as public analysts in the early days of the position had acted against the interests of the analysts and there was still a feeling in the early twentieth century that the office of public analyst was considered inferior to that of

122. Joint Committee of the Institute of Chemistry and the Society of Public Analysts and Other Analytical Chemists to President of the Local Government Board. Analyst, 1908, p. 347.

123. Presidential address. Analyst, 1909, p. 85.

124. Joint Committee of the Institute of Chemistry and the Society of Public Analysts and Other Analytical Chemists to President of the Local Government Board. Analyst, 1908, p. 347.

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the medical officer by both the Board and the local authorities. The two roles were analogous in some ways, especially in their setting up, but they were not treated the same by the Local Government Board.

The 1872 Adulteration of Food, Drink and Drugs Act was part of a package of local government reforms that followed the recommendations of the Royal Sanitary Commission. The Local Government Board Act 1871 replaced the Local Government Act Office with the Local Government Board and the following year the Public Health Act and the Adulteration of Foods and Drugs Act placed both medical officers of health and public analysts under the central administration of the Board. The main difference was that under the Public Health Act the medical officers of health were made compulsory throughout the country, when previously they had been compulsory in London only, whereas the appointment of public analysts was left to the discretion of the local sanitary authority except where the Local Government Board should require an appointment to be made. The first consequence of this was one of number, as medical officers were appointed in every part of the country almost immediately. The numbers of public analysts grew more slowly, depending on how quickly the Local Government Board could get out the letters, and there were never to be as many because the analysts' duties were taken over in the smaller boroughs, after 1888, by the county authorities. When the county councils took over the role of providing public analysis after 1888, the borough analysts were dispensed with, leaving a probable maximum of 234 officers. This was not the case with the medical officers. When the county councils began

125. Presidential address. Analyst, 1911, p. 50.

to appoint medical officers of health this was as well as in other localities, and by 1899 the number of officers submitting reports to the Board was 1771.¹²⁶

So, although superficial parallels can be drawn between the two public appointments there was a great difference in the amount of central support and communication between the centre and the localities. Despite his local autonomy in day-to-day matters the medical officer of health was kept tied to the Local Government Board by statistics gathering and form filling. His chief duties, inter alia were to 'study and report to the Central Office as well as to his own authority ... all things relating to considerable changes in the health of his district'. The Central Office supplied him with forms for district returns to be filled out in duplicate, one central, one local. The Central Office would also send him reports and even, if he wished, help with meteorological equipment for making weather observations. 'The inquiries of the local medical officers will be guided from the Central Office with the highest attainable medical and scientific knowledge; and their reports will supply a vast collection of facts for the study and elaboration of the central officers.'¹²⁷ The public analysts, on the other hand, were required under the 1872 Act only to make quarterly returns to their local authorities and there were no central demands made on them. After a suggestion from C.M. Tidy to the 1874 Committee that the reports should also be sent to the Board this

126. Anne Hardy, 'Public health and the expert: the London medical officers of health, 1856-1900' in R.M. MacLeod, ed., Government and Expertise, London 1988, p. 130.

127. 'Legislation of the past year', Medical Directory, 1873, pp. 17-18.

was done, and after that date a digest of the quarterly returns formed part of the annual reports of the Board,¹²⁸ but there was little communication from the centre, or central interest in the analysts.

9. Field executives

Anne Hardy has shown that the medical officers were a most significant force in Victorian social reform, and she describes their work in terms of belonging to MacDonagh's field executive:¹²⁹

subordinate officers charged with the direct execution of supervision of some regulation up and down the country. Such men were usually recruited from some other original profession close, or as close as possible to their new work.¹³⁰

The public analysts, created in the same spirit, also appear to be candidates for the same role, and MacDonagh himself suggests that they exemplify his model: 'The first food and drugs act of 1860 achieved little until it was supplemented by a requirement in 1872 that all counties and boroughs with police forces should appoint professional public analysts.'¹³¹ The appointment of public analysts was not compulsory, strictly speaking, until 1899, but the effect of the 1872 and 1875 Acts was a gradual compulsion, depending on the administrative time available. However, once the field executive have been appointed

128. Select Committee on Food Products Adulteration, Parl. Papers 1894, XII, H. Preston-Thomas' evidence, p. 11.

129. Anne Hardy, 'Public health', p. 128.

130. O. MacDonagh, A Pattern of Government Growth 1800-60: The Passenger Acts and their Enforcement, London 1961, p. 333.

131. Ibid., p. 338.

after 1872 they depart to some extent from MacDonagh's model as the public analysts worked independently of central government from whom they were almost completely detached. They achieved their aims not as petty officials, but from without the system, as independent chemists working as a pressure group through their professional association and its journal the Analyst. This had more in common with the way the medical profession achieved reforms than, say, MacDonagh's emigration officers. However, acting as an unofficial pressure group via the SPA was not the way the analysts wanted to achieve their reforming goals. They wanted central support and the security of petty officialdom, but this was denied them by a government reluctant to impose further control on local authorities, and they had to fend for themselves sometimes in hostile territory. Furthermore, the growth in legislation brought about by the analysts was not rewarded by an increase in emolument or empire, but was rewarded only by longer hours.

The Revenue officers could also be described as field executives under the same description as the public analysts, enforcing the regulations, but it was not the Revenue officers in the field who worked towards defining standards of purity and influencing government policy, but the Revenue chemists in the laboratory in London. The Revenue officers had no influence on central decisions. The first laboratory was not founded as a response to a public evil, but to increase government revenue. It worked well from the start and grew organically not just from within, but also from without, as work was imposed on the central laboratory from other government departments, including the Local Government Board.

The Inland Revenue Laboratory was not the only government laboratory where expert evidence was prepared. The Home Office

Inspector of Explosives worked not only from his office at the Home Office, but also had laboratory facilities at Woolwich Arsenal, and although he was originally engaged, as the Gunpowder Inspector, to safeguard the lives of employees and public, he spent a good deal of his time investigating explosions caused by the criminal actions of Home Rule activists. Whereas the Inland Revenue chemists and public analysts fail, for different reasons, to conform to MacDonagh's model, the Home Office Inspector of Explosives typifies that class of 'agents of knowledge' described by MacLeod as the instruments by which the administrative revolution was secured - men who acquired the powers to investigate and report, and the authority to act first and explain later.¹³²

132. R.M. MacLeod, Government and Expertise, London 1988, p. 5.

Chapter 8

The role of the Home Office Inspector of Explosives

Her Majesty's Inspectorate of Gunpowder, created in 1871, was a product of the mature stage of the administrative revolution, when inspectorates were well established 'that government might interfere in economic affairs in order to protect the individual and that Whitehall might supervise local government in order to ensure administrative efficiency'.¹ Rhodes categorises the inspectorates into efficiency inspectors, such as those for schools (created 1840) and the constabulary (1856), and enforcement inspectors. In this latter pigeonhole he includes inspectors of anatomy (1832), factories (1833), weights and measures (1835 - now trading standards officers), railways (1840), mines and quarries (1850), nuisances (1848-1855 - now environmental health officers), gas examiners (1859 - such as Henry Letheby), alkali inspectors (1863 - now part of the Pollution Inspectorate) and the gunpowder inspector (1871 - who became the explosives inspector in 1875).² The enforcement inspectors had more forensic potential than the efficiency inspectors depending on the wording and purpose of the Acts under which they were appointed. Their

1. G. Rhodes, Inspectorates in British Government, London 1981, p. 3.

2. Rhodes, Inspectorates, Appendix 2, pp. 234ff. See also A.S. Wohl, Endangered Lives, London 1983, especially for the work done by the nuisance inspectors, alkali inspector and the River Pollution Inspectorate.

powers could extend to investigating and prosecuting offences except where the inspectors were employed by the local authority, in which case the authority would be the prosecuting authority and the inspector the leading witness.³ Investigating accidents was part of the function of factory, mines and quarries inspectors, added to which the railway inspector - originally appointed in a regulatory capacity - soon found himself drawn into the investigation of accidents,⁴ as did the gunpowder/explosives inspector Vivian Dering Majendie (1836-1898).

1. The Explosives Inspectorate

As with the other enforcement inspectorates, the Gunpowder Inspectorate was designed to protect employees and the public. The 1860 Gunpowder Act⁵ followed an explosion at an ammunition factory in Birmingham where twenty-one men were killed.⁶ The Act set out regulations and required licences, and the Home Secretary could authorise inspection.

Inevitably, the Act worked poorly and more explosions, also in Birmingham, led to the Nitro-glycerine Act 1869.⁷ This incorporated all the provisions of the Gunpowder Act 'as if the word "gunpowder" in such provisions included nitro-glycerine as defined by this Act'.⁸

'Nitro-glycerine' included any substance having nitro-glycerine as an

3. Rhodes, Inspectories, p. 239.

4. Ibid., p. 8.

5. 23 & 24 Vict. c. 139.

6. Jill Pellew, 'The Home Office and the Explosives Act 1875', Victorian Studies, 1974, 18, p. 178.

7. 32 & 33 Vict. c. 113.

8. S. 6.

ingredient (e.g. dynamite, which is nitro-glycerine soaked in a German clay called kieselguhr). The Act prohibited the import or possession of nitro-glycerine without a licence. Further explosions in 1870, yet again in Birmingham, led the Home Secretary to direct Captain Majendie, RA, to inspect all explosives factories in the area.⁹ Majendie was a veteran of the Crimea and the Indian Mutiny and in 1870 was assistant superintendent of the Royal Laboratory at Woolwich Arsenal.¹⁰ In the first of what would be many reports to the Home Secretary he concluded that the earlier Acts were 'habitually disregarded' and that a qualified government inspector was needed to decide disputed questions, grant certificates for licences, render assistance to the manufacturers and to 'inspect at uncertain intervals' how gunpowder and explosive materials were handled and stored.¹¹ He was appointed on 6 July 1871 as Inspector of Gunpowder Works.¹²

Five weeks later he was investigating a serious explosion at a gun-cotton factory at Stowmarket, called in by a letter from the Home Secretary dated 14 August 1871. Twenty-four people had been killed in two explosions in the factory's gun-cotton magazines, which were nothing more than wooden huts. The factory had been almost entirely destroyed and only two deep craters were left on a site which ran by a

9. The Necessity for the Amendment of the Law relating to Gunpowder and Other Explosives and Suggestions for a New Act, Parl. Papers 1874, LII, p. 303.

10. Who was Who. This was not the domain of Frederick Abel, War Department Chemist, who was in charge of the Chemical Laboratory on another part of the site.

11. Parl. Papers 1874, LII, pp. 303-4.

12. Pellew, 'Explosives Act', p. 183.

busy railway line. The factory was less than half a mile from the town of Stowmarket, where almost all the windows were blown in and one cottage had to be rebuilt.¹³

Majendie went over the scene of the explosions with the manager and inspected the works, noting damage done and visiting places in the neighbourhood with a view to attending the inquest, where, it would appear from the quote below, he was invited to cross-examine the witnesses. His report, with factory plans and painstaking details, shows scene of crime work not only at its earliest, but as having a sophistication that would be difficult to surpass today. Majendie was not a chemist but an artillery specialist, yet was experienced enough to see that the explosions, on a very hot day, could have been caused by inflammation, detonation or by a chemical cause. He needed an independent chemist urgently to give chemical evidence on the condition - unstable or not - of the stored gun-cotton. This gave him some difficulty:

owing to the absence from town at that time of year of the greater part of the professional men, and owing to the fact that Dr Odling had been engaged by the Company, while Professor Abel was acting for the War Office and Professor Bloxam declined to act. I was, however, fortunate enough to be able to engage Dr Dupré, Consulting Chemist to the Medical Department of the Privy Council, and Mr Keates, Consulting Chemist to the Metropolitan Board of Works. These gentlemen rendered me most valuable

13. Report on Explosion of Gun-cotton at Stowmarket on the 11th of August 1871 by Captain V.D. Majendie, Parl. Papers 1872, XXVII, p. 527.

assistance throughout the inquiry, not only by conducting with great care a chemical analysis of the various samples of gun-cotton etc., submitted to them, but by suggesting to me from time to time points upon which it was desirable to elicit information in the cross-examination of various witnesses.¹⁴

Contemporary knowledge about gun-cotton was that if mishandled while unconfined it would not explode, but catch fire only. If, then, mishandling the gun-cotton had caused the accident, thus showing it to be unstable, then it would have to be abandoned, whatever its merits as an explosive agent. Abel had performed many experiments on the gun-cotton and found it perfectly stable, as had Odling, Keates and Dupre, which is to say that all the scientific witnesses at the inquest - Crown, company and independent - agreed. Their combined scientific detective work showed that although there was potential for dangerous inefficiency in the manufacturing process - gun-cotton was made by steeping cotton waste in nitric acid and sulphuric acid and then rinsing and spinning dry several times - the explosion had not been caused by insufficient rinsing but by sabotage. Person or persons unknown had poured sulphuric acid over the gun-cotton 'subsequent to its passing all the tests required by the Government'. The perpetrator, according to Majendie, would not have anticipated a big explosion, only a fire, for the commercial injury of the company or the government.¹⁵ Since the invention of dynamite in 1867 this explosive had become the favourite tool of the Fenians, fighting for Home Rule in Ireland. It

14. Ibid., p. 527.

15. Ibid., pp. 546-7.

may have been in the minds of the investigators that the Stowmarket explosion was a dynamitard plot, though no one was brought to trial.

Majendie's reports to the Home Secretary continued to urge for better explosives legislation¹⁶ and he outlined a draft Bill for the Home Secretary in 1872. Nothing was done for some time, however. It was only after Sir Richard Cross came into office in February 1874 that action was taken. The reason is suggested in a communication to Disraeli which he wrote shortly after his appointment. In it he says that he has been studying an explosives Bill drafted in the time of his predecessor but which had never been introduced. Cross had rejected this draft as it was 'calculated to disturb everyone connected with the trade'. He proposed instead that an enquiry be held where the trade might have an opportunity to be heard¹⁷. This was the Select Committee on Explosive Substances, at which Majendie was the first witness.¹⁸ Another witness was Alfred Nobel, representing the vested interests of the explosives industry. He complained:

The Nitro-glycerine Act has altogether crippled the dynamite trade in Great Britain. The best proof of it is that up to the beginning of this year this country has only used 200 tons of dynamite, against more than 3000 tons used in Germany. It is a

16. Ibid., pp. 553-60.

17. Pellew, 'Explosives Act', p. 184.

18. Select Committee on Substances of an Explosive Nature, Parl. Papers 1874, IX, p. 1.

wonder that even 200 could be used, because the regulations are such that it is impossible to base a trade upon them.¹⁹

However, the fact that the regulations were either not strict enough, or not rigorously enough enforced, was underlined while the committee was sitting when a Regent's Canal barge exploded under a bridge near London Zoo, killing three people and alarming the inhabitants of the area as well as the zoo animals. The barge was carrying both gunpowder and benzoline.²⁰

The Explosives Act 1875 came into effect on 1 January 1876 though Majendie had been created Chief Inspector of Explosives the previous September, with Major Arthur Ford, RA, as his assistant.²¹ In addition to helping to draft the 1875 Act, Majendie and Ford were also expected to work out the detailed Orders in Council under which the Act would operate with relation to - for example - sale of explosives, small firework factories and floating magazines.²² A third inspector was added in 1882, Captain J.P. Cundill.²³ The three men worked a monthly rota of one man in the office at the Home Office while the other two would be at Woolwich, roving the country on an inspection programme, or

19. Parl. Papers 1874, IX, Q. 3439, quoted in Pellew, 'Explosives Act', p. 185.

20. Report of the Explosion of Gunpowder in Regent's Park in October 1874, Parl. Papers 1875, XVII, p. 803. Benzoline was a type of fuel oil used in lamps (OED).

21. Annual Report of HM Inspector of Explosives 1875, Parl. Papers 1876, XVII, p. 3.

22. Ibid., p. 15.

23. Annual Report HMIE 1882, Parl. Papers 1883, XIX, p. 1.

investigating accidents - the major part of the job.²⁴ In 1880, for example, there were 109 explosives accidents, with sixty-seven injured and thirty-two killed, which all featured in the Annual Report.²⁵

The absence of experienced chemists on holiday during the Stowmarket explosions was good news for Dupré, as in 1872 he was appointed Chemical Adviser to the Home Office and worked closely with Majendie for many years.²⁶ His chemical expertise was used in quality control - analysing samples of explosives to ascertain whether they met government regulations. In the Annual Report for work done in 1881 he was given his own section under 'Chemical Branch of the Department', addressed from Westminster Hospital, where he lectured in chemistry. His first report showed that he had discovered impure dynamite being imported from Cologne. It was seized and proceedings were instituted.²⁷

2. The Fenian bombing campaign 1881-94

Explosions due to 'personal and political malice' had started to make a regular appearance by the Annual Report for 1881. The impersonal nature of the reports conceals the part that Majendie played in the investigation of the 'outrages' (as they are indexed) over the years, but Appendix 4 lists the seventy-nine incidents from 1881 to 1894 inclusive, which were investigated from Woolwich. Majendie was expected to liaise with the Fenian Office, a precursor of the Special Irish

24. Annual Report HMIE 1893, Parl. Papers 1894, XX, p. 23.

25. Annual Report HMIE 1880, Parl. Papers 1881, XXIV, Appendix.

26. Men and Women of our Time, 13th edition, 1891.

27. Annual Report HMIE 1881, Parl. Papers 1882, XVII, p. 21.

Branch, that was set up in 1881 at Scotland Yard as a response to the mainland bombing campaign which started that year.²⁸ The first event was a bomb at a barracks in Salford which killed a boy passing by in January. A further device outside the Mansion House (London) was defused by a sharp-eyed constable in March, and in May and June infernal machines were used in attempts to blow up Liverpool Police Station and Town Hall.²⁹

The main event of 1882 was not on the mainland. It was the murder of the new Chief Secretary for Ireland, Lord Frederick Cavendish, and the Permanent Under-Secretary, Thomas Henry Burke, in Dublin's Phoenix Park in May. They were walking towards the Chief Secretary's official residence in the park when they were set upon by Home Rule extremists and stabbed. The murderers were tracked down and eventually arrested on 12 January 1883.³⁰ In retaliation a mainland bombing campaign started a week later in Glasgow on the Saturday night of 20/21 January. An explosion at the Tradeston Gasworks went off at 10.10 p.m., followed two hours later by a misfire on the Possil Road Canal Bridge, and at 1.15 a.m. by another explosion in a disused railway shed. No one was killed, though some people sustained burns by running out of their houses on hearing the gasworks explosion, to be met by a rush of flame from the igniting gas. Majendie was called in by telegram from the Procurator Fiscal who, at the inspector's request, gave instructions

28. Bernard Porter, Origins of the Vigilant State, London 1987, p. 41.

29. Ibid., p. 196.

30. H. Montgomery Hyde, Cases that Changed the Law, London 1951, pp. 132-35.

that the scenes of the explosions were to be as little disturbed as possible.³¹ If the engravings of the bomb container in the report were reproduced from photographs taken at the time, then these could represent the earliest scene of crime photographs.

Majendie found that the seat of the gasworks explosion was 'external to the gasholder' (i.e. a bomb). He could not identify the explosive despite scene of crime work by himself, Dr Dupré and Mr MacRoberts, works manager of Nobel's Explosives Company at Ardeer, but they found two pieces of tape near the site of the explosion of a kind used on certain makes of safety fuse (for the purpose of binding the fuse to the detonator and the charge).³²

The Possil Road Canal Bridge was a place where the canal crossed the Possil Road, the plan being to alarm the inhabitants by emptying the canal down the road. The plan misfired because a drunken soldier on leave coming home across the bridge with some friends saw the box and lifted the lid. It was filled with 'brown sand', he told Majendie, which began to fizz when he touched it and it exploded, knocking him down and spraying his companions with flying metal. The brown sand was home-made lignin dynamite - nitro-glycerine soaked not in kieselguhr but in the more readily available sawdust. The police recovered the box, the explosives and some odd pieces of brass and submitted them to

31. Report to the Home Department on the Circumstances attending Three Explosions which occurred in Glasgow on the Night of Saturday 20th January, and the Morning of Sunday the 21st of January 1883, Parl. Papers 1883, XIX, pp. 157-8.

