CHAPTER TWO

Scientific research and colonial development after 1940

In 1941 the Colonial Office made a commitment to fund scientific research into the chemistry of sugar. If sugar cane could be used to make plastics, building materials, drugs and other synthetic products, then it was hoped the British West Indies would find themselves in the fortunate position of being producers of a lucrative raw material for the chemical industry rather than a low-value foodstuff. This was a vision that endowed laboratory research with the power to transform the economic and social life of the British West Indies. But how exactly was knowledge expected to move from the laboratory and spur development? This chapter will examine the relationship between scientific investigation and colonial development that was embodied in the new arrangements for colonial research that were created in fields such as sugar chemistry during the first half of the 1940s.

The late colonial period saw an unprecedented expansion in scientific research across the Colonial Empire and in British universities, funded through the Research Fund of the 1940 CDW Act and its successors. The new research fund formed part of the Colonial Office response to the crisis that affected the Colonial Empire in the late 1930s, of which riots in the Caribbean were only a part. Research became a priority at a point at which Britain needed a meaningful gesture to ward off domestic and international criticism of the management of its colonies. Scientific research was described as a practical tool that would provide the basic information that underpinned development and so would serve to guarantee the efficacy of Colonial Office interventions in the future.

The Colonial Office engaged a group of high-powered scientific advisors drawn from Britain’s research councils to oversee spending
of funds from the CDW Acts. These scientists created a system for colonial research that included over forty research institutions in the colonies by 1952. The expression used most frequently in the early 1940s to describe the work that the Colonial Office wished to support in these institutions was ‘fundamental research’, and officials and scientists took great pains to differentiate this work from other modes of science such as problem solving and routine testing. The key value that informed the new arrangements was ‘freedom’. Advisors at the Colonial Office claimed that for the highest quality research to occur, scientists had to be free to choose their own research problems and be free of direction by administrators and less-qualified technical officers. The arrangements that were introduced for colonial research were, in fact, less the expression of a rational model of the development process and more the product of the priorities of a group of elite metropolitan scientists who wished to provide autonomy and status for scientific researchers working in government service. The fact that the discourse on science and development that emerged in the 1940s could encompass both the idea of research as the basis of planning and research as an activity in which freedom for researchers was paramount was possible because of the multiple meanings that could be attached to the idea of fundamental research. This was a concept of considerable political utility.

**Research and colonial development after 1940**

In 1938, the freshwater biologist E. B. Worthington published a summary of the state of scientific research in Africa in which he made the following complaint about past development initiatives:

> Economic development has taken the lead and often chooses the wrong turning. Science follows, but the pace is laboured, and falling behind she is neglected. Often she has to follow along the wrong path for some distance before beckoning development back to the direct way. Roads and rails have been built before there were accurate maps on which to mark them; crops have been introduced and grown under all kinds of conditions, regardless of the suitability of the soil.

He concluded that, ‘A development based on a real understanding of Africa’s potentialities has hardly yet begun, and will be impossible until the necessity of scientific knowledge is recognized’.¹

The idea that the failure of previous development projects was due to a paucity of knowledge about tropical conditions had great resonance. At the Colonial Office, a wider reform of colonial policy was under way that aimed to address the limitations of the 1929 Colonial
Development Act. The priority of the 1929 Act had been to alleviate unemployment at home by generating demand for British manufactured goods, and the restricted nature of loans from the Act had led to few improvements in social or economic conditions in the colonies. The deprivations experienced by many territories during the Great Depression, along with increasing hostility to British imperialism in the US and Germany, contributed to an acute sense of crisis amongst colonial officials by the end of the 1930s. The possibility that Britain could be made to relinquish its colonies altogether gave urgency to the idea that a grand gesture was required to show Britain was committed to taking action to deal with colonial problems, even when war had recently broken out. The CDW Act was formulated to provide free grants for development in both the economic and social sphere and to create a large fund solely dedicated to scientific research. For the Colonial Office the timing was crucial, ‘Measures for the advancement of the Colonies are politic at a time when the general question of Colonial responsibilities is under widespread criticism and when it is expedient for us to justify our position.’

