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Commercial Clinical Laboratories in Britain: The Clinical Research Association, 1894-1914¹

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The history of the emergence of clinical pathology laboratories after 1890 has been written around the growth of services provided by public health agencies and teaching hospitals. In this paper I discuss a neglected aspect of development for such services – those provided by private companies – and in particular the work of one London-based enterprise – the Clinical Research Association Limited (CRA). The current historiography of clinical pathology laboratories has two characteristics that this paper challenges: first, that the provision of such laboratories was supply-led, in other words, that services were developed by enthusiasts for laboratory medicine ahead of demand by clinicians. And second, that these enthusiasts stressed that the new laboratory methods were superior to traditional clinical methods of diagnosis. Instead, I will argue that the establishment and growth of the CRA was due to the entrepreneurial exploitation of a clear, though quite specific, demand from doctors and their patients; and second, that the promoters of the CRA went out of their way to avoid challenging clinical authority, seeking an accommodation where laboratory data was to be just another factor in a diagnosis.

The CRA was founded in September 1894 as a spin-off company from the Pathology Department of Guy's Hospital London. In the previous year, the Hospital's Post-Mortem Room Attendant, H. A. Hunt, had offered readers of the *Guy's Hospital Gazette* – a publication read by staff and former students of the Medical School – the opportunity of sending in morbid specimens for cutting, mounting and histological reports. Doctors were to be charged 2s 6d for the service, but were offered the possibility that their specimen might be discussed in the Gazette's advice column – 'From the Gazette's Special Pathologist'. The response was so great that Hunt's hospital work was compromised, so in January 1894 the Gazette announced that the fee was to be increased to 1 or 2 guineas (an 8- or 16-fold increase) so that reports could be commissioned from outside experts. In the spring, it was reported that the demand for bacteriological tests, especially of sputum for Tubercle bacilli, was proving greater than that for histological reports. It was a paradox that only in the wake of the embarrassing failure of Koch's laboratory-produced remedy of tuberculin in 1891, did the bacteriological diagnosis of tuberculosis begin to be widely used. In fact, the summer of 1894 was a high point for laboratory medicine in Britain, with the first reported successes with of diphtheria antitoxin, Herman Biggs's visit to London during which he described to envious audiences the new diagnostic services being provided in New York, and the laying, at last, of the foundation stone of the Lister Institute of Preventive Medicine. The latter,

¹ Talk given at the Annual Meeting of the American Association for the History of Medicine, Madison, USA, May 2, 2004.

styled as the British equivalent of the Pasteur Institute in Paris and the Koch Institute for Infectious Disease in Berlin, promised to make available bacteriological testing and research facilities in London and serve Britain as a whole.

This was a good moment, therefore, to exploit the commercial potential of laboratory medicine in London, especially for a service that did not antagonise antivivisectionists by using laboratory animals. This opportunity was seized by Charles H Wells, who at the time was Secretary to the Treasurer of Guy's, and who later became Clerk to the hospital's Governors. In September 1894, he established the Clinical Research Association Limited. Its prospectus claimed that the Association would place 'at the disposal of every practitioner in the Kingdom the services of a completely equipped physical laboratory' that would provide accurate laboratory reports to assist them in diagnosis. It worth commenting that the CRA saw the whole country as its market, though very soon there were competing companies in London, Liverpool and the West of Scotland.

A CLINICAL RESEARCH ASSOCIATION.