32. Ibid., p. 158.

Dupré for analysis.³³ Dupré was also active at the railway shed, where he examined the planks for traces of a nitro-glycerine compound but without success (the explosive having been completely exhausted in the explosion).³⁴ James Campbell Brown, professor of chemistry at Liverpool University and public analyst for the Borough of Liverpool,³⁵ was able to discover how the pieces of brass could be fitted together and used as a fuse.³⁶ Brown's scientific detective work did not stop there.

Before the trial, it became important to ascertain whether the prisoner took part in the preparation of the infernal machine, or whether he was the simple country fellow which he seemed, misled and sent as a messenger to carry the bomb. To test this, I got an order to visit him in prison, shook hands with him, asking if he got enough to eat and was well-treated. His only complaint was that the skilly was not satisfying enough for his healthy young appetite. Whilst the conversation was going on I examined his hands, and found that they were clean and fresh through recently renewed skin. But what remained was dead and coloured yellow, in the way that nitric acid stains the hands. The simple-looking man

33. Ibid., p. 172.

34. Ibid., pp. 175-8.

35. Returns of Public Analysts Appointed under the Adulteration Act 1872, Parl. Papers 1873, LV, p. 1.

36. Parl. Papers 1883, XIX, p. 174.

had taken part in making the dynamite himself. He got twenty years penal servitude.³⁷

On the Thursday night of 15 March 1883 (Boat Race Day, when the police were diverted from central London) the dynamitards set off bombs at the offices of the Local Government Board in Whitehall, near the Home Office, and at the offices of the Times, in Playhouse Yard. Majendie was required to hold an inquiry and his report shows scene of crime work here being carried out by Dupre again, examining the pulverised debris in the immediate vicinity in company with Professor Abel.³⁸ Majendie's report of the incident was too modest, as the Illustrated London News tells us that he was himself employed in making a very minute examination at the scene.³⁹ The Illustrated London News refers to them as 'scientific experts'.⁴⁰

Majendie, speaking with hindsight in his report, claimed that he suspected a mainland bomb factory because of the difficulties and dangers of transporting materials by ship, and so it proved.⁴¹ 'Alfred George Whitehead', also known as Jemmy Murphy, had set up a bomb factory in Birmingham in February 1883, when he arrived from America and rented 128 Ledsam Street apparently in order to sell paints,

37. James Campbell Brown, Essays and Addresses, London 1914, pp. 207-8.

38. Report to the Home Secretary on Circumstances Attending two Explosions which occurred in London on the Night of the 15th March 1883 at the Offices of the Local Government Board, Whitehall and the Times Newspaper, Playhouse Yard, Parl. Papers 1883, XIX, p. 197.

39. Illustrated London News, 24 March 1883, p. 286.

40. Ibid., 16 May 1885, p. 501.

41. Parl. Papers 1883, XIX, p. 205.

brushes and wallpapers.⁴² He hired a shop boy and began to buy chemicals from local suppliers, including vast quantities of nitric acid, sulphuric acid and glycerine. The discovery of the factory was due to the vigilance of Gilbert Pritchard, a carman in the employ of Messrs Harris and Co., Manufacturing Chemists, who first communicated to Sergeant Price his suspicion of what was going on on 27 March.⁴³ On 2 April, Pritchard and another police officer entered the premises at 2 a.m. using skeleton keys and removed samples of the chemicals, receiving burns to their feet from chemicals spilled on the floor. Dr Alfred Hill, the city public analyst, MOH and one-time president of the SPA, confirmed that they could be used for making nitro-glycerine. The bombers were absent.⁴⁴ Detectives at the Irish Bureau at Scotland Yard,⁴⁵ acting on information received, were already following Dr Thomas Gallagher, the campaigners' leader, and his associates round London. The Fenians were having some difficulty buying waterproof containers in which to transport the nitro-glycerine down from Birmingham. Eventually they had to settle for fisherman's stockings, tied very tightly at the knees and loaded into a portmanteau. Once in London with 276 lbs of unstable explosive which the police had let them bring down to London on 4 April, the team were arrested, leaving Majendie with the nitro-glycerine to dispose of.⁴⁶ Here it was said of

42. Short, Dynamite War, p. 127.

43. Times, 6 August 1883, p. 7e.

44. Short, Dynamite War, pp. 129-30.

45. The bureau later evolved into the Special Branch.

46. Short, Dynamite War, pp. 136-7.

the Colonel that 'he carried an india-rubber bag full of nitro-glycerine, found in the lodging of a Fenian, in a four-wheel cab to Woolwich and that on this occasion he warned the driver not to collide with any other vehicle on the way, else "he might hear no more about it"'.⁴⁷ The nitro-glycerine was taken out to Woolwich marshes and burnt.⁴⁸ As for the bomb factory in Birmingham, Dr Dupré reported:

Colonel Majendie, CB, and myself left for Birmingham on the 6th April, arriving there about 2 p.m. and drove at once to the office of the Head Constable, where we found that officer, as also one of the members of the Town Council, in a state of great anxiety. We therefore went at once to Whitehead's shop, 128 Ledsam Street, accompanied by the Head Constable and Dr Hill, the Borough Analyst, and examined the premises.

We found that at the time of his arrest, Whitehead had been engaged in the manufacture of nitro-glycerine, and a considerable quantity of this substance in a strongly acid condition had been left floating on the mixture of strong acids used in its manufacture. Now, the spontaneous explosion of nitro-glycerine under such conditions is by no means a very rare occurrence, and indeed its ultimate explosion, in quantities such as we had here to deal with, is chiefly a question of time. The neighbourhood of Ledsam Street had thus undoubtedly been exposed to very considerable danger. Our first care was to render the nitro-glycerine comparatively speaking harmless by removing it

47. Men and Women of our Time, 1895.

48. Annual Report HMIE 1883, Parl. Papers 1884, XVII, p. 170.

from the acid and washing it first with water and then with a solution of carbonate of sodium. Next we carefully inspected the premises and examined the contents of every vessel kept in the place. In the course of this examination we discovered that one of the carboys which stood with a number of others in a room behind the shop, and which was supposed to contain acid, in reality contained nitro-glycerine (about 150 lbs) in by no means a pure or safe condition. This ... was rendered provisionally safe by placing it in a tub surrounded by ice, all the other carboys containing acid only having previously been removed from the place. There now remained for us to devise some means of removing this large quantity of nitro-glycerine without danger to the neighbourhood or town. After careful consideration we decided to telegraph to Nobel's Explosives Company, Glasgow, asking them to send down a workman skilled in the making of dynamite, with a sufficient amount of kieselguhr to convert the whole of the nitro-glycerine on the premises into dynamite, which could then be safely removed to some place outside the town and destroyed by burning. Nobel's Explosives Company at once responded to the appeal and a workman came down and in the course of Sunday, with the assistance of Dr Hill, converted the nitro-glycerine into dynamite, and afterwards superintended its removal and burning. All this was effected without the slightest accident, and a very serious danger was thus happily averted.⁴⁹

49. Ibid., pp. 185-6.

After the arrest of the Fenians the government rushed through the Explosives Substances Act⁵⁰ which received Royal Assent on the same day that it was debated in the House of Commons, 10 April 1883. The Act modified the 1875 Act so that causing, or attempting to cause an explosion with intent to danger life carried a maximum penalty of twenty years and being in possession of explosives with intent to danger life fourteen years penal servitude. Thomas Gallagher, Henry Wilson, John Curtin and Alfred Whitehead all received the maximum term at the Central Criminal Court in June 1883 for a crime committed before the Act came into force, but there were no questions asked about retrospective legislation in the House of Commons, nor was there any scientific expertise presented on behalf of the defence to counter that of the prosecution. There was sensation, but no controversy. This contrasts markedly with the situation in the notorious Victorian poisoning cases. The main difference was that in the explosives cases there was no one to take pity on the defendants.

The bombing campaign continued with bombs at railways stations, Scotland Yard, St James' Square and Trafalgar Square⁵¹ and Majendie and his colleagues continued to sift the debris at the scene for clockwork or other devices 'for effecting the explosion'. Any experiments

50. 46 Vict. c. 3.

51. For official accounts see: Report on two Explosions on the Underground Railway, 30 October 1883, Parl. Papers 1884, XVII, p. 793; Report on an Explosion at Victoria Railway Station, Pimlico, 26 February 1884 and attempted Explosions at Charing Cross, Paddington and Ludgate Hill Railway Stations, Parl. Papers 1884, XVII, p. 765; Report on Explosions at Scotland Yard and St James' Square, 30 May 1884, and an attempt at Trafalgar Square, Parl. Papers 1884, XVII, p. 753.

necessary were conducted at Woolwich by Abel and Dupré.⁵² When a bomb went off at Victoria Station in February 1884 Majendie defused another 'clockwork infernal machine' which was working at the time and which might have exploded and killed him at any moment'.⁵³

These heroic deeds did not go unnoticed by the press, and Edward Jenkinson, trying to co-ordinate Irish Bureau investigations, found that the Colonel's willingness to talk to the papers hampered their activities by alerting the Fenians to what the authorities were doing. 'I think he enjoys making his discoveries public,' Jenkinson criticised in a letter to Lord Spencer, 'but it is very mischievous'.⁵⁴ Majendie's fame persisted for a few years, notwithstanding. Majendie Road in Woolwich is named after him,⁵⁵ and he was caricatured in Vanity Fair in April 1892.⁵⁶ The fame that Majendie enjoyed in the 1880s and 1890s as a scientific expert was muzzled when the first Official Secrets Act came into force in 1889.⁵⁷ The Act was aimed specifically 'to give increased powers against the offence of disclosing confidential matters by officials'.⁵⁸

52. See, for example, Parl. Papers 1884, XVII, p. 801.

53. Men and Women of our Time, 1895.

54. Porter, Origins, p. 52, letter dated 3 May 1884.

55. Information supplied by Alan Turner, Chairman of the Royal Arsenal Historical Group.

56. This is reproduced in Porter, Origins, near p. 144, together with a photograph of Majendie's bomb defusing hut on Duck Island, St James' Park, which survived until 1985.

57. 52 & 53 Vict. c. 52.

58. Attorney General, Sir Richard Webster, House of Commons, Parl. Debates, House of Commons, 7 June 1888, col. 1495.

3. Continuity and change

Majendie died in office in 1898 aged 61, having built up his department to four inspectors.⁵⁹ By 1979 there were fifteen inspectors, not necessarily drawn from the Royal Artillery, but still acting for the Crown in investigating IRA 'outrages'. The Inspectorate became part of the Health and Safety Executive in 1974 and is now run as a branch of the Factory Inspectorate.⁶⁰

August Dupré, of Huguenot descent like Majendie, was succeeded by two of his sons as Chemical Advisers to the Explosives Department after their father's death in 1907.⁶¹ Frederick Harold Dupré was transferred to the Home Office section of the War Office Research Department in the 1920s when it was considered inappropriate for the Chemical Adviser to be an independent consultant. Yallop's monograph for the Forensic Science Society tells us that this branch 'continued with the duties of advising HM Inspectors of Explosives and with providing a forensic science service for the police. It retained its identity through many governmental reshufflings of ministries and still continues its work as a branch of the Royal Armament Research and Development Establishment'.⁶²

59. The Annual Report for 1898 contains four inspectors' signatures, Parl. Papers 1899, XI, p. 297.

60. Rhodes, Inspectories, Appendix, p. 246.

61. Dupré's obituary is in the Analyst, September 1907, p. 313.

62. H.J. Yallop, Explosion Investigation, Forensic Science Society, 1987, preface. Yallop is a former explosives inspector himself.

4. Conclusions

The work of the Home Office Inspector of Explosives fits well into MacDonagh's model, as Pellew's paper demonstrates⁶³: the inadequacy of the 1860 Act, the vested interests which tried to resist the passing of the 1875 Act, and Majendie's mature-stage work behind the scenes doing his best to influence legislation and coping with the details of enforcing the current laws. But this chapter essentially shows that forensic science as we would define it today was being practised routinely as part of his role by HM Inspector of Explosives from the 1870s onwards in an unbroken history to the present day, and that the sophisticated forensic investigation of explosives incidents was conducted by the expert himself as the investigating officer, accorded the respect and deference of Coroner and Procurator Fiscal, being given a free hand to conduct the investigation as he wished. Then later in London he is seen as a 'scientific expert' and part of an investigatory team at the scene of crime, in the laboratory and finally in the courtroom.

63. Pellew, 'Explosives Act', p. 176.

Chapter 9

The development of criminal records and police science

Police science did not evolve for 'forensic' purposes, that is, it was not created in order to link, by way of expert evidence, a person suspected of a criminal offence with a crime, nor was it originally developed as an aid to detection. These applications came later, after the turn of the century. Photography, anthropometry and fingerprinting, the three associated police sciences, developed alongside the need to keep track of prisoners released onto the streets on ticket-of-leave. Under the Penal Servitude Acts, if they reoffended they had to serve the rest of their original sentence as well as any new term of imprisonment imposed. But first they had to be identified as recidivists. The growth of criminal work at the Home Office has been explained in terms of the nineteenth-century revolution in government and its greater use of scientific expertise by Jill Pellew.¹ The creation of a criminal records system to keep track of habitual criminals was one such growth area that required scientific assistance. However, the series of Acts under which the system operated were inadequate, the Habitual Criminals Registry did not have the advantage of an able administrator to superintend it and in any case there was no one central supervising office, despite good intentions, and the work

1. Jill Pellew, 'Law and order: expertise at the Victorian Home Office', in R.M. MacLeod, Government and Expertise: Specialists, administrators and professionals, Cambridge 1988, p. 60.

was batted to and fro between the Home Office and Scotland Yard, between civil servants and policemen. This was not the case in Paris, where the problem of identifying recidivists was successfully tackled by Alphonse Bertillon, the Parisian Police's expert and key figure in anthropometry. Eventually, as this idea spread to England, it was taken up by a key figure here, Sir Francis Galton. Galton was an outsider, a gentleman and Darwin's cousin. He could not superintend an anthropometric office himself for reasons of age and social superiority, but his professional colleague did. This was Dr John George Garson, who became anthropometric expert to the Metropolitan Police/Home Office in 1894. Garson should have had every opportunity to fulfil something like Majendie's role as expert witness, training officer and adviser in his separate field, but the rug was pulled from under his feet by further conflict between the Home Office and New Scotland Yard.² Though Garson was being paid as an adviser by the Treasury via the Home Office, the Anthropometric Office was physically at New Scotland Yard and the Commissioner of Police in 1898 or 1899 issued an order that 'the whole work was to be done by police officers under police discipline'.³ Consequently, no one asked Garson's advice and the service deteriorated, with Garson being called to account by the Home Office. The situation was only successfully placed under one superintending central body when E.R. Henry became Assistant Commissioner and founded the Fingerprint Branch in 1901. After this

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2. Scotland Yard became New Scotland Yard in 1890 on its move to new premises on the Embankment.
 3. Departmental Committee on Identification of Criminals (Belper Committee), 1900, p. 6. Apparently this was never published as a Parliamentary Paper.

time the Home Office/Treasury abandoned the unworkable anthropometric system, pensioned off Garson and the police finally took sole charge of criminal records under Henry's expert authority. With the creation of an efficient Fingerprint Branch internal dynamics 'produced a flywheel effect, whose momentum in turn propelled other developments', and greater growth.⁴ In the case of the Fingerprint Branch the value of taking prints at the scene of a crime was soon realised, as they could now be matched to a previous offender, although painstakingly, from a single print, thanks to Henry's classification system. The need to produce fingerprints in court and to photograph them at the scene of a crime led to a small photographic section being formed and this led in turn to a wider use of photography for identifying wanted persons and stolen property. The work at New Scotland Yard prompted other forces to follow in their footsteps and a small laboratory was set up in Cardiff in 1902 specialising in photography and fingerprinting, and a fingerprint department was established at Bradford in 1906.

Behind the introduction of anthropometry and fingerprints was the influential figure of Sir Francis Galton, who persuaded those in authority that fingerprints were persistent over time, peculiar to the individual and that an adequate classification system was essential. Although in the first instance Galton persuaded the authorities that he had solved these difficulties, his statistical experiments to support his contention that there was a 1 in 64,000 million chance of two fingerprints being the same were completely spurious and in fact the whole science of fingerprints has been built on a fallacy. It is

4. MacLeod, Government and Expertise, p. 5.

fortunate that two fingerprints have not so far been found to match in all details, but Galton did not prove it, as this chapter shows. The way that he and his like-minded peers persuaded the government to adopt anthropometry and fingerprinting owed much to the methods that the Benthamites pioneered to influence government two generations earlier and which was by the 1890s the norm.

1. Controlling the criminal classes

The concept of a 'police science' developing in the nineteenth century makes the assumption that the police were concerned with the prosecution of offenders. In the eighteenth century in England and Wales prosecutions were normally brought by the victims or sometimes, towards the end of the century, by associations for the prosecution of felons, who might employ Fielding's thief-takers or others from London if the situation called for it. If there were no prosecutor available, the magistrates could take on the onerous task. During the nineteenth century the new police gradually took over this role to a great extent, particularly in offences against public order, public decency and public safety.⁵ In fact, the two Commissioners of the Metropolitan Police were themselves sworn in as magistrates. It should be noted that throughout the century the police possessed no special duties or powers to prosecute. They acted as private citizens paid by their fellow citizens to carry out these duties on their behalf.⁶ Private

5. See for example the Town Police Clauses Act 1847, 10 & 11 Vict. c. 89, S. XXVIII.

6. J.L.J. Edwards, Law Officers of the Crown, London 1964, p. 336; F. Calvert, The Constable's Pocket Guide to Powers of Arrest and Charges, London 1946.

prosecutions have always been a feature of the English criminal law and at least until 1875 private individuals were still making substantial use of police courts in London. For example, employers would prosecute their servants and staff, and market gardeners and dock companies would prosecute petty thieves whether employees or not. The working classes also used the magistrates' courts and between 1856 and 1875 they brought an average of one-fifth of all larceny charges despite a 2 shilling charge for a summons. A half of these charged acquaintances and roommates, while the other half were street crimes.⁷ There were also prosecutions brought by the Customs and Excise (as Chapter 7 showed), Inland Revenue, Royal Mint, factory inspectorate and so on.

Keeping this in mind, it seems likely that as the number of police increased, particularly after the 1856 County and Borough Police Act, there was a significant increase in police prosecutions. Once the county and borough police had settled into existence they began to send returns to the Home Office which saw light in the revised Criminal Statistics for 1856. A revision of procedure in 1858 showed the numbers of the 'criminal classes' for the first time, three years before they were over-catalogued and exposed to public view by Henry Mayhew's articles on London Labour and the London Poor.⁸ Anxiety about threats from criminals at large in the cities had been around at least since John Fielding's Plan for Preventing Robberies within 20 Miles of London was published in 1755. Mid-nineteenth-century attention on the

7. Jennifer Davis, 'A poor man's system of justice: The London Police Courts in the second half of the nineteenth century', Historical Journal, 1984, p. 318.