Interest at the Colonial Office in an expansion of colonial research had in fact existed for some time. While the rise of development as a goal of colonial policy from the 1890s onwards was accompanied by a growing belief in the importance of science and medicine, funds specifically for research were not plentiful before the Second World War. Small ad hoc grants for research were issued by the Colonial Office between 1919 and 1933, and the Empire Marketing Board also allocated research monies of £285,000 in the period between 1926 and 1933. A small number of grants for research came from the 1929 Colonial Development Fund. In the field of agricultural research, the Lovat Committee made recommendations for an expansion of agricultural research in 1927 and this helped to revive the fortunes of the East African Agricultural Research Institute at Amani in Tanganyika. This research station, created by Germany when it had been in possession of Tanganyika, had fallen into dereliction, and the neglect of Amani was presented as symbolic of the relative indifference of Britain to research. Whilst funds were secured for Amani, and also for the Imperial College of Tropical Agriculture in Trinidad, the wider proposals of the Lovat Committee for a chain of agricultural research stations were never implemented because of the refusal by colonial governments to provide financial support and the retrenchment of the 1930s. Research in medicine and social science in the colonies was mainly funded by the Rockefeller Foundation before 1940 with addition of some small grants from the MRC. Worthington’s *Science in Africa* noted some of the gains that had been made by research in Africa, including studies
of rinderpest, east coast fever and other diseases of cattle, sheep and goats in Kenya and plant-breeding programmes that had increased the yields of sorghum in Nigeria.6 Research, however, was an activity that members of medical, veterinary and agricultural departments in the colonies often had to fit in around their regular duties. In general, while the early twentieth century saw a substantial increase in the numbers of scientists and medical personnel deployed to work in the colonies, research work was often marked by a lack of continuity and coordination. Officials in London and colonial governments were not in direct command of substantial funds or a cadre of scientists to implement programmes of investigation.7

Colonial Office plans for the creation of a specially designated research fund as part of the 1940 CDW Act drew upon the recommendations of the eminent figure of Malcolm Hailey. Lord Hailey had headed the African Research Survey that had recruited Worthington to undertake his study of scientific provision in Africa. Hailey had agreed to lead the Carnegie-funded African Research Survey after an illustrious career in India that culminated in the post of Governor of the United Provinces. The African Research Survey of 1936 was an ambitious attempt to capture both the present state of knowledge about Africa and the potential for its future development based on scientific understandings. It had its origins in meetings at Oxford University in 1929 that brought together African experts, politicians, high-ranking civil servants and scientists, including Leopold Amery, Frederick Lugard, Joseph Oldham, Malcolm MacDonald and Julian Huxley.8 As a result of his tour of Africa, Hailey produced An African Survey, a landmark account of problems affecting the African colonies of the European powers and the paths to future progress across a large number of fields such as science, law and anthropology. An African Survey generated a great deal of public attention and officials at the Colonial Office would come to refer to it as ‘the bible on practically everything relating to our administration in tropical Africa’.9 This substantial volume incorporated Worthington’s recommendations for a major expansion in research. Hailey stated that development could never be accomplished while the colonial powers were ignorant of the basic conditions that existed across the African continent. The priority was, ‘a more comprehensive study of the factors which determine the nature of its social development, and a more scientific approach to the problems of health and material well-being to which its physical characteristics have given rise’.10

The Secretary of State for the Colonies, Malcolm MacDonald, was persuaded to include a research allocation extended to the study of issues occurring across the whole of the Colonial Empire as part of the proposed CDW Act. With the passing of the 1940 CDW Act this was
£500,000 each year, doubling to £1 million with renewal of the Act in 1945. The Research Fund was Britain’s most significant financial commitment to research related to the problems of the British Colonial Empire by a considerable margin. It elevated the Colonial Office to the position of second-largest sponsor of civil scientific research in Britain during the 1940s. Suddenly the Colonial Office had funds that eclipsed the allocation given to the ARC and the MRC, with only the DSIR, a government department entirely devoted to promoting scientific research, receiving a larger provision. The Research Fund, then, was a major new source of support for colonial research, and also for British scientists.