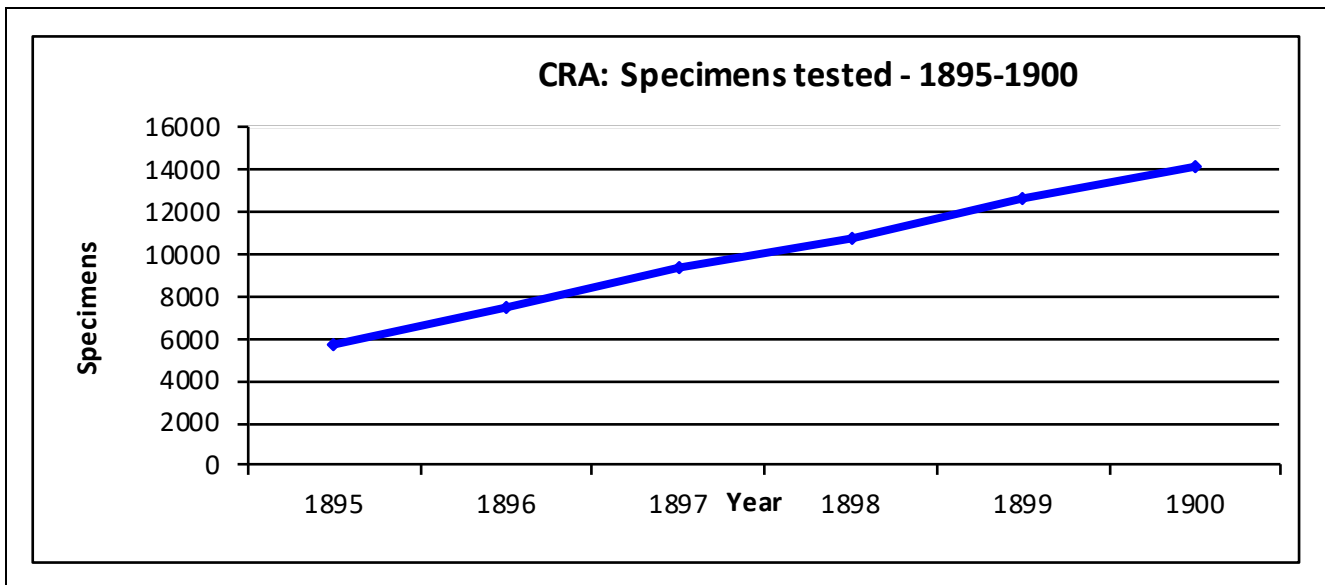
A CLINICAL RESEARCH ASSOCIATION has been formed with the object of assisting medical practitioners in the investigation and treatment of disease by furnishing trustworthy reports upon excretions, tumours, and other morbid products. A laboratory has been fitted up, and will be under the direction of Dr. J. Galloway, Mr. J. H. Targett, M.S., and Mr. F. G. Hopkins, B.Sc. The scale of charges submitted to us is remarkably low, ranging from half-a-crown for the quantitative estimation of sugar, albumen, uric acid, urea, the examination of a urinary deposit, or of sputum for tubercle bacilli, to seven and sixpence for the bacteriological examination of supposed diphtherial membrane, and a report by telegram. The scheme of the Association has the support and patronage of many distinguished physicians and surgeons, among others Sir James Paget, Dr. Wilks, Mr. Jonathan Hutchinson, Sir W. H. Broadbent, Sir George Humphry, and Dr. Clifford Allbutt. The progress of medical and surgical knowledge has already made it desirable for the conscientious practitioner to make chemical and microscopical examinations, especially for the purpose of diagnosis, in a considerable proportion of cases. These examinations make considerable inroads upon the too limited leisure of the general practitioner, and demand in some instances a special manipulative skill which he may not have had the opportunity of acquiring. Matters are not likely to be simplified in the future, and from another point of view it is a truism to say that future advances in diagnosis and treatment must be accomplished through increased accuracy and completeness of observation of individual cases. From every point of view, therefore, this new venture, founded not for individual profit but in the interests of clinical medicine, deserves wide support. The Association will

British Medical Journal, 15 September 1894, 601.

The CRA had an impressive list of senior clinicians as patrons, including Clifford Allbutt, Thomas Lauder Brunton, Jonathan Hutchinson, and William Broadbent, and senior Guy's figures including J. F. Goodhart and Sir Samuel Wilks. Its laboratories and offices were at 1 Stamford Street, along the road from Guy's and its telegraph address was 'Tubercle, London' – no doubt anticipating where it saw its principal market. The directors of its laboratories were J. H. Targett, a junior surgeon, and Frederick Gowland Hopkins, then a junior doctor who gave up the editorship of the *Guy's Hospital Gazette*