8. Henry Mayhew, London Labour and the London Poor, London 1861-2.

newly emerging criminal classes may have stemmed from the work of H.A. Fr_gier, whose French book on the dangerous classes of large towns in 1840 was widely reviewed in England before being taken up as a British problem.⁹ Educated public opinion in England, specifically the instigators of, and witnesses to, the Select Committee on Transportation in 1838, were coming out against transporting criminals to a sentence 'beyond the seas' and its use declined in the years following the Committee's Report. Feeling against it ran high in the colonies too, and in 1849 citizens of Melbourne and Sydney refused to allow a convict ship to disembark. Van Dieman's Land took no more convicts after 1853 and the name was changed to Tasmania. The dwindling destinations for ships and the changing views of a penal policy that was becoming more explicit mid-century, led to the gradual substitution of penal servitude for transportation in the 1853, 1857 and 1864 Penal Servitude Acts.¹⁰ Penal servitude was different from ordinary imprisonment. Imprisonment was in local prisons for a term of two years or less. Penal servitude was served in convict prisons like Millbank and Pentonville and was introduced with a minimum sentence of four years to be equivalent to transportation of seven years, though this minimum changed with each successive Act. It had been the custom for transported prisoners to be released on ticket-of-leave before the

9. L. Radzinowicz and R. Hood, A History of English Criminal Law and its Administration from 1750, Volume 5, pp. 73-4.

10. Report of the Select Committee on Transportation, Parl. Papers 1837-38, XXII, pp. 1-47; Joyce Marlow, The Tolpuddle Martyrs, London 1974, pp. 268-9, and Radzinowicz and Hood, History, pp. 478-85. The discovery of gold in Australia mid-century surely must have contributed to the decision to abolish transportation there, as public perceptions of the continent changed from seeing it as a penal colony to Eldorado.

sentence expired, and this idea was now transferred to penal servitude, so that for the final year of this sentence the prisoner was at large. If he reoffended the licence would be revoked and he would serve the rest of his original sentence as well as the sentence for the new offence.¹¹ The substitution of penal servitude for transportation, then, had the effect of releasing discharged prisoners onto the streets of London and other large towns and contributed to the London garotting panic of 1862 with its 'moral sewage ... in the midst of us, polluting and poisoning our own air' as the Saturday Review put it.¹² The panic followed an attack on Hugh Pilkington, MP, in Pall Mall as he walked to the Reform Club. Much was made by the press and public of the marauding dangerous classes preying on the respectable. Jennifer Davis suggests that the creation of a criminal class represented a ruling class strategy to divide and conquer the lower classes.¹³ Defining the class in the criminal statistics, at least gave the impression that everything was under control and that crime could even be stamped out. The reality was different. Predictably, the 1853 and 1857 Acts were poorly thought out as there was no machinery spelled out in them to supervise the licence-holders. In 1862 Sir Richard Mayne, Commissioner of the Metropolitan Police, was asked to name and report to the Home

11. Radzinowicz and Hood, History, pp. 498-502; Penal Servitude Acts 1853 (16 & 17 Vict. c. 99), 1857 (20 & 21 Vict. c. 3) and 1864 (27 & 28 Vict. c. 47).

12. Saturday Review, 30 August 1862, p. 192, quoted in Jennifer Davis, 'The London garotting panic of 1862: A moral panic and the creation of the criminal class in Mid-Victorian England', in V.A.C. Gatrell, B. Lenman and G. Parker (eds), Crime and the Law, London 1980, p. 191.

13. Davis, 'Garotting', p. 191.

Office on those ticket-of-leave men in London thought to be leading disorderly lives, and none could be traced. The situation was the same in Birmingham and Bristol.¹⁴ The Royal Commission on Penal Servitude of 1863 was convened to look at the working of the two Acts and concluded that habitual criminals should be punished more severely than persons of a different character convicted of a similar offence,¹⁵ and that the system would only work if habitual criminals could be identified as such.¹⁶ Consequently, under Section 2 of the 1864 Act the minimum sentence for a reoffence, which had been raised to five years in 1857, was now raised to seven years, the original minimum for transportation. If the prisoner broke the conditions of his licence it would be forfeited and he would therefore have to complete the original sentence. In addition, under Section 5, if he failed to produce his licence or broke any other conditions of it he would receive up to three months imprisonment with or without hard labour. As for keeping track of prisoners on licence, Section 4 provided for supervision of ticket-of-leave men on a monthly basis by the police, to whom should be notified any change of address.

2. Identifying the habitual criminals

The public debate continued and pressure was put on legislators to extend the idea of supervision to those given short sentences in local

14. Radzinowicz and Hood, History, pp. 249-50.

15. Radzinowicz and Hood, History, p. 244; Report of the Commissioners appointed to inquire into the operations of the Acts relating to Transportation and Penal Servitude, Parl. Papers, 1863, XXI, p. 1, 283.

16. Parl. Papers 1863, XXI, p. 26.

prisons as well as penal servitude. The result was the unworkable Habitual Criminals Act 1869 which introduced registration for all habitual criminals and extended the crimes for which supervision and registration were appropriate. The Habitual Criminals Register for the whole country was to be kept under the management of the Commissioner of Police of the Metropolis.¹⁷ It was unworkable, according to Radzinowicz and Hood, because its provisions exceeded the capacity and possibly the willingness of the police to enforce them. Licence holders had to notify the police of their change of address only if they moved to another police district. Needless to say those who wished to 'go straight' reported regularly while those who did not melted into the anonymity of the streets. A further point was that the numbers grew so fast that the police had no chance of supervising them all.¹⁸ The Prevention of Crimes Act 1871¹⁹ was brought in to amend some deficiencies of the 1869 Act and repealed it. Amongst other measures it now made statutory provision for photographing inmates. Photographing prisoners for identification purposes by the Metropolitan Police had its forerunners in the provincial prisons. The Governor of Bristol Gaol, Anthony Gardiner, was circulating photographs of his prisoners to every prison in the country by 1854 to see if any apparently first offenders were in fact old customers. William Garbutt, Deputy Governor of Derby Gaol, was an amateur photographer and took portraits himself of both prisoners and suspects from 1856 to

17. Habitual Criminals Act 1869, 32 & 33 Vict. c. 99.

18. Radzinowicz and Hood, History, p. 256.

19. Prevention of Crimes Act 1871, 34 & 35 Vict. c. 112.

1873,²⁰ but normally an outside expert would have to be employed.²¹

There was no use of, indeed no thought of using, photographs as evidence in court. The habitual criminal was attested to in two stages. A policeman from the original arrest would identify the suspect in court and the previous conviction would then be proved by certificate.²² The system proved unworkable as it was, because too many registrations were being taken, 150,000 by 1875 for only 1000 identifications.²³

A report on the working of the Register was made by Home Office Legal Adviser Godfrey Lushington.²⁴ His report, dated 1 January 1875, concluded that the Habitual Criminals Register had been a failure in England and Scotland and had a greater value in tracing an arrested man's previous convictions than as a means of identifying habitual criminals. Its prime purpose was to act as a central information office. However, the fact that it was at Scotland Yard had prevented it from being used as such due to force rivalries. He recommended that the types and numbers of persons on the Register be reduced by limiting

20. G.A. Gernsheim, History of Photography, London 1965, pp. 514-15.

21. D.E. Luke, Criminal Record Development, Godalming 1980, p. 92.

22. Luke, Criminal, p. 118. This assumes that the greater number of prosecutions were being brought by the police. The question of proving a previous conviction in private prosecutions was raised in 1889 and the Home Secretary instructed the Metropolitan Police to prove the previous conviction in these cases also, ibid., p. 122.

23. Radzinowicz and Hood, History, p. 262.

24. Lushington joined the Home Office in 1869 as Legal Adviser, became Assistant Under-Secretary of State in 1875 (a new post) and Permanent Under-Secretary in 1885. (Jill Pellew, The Home Office 1848-1914, London 1982, p. 208.)

the classes of offence and that the Register be transferred to the Home Office.²⁵ A brief Amendment Act to the Prevention of Crimes Act was therefore passed in 1876 permitting the Secretary of State from time to time to prescribe the class of prisoners to be registered²⁶ and at the same time the Register was transferred to the Home Office in the charge of Edmund Du Cane. Du Cane was the obvious candidate for the job. As Director of Convict Prisons he already kept the General Register of Convicts. In addition to the Register of Habitual Criminals a Register of Distinctive Marks was kept and copies of both these registers were distributed to police forces on a regular basis, but they were little used. The failure was due to the difficulty both of devising a classification system based on distinctive marks when many registered men had none at all, and of using a register issued in a printed form at regular intervals.²⁷ On 1 June 1880 the Central Register Branch at Scotland Yard was renamed the Convict Supervision Office and its activities were restricted to keeping track of convicts discharged on licence and persons under police supervision.²⁸ Although the CSO was in a separate office from the newly formed Criminal Investigation Department its officers were in plain clothes and under the supervision of the new Director of Criminal Investigations, Howard Vincent.²⁹

25. Luke, Criminal, pp. 61-3.

26. 39 & 40 Vict. c. 23.

27. Identification of Habitual Criminals (Troup Committee), Parl. Papers, 1894, LXXII, pp. 213-16.

28. Annual Report Metropolitan Police 1880, Parl. Papers, LI, 1881, p. 329.

29. Radzinowicz and Hood, History, p. 259.

Scotland Yard continued with its own system of keeping track of criminals, using the Police Gazette and Illustrated Circular, which latter volume to some extent duplicated the work of the Habitual Criminals Register.³⁰

There seems to have been little intercourse between Scotland Yard and the Director of Convict Prisons Office at the Home Office. There was, however, some movement of personnel between the two 'departments' which answered directly to the Home Secretary. Robert Anderson was brought over from Dublin in 1867 as Fenian Adviser to the Home Office, and from 1877 onwards he combined this role with duties as a Prison Commissioner under Du Cane. His duties as Fenian Adviser were, from 1881, to co-operate with the Fenian Office at Scotland Yard and with Vivian Majendie, the Home Office Explosives Inspector. Anderson was also a spymaster of at least one known spy 'Henri Le Caron', who was reputed to have wanted to deal only with Anderson.³¹ In 1887 James Monro, the Assistant Commissioner, brought Anderson into his headquarters team to combat the Fenians and Anderson became part of the Metropolitan Police's 'Section D' (which was being called, as early as November 1887, 'Special Branch').³² When Monro resigned as Assistant Commissioner in August 1888, he moved over to a room in the Home Office, where he kept on his control of Section D, while Anderson took

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30. Metropolitan Police Museum, New Scotland Yard, Standard Note File 96, 'Precis and annotated index of correspondence re anthropometry and fingerprinting 1894-1907', Commissioner to Secretary of State, 30 July 1895. (Hereafter New Scotland Yard, Standard Note File 96.)
31. B. Porter, Origins of the Vigilant State, London 1987, pp. 47.
32. This was separate for the moment from the Special Irish Branch of the CID ('Section B'), according to Porter, Origins, pp. 85-6.

over as Assistant Commissioner at Scotland Yard. Monro came back to Scotland Yard as Commissioner in November 1888. Lushington expected the two departments to work closely together, and, in fact, treated the Metropolitan Police as a Home Office Department.³³ Despite these close associations between the Home Office and the Metropolitan Police, there was little communication as regards criminal records and in the hands of Du Cane the Habitual Criminal Register became a dead letter. Monro informed the Home Office in 1886 that it was rarely visited by the Metropolitan Police and that the CSO had more information available in convenient premises for police and others. He requested the return of the Register, but this was not done.³⁴

3. Bertillonage

Despite the use of photographs on the record cards the main way of identifying repeated offenders was still by personal recognition, the thrice-weekly visits of Detective Inspector Shore and his party to remand prisons.³⁵ Inevitably there were mistakes. On 4 August 1887 Sir Walter Barttelot, MP for Sussex NW, asked the Home Secretary, Sir Henry Matthews, if he had seen the St James' Gazette for 30 July. A City detective had made an error in identifying a prisoner who was the same height as a recidivist with a scar in the same place. Sir Walter

33. Jill Pellew, Home Office, p. 49.

34. James Monro, 'A Report on the History of the Department of the Metropolitan Police known as the CSO', 1886, HO Printed Memoranda, vol. 2, p. 695, in Stefan Petrow, 'Policing morals: The Metropolitan Police and the Home Office in London, 1870-1914', PhD, Cambridge University 1988, p. 57.

35. Luke, Criminal, p. 108, and Petrow, Policing, p. 29.

asked Sir Henry if he was aware of Bertillon's system and whether he would consider it for adoption in this country. The Home Secretary felt that the adoption of the French system would be expensive and troublesome, though 'the subject appears to me, however, to deserve further consideration'.³⁶ Alphonse Bertillon had introduced a system of measuring new arrestees in Paris in 1882 on the basis that no two adults would have exactly the same measurements on certain key bones. By February 1888 he had added to his Bureau d'Identit_ Judiciaire a photographic section instituting for the first time the two views, full face and profile, with which we are so familiar today.³⁷

The possibility of Bertillonage for English use was brought across the Channel by retired civil servant Edmund R. Spearman, who lived in Paris. He alerted the Home Office to its potential in 1887,³⁸ and was probably behind the initial questions in the House of Commons and early newspaper articles in the Times and Pall Mall Gazette which praised the system.³⁹ The Assistant Commissioner at that time, Monro, considered anthropometry but thought it a scientific fad and inapplicable to England as there were no legal powers to strip a man in order to take his measurements.⁴⁰

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36. Parl. Debates, House of Commons, 318, cols 1126-7, 4 August 1887.
 37. 'Cent ans de police scientifique', Prefecture de Police, Ve arrondissement, exhibition brochure 10-29 March 1987, pp. 13-14. The Bureau existed until 1959.
 38. Radzinowicz and Hood, History, p. 263.
 39. Times, 28 September 1887; Pall Mall Gazette, 16 November 1887.
 40. J. Hall Richardson, 'Scotland Yard', Murray's Magazine, July 1890, p. 17.

Meanwhile the cause of anthropometry for criminal records purposes was taken up by Sir Francis Galton, who had set up an anthropometrical laboratory as part of the 1884 Health Exhibition in South Kensington. The laboratory continued after the exhibition for some years and the general public were encouraged to come and be measured.⁴¹ Galton's primary interest in anthropometry was to discover which features were suitable for 'hereditary investigation' so that 'it might be possible to trace kinship with considerable certainty'.⁴² He saw some difficulties with this as the measurements were not independent. 'The bodily measurements are so dependent on each other that we cannot afford to neglect small distinctions. Thus long feet and long middle fingers usually go together. ... No attempt has yet been made to estimate the degree of this interdependence. I am therefore having the above measurements ... recorded at my anthropometry laboratory for the purpose of doing so'.⁴³ Within a few months he had developed a way of measuring correlations, familiar to today's statisticians, in a paper entitled 'Co-relations and their measurements chiefly from anthropometric data'.⁴⁴ Despite these reservations Galton was enthusiastic about the use of anthropometry

41. Galton, Memories, p. 245.

42. F. Galton, 'Personal identity', Nature, 1888, pp. 173-7, 201-2.

43. Ibid., p. 175.

44. F. Galton, 'Co-relations and their measurements, chiefly from anthropometric data', Proceedings of the Royal Society, 20 December 1888, pp. 135-45.

which he considered 'added vastly to the precision with which the identification of a person may be established'.⁴⁵

Galton had visited Bertillon in 1888 while on a holiday in France,⁴⁶ and in April 1890 introduced Jacques Bertillon, Alphonse's brother, to the Anthropological Institute for a talk on the merits of the system. Anthropometry was of sufficient national interest by then for the presentation to be summarised in the Times the following day.⁴⁷ Dr Bertillon explained that the drawer with the right measurements was found by a process of elimination. First the individual was matched to headsize, small, medium or large. Then within that category were drawers for left middle fingers, little, medium and large, then for length of foot and forearm from elbow. As a check the individual would be matched for photographic likeness, scars and other particular marks.⁴⁸ Petrow suggests that it was Spearman who did much to publicise the advantages of anthropometry for criminal records purposes,⁴⁹ but Galton's role in spreading the word amongst the influential intelligentsia must also be taken into account. Following

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45. Journal of the Anthropological Institute, 1891, p. 198. The occasion was a general discussion following a presentation by M. Mouat, see note 49.
46. D.W. Forrest, The Life and Work of a Victorian Genius, London 1975, p. 208.
47. Times, 23 April 1890. This newspaper article was later reproduced in the Journal of the Royal Statistical Society, vol. 53, pp. 323-6.
48. F.J. Mouat, 'Notes on M. Bertillon's discourse on the anthropometric measurement of criminals', Journal of the Anthropological Institute, 1891, pp. 182-200 (meeting on 22 April 1890).
49. Petrow, Policing, p. 60.

the meeting at the Anthropological Institute there was, as usual, some informed comment from the audience, and we can see the increase of interest amongst the well connected by the fact that Sir Rawson Rawson had taken the trouble to see Bertillonage in action on a trip to Paris and believed 'it might be introduced with great advantage in the United Kingdom'.⁵⁰ Spearman had had an article, one of several, in the Fortnightly Review in February 1890⁵¹ and the matter was raised in the House of Commons from time to time. On 9 February 1891 the Home Secretary was asked if he had considered introducing Bertillon's system. He replied that he had but that the French police had powers over prisoners which the police did not possess in this country. However, he had inserted a clause in the forthcoming Prevention of Crimes Bill 'giving powers to take the measurements of prisoners, which is perhaps the most important element of the French system'.⁵² Further requests were made and the Committee on the Identification of Criminals, under the chairmanship of C.E. Troup, of the Home Office, was convened in 1893 following a query from the British Association for

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50. Journal of the Anthropological Institute, 1891, p. 198. Sir Rawson William Rawson (1812-98) was a retired Governor of the Bahamas and Windward Islands, president of the International Statistical Institute 1885-98, vice-president of the Royal Geographical Society and an ex-president of the Royal Statistical Society. (DNB.)
51. E.R. Spearman, 'Mistaken identity and police anthropometry', Fortnightly Review, February 1890, pp. 361-76; 'Criminals and their detection', New Review, 1893, p. 65-84; 'Known to the police', Nineteenth Century, September 1894, pp. 356-70.
52. Parl. Debates, House of Commons, 350, cols. 197-8, 9 February 1891. This successful Bill became law the same year.

the Advancement of Science.⁵³ Spearman, a witness to the Committee, claimed that the visit at his request 'last spring' of the current and previous Attorneys-General Sir Charles Russell and Sir Richard Webster to Paris also swayed the Home Office.⁵⁴ Yet the fact that statutory provision for the taking of measurements was inserted into the Prevention of Crimes Act 1891 meant that the plans to introduce anthropometry were fairly advanced well before the committee was requested.⁵⁵

The chairman, Edward Troup, was a protege of Lushington's, who would reform the criminal statistics in 1893 while still a senior clerk, and who would become Permanent Under-Secretary from 1908 to 1922.⁵⁶ Other commissioners were Major Arthur Griffiths, Inspector of Prisons, and Melville McNaghten, Chief Constable at New Scotland Yard. The committee took the opportunity also to look at the possibility of using fingerprints as a 'distinctive mark' on the record card.

4. Fingerprints

Galton's interest in anthropometry had also re-awakened a slight interest in fingerprints. In the spring of 1888 he was invited to give a Friday evening lecture to the Royal Institution on 'Bertillonage', as it was beginning to be called. 'The subject,' he recalled, 'was

53. Radzinowicz and Hood, History, p. 263.

54. E.R. Spearman, 'Known to the Police', Nineteenth Century, September 1894, pp. 356-70. (Sir Richard Webster became Lord Chief Justice, Lord Alverstone, in which capacity he judged the Crippen trial in 1910.)