Alongside the new fund, Hailey persuaded Malcolm MacDonald to appoint a body at the Colonial Office of leading British scientists to oversee the spending of the money. The stature of the proposed committee was important: ‘Apart from being competent to give advice on research schemes, the committee should be such as to command the respect and confidence of the Colonial Office Advisory Committees and the scientific world in general.’ Hailey made it clear in An African Survey that the success of any expansion in colonial research would be dependent upon recruiting suitably well-qualified personnel to undertake these investigations. There was a feeling, however, amongst those that were familiar with the scientific and medical work prosecuted in the colonies before 1940 that the technical services – the Colonial Medical Service, the Colonial Agricultural Service and the Colonial Veterinary Service – generally failed to attract talented researchers. These services employed two types of candidate. Some officers in the Colonial Agricultural Service, for example, came with a general qualification in agriculture that made them well suited to the task of teaching farmers in the field. These members of departments of agriculture in the colonies were often confusingly referred to as ‘administrators’. Other officers had degrees in what G. B. Masefield, the historian of the Colonial Agricultural Service, described as ‘pure science’. This was a reference to men who had specialisms in fields such as zoology or plant physiology rather than something more practical such as animal husbandry, and who could undertake experimental study. Efforts had been made to raise the standard of both types of candidate during the interwar period. New advisory committees were formed at the Colonial Office to oversee and coordinate work in areas such as health and agriculture. A Chief Medical Adviser was appointed in 1926 and an Agricultural Adviser in 1929, and this helped to raise the profile of technical matters in London. In 1934 and 1935 the Colonial Office unified the regional branches of the colonial services that employed staff for agriculture, veterinary medicine, forestry and
medicine with the intention of giving better career prospects for officers as they could now move to positions across the whole Colonial Empire. To further raise the prestige of the services, entrants were increasingly given specialised training; cadets for the Colonial Agricultural Services took a probationary course at the University of Cambridge and the Imperial College of Tropical Agriculture in Trinidad from 1926. The view expressed in 1940, however, was that the numbers of individuals suited to research were still low. Thomas Lloyd, Assistant Under-Secretary of State at the Colonial Office, stated that while training had worked to raise the level of administrative officers, the colonial services were not successfully competing with domestic research institutions for specialist scientific staff.¹⁸

The idea that the colonial services failed to attract really good research workers lay behind Hailey’s suggestion of a committee that would raise the stature of colonial research. The goal was to place the high-profile committee at the Colonial Office on the same footing as the research councils in Britain. In 1940 there were three research councils that provided money for science in British universities and in their own research institutes. The DSIR had been created in 1916, followed by the MRC in 1920 and the ARC in 1931. The research councils were not the only source of funds for British scientists during the interwar period. Government departments such as the Ministry of Health or the Ministry of Agriculture and Fisheries also funded science, and the Admiralty, Air Ministry and War Office spent substantially more on research than the largest research council, the DSIR.¹⁹ The research councils, however, claimed a special position in British science on the basis that, unlike government departments, they were not under the control of a minister or a senior member of the armed services, but instead were overseen by a committee of scientists who reported to the Lord President of the Privy Council. Edward Mellanby, Secretary of the MRC in 1940, claimed that the significance of this arrangement lay in the fact that the MRC was not subject to direction by a non-scientific administrative class. Scientists determined the policies of the MRC and therefore the direction of medical research in Britain. Accordingly, it was claimed, the MRC was a body that was in receipt of state funds but was not subject to state control.²⁰ Mellanby asserted that it was this position of independence that gave the MRC its special status in the eyes of British medical researchers, and it was clear that for many the research councils were considered to be the true bastions of fundamental research in Britain.²¹

The problem facing the Colonial Office as it contemplated a significant expansion in colonial research was the relative disdain that could be shown for the science prosecuted by government departments, at
Hailey and the Colonial Office believed the high-calibre scientific researchers they sought were not likely to seek employment in the colonial services unless a system for research in the colonies was created that had clear connections with the DSIR, ARC and MRC. The first step was the creation of a committee, the Colonial Research Committee (CRC), along the lines suggested by Hailey and which contained eminent scientists such as Mellanby recruited from the research councils. In 1945, the Colonial Office also created a new internal department in the Economics Division dedicated to the administration of colonial research, headed by an administrator, Charles Carstairs. The Research Department was described by officials as a ‘Department of Scientific and Industrial Research to the Colonial Office’; clear indication that the Colonial Office wished to see its work in the field of colonial research aligned with the elite system to administer state funds for research that had developed in Britain since the First World War. The suggestion by Hailey and Worthington that research would provide the knowledge that would underpin effective development struck a particular chord with Carstairs, who stated in 1945:

I think that it must be recognised that in the prevailing absence of the bulk of the fundamental data required for sound planning, much of the developmental expenditure cannot fail to be misdirected and so wasted, together with the man-power diverted thereto. We must reconcile ourselves to a period of building on sand, and to some extent of pouring money into sand, but we should I think make it a primary object of policy probably for the duration of the CD and W legislation to reduce this period of inevitable waste and disappointment by making a very serious effort to construct a solid framework of basic information by means of the survey techniques listed earlier.

Later, Carstairs circulated to his colleagues an address by Herbert Morrison in which Morrison had described five stages in planning. The second stage in this process, Carstairs noted, was the collection of data. Colonial Office enthusiasm for a research fund and new research arrangements as part of the wider reform of policy that cumulated in the 1940 CDW Act can be explained by a desire on the part of officials to see colonial development be placed on a much firmer footing. The claim that research would provide the knowledge that ensured the efficacy of development had great appeal at a moment in which Britain was sensitive to criticism about poor management of its colonial possessions. In their application to the Treasury for the creation of the Research Fund, officials spoke of the need to ‘substantiate, in as
striking manner as possible, its professions of trusteeship on behalf of the subject peoples in the colonial dependencies. The significance of the discussions that led up to the CDW Act and its Research Fund lay not just in the idea that greater funds be created, however, but also in the suggestion that scientific research needed new arrangements to recruit the personnel who were going to execute a comprehensive programme of investigation into the problems affecting the Colonial Empire.

**New arrangements for colonial research**

The CRC had its first meeting in June 1942, and at that time the committee included the heads of the research councils – Edward Mellanby (MRC), W. W. C. Topley (ARC) and Edward Appleton (DSIR), along with A. V. Hill, Secretary of the Royal Society. The scientists on the committee had recently met together as the Scientific Advisory Committee to the War Cabinet, under Lord Hankey. They were a powerful and influential group who controlled the elite bodies for civil research in Britain and who were experienced in providing advice to government. According to the scientist and administrator Alexander King,

> Up to the Second World War, the size of the British science system was small enough for internal adjustments and policy direction to be in the hands of a few, outstanding personalities belonging to the same coterie. Coherence and mutual understanding were probably achieved rather effectively, if utterly informally, through frequent, easy, but often unplanned contacts between the leading figures of the Royal Society, the research council secretaries, and senior civil servants, all of whom were habituéés of the Athenaeum Club.

Hailey was appointed chair of the committee, and in 1946 Worthington was appointed Scientific Secretary. By the end of the 1942, a number of prominent representatives of business, social science and economics had also been invited to take a seat on the CRC: A. M. Carr-Saunders, Director of the London School of Economics, the social scientist Audrey Richards, the economists Henry Clay and Hubert Henderson, and John Caulcutt, Chairman of Barclays Bank.

In addition to the CRC, a number of other committees were created between 1943 and 1947 that brought even greater numbers of eminent scientists linked to existing British research organisations, often through the research councils and the universities, into the Colonial Office. The Colonial Office formed the CPRC in 1943, followed by the Colonial Fisheries Advisory Committee. The Colonial Social
Science Research Council and the Tsetse Fly and Trypanosomiasis Research Committee were formed in 1944 and the Colonial Medical Research Committee and the Committee for Colonial Agriculture, Animal Health and Forestry Research were formed in 1945. These committees were followed by the Anti-Locust Research Centre Scientific Committee in 1946, and the Colonial Economic Research Committee and the Colonial Insecticides Committee in 1947. The CRC had an overview of all research, ensuring, for example, the fair division of funds between different research areas, and it oversaw work in a number of miscellaneous areas such as buildings research.