to take up the new post. Hopkins only worked for the CRA for a few months, moving to Cambridge to work under Michael Foster, beginning an illustrious career that saw him awarded the Nobel Prize in Physiology and Medicine for his work on vitamins. Targett, who subsequently became Obstetric Surgeon at Guy's and held many other posts in London, worked there until 1910. It seems that both Targett and Hopkins did their CRA work in the evenings. Targett maintained a busy hospital and consulting practice during the day and was amongst the most respected pathologists the capital, which helped give authority to the CRA's reports, especially on morbid growths and gynaecological cases. Hopkins left to take up an academic post at a provincial university where he worked on accessory food factors with some success. The CRA was not the only company that Wells founded; in 1897 he created 'The Medical Agency', a consultancy firm that advised on the financial and legal aspects of practice. Cameron's history of Guy's comments that Wells had 'an extraordinary capacity for organisation and tireless industry', and, it seems, an eye for making money from services to the medical profession. The CRA was 'a great success financially from the first', indeed, when Wells died in 1917, he left £59,000 to Guy's Medical School, equivalent today to £1.8M or over \$3M.

Any medical practitioner in Great Britain could join the CRA. Life membership cost 1 guinea, for which members received discounted rates on its diagnostic services, plus a box of bottles, metal postal cases and other apparatus for collecting and sending material to the laboratories. Wells had to negotiate with the Post Office to allow potentially dangerous specimens to be sent, hence the later addition of packaging that could be hermetically sealed. The CRA initially offered chemical, histological and bacteriological tests at set fees. In its first year, over 2,000 doctors joined the Association and they submitted over 5,000 specimens. The largest category was bacteriological tests (43%), then chemical analyses, mostly of urine, (32%), and lastly, histological examinations (25%). In the following year, over half of all specimens were bacteriological. The fees for the tests were said to be as low as possible and Wells suggested to doctors that they added the cost to their normal consultation fee. The scale of charges was presented, not by test, but by specimen, which made for an unattractive listing: 'Sputum, Urine, Blood, Pus, Vomit, Faeces, Hair and Skin, and Tumours and Diseased Tissues'. An indication of the level of charges can be gleaned from the most popular tests: detection of Tubercle bacilli cost members 2s 6d and non-members 3s 6d; general urine analysis – 5s 0d or 7s 6d, and basic histological examinations cost the same. Such charges would double or triple the cost of a consultation for a working-class patient, but represent only a marginal extra cost for middle- and upper-class patients. By 1900, the CRA was offering other clinical services, including "Rontgen (sic) Ray skiagrams", either at Southwark Street or at the patient's home, with a sliding charge for the length of journey, and no limit on the distances they would take their mobile equipment. The CRA could supply attendants who could help with the 'mechanical work' of post mortem examinations and a pathologist could also be hired to attend trials at the rate of 3 guineas per day in London and 5 guineas plus travel elsewhere. In addition to clinical pathology, the CRA was offering testing of drinking water, poison detection, and food analyses, as well as supplying other hospital laboratories with culture media and demonstration slides and culture plates. The CRA had diversified its operations, offering high margin clinical and laboratory support services, alongside its original diagnostic services, which had moved in some areas towards high volume, routine testing.



The demand for the CRA's services grew steadily, from over 5,000 specimens submitted in 1895 to 15,000 in 1900. Membership was truly national, though there was a preponderance of members from the south east. The growth in the number of tests came initially from a growth in the number of members, rather than an increase in the number of tests per member. In its first year, the average number of specimens each member sent in was 2.5, by 1900 this had risen to barely 3. I have not been able to locate sources that reveal what lay behind these figures; I do not know whether most members requested a couple of tests per year, or whether a few kept the laboratories busy and majority never sent anything. By 1900 membership stood at over 4,000, or one in three of doctors on the Medical Register, while 150 public bodies, especially local authorities and small hospitals, had also joined.

The use of the CRA for *ad hoc* pathological examinations was very evident in the medical press, where reports on specimens were often quoted in articles on clinical cases. Between 1894 and 1914, the Association was mentioned 245 times in the *British Medical Journal* and 157 in the *Lancet*. These reports covered the whole range of clinical pathology, including morbid anatomy, bacteriology, haematology, histology and biochemistry. Such articles were published by doctors from across the country and all types of practice, though it is likely that they were younger, more ambitious doctors using the latest methods and seeking publication of their interesting cases. The CRA was also used in less conventional areas; two notable examples were an investigation of the germ-carrying capacity of Harris Tweed as against other cloths and a strange case in 1907 where a woman in Boston, Lincolnshire.