55. Prevention of Crimes Act 1891, 54 & 55, Vict. c. 69, S. 8.

56. Pellew, Home Office, pp. 36, 53-57, 208.

attracting much interest at the time, and had received a great deal of off-hand newspaper praise ... but being desirous of introducing original work of my own, I gave to my lecture the more general title of "Personal Identification and Description" on which larger subject there was much new to be said.⁵⁷ He wrote to Nature, possibly half-remembering some correspondence on the subject of finger-marks⁵⁸ and received a reply from Sir William Herschel, who had used fingerprints in India as a way of preventing impersonation when Indian pensioners came to collect their money.⁵⁹ Herschel, now retired, loaned Galton two sets of his own prints taken at twenty-eight-year intervals for the lecture.⁶⁰ This partially solved one of the questions about fingerprints - was the pattern persistent over time. Galton identified three facts that had to be established before it would be possible to advocate the use of fingerprints for criminal or other purposes. 'First, it must be proved, not assumed, that the pattern of a finger-print is constant throughout life. Secondly, that the variety of patterns is really very great. Thirdly, that they admit of being so classified, or "lexiconised", that when a set of them is

57. F. Galton, Memories of my life, London 1908, p. 251.

58. H. Faulds, 'On the skin furrows of the hand', Nature, 28 October 1880, p. 605; Sir William Herschel, 'Skin furrows of the hand', Nature, 25 November 1880, p. 76. Galton was a regular contributor to the magazine and an article by him appeared in the same issue as Faulds' letter. Faulds at the same time had also written to Darwin, who corresponded with Galton, his cousin, on the subject, but Galton seems to have forgotten this, much to Faulds' lifelong annoyance. See G. Lambourne, The Fingerprint Story, London 1984, pp. 33-6.

59. Herschel, 'Skin furrows'.

60. F. Galton, 'Personal Identification and Description', Proceedings of the Royal Institution of Great Britain, 1889, pp. 357-8.

submitted to an expert, it would be possible for him to tell, by reference to a suitable dictionary, or its equivalent, whether a similar set had been already registered.⁶¹ Galton devoted a great deal of his time in the latter years of the South Kensington laboratory to investigating fingerprints. Indeed, he stated that its 'chief value ... lay in the convenience it afforded for obtaining and testing the value of fingerprints'.⁶² His book Finger Prints, the first of its kind, came out in 1892 and the three conditions appeared to be met. He believed he had proved persistence through life,⁶³ (even reforming exactly after injury), that each pattern was unique,⁶⁴ and the book contained the author's attempts at a classification system based on arches, loops and whorls.

Galton was involved in the BAAS committee which recommended a Select Committee on anthropometry and although he agreed that its introduction was a good idea, he wanted fingerprints added, and wrote a persuasive letter to the Times on the subject in July 1893.⁶⁵ When the terms of the Select Committee were set out in October 1893, the members were asked to report 'whether the anthropometric system or the finger-mark system can with advantage be adopted in England either in substitution for or to supplement the existing methods and if so, what arrangements should be adopted for putting them into practice, and what

61. Galton, Memories, p. 254.

62. Galton, Memories, p. 250.

63. F. Galton, Finger Prints, London 1892, pp. 89-99.

64. Ibid., p. 59. But see below for a discussion of this.

65. Lambourne, Fingerprint, pp. 43-6; Times, 7 July 1893 p. 4e.

rules should be made under Section 8 of the Penal Servitude Act 1891 for the photographing and measuring of prisoners'.⁶⁶ So, although the possibilities of anthropometry were insinuated into the public and official consciousness by several key figures, Galton alone was responsible for developing the science of fingerprinting and persuading the government to adopt them. The original correspondence in Nature in 1880 was from Dr Henry Faulds, then running a hospital in Japan, who had recognised their potential for catching criminals after experimenting with them to compare racial characteristics.⁶⁷ However, once Galton had taken up their development Faulds' role was forgotten and he became bitter about Galton's contribution, as his letters and books illustrate.⁶⁸ Karl Pearson assessed Galton's contribution, in his edition of his correspondence, with a veiled reference to Faulds:

Attempts have been made to belittle [Galton's] achievements in this matter. Galton's claim is not based on his being the first to suggest this use of fingerprints, or on being the first actually to apply them. It lies in the fact that general police adoption of fingerprints resulted from his activities. It is easy to make suggestions, it wants an additional mental quality

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66. Troup Committee, p. 212. This was the Act whose Bill was referred to by the Home Secretary as the Prevention of Crimes Bill, above.
67. Faulds, 'On the skin furrows'.
68. See, for example, H. Faulds, Guide to Fingerprint Identification, 1905; H. Faulds, Dactylography, 1912; G.W. Wilton, Fingerprints: History, Law and Romance, 1938; and Lambourne, Fingerprint.

to get them carried out by administrative bodies, always and often justly conservative in character.⁶⁹

5. The anthropometric expert

The Troup Committee Report highlighted in no uncertain terms the deficiencies of the present unsatisfactory system, listing horror stories of identification by photographs alone. It was not just that the innocent could be wrongly identified as a previous offender, but that if a first offender was identified as a habitual criminal it added to the length of his sentence, or vice versa. In one case an averted mistake reduced a sentence from 7 years penal servitude to 6 months imprisonment.⁷⁰ The committee seemed more interested in making sure that the previous offender moved up the tariff than that first offenders received their lesser due.⁷¹

Spearman's evidence showed how anthropometry was spreading to other countries from France - for example to India, where E.R. Henry, Inspector General of Police in Bengal, had introduced it in 1892.⁷² Galton elaborated on his finger-mark system almost directly from the pages of his book on the subject⁷³ - though Troup remarked that the

69. Karl Pearson, The Life, Letters and Labours of Sir Francis Galton, vol. IIIa, Cambridge 1914-1930, p. 141.

70. Troup Committee, p. 222.

71. Ibid., pp. 223-6.

72. Ibid., pp. 269-71.

73. Ibid., pp. 264-8.

classification was the difficulty.⁷⁴ Another witness was Dr John George Garson, a vice-president, along with Galton, of the Anthropological Institute and assistant in the Anthropological Department of the Royal College of Surgeons' Museum in Lincoln's Inn Fields.⁷⁵ The Report proposed that the two systems of anthropometry and fingerprinting be adopted. The primary classification would be by measurement, taking five key measurements, plus a photograph which should include the ear. This was usually done by fixing a mirror behind the offender's head, but the Committee recommended two separate views as in Paris. A secondary classification on the card, as an identity check, would include fingerprints and any distinctive marks, along with a detailed description.⁷⁶

The Committee thought it desirable that the new Anthropometric Office at New Scotland Yard should from the first have the advantage of the services of an expert 'practised in the methods of scientific anthropometry, and if possible one who has had practice in training other persons in taking scientific measurements'.⁷⁷ His duties would be to instruct the prison warders in the measurements of prisoners and superintend the decipherment and classification of fingerprints. The role of Galton's professional colleague as a witness to the Committee now becomes clear as the intended expert, rather than Galton himself, who, at this time was 72 years old and a gentleman of some means.

74. In answer to Sir Richard Webster, ibid., p. 257.

75. Ibid., pp. 258-63.

76. Ibid., p. 239.

77. Ibid., p. 243.

Garson was engaged for three years from 4 July 1894 at a salary of £600 per annum, payable by the Treasury (after a preliminary grumble at not having been consulted beforehand) via the Home Office.⁷⁸ Robert Anderson, Assistant Commissioner in charge of the CID, would be allowed £100 per annum as Registrar of Anthropometrical Measurements. The salaries of the assisting Police Sergeant and Police Constable would also be paid by the Treasury via the Receiver of the Metropolitan Police.⁷⁹ In other words, the new service was not funded out of the budget of the Metropolitan Police but directly from central government. With the setting up of the new office the Habitual Criminals Register was now to be transferred back to New Scotland Yard with Chief Inspector Neame in charge, after completion of the 1895 volume at the Home Office.⁸⁰

Garson's duties were to implement the anthropometric system, as it was adapted for English use, throughout the prisons, training male and female warders in the taking of measurements and fingerprints. On 10 April 1897 Garson submitted a report in connection with Robert Anderson's request for the renewal of his services. Anderson felt that Garson's duties were 'such as require a high degree of education and intelligence for their due performance, as well as a considerable amount of tact in dealing with the Governors of the various prisons which he visits, to which no increase of staff has been assigned to

78. New Scotland Yard, Standard Note File 96, Home Office to Anthropometric Office, 27 June 1894; Treasury to Anthropometric Office via Home Office, 15 January 1895.

79. Ibid., Home Office to Anthropometric Office, 22 March 1895.

80. Ibid., Commissioner to Home Office, 30 July 1895.

deal with the extra work imposed on the officials'. By this date 184 prison officers had been trained in the taking of measurements and fingerprints and three classes per annum were planned for the instruction of new officers under Garson's superintendence at New Scotland Yard, for the decipherment and classification of fingerprints according to Galton's system. This Garson either did himself or immediately supervised.⁸¹ However, at this point the reluctant generosity of the Treasury waned, and Garson's extension at the same salary was for another few months only, to 31 March 1898. After that time the Habitual Criminals Registry was to be re-organised and amalgamated with the Convict Supervision Office, presumably with a saving of money, and from 1 April 1898 the Anthropometric Office and Dr Garson's services were to be retained as 'Expert Adviser to the Commissioner of Police and the Instructor of Prison Warders in Methods of Identification by Measurements and Fingerprints'⁸² at a reduced salary of £400 per annum.⁸³

The closing years of the century saw what Radzinowicz and Hood call the 'English miracle', the diminution of crime, the hardest evidence of which was a substantial decline in the prison population.⁸⁴ With fewer prisoners to measure it is understandable that the Treasury sought to rationalise, but the result, according to Garson, was

81. Ibid., ACC to Home Office, 10 April 1897.

82. Belper Committee, p. 4.

83. New Scotland Yard, Standard Note File 96, Home Office to Anthropometric Office, 22 March 1898.

84. Radzinowicz and Hood, History, p. 113-16.

disastrous.⁸⁵ The correspondence between New Scotland Yard and the Home Office with regard to anthropometry in 1899 shows that a large number of inaccuracies were appearing in the metric descriptions and Garson was invited by the Home Office to send them a report, then a few months later he was asked to send a fuller report. In addition, some administrative problems were emerging as magistrates' approval had to be obtained before taking photographs or measurements of remand prisoners. There was also the question of extra remuneration for prison officers engaged in taking the measurements.⁸⁶ The result was that a departmental committee was called in July 1900 on the identification of criminals under the chairmanship of Lord Belper, and Garson was given the opportunity to air his grievances. These were based on the fact that the Commissioner, Colonel Sir Edward Bradford, disregarded the terms of Garson's appointment and his paymaster, and had given instructions that 'the whole work was to be done by police officers under police discipline'.⁸⁷ This left out Garson, who wanted the Metric Office to be set up like Galton's anthropometric laboratory on scientific principles and not like a police office. As the office now functioned, Garson could only advise if he were asked. He attended every day, but as no one in fact asked his advice, he found himself doing routine office work.⁸⁸ He felt aggrieved that any change might

85. Belper Committee, p. 6.

86. New Scotland Yard, Standard Note File 96, Summary of letters between the Commissioner and the Home Office, 29 March 1899-23 February 1900.

87. Belper Committee, p. 6.

88. Ibid., p. 6.

be made in the office without his knowledge.⁸⁹ Anderson by now was no longer enchanted with Garson's work and disagreed with his claim that the work had deteriorated because it was no longer under scientific direction. In Anderson's judgement 'the work is better done at present for the simple reason that it is no longer done by one scientific expert'. He preferred the system of calling in experts when needed, as in other areas of government work.⁹⁰ If fingerprints could be indexed so as to make searching easier, Anderson would prefer the system to another.⁹¹ This indexing was the crux of the matter.

6. The fingerprinting expert

The star witness at official committees was always billed first. In the 1894 Troup Committee it had been Galton. Now it was the turn of E.R. Henry of the Indian Civil Service, giving evidence on 12 July 1900, a few days before the publication of his book Classification and Uses of Fingerprints. As Inspector General of Police based in Calcutta, Henry had introduced anthropometry in 1892, refining the system to include a thumbprint in 1893. Henry had doubts about the accuracy of taking measurements and, as he felt the system unsafe, reliance was placed exclusively on matching the thumb impressions. He visited Galton and corresponded with him, feeling that if a usable classification system for fingerprints could be devised it would be a better system than anthropometry. By 1897 he had formulated a system, inspired by

89. Ibid., p. 13.

90. Ibid., p. 37. Of course, Anderson was a Home Officer expert himself, having been the Fenian adviser twenty years earlier.

91. Ibid., p. 39.

Galton's, but which could accommodate a much greater number of prints.⁹² The system was adopted in Bengal in that year, superseding anthropometry altogether. The Belper Committee Report also noted that, as with Henry's experiences in Bengal, 'though a man's previous record is traced by his measurements, yet it is the fingerprints alone that are attended to when the two cards are being compared for the purposes of judging whether they are the records of the same individual; and the question naturally arises whether they might not be used for classification as well as identification, and if so, whether the measurements may be dispensed with.' The answer was yes, and on 23 May 1901 the Home Office ordered fingerprint identification to supersede the system of measurements. Henry was appointed Assistant Commissioner in charge of CID on Anderson's convenient retirement on 31 May.⁹³ The Fingerprint Branch was established on 1 July with officers from the Anthropometric Office, Detective Inspector Charles H. Stedman, Detective Sergeant Charles Stockley Collins and Detective Constable Frederick Hunt.⁹⁴ The Treasury authorised publication of the second edition of Henry's book also in July and in August Garson was pensioned off with an honorarium of £250 for his services.⁹⁵

92. Lambourne, Fingerprint, pp. 35-7, 64.

93. New Scotland Yard, Standard Note File 96, Annotated index of correspondence between the Commissioner and the Home Office, 23 May 1901-23 August 1901.

94. Lambourne, Fingerprint, p. 65. See also the list of experts at Appendix 1.

95. New Scotland Yard, Standard Note File 96, Annotated index of correspondence between the Commissioner and the Home Office, 23 May 1901-23 August 1901.

7. Fingerprints in court

With the introduction of Henry's system of classification came a radical change in the use of fingerprints. Instead of using the system as an aid to identification in criminal records, the system now began to be used as an aid to detection and the fingerprint, or a photograph of it - compared with the authenticated fingerprint of the suspect - was produced in court as scientific evidence, with the police officer concerned as the expert witness. To use fingerprints in this way in England required yet another hurdle to the three conditions of use raised by Galton of persistence, individuality and adequate classification; it had to be accepted in court. In India the Government had passed an Act amending the law of evidence to allow fingerprinting testimony of 'those who by study have become proficient in fingerprint decipherment'.⁹⁶ In England the matter relied not on statute, but on the whim of the judge as Chapter 6 explained. The trial of Harry Jackson for a burglary committed in June 1902 was the first case in England. Detective Sergeant Collins, a keen amateur photographer, and his colleagues had searched through thousands of record cards to match a left thumbprint found in fresh paint on a windowsill. Collins took photographs and tracings showing corresponding ridge countings into court and together with other circumstantial evidence, Jackson was found guilty, thus setting a precedent for accepting fingerprint evidence in court.⁹⁷

96. Belper Committee, p. 3.

97. Lambourne, Fingerprint, pp. 67-8.

The precedent for accepting a fingerprint as evidence in a murder case was set in the Stratton case in 1905, when Albert and Alfred Stratton were tried for the murder of Thomas and Ann Farrow, an elderly couple who kept a paint shop in Deptford. Alfred Stratton's thumbprint was found on the open cash box belonging to the couple.⁹⁸ Collins, now a Detective Inspector, stated that there were between 80,000 and 90,000 sets of fingerprints at New Scotland Yard, 800,000 to 900,000 digits. In his experience he had never found any two such impressions to correspond.⁹⁹ His search in this instance had been unsuccessful until he had fingerprinted the suspects and found twelve points of resemblance between the mark on the cash box and the thumbprint of Alfred Stratton.¹⁰⁰ Stedman corroborated Collins' evidence. The detectives from the Fingerprint Branch were now well established as the expert witnesses in fingerprint cases, a fact which was highlighted in the Stratton case by the behaviour of Garson, whose evidence for the defence was thoroughly discredited. Garson had written to the Director of Public Prosecutions offering his services, as well as writing on the same day to offer his services to the defence, adding in his letter to the solicitor for the defence that the way fingerprints were being used by the police would bring them into disrepute. His offer was taken up by the defence, and he tried to throw doubt on Collins' and Stedman's

98. Times, 6 May 1905, p. 19a.

99. Ibid., 8 May 1905, p. 4d.

100. Lambourne, Fingerprint, p. 77. The New Scotland Yard standard of 16 characteristics of resemblance for court purposes was introduced in 1920 and it became the national standard in 1953, ibid., p. 138.

evidence.¹⁰¹ The Counsel for the Prosecution, Richard Muir, read out Garson's letter to both defence and Crown and successfully discredited him when it became known that Garson had not seen the fingerprint before he had written. His defence was that he was an independent witness but he was interrupted by the judge who interposed: 'An absolutely untrustworthy one I should think'.¹⁰² Garson wrote an indignant letter to the Times after the case, putting his view that the judge 'assumes my evidence would have been adapted to suit the requirements of either side'. He was ready to give his views on the points of identity or difference to either side. The judge, he continued, 'does not condemn the barrister who is ready to take fees to defend any case'. Finally, he gave his opinion that 'the whole subject demands accurate scientific training and absolute independence of testimony that would be hopeless to look for in a partially educated investigator'.¹⁰³ In other words, a medical man was required, a point echoed by the Lancet:

It seems to us that the person called upon to examine and to advise as to identity or non-identity should possess thorough and practical knowledge as well as trained mental powers of discrimination. To intrust the duty to partially skilled persons

101. Times, 8 May, p. 4d.

102. Ibid., p. 4e; Lambourne, Fingerprint, pp. 77-9.

103. Times, 18 May 1905, p. 15e.

is in the highest degree dangerous from a public point of view.¹⁰⁴

This assumption that only the medically qualified were competent to be expert witnesses in police/Home Office prosecutions was discussed in Chapter 4 and continued to influence government thinking with regard to twentieth-century forensic science. Garson never regained his public standing. He appears to have taken a country practice shortly after the case and served as a Captain in the RAMC in the First World War. There are no entries for him in the Medical Directory after 1932.

8. Edwardian police science

The development of fingerprints had a knock-on effect both within New Scotland Yard and around the country. Within the CID in 1903 a register was started entitled 'Visits with camera to photo fingerprints'. The first of these, indicating the official birth of scene of crime work, was dated 20 February, 1903, to an address in Wimpole Street.¹⁰⁵ In August a photographic outfit was sanctioned for the Fingerprint Office.¹⁰⁶ Detective Superintendent Carter wrote many years later that 'one officer was detailed to photograph wanted persons, scenes of crime, small items, jewellery etc., and

104. Lancet leader, 'Identification by fingerprints', 13 May 1905, p. 1281.

105. Undated memorandum, courtesy of Metropolitan Police Museum at Brixton.

106. New Scotland Yard, Standard Note File 96, Home Office to Commissioner, 25 August 1903.

documents'.¹⁰⁷ The accounts showed that the system was rudimentary in 1905, when expenditure was £43. It had risen to £86 in 1914 and by 1974 it was £30,000 per annum on consumable materials alone.¹⁰⁸ The growth of scene of crime work by 1905 is demonstrated in the third edition of Henry's Classification and Uses of Fingerprints, which contains new material by Stedman and Collins: 'The photographing of fingermarks left by criminals on articles such as plated goods, window panes, drinking glasses, painted wood, bottles, cash boxes, candles, etc, have in many instances from time to time supplied the clue which has led to the apprehension of the thief or thieves.'¹⁰⁹ By the 1913 fourth edition the special section was being written by the constantly promoted Chief Inspector Collins and possibly for the first time in print he refers specifically to 'scenes of crime'.¹¹⁰ It was also in 1913 that the reorganisation became complete when the term 'Criminal Record Office' was adopted for the department formerly variously known as the Habitual Criminals Registry, Convict Supervision Office and Fingerprint Department.¹¹¹

In other parts of the country a small police laboratory was set up in Cardiff in 1902 with fingerprints and photography as its

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- 107. Detective Superintendent W.E. Carter, 'Photography at New Scotland Yard', Forensic Photography, 1974, vol. 3, no. 9, p. 7.
 - 108. Ibid.
 - 109. E.R. Henry, Classification and Uses of Fingerprints, third edition, Appendix.
 - 110. E.R. Henry, Classification and Uses of Fingerprints, fourth edition, 1913, Appendix.
 - 111. New Scotland Yard, Standard Note File 96, handwritten note dated 20 September 1913.

basis,¹¹² and in 1906 the West Riding Constabulary sent a sergeant to New Scotland Yard to study fingerprinting and photography, which skill he passed on to his own divisions.¹¹³ This was no doubt Oliver Underwood Cromwell, whose book Fingerprint Photography was published in 1907. The West Riding fingerprint registry was formed at about the same time.¹¹⁴

9. The unwarranted authority of the expert

Behind the introduction of anthropometry and fingerprints was Sir Francis Galton, who persuaded those in authority that his criteria for the acceptance of fingerprints had been met - persistence, individuality, and a retrievable classification system. Finding stored prints depended on a process of elimination. In Galton's 1892 system there would be cabinets labelled arches, loops and whorls, with sub-sections within the cabinets. Because of the preponderance of loops, this cabinet would become full very quickly with loops and the search would be too lengthy. With Henry's 1900 system the process of elimination started earlier by first dividing fingerprints in two: loops or arches (the largest and smallest groups), and whorls and composites (the two middle groups). A complex numerical system then

112. N. Ambage, 'Origins and development of the Home Office forensic science service 1931-1967', PhD, University of Lancaster, 1987, p. 52.