Even though positions on the research committees were voluntary and unpaid, the Colonial Office gave these bodies considerable power; they were free to devise their own research projects and they decided the future of all schemes submitted to the Colonial Office by colonial governments. During the 1940s, officials at the Colonial Office did not generally interfere in the business of the new research committees and often privileged the views of these research bodies over those of existing officers in the technical services in the colonies. In effect, responsibility in determining the future direction of colonial research was shifted to metropolitan committees that contained scientists who did not necessarily have any direct experience of work in the tropics but who had made careers in the domestic research system. The aim in doing this was to bring colonial research into much closer contact with research institutions and universities at home. This was considered essential to facilitate the recruitment of high-calibre scientists to work on colonial problems. One of the deterrents to working in the colonial services was said to be the fact that it distanced young scientists from the major centres of their disciplines so they struggled to keep abreast of developments in their field, and this retarded their careers in the long term.37 The committees that oversaw research contained scientists who had contact with the main bodies and institutions for research in Britain and this was said to ensure better communication between science in Britain and its colonies. In addition, the high profile and reputation of members of the CRC was thought to endow colonial research with greater cachet than it would otherwise be able to attain.

The dominance of the new committees at the Colonial Office by individuals linked to metropolitan centres of research, and the considerable authority given to these committees, proved significant for the organisation of colonial research in a number of ways. The scientists drawn from the domestic research councils that sat on the Colonial Office committees impressed upon officials that colonial development required an expansion in fundamental research. Long-term fundamental research was said to provide the knowledge of soils, insects,
crops, disease and commodities on which all other activities, from problem solving in science to efficient management of the development process, ultimately depended. It was said to yield an in-depth understanding of the most widespread and basic issues that existed in the colonies so that fundamental research was in fact ‘general’ research. Importantly, this was an assertion about the nature of research only. Other activities that fell within the scope of science, such as laboratory testing, the preparation of vaccines or the short-term solution of practical problems, were intrinsically ‘local’ problems relating to the immediate requirements of the individual territory, and were best dealt with by the existing technical departments in the colonies. The investigation of fundamental problems that were shared by colonies, on the other hand, was said to require the view from above provided by the London-based research committees.

The creation of the CRC and other research committees worked to marginalise the input of scientists, veterinary officers and doctors that were already based in the colonies into shaping both new arrangements for research and even its content. Some doctors, biomedical scientists, and veterinary officers had sought to coordinate their work in the colonies on a regional basis and expand their research activities before the outbreak of the Second World War. The CRC explained why colonial research was an activity that required new arrangements, however, that shifted control of research to committees based in London. In the colonies, ‘there is a tendency for research problems to be dictated too exclusively by local and temporary interests, without due regard to scientific possibilities, or to the scale on which a given investigation must be planned if it is to have any reasonable hope of success’. And ‘the frontiers of scientific research do not coincide with political boundaries. In so far as scientific problems in various parts of the world resemble one another, the boundaries are rather lines of latitude.’

Research considered problems that eclipsed the borders of individual colonies and therefore the organisation of this work was beyond the scope of the technical departments that operated as part of the colonial governments. Only committees such as the CRC at the Colonial Office in London were able to grasp the scale of the problems dealt with by research.

References to the nature of research had rhetorical intent; they worked to naturalise the ambitions and preferences of elite scientific advisors to the Colonial Office. In part, declarations about the intrinsic character of research worked to assure the position of the research councils and their representatives in controlling the colonial research agenda after 1940. This concern for their own status was characteristic of bodies such as the MRC. The system of state funds
for science in Britain had grown considerably since the First World War. From discussions concerning the creation of the DSIR onwards, British scientists had worked hard to negotiate between a desire on the one hand to receive greater funds for the work they wished to undertake and the need to reject any possibility that government funding would mean civil servants or politicians would decide the goal of their investigations. For many scientists, state funding of science raised the spectre of a shift towards applied science in which administrators would determine the objectives of research. The promotion of fundamental research as an activity in which oversight by scientists was essential was one way in which researchers attempted to maintain their professional standing. Fundamental research was synonymous with the preservation of freedom for research workers to pursue their investigations along lines of their own choosing. The fear that a closer relationship with government could result in the subordination of scientists to the interests of the state was also apparent in the debates about the position of scientists in the civil service. The 1943 Barlow Report created the Scientific Civil Service, in which scientists were placed for the first time on grades that were equivalent in pay and status to their non-scientific counterparts. Apart from addressing the grievances of many scientists, Barlow’s recommendations were intended to improve the image of the civil service as a career for talented researchers.41 The discussions at the Colonial Office about the appropriate machinery for the organisation of colonial research occurred therefore against a wider backdrop in which British scientists were keen to improve their status in relation to administrators in government and in which the research councils had emerged as strident defenders of autonomy for scientific researchers in order to preserve their status.