‘Shortly after partaking of a dinner of boiled beef, carrots and potatoes lay down to rest, when she was seized with a choking sensation, and to her horror vomited a creature several inches in length of a dark yellow colour and with two bright eyes, and the thin part curled over the back in the form of a tail.’

Her doctor sent the ‘lizard’ away for examination and subsequently wrote that ‘the substance was reported by the Clinical Research Association to be a “vegetable leaf in a partial state of digestion’.

The growth in the demand for the CRA's services continued. When it moved to new premises in Watergate House in 1907; it was now reporting on over 25,000 specimens per year, mostly to private practitioners. Watergate House was an impressive structure and the Association occupied the top floors, having had an input into its design to ensure optimum conditions of light and asepsis. In the same year, the Association began sending out its *Journal of Clinical Research*, a quarterly publication that was distributed free to all members. Readers were told that the *Journal* would help update isolated practitioners by presenting, not just research findings, but information on the new diagnostic methods and standards. Needless to say, the *Journal* was also a good marketing tool. Doctors had only paid one guinea for life membership and further contact with the CRA depended on the submission of specimens. Hence, the *Journal*, a substantial 60-page publication that also carried advertisements, was a useful and regular reminder of the company and the progress of clinical pathology. At the same time, following the fashion for vaccine therapy, the CRA began to offer its own therapeutic products. As early as 1907 it had its own Opsonic Department offering the full system of Opsonic Index measurements and autogenous vaccine preparation, as developed at St Mary's Hospital by Almroth Wright. In addition, it produced the mass-produced stock vaccines, initially, tuberculins and Staphylococci vaccines, but by 1914 the CRA was offering around 10 tuberculins and over 20 other stock vaccines.



In its publications, the CRA continually refuted accusations that its services were damaging standards in medical practice. In 1896, an editorial in the *Guy's Hospital Gazette*, the very journal that had spawned the Association two years earlier, worried that amongst 'the thoughtful and less energetic [practitioners] there will be the very

serious temptation to abandon on their own part ... the examination of the specimen' and to rely on results from the CRA. It is, of course, debatable how many doctors had previously undertaken their own bacteriological, chemical or histological examinations; indeed, the editorial concluded, sarcastically, by pointing out the large number of CRA tests that had proved negative due to the incompetence of practitioners in preserving specimens appropriately before posting. One key issue here was 'how far the modern tendency to make the bedside observer and the laboratory investigator two separate persons is for the good of the persons or that of their joint patient'. Wells saw this as two issues, an economic one and a practical one. There was a common assumption that the public only wanted to pay for remedies and not for diagnoses, but Wells always argued that more accurate diagnoses would lead to more effective and cheaper therapies. With regard to the division of labour in medicine, Wells maintained that clinical laboratory work was either beneath or above the skills of the average doctor. He argued that many tests were routine and mechanical, and amenable to economies of scale. He drew a telling analogy, asking who would expect a poet to typeset, print, and then bind their own books? However, he quickly added many procedures demanded high levels of skill and experience, with the number of complex tests growing, and with these reliable results depended on high level expertise.

In its publicity, the Association always warned against too much reliance being placed on 'laboratory diagnoses, suggesting instead that it was better to think about a laboratory report as 'one more absolutely essential fact for the medical practitioner to add' to history-taking, symptoms and physical signs in making a diagnosis. An editorial in the CRA Journal in 1908 stated that 'clinical laboratory work was no penny-in-the-slot means of diagnosis', it required knowledge and skill, and careful interpretation alongside other evidence. I found only one example of a CRA 'Laboratory Report'; it was sent to a Dr M. Prickett of Oxford Square, London in October 1903. The Report was on a urine analysis that gives a qualitative description derived from a microscopic examination of urine, plus quantitative data on albumen and urea. The report was in private correspondence, so we know what Dr Prickett did with the Report he received. He forwarded it, with a covering letter, to the patient's husband. In the letter, Prickett maintained that the report supported his view that 'A M' was again suffering from inflamed kidneys. He had already prescribed a strong iron tonic 'to help the kidneys as well as strengthen her' and did not change his advice. It seems that this was the second laboratory report, as Prickett remarked that the albumen level had changed for the better and this would be a record against which future tests should be judged.