113. Luke, Criminal, p. 148.

114. Luke, Criminal, p. 149. The concept of the modus operandi also stems from the West Riding force, developed by its Chief Constable Major Llewellyn William Atcherley in 1913. Ibid.

enabled the expert, with some practice, to identify the right drawer, supposing that he had prints for both hands.

The difficulty over classification, which Galton recognised, diverted the Troup Committee, and everyone else,¹¹⁵ from the fact that Galton had failed to demonstrate the individuality of fingerprints. His actual words, on tentatively suggesting that there was a 1 in 64,000 million chance of two fingerprints being alike were: 'I always fear these large numbers; I merely gave those figures as a perfectly reasonable result after very careful experiments; but I do not cling to them at all.'¹¹⁶

Galton's 'very careful experiments' were described in detail in his 1892 book Finger Prints, pages 103 to 113 (photocopied at Appendix 5). This exposition was evidently not read by the Troup Committee. Galton suggested: 'It may be of interest to show the original experiments', but the Committee pressed on with the next question.¹¹⁷ Galton devised three experiments based on reconstructing masked areas of enlarged fingerprints by guesswork. He assumed that 'any one of these reconstructions represents lineations that might have occurred in Nature'. For the three experiments he had a total score of 27 correct guesses out of 75, a little over one-third. The third experiment formed the basis of his detailed proof and for this experiment he

115. See also Major Arthur Griffiths, a member of the Committee, Mysteries of Police and Crime, London 1898, vol. 1, p. 15: 'No less remarkable are the results obtained by Mr Francis Galton with the human fingerprints. He has also proved that these, exhibited in certain unalterable combinations, suffice to fix individual identity'.

116. Troup Committee, p. 265.

117. Ibid.

obtained a success rate of 7 correct reconstructions out of 16, a little under half. From this third experiment, however, he argued that there was a 1 in 64,000 million chance of two fingerprints being exactly alike.

For this third experiment he obtained a greatly enlarged copy of a fingerprint traced by pantograph and attempted to reconstruct it by 'two successive and independent acts of interpolation'. He ruled a piece of tracing paper into 6-ridge interval squares, blanking off half of these to make a chequerboard of 6 squares by 4. Twelve would therefore be transparent. He then laid this over the fingerprint and attempted to join up the ridges by guesswork. He then took away the original fingerprint and the blanks and attempted to complete the other 12 squares. He estimated his chance at getting all 24 squares right at 1 in 10,000 million. It is actually 16.8 million by a modern calculator. (There is a 1 in 2 chance of getting the first square right - it is either right or wrong. The chance decreases to 1 in 4 for getting two squares right, 1 in 8 for the three and so on.)

In addition to this slender chance of 1 in 10,000 million, which he called chance a, he postulated a chance b and c:

We must next combine the above enormously unfavourable chance, which we will call a, with the other chances of not guessing correctly beforehand the surrounding conditions under which a was calculated. These latter are divisible into b and c; the chance b is that of not guessing correctly the general course of the ridges adjacent to each square, and c that of not guessing rightly the number of ridges that enter and issue from the square.

This is hardly clear, but appears to mean that he added chance b and chance c (estimated at 2^4 and 2^8) to chance a. With a at 2^{24} this made the total possibility 1 in 2^{36} , or 1 in 64,000 million. However, a appears to be an absolute right or wrong. That is to say, as b and c are defined in the quote above they appear to be the conditions for guessing a and are not in addition to them. Therefore the possibility remains at an estimated 1 in 10,000 million, or 16.8 million by calculator. If this is so, how was it that Galton guessed correctly 7 times out of 16? Galton's solution depended, as he said himself, on the relationship between the squares being independent and:

It is hateful to blunder in calculations of adverse chances, by overlooking correlations between variables, and to falsely assume them independent, with the result that inflated estimates are made which require to be proportionately reduced. Here, however, there seems to be little room for such an error.

Yet Galton fell into the trap he warned against, as the results which he himself gave should have shown him. The fact that the lines were continuous behind the blank squares and the fact that they were part of a single pattern of lines and ridges made it obvious that they were not independent. If he had taken features within the lines and ridges such as scars, lakes, spurs or islands¹¹⁸ rather than the lines themselves a case could have been made out for their independence (as was done in practice); but he failed to do this, recognising only that 'there may

118. These technical terms were developed later and Lambourne estimates that there are 80 to 100 such characteristics possible within each fingerprint. Fingerprint, p. 138.

be islands or enclosures in any particular part of the square' which could 'run in the observed way or in a different way'.

An allied problem is that he assumed that the smaller the number of ridges in the square the greater the possibility for error. This was not proven to be the case and is probably unsound. If the area to be guessed is smaller, there is less room for variations of features such as whorls and loops and more chance that a simple line or two will suffice. He should have repeated the experiment with a different size and number of squares, not just made the assumption that he so despised.

A further assumption was that any one of the reconstructions might occur in nature. Not only is it difficult to prove that the reconstructions might occur in nature but it should be noted that the fingerprint itself was not original, but traced. So not even the experimental fingerprint occurred in nature.

Finally, the move from the laboratory experiment to the real world is condemned as false analogy. Constructing a fingerprint by guesswork is by no means analogous to comparing two real prints. Gigerenzer *et al.*, although they do not refer specifically to fingerprints, condemn Galton's reliance on analogies as extreme, offering the comment that in his work 'analogy often served as a substitute for explanation'.¹¹⁹

Galton's arguments are faulty, then, for the following reasons:

119. G. Gigerenzer *et al.*, The Empire of Chance: How probability changed science and everyday life, Cambridge 1989, pp. 55-6. See S.R.S. Sreter, 'The first scientific social structure of modern Britain 1875-1883', in Ll. Bonfield *et al.* (eds), The World We Have Gained, Oxford 1987, for further criticisms of Galton's scientific method, pp. 337-354.

- (1) False analogy: Constructing a fingerprint by guesswork in the laboratory is not analogous to comparing real prints;
- (2) False assumptions:
 - (a) that the guessed lineations might have occurred in nature when not even the original fingerprint occurred in nature;
 - (b) that chances b and c were in addition to chance a when they were included in it;
 - (c) that the squares were independent when they were dependent to a degree which upset the experiment;
 - (d) that the smaller the squares, the greater the possibility of error, when a further set of experiments with different sizes and numbers of squares could have shown this not to be the case;
- (3) Failure to reach a conclusion from the experimental data presented: An experimental success of 7 in 16 guesses became a chance of 1 in 64,000 million by the end of the argument.

Therefore Galton did not prove individuality of fingerprints. As time has gone by the many millions of empirical searches among the cabinets, in conjunction with the independent variables of the points of resemblance, have made it more likely that no two fingerprints are alike, but its universal truth can never be proved in practice. It should be noted in passing that Treasury Counsel Richard Muir, in neither the Jackson or Stratton cases, referred to Galton's arithmetic, but stressed the experience of Collins and Stedman and the numbers of files through which they had searched.

10. The role of public opinion

Parris criticises MacDonagh for seeking to eliminate Benthamism as a factor in nineteenth-century history.¹²⁰ What Bentham represented in Dicey's original thesis, Law and Opinion in the Nineteenth Century, was the force of public opinion. This was not the kind of public opinion gathered by an opinion poll, which Parris argues that MacDonagh allowed,¹²¹ but the influential views of opinion leaders who, Finer suggests, deliberately manipulated the nineteenth-century decision-making process to give legitimacy to their ideas. This was done by irradiation: small knots of Benthamites in salons, committees and associations infused a wider circle of men with enthusiasm for their ideas; suscitation ('to quicken, vivify, animate'): they arranged public inquiries and press publicity to create favourable public opinion; permeation: they secured official employment for themselves and used the position for further *irradiation and suscitation*.¹²²

While not suggesting that Galton was a Benthamite, it seems clear that he and Spearman, acting independently, used the same tactics, which, fifty years afterwards, had moved along the road from being half-formed pioneering notions to being the standard channels by which public opinion and government were (and are) influenced. Galton was a committee member or officer of at least the Anthropological Institute and the British Association. His talks to the Anthropological

120. H. Parris, 'The Nineteenth-Century Revolution in Government: A reappraisal reappraised', Historical Journal, 1960, p. 33.

121. Ibid., p. 27.

122. S.E. Finer, 'The transmission of Benthamite ideas 1820-1850'. in Gillian Sutherland (ed.) Studies in the Growth of Nineteenth-Century Government, London 1972, p. 13.

Institute and the Royal Institution were published in their Proceedings and in the quality press. Spearman wrote articles in gentlemen's magazines and persuaded influential opinion leaders to see anthropometry for themselves. Garson, a professional colleague of Galton, secured official employment.

Their success was limited for reasons outside their control. Monro was right, anthropometry (for criminal record purposes at least) was a scientific fad, though it is still used in anthropology and nutritional studies of children. Criminal anthropometry became less accurate when not supervised by Bertillon's paternal attention and it was superseded by a cheaper and more accurate system which was put in the hands of the police, not the independent scientific expert, for practical and financial reasons. That the individuality of fingerprints had not in fact been proved passed everyone by. The publicity campaign was more successful than it should have been and even the villains did not think to challenge them in court.¹²³ Only the aggrieved Garson tried, with a humiliating result that had nothing to do with the evidential value of fingerprints.

123. When first offender Green of Gloucester was proved by fingerprints to be none other than old lag Brown of Birmingham in 1903, he said 'Bless them fingerprints, I knew they'd do me in'. Lambourne, Fingerprint, p. 69.

Chapter 10

The creation of 'forensic science'

Difficulties in obtaining willing and experienced scientific help to combat the growing crime rate in the late 1920s led to the creation of a scientific laboratory for the Metropolitan Police in 1935. This was to be the first of several laboratories round the country aimed at providing a comprehensive scientific support service to the police. In London the Commissioner of the Metropolitan Police and others wanted the service linked to a central medico-legal institute under the auspices of London University. These plans were not completely realised. Development of the laboratory system was slow until after the Second World War and the laboratories, in any case, ran alongside the former ad hoc system whereby some forces used public analysts or, in London, the Department of the Government Chemist and other experts when necessary. The medico-legal institute was never built and the initial, and intended, medical bias in the new system became more than balanced by scientific expertise of different kinds as each of the new laboratories was set up.

In fact, despite good intentions, the new system did nothing in its early days to improve conditions for those working in forensic medicine at all levels. Nor did the creation of a forensic science service lead quickly to a group identity of 'forensic scientists' in those working in the laboratories. The new service failed to provide training for either criminal forensic medicine or forensic science, though as the Forensic Science Service pulled away from its association

with forensic medicine after 1946 it gradually took on a sense of its own identity, even without specialised training, while forensic medicine continued to decline.

1. The decline of twentieth-century forensic medicine

Before the First World War there had emerged four types of practitioner of forensic medicine. At the elite end were the Home Office Analysts performing a variety of functions apart from court-directed analysis. Next in pecking order were the special pathologists with Bernard Spilsbury at the top on an equal footing in court with William Willcox, the Senior Analyst. The two men were engaged together on the most sensational trials of the early twentieth century: Crippen (1910), the Seddons (1912), G.J. Smith (1915 - the brides in the bath) and Armstrong (1922), Willcox's last major case. At a grass roots level there were the police surgeons, most numerous in London where in 1888 there were 190,¹ and general practitioners practising forensic medicine in the natural course of their work. These doctors were increasingly finding their time taken up with assessments under the Workmen's Compensation Acts of 1897 and 1906, i.e. medical witnessing in the civil courts, whereas the work of the forensic medical specialists tended towards serving the police.

Training was poor at all levels, as Chapters 4 and 5 have shown, and declined in Edwardian times. Nor could specialists make an easy living. The celebrity status of Spilsbury and Willcox in the era of

1. R.D. Summers, History of the Police Surgeon, Association of Police Surgeons of Great Britain, 1988, p. 5.

what Gee and Mason call 'the cult of the omniscient expert',² masked the fact that criminal forensic medicine was struggling for existence.

Spilsbury's 'Home Office appointment', though assumed as fact by Browne and Tullett,³ was informal and was only formalised in July 1922 after his move to Bart's to become a full-time special pathologist. He was knighted in January 1923⁴ following over thirty successful cases from 1919 to 1923.⁵ He appears to have been the only full-time medico-legal specialist at this time. Alfred Swaine Taylor had been the last.

Spilsbury's Home Office appointment was honorary; he received only his fees for individual cases and £100 per year towards the upkeep of a laboratory.⁶ Even Willcox combined his Home Office role with his duties as a hospital physician and lecturer not just in forensic medicine but in public health and chemical pathology.⁷ Just as in the 1860s the subject had to compete for space in the medical education curriculum with exciting and ever-increasing developments in medicine, as Willcox

2. D.J. Gee and J.K. Mason, The Courts and the Doctor, Oxford 1990, p. 25.

3. D.G. Browne and E.V. Tullett, Bernard Spilsbury: His Life and Cases, p. 59.

4. Times, 1 January 1923, p. 16a.

5. Browne and Tullett, pp. 128-137.

6. Ibid., p. 219. In a personal communication P.H.A. Willcox, author of his father's biography, The Detective-Physician, London 1970, said that Spilsbury did not normally employ a secretary and was always hard up.

7. Z. Cope, The History of St Mary's Medical School, London 1954, p. 236.

had described⁸ and forensic medicine for the criminal courts had, as always, problems in attracting funding from central government.

Both pathology and Home Office analysis had trouble in attracting new recruits. There was no formal postgraduate training for special pathologists and the work involved 'unsocial hours, no career structure and inconvenient court appearances where they can be cross-examined'.⁹ Moreover there appears to have been some uneasiness between the clinical and special pathologists. Professor Keith Simpson, of Guy's Hospital, speaking of a time before 1930 noted:

Few pathologists indeed thought of forensic pathology as an academic domain and painfully little research came from those who specialised in, or who had any experience in, the subject; far from enjoying the respect and help it needed from its elders in clinical pathology, the speciality was despised by them for its divorce from the university schools.¹⁰

The work was badly paid and in some cases a fee was not asked, some London pathologists performing medico-legal work as part of their university duties.¹¹ The reasoning behind this was explained by Professor J.A. Cameron of London Hospital:

8. See Chapter 5.

9. A.K. Mant, 'A survey of forensic pathology in England since 1945', Journal of the Forensic Science Society, 1973, p. 22.

10. C.K. Simpson, 'The changing face of forensic medicine, 1930-1960', Guy's Hospital Reports, 1963, p. 338. Simpson's Forty Years of Murder (London 1980) describes how he was taught by John Ryffel, the Junior Analyst, p. 33.

11. G.J. Wasserman, 'Forensic pathology - a service?', Medico-Legal Journal, 1990, p. 206.

We are basically university employees, employed on behalf of the coroner and all fees are paid into the university. Up till now [1989] the police have not had to pay from any of their funds for any investigation that we have carried out on their behalf Many of the pathologists within the London area appreciate that independence from the police in that we can quite readily advise the defence or advise the prosecution, far more readily than if we had a Home Office retainer. We do not need to check with anybody to see if we can appear for the other side.¹²

The Home Office Analysts were also worrying about the future of their speciality as there was no one coming up to replace Gerald Roche Lynch and John Ryffel, both nearing retirement.¹³ The Medico-Legal Society hoped to found a Medico-Legal Institute in London to ensure proper training for forensic medicine - a compulsory degree or diploma for pathologists, for example - and to ensure independence from the Crown. The Institute was intended to serve the pathological and toxicological needs of the whole country and it was important to members that it should be under the University of London rather than the Home Office or the police to avoid any suggestion of bias.¹⁴ Where to find funding was

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12. Home Office Affairs Committee on the Forensic Science Service, Session 1988-89, 26-I, p. 162.
 13. 'Dr Roche Lynch and Dr Ryffel have no deputies coming on and if anything happens to them it will be left to chance whether a suitable successor can be found', W. Willcox, speaking at the medico-legal institute debate at a meeting of the Medico-legal Society in November 1936, Medico-Legal Journal, 1937, p. 44.
 14. W.G. Barnard, 'The Medico-Legal Institute', and following debate, Transactions of the Medico-Legal Society, 1937, p. 43.

the weakest part of the Society's scheme. The real trouble, as Dr Laetitia Fairfield put it:

is that it is nobody's business to put down the money for the initial cost necessary to create such an institute as this in England. It would mean a quite substantial capital sum to get a medico-legal institute started and ... the real difficulty is that none of the various persons concerned in London - mainly the Home Office, London County Council, or the University of London - feel that it is quite sufficiently their own concern to justify them in the large initial capital expenditure.¹⁵

2. The scientific laboratories

When the impetus for action finally came it was from the Home Office. Arthur Dixon, Assistant Under-Secretary of State at the head of the Police Department, alarmed at the rising crime rate, submitted proposals to the Home Secretary in 1929 for a police college with two scientific laboratories and a photographic department. This was followed up two years later by plans outlined at a chief constables' conference for regional laboratories in university towns. However, it was not until a like-minded Commissioner was appointed, Lord Trenchard, that the plans started to be realised.¹⁶

The first step was to set up a Departmental Committee to investigate the use of scientific aids by the police. Dixon chose C.T.

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15. Debate following F.T. Grey, 'The medico-legal expert in France', Medico-Legal Journal, 1931, p. 176.
 16. N.V. Ambage, 'The origins and development of the Home Office Forensic Science Service 1931-1967', PhD thesis, Lancaster 1987, pp. 36-42.

Symons to help him with this task. Symons was formerly Government Analyst in Ceylon and was experienced in supplying scientific evidence for prosecutions in much the same way that the Home Office Analysts were over here. In 1934 Dixon sent him out to the provinces to investigate the uses made of scientific aids by the police.¹⁷ A questionnaire was also sent out to the provincial forces. The Committee found that there were already small police laboratories in Cardiff, Bristol and Nottingham, but that in other places scientific support for police prosecutions was little used. When help was needed consultants were called in on an ad hoc basis, largely public analysts. The most experienced of these was apparently Professor W.H. Roberts, public analyst to Liverpool, who handled thirty police cases per year. Other men were academics called in from time to time on a case by case basis such as chemist J.B. Firth and botanist H.S. Holden of Nottingham or Professor F.G. Tryhorn of Hull.¹⁸ Commerce was represented too, by the expertise of London gunsmith Robert Churchill, who had been appointed firearms adviser to the Home Office in 1912 following the Sidney Street siege.¹⁹ In London most of the chemical work was undertaken by the Department of the Government Chemist, as the Inland Revenue Laboratory was called from 1911.²⁰ Payment of some of these regular consultants

17. Ibid., pp. 43-4.

18. Ibid., pp. 47-9.

19. See MacDonald Hastings, The Other Mr Churchill, London 1963.

20. The court work of the Laboratory increased over the years and when it became the Laboratory of the Government Chemist in 1959 this work was formally recognised by one of the five new divisions of the re-vamped laboratory 'Crown contracts, water, physical methods, forensic and technical services'. P.W. Hammond and H.

(Footnote Continued)

was haphazard. One analytical chemist was paid only in court fees, rather than by analysis, and so if his work resulted in a guilty plea he received nothing. J.M. Webster, the Sheffield police surgeon and pathologist received neither court nor post mortem fees.²¹

The benefits of and the need for a formal scientific support service for the police being proved, Dixon was able to get funding for the scheme. A Metropolitan Police laboratory was to be set up at Hendon in the grounds of the new police training college and a regional system was to be set up in the provinces, building on the existing laboratories, which would eventually be paid for half from the Exchequer Grant and half locally.²² Dixon suggested that Roche Lynch, the Senior Analyst, should be in charge of the Metropolitan Laboratory. As an analytical chemist with a medical qualification he was the obvious choice. Trenchard, however, made further enquiries. He sent Assistant Commissioner Colonel Maurice Drummond to Glasgow and Edinburgh to consult Professors John Glaister and Sydney Smith, both eminent medical men and expert witnesses, the leaders of the forensic medical field in Scotland. Glaister recommended a medical man unreservedly for the post. He thought that Drummond's suggestion of Hull chemist Tryhorn absurd because he could be demolished in court, especially if the evidence for the defence was given by a medical man. Glaister himself was not interested in the London post as the salary was too low for him. Smith felt the same and recommended a more junior colleague Dr James Davidson.

(Footnote Continued)

Egan, Weighed in the Balance: A History of the Laboratory of the Government Chemist, HMSO 1992, p. 243.

21. Ambage, 'Origins', pp. 52-5.

22. Ibid., p. 139.

Davidson, a senior pathologist at Edinburgh Royal Infirmary, was experienced in medico-legal work and had worked with Smith for five or six years. Davidson, no doubt cheaper than Roche Lynch, and more medically oriented, was appointed head of the Metropolitan laboratory, which opened in April 1935 with a staff of six. Davidson's pathological experience was supplemented by the appointment of analytical chemist L.C. Nickolls who was seconded from the Government Laboratory. The police were represented on the staff by amateur scientist and enthusiast Detective Sergeant C.R.M. Cuthbert as police liaison officer. There was also a support staff of laboratory assistant, technician and clerk. Dixon was disappointed with Davidson's appointment. He had wanted more emphasis on chemistry and physics - it was property crime, mainly larceny, which was increasing in London, not offences against the person.²³ Norman Ambage suggests in his thesis that Trenchard was influenced towards a medical bias by Glaister and Smith (via Drummond) and by proponents of the ill-fated medico-legal institute scheme.²⁴ Trenchard was chairman of the advisory committee appointed in April 1935 to look into 'the manner in which the Laboratory for the Scientific Investigation of Crime ... may best be developed in the national interest'. Of the six pages of text in the report, four were taken up with plans for a medico-legal institute'.²⁵ Trenchard retired at the end of 1935 and the new Commissioner, Sir Philip Game, and his AC

23. In 1932 57 per cent of the 83,000 indictable crimes in the Metropolitan area were larcenies. (Metropolitan Police Commissioner's Annual Report for 1932, Statistical Tables.)

24. Ambage, 'Origins', pp. 70-8.

25. Report of the Advisory Committee on the Scientific Investigation of Crime, HMSO 1936. Spilsbury was also on the Committee.

(Crime) Sir Norman Kendall were unenthusiastic about the new laboratory.²⁶ Game thought it wrong to have a pathologist in charge and condemned Davidson as a poor witness and uninspiring lecturer, lacking the confidence of the DPP's office. He wanted the laboratory to be at New Scotland Yard instead of out at Hendon, and the pathological function dispensed with, using outside experts when necessary.²⁷

Once the Metropolitan Police Laboratory was running, and taking samples from other forces, the Home Office put in motion plans to establish regional laboratories. There had been resistance from the start to the idea that these should be headed by pathologists. Holden, appointed by Dixon as Forensic Science Adviser to the Home Office in January 1935, was against the idea of Smith coming down from Scotland to make recommendations for Lancashire. He felt he would suggest pathologists at Preston, Manchester and Liverpool, feeling that 'only medical men are really competent to deal with forensic work'.²⁸ The Treasury, however, had insisted that there should be no duplication of work within the regional laboratories²⁹ and as Birmingham was destined to be a centre for pathology with J.M. Webster as its director (from 1937),³⁰ Holden got his way with regard to Lancashire and chemist J.B. Firth was appointed director of the Preston laboratory.³¹

26. Ambage, 'Origins', p. 78.

27. Ibid., p. 85-6.

28. Ibid., p. 114, from HO 45, Holden to Dixon 21 December 1937.

29. Ibid., p. 99.

30. Ibid., p. 107.

31. J.B. Firth, A Scientist Turns to Crime, London 1960, p. 19.

The non-duplication principle led to a variety of expertise being appointed at each of the fully operational regional laboratories as they were established. Nottingham was the first to be 'regionalised' - i.e. with funds coming jointly from central and local funds - in 1938 with Holden as director. The existing laboratory at Bristol started to expand on the Nottingham model under the direction of Dr Parkes, from the analytical laboratory of the Royal Dental Hospital in London.³² Birmingham had pathology under Webster. Cardiff's police laboratory, founded in 1902, had been run since 1930 by Dr Wilson R. Harrison, a son of the Deputy Chief Constable, who specialised in document examination.³³

Before the laboratory system was established the Home Office Analysts had taken on new tasks which stretched their expertise, as Chapter 4 showed, and although Willcox and Webster escaped criticism, Simpson felt that chemist Roche Lynch had been 'persuaded disastrously to undertake glass, hair, fibres, dust and blood-grouping work of which he had no experience whatsoever'.³⁴ The coming of the new service did not mean that experienced people were suddenly found to perform these new tasks. It meant rather that additional people with suddenly legitimised expertise were now asked opinions on questions outside their experience. Nickolls and C.G. Daubney³⁵ at Hendon and Parkes at

32. Ambage, 'Origins', p. 108.

33. Ibid., p. 106.

34. Simpson, Forty, p. 33.

35. Daubney, like Nickolls, was seconded from the Department of the Government Chemist. H.J. Walls, Expert Witness, London 1972, p. 26.

Bristol, for example, were doing handwriting analysis and giving evidence on it.³⁶ However, as the new service could not provide comprehensive cover either in every aspect of the work or in every part of the country other expertise was still required. Ipswich, for example, was still using the local analysts in 1939, even though the Metropolitan Laboratory was available, though some distance away.³⁷ The Home Office Analysts were available as before until their role died out in 1954 and the work was taken over by the laboratories. Similarly, a small team of experienced pathologists was available, Spilsbury's solo expertise having now been augmented by Keith Simpson, Francis Camps and Donald Teare.³⁸

So despite the foundation of the Forensic Science Service there was (and is) still an ad hoc selection of freelance expert witnesses consulted from time to time, and the picture that emerges from the early days of the new service is not altogether one of superimposition of an ordered system from an authoritative centre on a hitherto higgledy piggledy network of local contacts - which may have been what was planned - but the creation of a new system which ran alongside the old and whose personnel were drawn, like MacDonagh's field executive, from 'some other original profession close, or as close as possible, to their new work'.³⁹ J.B. Firth's appointment at Preston was a typical example of this. In his memoirs he describes how he came to be appointed and

36. Ambage, 'Origins', pp. 168-70.

37. Ibid., p. 170.

38. 'The Three Musketeers', as Simpson styled them, Forty, p. 32.

39. O. MacDonagh, A Pattern of Government Growth 1800-60: The Passenger Acts and their Enforcement, London 1961, p. 333.

recalls his work prior to 1938 as a consultant to 'various authorities on water supplies, treatment and disposal of sewage, trade effluents and so on':

The work ultimately resulted in my appearance as scientific witness in a variety of courts, from magistrates' to Chancery, and at Ministry of Health inquiries. All this experience was apparently taken into account when I was being considered for my ultimate Home Office appointment. I spent many hours in the witness box; in one Chancery case I was in the box for two full days, undergoing examination, cross-examination and re-examination.... I was asked several times to help the Nottingham police, who were pioneers in seeking the help of a chemist. From these small beginnings I came to lecture various police forces on the means by which science could be used day by day against crime. In 1938 my sideline became my sole job; I was invited by the Home Office to start a Forensic Science Laboratory for the North West Area.⁴⁰

However, there are some problems fitting the new forensic scientists into a framework of MacDonagh's field executive. They were not involved themselves in applying some central regulation up and down the country, but were a support service to provincial forces which themselves had a complex relationship with the local police authorities and the Home Office.⁴¹ Furthermore, MacDonagh's model is firmly set in

40. J.B. Firth, A Scientist Turns to Crime, London 1960, p. 19.

41. See C. Emsley, The English Police: A Political and Social History, Hemel Hempstead 1991, Chapter 7, 'Policing mid-twentieth-century England', and Chapter 8, 'From local Bobby to state lackey?'.

the period before 1870 although some extension might justifiably be claimed. But the real problem is that the Forensic Science Service was planned from the centre, although some organic growth did creep in from the field after the war, as Ambage explains.⁴² But, like the Department of the Government Chemist, the forensic science laboratories also grew exogenously, more notably in the period after 1945, in that as they developed they began to take cases for local coroners, prisons, Customs and Excise, British Transport Police and Ministry of Defence Police.⁴³

Where the new service failed was in the matter of training. The evaporation of the idea for the medico-legal institute also evaporated the ideas for a postgraduate diploma in forensic medicine. The analysts' work was taken over by the laboratories but there was no substitute for the pathologist. Despite plans to remove him Davidson remained as director of the Metropolitan laboratory until his retirement in 1946 when he was replaced by Holden.⁴⁴ However, biographies of Spilsbury, Simpson and Camps⁴⁵ show that throughout Davidson's tenure they were active on the major cases, suggesting that Davidson's laboratory work had diverted him away from the actual practice of pathology. Pathology remained only at Birmingham. Otherwise the speciality had to manage the best it could, but without a method of training new recruits it threatened to die out altogether, especially in

42. Ambage, 'Origins', p. 311.

43. Home Affairs Committee, pp. vii, xxiv, Report.

44. Ibid., p. 217; Metropolitan Police Commissioner's Annual Report for 1946, p. 28.

45. Browne and Tullett, Bernard Spilsbury; Simpson, Forty; F.E. Camps, Camps on Crime, Newton Abbot 1973.

the years after 1945.⁴⁶ So choosing the medical model on which to base the new service, despite good intentions, disadvantaged forensic medicine by failing to provide medico-legal training and research. However, the government also failed to provide facilities for training and research for the new body of forensic scientists. This failure was probably due to the fact that the authorities did not recognise 'forensic science' as a new entity.

3. A sense of identity

The new executive did not instantly become 'forensic scientists'. Some already had a group identity as members of the medical profession, such as police surgeon and pathologist, or would have adhered to their earlier identity as 'analytical chemist' or 'botanist'. The term 'forensic science' itself was a young term in 1935. A Times leader on the opening of the Metropolitan Police Laboratory in April 1935 preferred 'police science':

Science in its application to police problems is usually labelled 'forensic', following the precedent of 'forensic medicine', but 'police science' (an anglicization of the French police scientifique) is a more comprehensive term. Police science may be said to have two sides, the forensic and the investigating, the one being the sphere of the expert witness and the other that of the police and scientists in co-operation. To speak of the latter as forensic tends to imply that the usefulness of science for police purposes is limited to what will constitute evidence in a

46. A.K. Mant, 'A survey of forensic pathology in England since 1945', Journal of the Forensic Science Society, 1973, p. 22.

court of law or be accepted by judge and jury as conclusive. This is far from being the case. The conclusions arrived at by laboratory examination of articles connected with a crime or other scientific tests or experiments may not in themselves be evidence but are often of the greatest assistance in bringing criminals to justice.⁴⁷

The phrase 'forensic science' was given official blessing in 1936 in the Home Office publication Scientific Aids to Criminal Investigation: Forensic Science Circulars No. 1, March 1936. Page one announced a series of 'forensic science circulars' and promised 'forensic science notes and circulation to forensic science laboratories'. The most significant marker of the development of forensic science as a separate cluster of sciences with an emerging group identity was the foundation of the Forensic Science Society in 1959 (and then its Journal in 1960) primarily aimed at those scientists concerned with the laboratories.⁴⁸

Before 'forensic science' was coined, then, in about 1935, all forensic science was subsumed under forensic medicine - even police science had been under medical control for the duration of Dr Garson's tenure at New Scotland Yard, and any other science in court was regarded as outside the universe of discourse. The emergence of the term 'forensic science' in the 1930s was accompanied by no firm guidelines as

47. Times leader 10 April 1935, p. 15. This is the earliest reference to the term that I have been able to discover. The term is now applied in the media to the investigation of disasters, possibly to suggest that a crime has been at the root of the incident. From the Times, 28 August 1990: 'Analysts and forensic experts from all over Yugoslavia converged here to discover the cause' [of the mine explosion].

48. Ambage, 'Origins', p. 284.

to whether it included forensic medicine or not, or whether forensic medicine included forensic science. The American Academy of Forensic Sciences at its foundation in Chicago in 1950 evidently decided that all were the forensic sciences (plural) and adopted the following sections: Forensic Pathology, Forensic Psychiatry, Forensic Toxicology, Forensic Immunology, Jurisprudence, Police Science and Questioned Documents.⁴⁹ The only common link seemed to be prosecutions by the police/Home Office/Director of Public Prosecutions. This narrow definition broadened at some point to include similar work for the defence,⁵⁰ but failed to include the vast amount of courtroom science, mainly analytical chemistry, done for civil suits and for prosecutions brought by other bodies like local government, Inland Revenue, Royal Mint, Post Office, HM Customs and Excise.

The historical reason for this exclusion was that Trenchard asked the advice of Glaister and Smith on the appointment of director of the first laboratory, echoing the Home Secretary's request to the Royal Colleges to nominate the Home Office Analysts fifty years before. If either men had asked the Institute of Chemistry a different reply might have been received and a different road might have been travelled. But the blinkered Dixon and Trenchard saw parallels only with laboratory forensic medicine and not with other science in court. It was not necessary that this laboratory medical model should have been followed

49. Journal of Criminal Law and Criminology, 1950-51, p. 477.

50. Independent forensic scientist Julius Grant widened the definition in 1973 to include himself: 'The independent forensic scientist is almost invariably called in by the defence in criminal cases brought by the police'. (J. Grant, 'Forensic scientist at large', Medico-legal Journal, 1973, p. 132)

for the new service. There was already a nationwide system of county analytical laboratories staffed by competent chemists experienced in court work. These laboratories, however, were not under the control of the Home Office and worked locally (as they still do) almost entirely independently of central government control,⁵¹ whereas London was conveniently the focus of forensic medicine and the home of the elite Medico-Legal Society, whose members included the Home Office Analysts. This meant that central control tended towards a medical bias, whereas non-medical scientific help seemed to be taken up more in the provinces using local networks and contacts.⁵² Left to organic growth the regional system could have expanded at a county level as a response to a growing need with little reference to central planning using the advice of such public analysts as W.H. Roberts in Liverpool or C.A. Mitchell in London.⁵³ If the service had developed along these ad hoc lines, it would have had the advantage of being seen as independent from the prosecuting state - an issue of long-term concern. The Home Secretary raised it in the Commons when announcing the appointment of the Home Office Analysts (see Chapter 4) and more recently the Medico-legal

51. Telephone interview with M. Barnett, public analyst for Bedfordshire.

52. Holden was originally consulted by a senior officer at Nottingham who wanted botanical advice on how to treat grass on cricket pitches. (Ambage, 'Origins', p. 54)

53. Charles Ainsworth Mitchell (1867-1948) was a chemist in the vinegar industry and was editor of the Analyst from 1920 to 1945. He wrote more than forty papers or books on inks, fibres, handwriting, oils, fats and fingerprinting. He was a member of the Medico-legal Society from 1911 and had been at one time joint editor of its journal and president of the Society. He was also one-time vice-president of the Medico-legal Society of France. (Analyst, 1948, p. 55)

Society's advocacy of a medico-legal institute under the auspices of the university was to avoid charges of bias. Roche Lynch was also afraid that the setting up of Home Office laboratories would lead to charges of bias,⁵⁴ and indeed these accusations have since been made.⁵⁵

3. Conclusion

The central theme that runs though this study is that central government, ultimately the Treasury, has failed to fund adequately criminal forensic medicine and, towards the ends of the period of review, forensic science. As independence from the central prosecuting body has been raised as an issue from time to time consideration must be given to this as a factor in the reluctance of the government to be seen hand in glove with the prosecution. However, earlier chapters showed that both central and local government bodies have a long history of prosecuting criminals, therefore other historical reasons must be sought. Where forensic medicine and public health, or 'medical police',

54. Ambage, 'Origins', p. 123. 'It had been the general impression of the Council [of the Institute of Chemistry], reinforced by the views of Roche Lynch, that scientists working in the proposed laboratories might be "compelled to produce evidence in favour of the police case"', from HO45 16215, R.L. Collett, Assistant Secretary of the IOC to Symons, 23 May 1935.

55. Forensic scientist Alan Clift, for example, was gently accused of bias in the 1980s when six of his cases were looked into by Margaret Pereira, director of the Forensic Science Service: 'He does not seem to have turned his mind to the possibilities of his evidence incriminating people - trusting that the police were always right in their initial suspicions', in J.H. Phillips and J.K. Bowen, Forensic Science and the Expert Witness, London 1985, p. 5. See also the discussion of the case in D.J. Gee and J.K. Mason, The Courts and the Doctor, Oxford 1990, p. 151. The debate continues currently in the Independent at least, whose leader on 4 February 1993 refers to 'challenges to the competence or integrity of forensic services employed by the Government', p. 22.

were institutionalised together in the last century in Scotland, France, Germany and Austria, forensic medicine found it easier to thrive and develop. However, forensic medicine's divorce from public health on the way to London from Edinburgh, and the private nature of the English medical profession, run by the Royal Colleges, counted against the development of forensic medicine as part of the re-organising state machine in the Victorian revolution in government as it was unable to compete for government funds. Attempts to reintegrate forensic medicine with public health in the 1860s were unsuccessful as a 'medical expert' practising forensic medicine failed to be incorporated alongside the 'medical officer'. In 1910 attempts to introduce a 'medical investigator' in the Coroners Bill failed with the Bill for different reasons, but by then teaching at an undergraduate level was in a decline and there was no postgraduate training and no original research.

However, it was not obvious in the early twentieth century that criminal forensic medicine was in such a bad state. The fame and standing of the Home Office Analyst and pathologist in an era marked by the 'cult of the omniscient expert' disguised the fact that criminal forensic medicine was struggling for existence. The standing that the leading forensic practitioners enjoyed seems to have roughly coincided with the era of the Home Office Analysts, 1882-1954. Before 1882 the leading medical witness, A.S. Taylor, came in for criticism in several of his cases for poor methodology and for witness bias in favour of the prosecution. The Christie case in 1954 and Evans' posthumous pardon began a steady decline in confidence in the criminal justice system, and forensic scientists have since been accused of poor methodology and witness bias as before. But this golden age of authoritative and unchallenged expertise cannot withstand close inspection. Stevenson's

confidence in Lipski's guilt in 1887 was not shared by campaigners for his pardon. Galton's 1892 exposition of the individuality of fingerprints was seriously flawed. Spilsbury's 1910 assertion that Mrs Crippen could be identified by a scar was challenged by a better pathologist than he and his skills have later been brought into question. Simpson criticised Roche Lynch's laboratory work in the 1920s and 1930s as being outside his field. The Home Office perhaps sought to perpetuate this golden age of the 'cult of the expert' by appointing Davidson, Smith's acolyte, but a closer examination of the current state of forensic medicine would have shown that they sought to perpetuate a myth, and a better understanding of the history of forensic medicine would have shown that they were basing the new forensic science on a failed model. The idea should at least have been considered to base the service on the county analysts, with the central Department of the Government Chemist called in as a court of reference. This arrangement is the only one which has been demonstrated to reduce crime of any sort and would have been free of charges of bias. Instead, the authorities clung to the advice of the medical profession, with the result that when the idea of integrating the new service with a central medico-legal institute failed, so did the plans for a postgraduate diploma in forensic medicine. The government failed also to make provision for training and research in forensic science, not recognising that something new was being created. It was only when forensic science began to cut free from forensic medicine when Holden was appointed in 1946, that it started to develop and slowly take on an identity of its own. Forensic medicine, meanwhile, continued to slide.