PRIVATE.

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The Clinical Research Association, Limited.

1. SOUTHWARK STREET,
LONDON BRIDGE, S.E.

13.10.03

LABORATORY REPORT.

To Dr. H. Prickett

The specimen

marked A.M. received

here on 13.10.03 has been duly examined, and I have
been instructed to forward the following Report thereon:—

Of albumen, there is a very large quantity, consisting
of the usual mixture of ser-albumen and ser-globulin.

In the centrifuged deposit tube casts are very numerous,
and practically all of the hyaline type, many of them, however, con-
tain a few epithelial cells. Free renal cells are fairly abundant,
and a few scattered red blood discs are noted. The remaining
constituents are a trace of pus, with some vesical cells and numer-
ous bacteria, the latter probably associated with the ordinary
decomposition of the urine.

Urea = 1.3% or 5.69 grains per oz

The charge for
this Report is
8/6

B. H. See
Secretary of the Association. *879*

Prepared Slides
enclosed,
if requested.

Telegrams:
"TUBEROLEX" LONDON.
TELEPHONE 2053 Hop.

In any further enquiry
respecting the Examina-
tion, please quote this
number:
596/10

Prickett also recommended that the patient visit Bournemouth, a south coast seaside resort which was a favourite location for the well-to-do to seek treatment and recuperate. Reinforcing the common observation that doctors were attracted to wealth as much as, if not more than, to ill-health, Bournemouth had the lowest doctor – patient ratio in the Britain. The cost of this CRA Report – 8s 6d – and that it had been placed by a Harley Street physician, for patients who could afford a stay in Bournemouth, indicates that such tests tended to be the preserve of the wealthy. The cost of a consultation with an ordinary general practitioner at this time varied with ability to pay, but 8s 6d was equal to the fee for a home visit for a well-to-do patient by a general practitioner, or one and half day's work for a skilled labourer. That the CRA was catering for elite practitioners and their patients can also be deduced from its mobile X-ray service – by 1900s most working class and lower middle-class people would have been prepared to attend hospitals for such examinations. Indeed, jumping ahead to how the CRA operated in the

1920s and 1930s, it then added the conversion of hotel rooms into operating rooms, as well as providing necessary staff and equipment.

The survival, growth and profitability of the CRA was testimony to the demand for bacteriological, chemical and histological laboratory tests amongst general practitioners and doctors in certain public medical services in Britain in the period 1894 – 1914. It has been suggested, not least by me, that Britain was slow to adopt laboratory methods into medical practice. This judgement may have to be revised, at least from 1895 onwards and for the elite doctors and patients. The CRA continued to grow steadily despite increased competition from laboratories in hospitals, universities and run by local authorities. And there were few competitors, its rivals were short-lived, so it developed a monopoly in the national market. Though it is telling that a single company was able to satisfy national demand for this type of service. The rising number of tests, along with its high profile and its commercial success a testimony to its success. Its main clients were elite clinicians with wealthy patients, or research-minded clinicians who would pay for the tests themselves and gain some recompense from publications. However, it was also used by general practitioners, consultants in small hospitals, and Medical Officers of Health in small local authorities that did not have their own service arrangements. While the 25,000 specimens received in 1907 seems an impressive figure, it represented only 100 specimens each working day for a laboratory servicing the whole country/ Put another way, there were an average of six tests per year per member – one every two months.

The work of the CRA confirms the now agreed view that in Britain the conflict between the clinicians and laboratory scientists was more rhetorical than real. The promoters of the CRA always maintained that their work provided additional evidence in making a diagnosis; it was never presented as a superior or alternative source of authority. In medical schools, in hospitals and in general practice, clinicians were more powerful socially and economically than laboratory pathologists. They were usually older, better connected, wealthier and more experienced than the younger, new qualified colleagues who worked in clinical laboratories. Indeed, it was observed that the turnover in such laboratories was very rapid as junior doctors used such posts as steppingstones – saving money, honing skills and making contacts – to move on to better clinical appointments.

ⁱ I would like to thank the Wellcome Trust for their support of this work and Jesse Olszynko-Gryn for encouraging me to ‘publish’ this paper on the University of Manchester website.