Appendix 1

The Experts

	Established	Original Paymaster
Metropolitan Police surgeon	1829	Met. Police
Excise chemist	1842	HM Excise
Public analyst	1860	Local Govt
HM Inspector of Explosives	1869	Home Office
HO Chemical Adviser	1872	Home Office
HO Analyst	1882	Home Office
Special pathologist	1884	HO/Coroners
HO Anthropometric Expert	1894	Home Office
Fingerprinting experts	1901	Met. Police
HO Gun Expert	1912	Home Office
Forensic scientists	1935	Met. Police

Appendix 2

Home Office Analysts

	Junior	Deputy	Senior	Hon. Medical Adviser
T. Stevenson (G)				1882-1908
C.M. Tidy (L)		1882-1892		
A.P. Luff (M)		1892-1908		
J. Webster (G/M)	1900-1915	1915-1919	1919-1927	
W.H. Willcox (M)	1904-1908		1908-1919	1919-1941
G. Roche Lynch (M)	1920-1927		1927-1954	
J.H. Ryffel (G)	1920-1955?			

Based on P.H.A. Willcox, The Detective-Physician, London 1970, p. 10.

G-Guy's Hospital

L-London Hospital

M-St Mary's Hospital

Appendix 3

Taylor's Medical Jurisprudence

Year	Edn	Title	Author/Editor	Position (as on title page)
1836	1	<u>Elements of MJ</u>	A.S. Taylor	Lecturer MJ & Chem Guy's Hospital
1844	1	<u>Manual of MJ</u>	A.S. Taylor	Lecturer MJ & Chem Guy's Hospital
1846	2	<u>Manual of MJ</u>	A.S. Taylor	Lecturer MJ & Chem Guy's Hospital
1849	3	<u>Manual of MJ</u>	A.S. Taylor	LRCP MRCS Professor MJ & Chem Guy's
1852	4	<u>Manual of MJ</u>	A.S. Taylor	Hon MD St Andrew's University LRCP MRCS Lecturer MJ & Chem Guy's
1854	5	<u>Manual of MJ</u>	A.S. Taylor	Hon MD St Andrew's University LRCP MRCS Lecturer MJ & Chem Guy's
1858	6	<u>Manual of MJ</u>	A.S. Taylor	FRCP MRCS Professor MJ & Chem Guy's Examiner in Chemistry University of London & Royal Coll. Vet. Surgeons
1861	7	<u>Manual of MJ</u>	A.S. Taylor	FRCP MRCS Professor MJ & Chem Guy's Examiner in Chemistry University of London & Royal Coll. Vet. Surgeons
1866	8	<u>Manual of MJ</u>	A.S. Taylor	FRCP Professor MJ & Chem Guy's
1874	9	<u>Manual of MJ</u>	A.S. Taylor	FRCP Lecturer MJ Guy's Hospital
1879	10	<u>Manual of MJ</u>	A.S. Taylor	FRCP Hon Member Medico-Legal Soc New York, Societe de Medecine- Legale of Paris, Medical Society of Sweden, late Lecturer MJ & Chem Guy's Hospital
1886	11	<u>Manual of MJ</u>	T. Stevenson (ed.)	MD(Lond) FRCP Lecturer MJ & Chem Guy's, Official Analyst to the Home Office
1891	12	<u>Manual of MJ</u>	T. Stevenson (ed.)	MD(Lond) FRCP Lecturer MJ & Chem Guy's, Official Analyst to the Home Office

Year	Edn	Title	Author/Editor	Position (as on title page)
1865	1	<u>Principles and Practice of MJ</u>	A. S. Taylor	FRCP Professor MJ & Chem Guy's Hospital
1873	2	<u>Principles and Practice of MJ</u>	A. S. Taylor	FRCP Lecturer MJ & Chem Guy's Hospital
1883	3	<u>Principles and Practice of MJ</u>	T. Stevenson (ed.)	MD(Lond) FRCP Lect. MJ & Chem Guy's Official Analyst to the HO
1894	4	<u>Principles and Practice of MJ</u>	T. Stevenson (ed.)	MD(Lond) FRCP Lect. MJ & Chem Guy's Scientific Analyst to the HO
1905	5	<u>Principles and Practice of MJ</u>	F.J. Smith (ed. & rev.)	FRCP FRCS Lect. MJ London Hospital Medical Referee to the Home Office
1910	6	<u>Principles and Practice of MJ</u>	F.J. Smith (ed. & rev.)	FRCP FRCS Lect. MJ London Hospital Medical Referee to the Home Office
1920	7	<u>Principles and Practice of MJ</u>	F.J. Smith (ed. & rev.)	FRCP FRCS Lect. MJ London Hospital Medical Referee to the Home Office
1928	8	<u>Principles and Practice of MJ</u>	S. Smith (ed. & rev.)	Regius Prof. For. Med. Univ, Edin. MD(Edin), FRCP Edin, DPH
1934	9	<u>Principles and Practice of MJ</u>	S. Smith (ed. & rev.)	Regius Prof. For. Med. Univ, Edin. MD(Edin), FRCP Edin, DPH
1948	10	<u>Principles and Practice of MJ</u>	S. Smith (ed. & rev.)	Regius Prof. For. Med. Univ, Edin. MD(Edin), FRCP Edin, DPH
1956	11	<u>Principles and Practice of MJ</u>	S. Smith (ed. & rev.) assisted by K. Simpson	Regius Prof. For. Med. Univ, Edin. MD(Edin), FRCP Edin, DPH MD Lond(Path), Reader in For. Med. Guy's Hospital
1965	12	<u>Principles and Practice of MJ</u>	K. Simpson (ed.)	MD Lon(Path), Reader in For. Med. Univ. London, Head of Dept. For. Med. Guy's Hospital
1984	13	<u>Principles and Practice of MJ</u>	A. K. Mant (ed.)	Professor MJ Guy's Hospital

Appendix 4

Fenian incidents 1881-1894¹

LIST of the more important OUTRAGES and ATTEMPTS, and suspicious cases of DISCOVERIES of EXPLOSIVES (exclusive of scares), which have engaged the attention of Her Majesty's Inspectors of Explosives during the Period 1881-1894, inclusive.

1881.

14 January.—An attempt to blow up the barracks at Salford by dynamite. The injury to the Salford Barracks was insignificant, but one boy was killed and another injured. (See Annual Report for 1881, page 46.)

16 March.—An attempt to injure the Mansion House, London, by a box containing from 15 to 20 lbs. of gunpowder. The touchpaper by which the gunpowder was to have been fired was extinguished by a policeman. (Ibid., page 47.)

16 May.—An attempt to blow up the police barracks at Liverpool with gunpowder in iron piping. The damage to the building was inconsiderable, and no one was hurt. (Ibid., page 48.)

10 June.—An attempt to blow up the Town Hall, Liverpool, by an infernal machine probably filled with dynamite. A great number of windows were broken, and some iron railings were destroyed, but no one was injured. The two perpetrators were captured. (Ibid., page 47.)

14 June.—A piece of iron piping filled with gunpowder exploded against the police station at Loanhead, near Edinburgh. Some windows were broken, but no other damage was effected. (Ibid., page 50.)

30 June.—An importation of six infernal machines at Liverpool from America in the "Malta," concealed in barrels of cement. They contained lignin dynamite, with a clockwork arrangement for setting it. (Ibid., page 50.)

2 July.—An importation of four similar machines at Liverpool in the "Baravia." (Ibid., page 50.)

15 August.—A large sandboat moored in the Tay at Perth, blown up with dynamite. The perpetrator was convicted and sentenced to 12 months' imprisonment. (Ibid., page 47.)

8 September.—An attempt to produce an explosion at the barracks, Castlebar. A canister containing gunpowder was thrown over the wall, close to the magazine. The lighted fuze which was attached fell out, and no harm was done. (Ibid., page 47.)

1882.

18 February.—Boxes fitted up as infernal machines sent to various persons in Edinburgh, by a man who was afterward convicted of the offence and sentenced to 20 years' penal servitude. About eight persons were injured. (Annual Report for 1882, page 47.)

26 March.—An attempt to blow up Weston House, Galway, with dynamite in an iron pot enclosed in a sack. Five persons were afterwards convicted of the outrage. (Ibid., page 49.)

1. HM Inspector of Explosives Annual Report for 1894, p. 129ff.

Letterkenny.
Co. Donegal.

27 March.—A 6-inch shell charged with explosive thrown into a house in Letterkenny. The explosion caused considerable damage. (Annual Report for 1882, page 47.)

Police Barracks, Limerick.

2 April.—An attempt to destroy the police barracks in Limerick by bringing some dynamite on the window sill. (Ibid., page 47.)

Mansion House,
London.

12 May.—A discovery of a parcel containing 12 lbs. to 20 lbs. of gunpowder with lighted touch paper or fuze attached at the Mansion House, London. (Ibid., page 47.)

1883.

Glasgow Gas Works.

*20 January.—An explosion of lignin dynamite at Tradeston Gasworks, Glasgow, doing considerable damage. (Annual Report for 1883, page 48; Special Report, No. L, dated 14th March, 1883.)

Possil Bridge,
Glasgow.

*21 January.—An explosion of lignin dynamite at Possil Bridge, Glasgow. Two or three persons, passing, sustained slight injury. (Ibid., page 48.)

Buchanan Street Station,
Glasgow.

*21 January.—An explosion of lignin dynamite at Buchanan Street Station, Glasgow, in a disused goods shed. (Ibid., page 48.)

Local Government Board,
Whitehall.

15 March.—An explosion at the Local Government Board Office, Whitehall, causing considerable local damage. (Annual Report for 1883, page 48; Special Report, No. LI., dated 25th April 1883.)

Times News-
paper Office.

15 March.—An abortive explosion of lignin dynamite outside a window at the "Times" office. (Ibid.)

Liverpool
infernal
machines.

27 March.—Two infernal machines, containing 28 lbs. of lignin dynamite (probably home made), discovered at Liverpool. Four persons were convicted and sentenced to penal servitude for life. (Annual Report for 1883, page 49.)

Manufacture of
nitro-glycerine
at Birmingham.

5 April.—The discovery of a factory of nitro-glycerine at Birmingham, and of a large amount of nitro-glycerine brought thence to London. The occupier of the house and others were subsequently convicted and sentenced to penal servitude for life. (Annual Report for 1883, p. 7.)

Underground Railway,
Westminster.

. 30 October.—An explosion in the Metropolitan Railway, between Charing Cross and Westminster, unattended with personal or serious structural injury. (Ibid., page 49; Special Report, No. LV., dated 17th November 1883.)

Underground Railway,
Praed Street.

30 October.—An explosion on the Metropolitan Railway, near Praed Street. Three carriages sustained serious injury, and about 62 persons were cut by the broken glass and débris, and otherwise injured. (Ibid., page 49.)

Westminster
infernal
machines.

22 November.—Two infernal machines discovered in a house in Westminster, occupied by a German named Wolff. Two men were tried and in the result the jury disagreed and a *nolle prosequi* was entered on behalf of the Crown. (Annual Report for 1883, page 50.)

1884.

Primrose Hill Tunnel.

16 January.—The discovery of some slabs of Atlas Powder A. (American make) in Primrose Hill tunnel.

London railway stations;
outrages;
Victoria.

26 February.—An explosion in the cloak room of the London, Brighton, and South Coast Railway at Victoria Station of Atlas Powder A. (American make), left in a bag or portmanteau. (Annual Report for 1884, page 37; Special Report, No. LIX., dated 8th March 1884.)

Charing Cross.

27 February.—The discovery of a bag containing some Atlas Powder A., with clockwork and detonators at Charing Cross Station. (Ibid., page 37.)

Paddington.

29 February.—A similar discovery at Paddington Station. (Ibid., page 37.)

Ludgate Hill.

1 March.—A similar discovery at Ludgate Hill Station. (Ibid., page 37.)

Birkenhead.
(Daly's
bombs.)

11 April.—A discovery of three metal bombs, containing dynamite (probably American make), at Birkenhead, in possession of a man named Daly, who was afterwards sentenced to penal servitude for life. (Annual Report for 1884, page 38.)

* In connexion with these three explosions, 10 persons were subsequently convicted. (See Annual Report for 1883, p. 45.)

1884—cont.

30 May.—An explosion of dynamite at the Junior Carlton Club, St. James' Square. About 14 Junior Carlton Club persons were injured. (Annual Report for 1884, page 38; Special Report, No. LXII., dated 10th June 1884.)

30 May.—An explosion of dynamite at the residence of Sir Watkin Williams Wynn, St. James' Square. (Ibid., page 38.)

30 May.—An explosion of dynamite in a urinal under a room occupied by some of the detective staff in Scotland Yard. It brought down a portion of the building, besides severely injuring a policeman and some persons who were at an adjacent public house. (Ibid., page 37.)

30 May.—A discovery of Atlas Powder A., with fuze and detonators, in Trafalgar Square. (Ibid., Trafalgar Square, page 38.)

29 November.—An attempted destruction of a house at Edenburn, near Tralee, occupied by Mr. Hussey. The injury, which was doubtless accomplished with dynamite, was less serious than was intended, and no one sustained bodily harm. (Annual Report for 1884, page 38; Special Report, No. LXVIII., dated 5th December 1884.)

13 December.—An explosion of a large charge of dynamite or other nitro-compound under London Bridge, fortuately doing very little damage. (Ibid., page 38.)

1885.

2 January.—An explosion in the Gower Street tunnel of the Metropolitan Railway, caused by about 2 lbs. of some nitro-compound fired apparently by a percussion fuze. Damage inconsiderable. (Annual Report for 1885, page 58.)

24 January.—An explosion in the Tower of London, caused, beyond all reasonable doubt, by about 5 to 8 lbs. of Atlas Powder A. (American make). Three or four persons were slightly injured and considerable damage was done to the Armoury. (Annual Report for 1885, page 59.)

24 January.—An explosion of a similar amount of Atlas Powder A. (American make), in Westminster Hall. Three persons were injured severely, and others slightly, and very considerable damage was done to the Hall and surroundings. (Ibid., page 59.)

24 January.—An explosion in the House of Commons (probably caused by a similar amount of the same explosive). No persons were injured, but very considerable damage was done to the Houses of Parliament. (Ibid., page 59.)

In connexion with these three last-named outrages two men (Burton and Cunningham) were afterwards convicted and sentenced to penal servitude for life. (Ibid., page 59.)

10 February.—A discovery of dynamite (of American make), in a house in Harrow Road, Paddington. (Ibid., page 59.)

9 March.—A discovery of Atlas Powder A. in the roof of a sawmill at Bootle. (Ibid., page 60.)

23 April.—Explosion of an infernal machine containing gunpowder, at Admiralty, Whitehall. Mr. Swainson, in whose room the explosion occurred, sustained severe injuries, and the room and neighbouring apartments were much damaged. (Ibid., page 59.)

1886.

24 March.—Attempted injury with blasting gelatine to the house of Mr. Tyzack, manager of the South Medomsley Colliery, Durham. (Annual Report for 1886, page 41.)

23 June.—An attempted injury, by explosion of dynamite, of new reservoir in connection with some new waterworks at Callington. (Ibid., page 41.)

12 July.—Bottles filled with gunpowder thrown among the crowd at an Orange demonstration at Londonderry. Derry. (Ibid., page 41.)

1 September.—Two attempts to injure residents by means of an iron pipe charged with powder and fuzed. (Ibid., page 41.)

1887.

- Dudley. 27 January.—Injury to three shops at Dudley by malicious explosion of gunpowder. (Annual Report for 1887, page 45.)
- Harlech. 1 January.—An explosion maliciously effected (by means probably of guncotton or dynamite) in the streets of Harlech. (*Ibid.*, page 46.)
- Kildysart,
co. Clare. 17 February.—Attempted dynamite outrage at Paradise House, near Kildysart, co. Clare (the residence of the Recorder of Galway). (*Ibid.*, page 44.)
- Walton, near
Preston. 20 March.—Injury to a man at Walton, near Preston, by an infernal machine. (*Ibid.*, page 45.)
- Preston. 8 March.—Attempted injury by tonite to canal near Preston. (*Ibid.*, page 44.)
- Newcastle,
West. 21 April.—Malicious explosion of gunpowder at houses at Newcastle, West, occupied by Mr. John Murphy. (*Ibid.*, page 45.)
- Hebburn. 4, 21, and 24 May.—Three outrages with explosives at Hebburn, Durham. (*Ibid.*, page 45.)
- Llanerchy-
medd. 27 July.—Attempt to injure the police station at Llanerchymedd by means of gunpowder. (*Ibid.*, page 45.)
- Ennis. 16 August.—Attempt to injure railway bridge at Ennis with dynamite. (*Ibid.*, page 45.)
- Cavan. 23 October.—Malicious explosion at the house of County Inspector Ridge, Royal Irish Constabulary, at Cavan. (*Ibid.*, page 44.)
- Case of Callan
and Harkins. 20 November.—Discovery of conspiracy between Callan and Harkins to commit an outrage or outrages by means of dynamite. (*Ibid.*, page 46.)
- Listowel. 6 December.—Attempt to injure the residence of the High Sheriff of Kerry, at Listowel. (*Ibid.*, page 45.)
- Macroom. 16 December.—Explosion of an infernal machine on the premises of a person at Macroom who had offended the Land League. (*Ibid.*, page 45.)
- Birkenhead. 16 April.—Explosion of gunpowder on the premises of a Mr. William Maddocks, contractor, Birkenhead, probably intended to cause alarm rather than real damage. (*Ibid.*, page 45.)
- Bodvain Rec-
tory (Denbigh-
shire). August.—An outrage was perpetrated at Bodvain Rectory, Denbighshire, by exploding some substance against a window. (*Ibid.*, page 46.)

1888.

- Ireland. 18 and 23 February, 18 September, and 6 December.—Fire minor outrages or suspicious circumstances suggesting intended attempts at explosive outrages in Ireland.—at Ennis, Listowel, Letterkenny, Coleraine, and Skibbereen. (Annual Report for 1888, page 44.)
- Trooper's Hill,
St. George,
Gloucester-
shire. 29 April.—A small charge of gunpowder exploded close to a new small-pox hospital, Trooper's Hill, St. George, Gloucestershire. (*Ibid.*, page 44.)

1889.

- Tipperary. 7 September.—Explosion of an infernal machine in Mr. Smith-Barry's office, near Tipperary. (Annual Report for 1889, page 41.)
- Near Wood-
ford, co.
Galway. 18 November.—Attempt, by means of an infernal machine, to blow up the police and bailiffs engaged in carrying out evictions on Lord Clanricarde's estate near Woodford, co. Galway. (*Ibid.*, page 40.)
- Rochdale. 28 November.—Attempt to explode infernal machine at Rochdale School Board Office. (*Ibid.*, page 41.)

1890.

- Macroom. 27 January.—Explosion of infernal machine in main street of Macroom. (Annual Report for 1890, page 41.)
- Toome, co.
Antrim. 22 March.—Destruction of a hut at a railway crossing near Toome station, co. Antrim, by malicious explosion. (*Ibid.*, page 41.)

1890—cont.

- 17 July.—Attempt to do injury or to create alarm by means of an infernal machine at the Falmouth Custom House. (*Ibid.*, page 41.)
- 25 September.—Explosion of a stone jar filled with gunpowder on window sill of a surgery occupied by Chairman of Town Commissioners, Tipperary. (*Ibid.*, page 42.)
- 9 October.—Attempted outrage, by means of blasting powder, on the premises of a baker at Templecombe. Templecombe. (*Ibid.*, page 42.)

1891.

- 15 January.—Malicious injury, by explosion, to the Dawsholm Gasworks, near Glasgow. (Annual Glasgow Report for 1891, page 40.)
- 3 July.—Personal outrage, by the explosion of a detonator, to a woman in the streets of Sunderland. Sunderland. (*Ibid.*, page 40.)
- 25 October.—Injury to offices of "National Press," in Dublin, by means of an explosive thrown into the building. (*Ibid.*, page 40.)
- 5 November.—Malicious explosion of tonite in the house of a police constable, and other houses at Crocombe, Crocombe, Somerset. (*Ibid.*, page 40.)
- 31 December.—Malicious explosion in the offices of the Chief Secretary, Dublin Castle. (*Ibid.*, Dublin Castle, page 39.)
- December.—Discovery of a packet of dynamite, with fuze, in the Dublin Post Office. (*Ibid.*, Dublin Post Office, page 40.)

1892.

- 29 January.—Explosion of infernal machine at private residence near Bristol. (Annual Report Bristol for 1892, page 53.)
- 24 March.—Conviction of anarchists at Walsall for being in possession of explosives for unlawful purposes, under Explosive Substances Act, 1883. (*Ibid.*, page 53.) Walsall anarchists.
- 5 April.—Explosion of infernal machine during Durham mining strike at house at Castle Eden Colliery. (*Ibid.*, page 53.) Castle Eden Colliery.
- 5 June.—Explosion of dynamite or gelatine cartridge in doorway of house at Inverkeithing. (*Ibid.*, Inverkeithing, page 54.)
- 5 August.—Explosion of a quantity of gunpowder on window-sill of an hotel at Rathkeale. (*Ibid.*, Rathkeale, page 54.)
- 12 August.—Explosion of a quantity of gunpowder in a miner's house at Low Spennymoor. (*Ibid.*, Spennymoor, page 54.)
- 24 December.—Explosion of infernal machine outside the Detective Office in Exchange Court, Dublin Castle. Dublin. One detective officer was killed. (*Ibid.*, page 53.) Dublin Castle.

1893.

- 19 April.—Discovery of a tin can containing about 10½ lbs. of gunpowder, with an arrangement for exploding it, on the line at the Newport end of the Gair tunnel. (Annual Report for 1893, Monmouth. Page 62.)
- 6 May.—Explosion of an infernal machine at the Four Courts, Dublin, situated on the north bank of the Liffey, at Inns Quay. (*Ibid.*, page 62.) Four Courts Dublin.
- 22 July.—Death of a man at Broadstairs, from the explosion of an infernal machine which had been sent to him by post. (*Ibid.*, page 62.) Broadstairs, Kent.
- 28 July.—Explosion of a detonator in a public-house at Great Bridge, causing serious injury to three men. (*Ibid.*, p. 63.) Great Bridge Staffordshire.
- 27 August.—A cartridge, probably of tonite, was thrown into the garden of a farmhouse at Euxton Chorley, Lancashire. and a fragment hit a window. (*Ibid.*, page 63.)

1893—cont.

- Parr, near St. Helen's.
17 September.—The house of a colliery fireman at Parr was wrecked by the explosion of some explosive, probably roburite. (*Annual Report for 1893*, p. 63.)
- St. George's Cathedral, London.
1 October.—Explosion, without injury, of some unknown substance during the service at St. George's (Roman Catholic) Cathedral, London. (*Ibid.*, page 63.)
- Broad Oak Road, Parr.
20 October.—Explosion of roburite on window-sill of a house occupied by a colliery fireman at Broad Oak Road, Parr. (*Ibid.*, page 63.)
- Ovingham, Northumberland.
27 October.—Explosion of some substance placed on the window-sill of a house occupied by a gamekeeper, at Ovingham. (*Ibid.*, page 63.)
- Aldborough Barracks, Dublin.
26 November.—Discovery of a tin box containing dynamite, with fuze attached, at Aldborough Barracks, Dublin. (*Ibid.*, page 64.)
- Dalziel, Lanarkshire.
10 December.—An explosion of a malicious character outside the dwelling-house of a gasman, in Cowies Square, Craigneuk, Dalziel. (*Ibid.*, page 64.)

1894.

- Greenwich Park.
15 February.—Explosion of a bomb near Greenwich Observatory, killing the man who was carrying it. (*Annual Report for 1894*, page 64.)
- Bunwell, Norfolk.
— April.—Discovery of two tubes filled with gunpowder near the stained glass window of the village church of Bunwell. One man was arrested, tried, and acquitted. (*Ibid.*, p. 65.)
- Great Yarmouth.
3 April.—A bomb containing gunpowder, nails, and scrap iron, with burning fuze attached, was found on a window-sill of the Conservative Working Men's Club at Great Yarmouth. (*Ibid.*, page 65.)
- Farnara and Polti.
14 April.—Discovery of a metal bomb, in connection with which two men named Farnara and Polti were afterwards sentenced, the former to 20 and the latter to 10 years' penal servitude. (*Ibid.*, page 65.)
- Bryncethin, near Bridgend.
20 June.—Explosion of dynamite, placed in the cellar of the Dunraven Hotel, Bryncethin, by a drunken miner, who was arrested and sentenced to seven years' penal servitude. (*Ibid.*, p. 66.)
- Steam launch "Kate."
2 August.—Two tins containing gunpowder were exploded in a recess of the flues of the smoke-board of the "Kate," off Lerwick, doing slight damage. (*Ibid.*, page 66.)
- Post Office, 177, New Cross Road, S.E.
14 August.—Explosion of a packet placed in the letter-box of the Post Office at 177, New Cross Road, London, S.E. (*Ibid.*, page 66.)
- General Post Office, London.
27 August.—Discovery of a large Chinese cracker amongst collection of letters. General Post Office. (*Ibid.*, page 66.)
- Galway.
2 October.—Explosion of a tin of gunpowder in a house on the Clanricarde Estate, Galway. (*Ibid.*, page 66.)
- Walsall.
11 October.—Discovery of a gas tube containing gunpowder, with lighted fuze attached, on the window-sill of the Metropolitan Bank, Walsall. (*Ibid.*, page 66.)
- Tilney Street, Mayfair.
4 November.—Bomb outrage in Tilney Street, Mayfair, at the house of the Hon. R. Brett. No one was injured. (*Ibid.*, p. 67.)
- East Rainton, Durham.
15 November.—Two pieces of metal piping about 2" bore, and from 8" to 12" in length, filled with gunpowder, were placed on door-step and window-sill, and fired simultaneously, doing considerable damage. The author of the outrage being unable to plead, was ordered to be detained during Her Majesty's pleasure. (*Ibid.*, page 67.)
- Police Station, Whittingham, Northumberland.
18 November.—Some glass was broken, and a small hole made in the station yard, by an explosion which was attributed to a person who had been recently prosecuted by the police. (*Ibid.*, page 67.)
- Yorkshire, West Riding.
27 November.—Several attempts at outrages were made by, it was believed, some mischievous boys. (*Ibid.*, page 67.)

Galton's Finger Prints¹

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EVIDENTIAL VALUE

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proportion of 3 to 2. Consequently, by drawing one line down the middle and two lines across, each portion may be divided into six squares. Moreover, it will be noticed that the side of each of these squares has a length of about six ridge-intervals. I cut out squares of paper of this size, and throwing one of them at random on any one of the eight portions, succeeded almost as frequently as not in drawing lines on its back which comparison afterwards showed to have followed the true course of the ridges. The provisional estimate that a length of six ridge-intervals approximated to but exceeded that of the side of the desired square, proved to be correct by the following more exact observations, and by three different methods.

I. The first set of tests to verify this estimate were made upon photographic enlargements of various thumb prints, to double their natural size. A six-ridge-interval square of paper was damped and laid at random on the print, the core of the pattern, which was too complex in many cases to serve as an average test, being alone avoided. The prints being on ordinary albuminised paper, which is slightly adherent when moistened, the patch stuck temporarily wherever it was placed and pressed down. Next, a sheet of tracing-paper, which we will call No. 1, was laid over all, and the margin of the square patch was traced upon it, together with the course of the surrounding ridges up to that margin. Then I interpolated on the tracing-paper what seemed to be the most likely course of those ridges which were hidden

1. F. Galton, Finger Prints, London 1892, p. 103ff.

by the square. No. 1 was then removed, and a second sheet, No. 2, was laid on, and the margin of the patch was outlined on it as before, together with the ridges leading up to it. Next, a corner only of No. 2 was raised, the square patch was whisked away from underneath, the corner was replaced, the sheet was flattened down, and the actual courses of the ridges within the already marked outline were traced in. Thus there were two tracings of the margin of the square, of which No. 1 contained the ridges as I had interpolated them, No. 2 as they really were, and it was easy to compare the two. The results are given in the first column of the following table :—

INTERPOLATION OF RIDGES IN A SIX-RIDGE-INTERVAL SQUARE.

Result.	Double Enlargements.	Six-fold scale with prism.	Twenty-fold scale with chequer-work.	Total.
Right .	12	8	7	27
Wrong .	20	12	16	48
Total .	32	20	23	75

II. In the second method the tracing-papers were discarded, and the prism of a camera lucida used. It threw an image three times the size of the photo-enlargement, upon a card, and there it was traced. The same general principle was adopted as in the first method, but the results being on a larger scale; and drawn on stout paper, were more satisfactory and convenient. They are given in the second column of

the table. In this and the foregoing methods two different portions of the same print were sometimes dealt with, for it was a little more convenient and seemed as good a way of obtaining average results as that of always using portions of different finger prints. The total number of fifty-two trials, by one or other of the two methods, were made from about forty different prints. (I am not sure of the exact number.)

The results in each of the two methods were sometimes quite right, sometimes quite wrong, sometimes neither one nor the other. The latter depended on the individual judgment as to which class it belonged, and might be battled over with more or less show of reason by advocates on opposite sides. Equally dividing these intermediate cases between "right" and "wrong," the results were obtained as shown. In one, and only one, of the cases, the most reasonable interpretation had not been given, and the result had been wrong when it ought to have been right. The purely personal error was therefore disregarded, and the result entered as "right."

III. A third attempt was made by a different method, upon the lineations of a finger print drawn on about a twenty-fold scale. It had first been enlarged four times by photography, and from this enlargement the axes of the ridges had been drawn with a five-fold enlarging pantograph. The aim now was to reconstruct the entire finger print by two successive and independent acts of interpolation. A sheet of transparent tracing-paper was ruled

into six-ridge-interval squares, and every one of its alternate squares was rendered opaque by pasting white paper upon it, giving it the appearance of a chess-board. When this chequer-work was laid on the print, exactly one half of the six-ridge squares were masked by the opaque squares, while the ridges running up to them could be seen. They were not quite so visible as if each opaque square had been wholly detached from its neighbours, instead of touching them at the extreme corners, still the loss of information thereby occasioned was small, and not worth laying stress upon. It is easily understood that when the chequer-work was moved parallel to itself, through the space of one square, whether upwards or downwards, or to the right or left, the parts that were previously masked became visible, and those that were visible became masked. The object was to interpolate the ridges in every opaque square under one of these conditions, then to do the same for the remaining squares under the other condition, and finally, by combining the results, to obtain a complete scheme of the ridges wholly by interpolation. This was easily done by using two sheets of tracing-paper, laid in succession over the chequer-work, whose position on the print had been changed meanwhile, and afterwards tracing the lineations that were drawn on one of the two sheets upon the vacant squares of the other. The results are given in the third column of the table.

The three methods give roughly similar results, and we may therefore accept the ratios of their totals,

which is 27 to 75, or say 1 to 3, as representing the chance that the reconstruction of any six-ridge-interval square would be correct under the given conditions. On reckoning the chance as 1 to 2, which will be done at first, it is obvious that the error, whatever it may be, is on the safe side. A closer equality in the chance that the ridges in a square might run in the observed way or in some other way, would result from taking a square of five ridge-intervals in the side. I believe this to be very closely the right size. A four-ridge-interval square is certainly too small.

When the reconstructed squares were wrong, they had none the less a natural appearance. This was especially seen, and on a large scale, in the result of the method by chequer-work, in which the lineations of an entire print were constructed by guess. Being so familiar with the run of these ridges in finger prints, I can speak with confidence on this. My assumption is, that any one of these reconstructions represents lineations that might have occurred in Nature, in association with the conditions outside the square, just as well as the lineations of the actual finger print. The courses of the ridges in each square are subject to uncertainties, due to petty *local* incidents, to which the conditions outside the square give no sure indication. They appear to be in great part determined by the particular disposition of each one or more of the half hundred or so sweat-glands which the square contains. The ridges rarely run in evenly flowing lines, but may be compared to footways across a broken country, which, while they

follow a general direction, are continually deflected by such trifles as a tuft of grass, a stone, or a puddle. Even if the number of ridges emerging from a six-ridge-interval square equals the number of those which enter, it does not follow that they run across in parallel lines, for there is plenty of room for any one of the ridges to end, and another to bifurcate. It is impossible, therefore, to know beforehand in which, if in any of the ridges, these peculiarities will be found. When the number of entering and issuing ridges is unequal, the difficulty is increased. There may, moreover, be islands or enclosures in any particular part of the square. It therefore seems right to look upon the squares as independent variables, in the sense that when the surrounding conditions are alone taken into account, the ridges within their limits may either run in the observed way or in a different way, the chance of these two contrasted events being taken (for safety's sake) as approximately equal.

In comparing finger prints which are alike in their general pattern, it may well happen that the proportions of the patterns differ; one may be that of a slender boy, the other that of a man whose fingers have been broadened or deformed by ill-usage. It is therefore requisite to imagine that only one of the prints is divided into exact squares, and to suppose that a reticulation has been drawn over the other, in which each mesh included the corresponding parts of the former print. Frequent trials have shown that there is no practical difficulty in actually doing

this, and it is the only way of making a fair comparison between the two.

These six-ridge-interval squares may thus be regarded as independent units, each of which is equally liable to fall into one or other of two alternative classes, when the surrounding conditions are alone known. The inevitable consequence from this datum is that the chance of an exact correspondence between two different finger prints, in each of the six-ridge-interval squares into which they may be divided, and which are about 24 in number, is at least as 1 to 2 multiplied into itself 24 times (usually written 2^{24}), that is as 1 to about ten thousand millions. But we must not forget that the six-ridge square was taken in order to ensure under-estimation, a five-ridge square would have been preferable, so the adverse chances would in reality be enormously greater still.

It is hateful to blunder in calculations of adverse chances, by overlooking correlations between variables, and to falsely assume them independent, with the result that inflated estimates are made which require to be proportionately reduced. Here, however, there seems to be little room for such an error.

We must next combine the above enormously unfavourable chance, which we will call α , with the other chances of not guessing correctly beforehand the surrounding conditions under which α was calculated. These latter are divisible into b and c ; the chance b is that of not guessing correctly the general course of the ridges adjacent to each square, and c that of not guessing rightly the number of

ridges that enter and issue from the square. The chance b has already been discussed, with the result that it might be taken as 1 to 20 for two-thirds of all the patterns. It would be higher for the remainder, and very high indeed for some few of them, but as it is advisable always to underestimate, it may be taken as 1 to 20; or, to obtain the convenience of dealing only with values of 2 multiplied into itself, the still lower ratio of 1 to 2^4 , that is as 1 to 16. As to the remaining chance c with which a and b have to be compounded, namely, that of guessing aright the number of ridges that enter and leave each side of a particular square, I can offer no careful observations. The number of the ridges would for the most part vary between five and seven, and those in the different squares are certainly not quite independent of one another. We have already arrived at such large figures that it is surplusage to heap up more of them, therefore, let us say, as a mere nominal sum much below the real figure, that the chance against guessing each and every one of these data correctly is as 1 to 250, or say 1 to 2^8 (= 256).

The result is, that the chance of lineations, constructed by the imagination according to strictly natural forms, which shall be found to resemble those of a single finger print in all their minutiae, is less than 1 to $2^{24} \times 2^4 \times 2^8$, or 1 to 2^{36} , or 1 to about sixty-four thousand millions. The inference is, that as the number of the human race is reckoned at about sixteen thousand millions, it is a smaller chance than 1 to 4 that the print of a *single* finger of any given

person would be exactly like that of the same finger of any other member of the human race.

When two fingers of each of the two persons are compared, and found to have the same minutiae, the improbability of 1 to 2^3 becomes squared, and reaches a figure altogether beyond the range of the imagination; when three fingers, it is cubed, and so on.

A single instance has shown that the minutiae are not invariably permanent throughout life, but that one or more of them may possibly change. They may also be destroyed by wounds, and more or less disintegrated by hard work, disease, or age. Ambiguities will thus arise in their interpretation, one person asserting a resemblance in respect to a particular feature, while another asserts dissimilarity. It is therefore of interest to know how far a conceded resemblance in the great majority of the minutiae combined with some doubt as to the remainder, will tell in favour of identity. It will now be convenient to change our datum from a six-ridge to a five-ridge square of which about thirty-five are contained in a single print; 35×5^2 or 35×25 being much the same as 24×6^2 or 24×36 . The reason for the change is that this number of thirty-five happens to be the same as that of the minutiae. We shall therefore not be acting unfairly if, with reservation, and for the sake of obtaining some result, however rough, we consider the thirty-five minutiae themselves as so many independent variables, and accept the chance now as 1 to 2^{35} .

This has to be multiplied, as before, into the factor of $2^4 \times 2^3$ (which may still be considered

appropriate, though it is too small), making the total of adverse chances 1 to 2^{47} . Upon such a basis, the calculation is simple. There would on the average be 47 instances, out of the total 2^{47} combinations, of similarity in all but one particular; $\frac{47 \times 46}{1 \times 2}$ in all but two; $\frac{47 \times 46 \times 45}{1 \times 2 \times 3}$ in all but three, and so on according to the well-known binomial expansion. Taking for convenience the powers of 2 to which these values approximate, or rather with the view of not overestimating, let us take the power of 2 that falls short of each of them; these may be reckoned as respectively equal to 2^6 , 2^{10} , 2^{14} , 2^{18} , etc. Hence the roughly approximate chances of resemblance in all particulars are as 2^{47} to 1; in all particulars but one, as 2^{47-6} , or 2^{41} to 1; in all but two, as 2^{47-10} to 1; in all but three, as 2^{47-14} to 1; in all but four, as 2^{47-18} to 1. Even 2^{47-18} is so large as to require a row of nine figures to express it. Hence a few instances of dissimilarity in the two prints of a single finger, still leave untouched an enormously large residue of evidence in favour of identity, and when two, three, or more fingers in the two persons agree to that extent, the strength of the evidence rises by squares, cubes, etc., far above the level of that amount of probability which begins to rank as certainty.

Whatever reductions a legitimate criticism may make in the numerical results arrived at in this chapter, bearing in mind the occasional ambiguities pictured in Fig. 18, the broad fact remains, that a complete or nearly complete accordance between two prints of a single finger, and vastly more so between

the prints of two or more fingers, affords evidence requiring no corroboration, that the persons from whom they were made are the same. Let it also be remembered, that this evidence is applicable not only to adults, but can establish the identity of the same person at any stage of his life between babyhood and old age, and for some time after his death.

We read of the dead body of Jezebel being devoured by the dogs of Jezreel, so that no man might say, "This is Jezebel," and that the dogs left only her skull, the palms of her hands, and the soles of her feet; but the palms of the hands and the soles of the feet are the very remains by which a corpse might be most surely identified, if impressions of them, made during life, were available.

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