Meetings of the CRC show it to be preoccupied by the relative status of research staff engaged to work on colonial problems. The CRC said of the highly qualified research staff it hoped to recruit for work on colonial problems,

workers must be not be [sic] inhibited from working in the way best calculated to allow them to achieve the most valuable results, which means, in the field of scientific research as much as in any other sphere of creative activity, allowing the worker the greatest possible latitude as to his methods of work. Complete freedom of enquiry is not the only, but it is an essential, condition of fruitful research work.42

Freedom of enquiry could only be guaranteed with the right people in charge. This was not just an argument for ensuring that non-scientific administrators did not tell scientists what projects they should work on, it was an argument that other types of technical and scientific officer
would not supervise research staff. In the Agricultural Department this might mean making sure that an extension officer with a degree in agriculture was not in charge of a scientist with a specialist degree from Cambridge University. Worthington had argued in *Science in Africa*, and the CRC agreed, that an expansion in research activities related to the needs of colonial development could not be achieved by merely giving more funds to the technical departments of the colonial governments. Research needed to be separated from other scientific and medical work and placed under the control of appropriately qualified research staff. It was said that the most able research workers simply would not submit to the authority of agriculturalists (called ‘administrators’ in the Colonial Agricultural Service) who lacked research experience. To lend weight to this argument, researchers were differentiated from other technical staff on the basis of their temperament: ‘We doubt whether anyone who has not been an active research worker for a part of his life can effectively lead a research team with the understanding and appreciation that will bring out the best of which members are capable.’43 And ‘The normal administrator, with ideas based on command and orderliness, must find it difficult to accept a position as a leader of a group of individualists, and attempts to impose discipline or order on the research worker can be fatal to productive research.’44

The need to ensure freedom for scientists working on research, the separation of research from other scientific and medical work in the colonies, and the focus on problems that transcended the boundaries of individual colonies, provided the rationale for the creation of a range of new institutions in the Colonial Empire.45 Forty new institutions and research units were established between the Second World War and 1952, many of which operated on a regional basis (see Table 3). The majority of the new research units were built in Africa, accounting for the larger proportion of the Research Fund spent on this area of the Colonial Empire (East Africa alone was given an allocation of 39 per cent of the total). The largest proportion of research monies (36 per cent) was spent on research in agriculture, animal health and forestry, reflecting the central importance given to these fields in the economic life of the British Colonial Empire.46 Two of the new laboratories were created under the aegis of the CPRC, the Sugar Technology Research Unit and the Colonial Microbiological Research Institute in Trinidad.

The new research units were afforded considerable autonomy with respect to colonial administrations, and research staff were not required to incorporate the suggestions of Directors of Agriculture or Medicine in the colonies in the development of their projects.
Table 3 Research institutions in Britain’s colonies funded by the CDW Acts, 1940–52.

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<tr>
<th>Region</th>
<th>Name of institute</th>
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<tr>
<td>East Africa</td>
<td>Fisheries Research Institute [Jinja, Uganda]</td>
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<td>East African Institute of Social Research [Makerere College, Uganda]</td>
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<td>Cotton Research Station [Uganda]</td>
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<td></td>
<td>Virus Research Institute [Entebbe, Uganda]</td>
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<td>East African Insecticides Research Unit [Arusha, Tanganyika]</td>
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<td>East African Agricultural and Forestry Research Organisation [Kenya]</td>
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<td>East African Veterinary Research Organisation [Kenya]</td>
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<td>East African Tsetse and Trypanosomiasis Research and Reclamation Organisation</td>
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<td>Filariasis Research Unit [East Africa]</td>
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<td>East African Scientific and Industrial Research Organisation</td>
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<td>East African Malarial Unit</td>
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<td>Coffee Research Station [Kenya]</td>
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<td>West Africa</td>
<td>Virus Research Institute [Lagos, Nigeria]</td>
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<td></td>
<td>West African Institute for Tsetse Fly and Trypanosomiasis Research</td>
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<td>Nutrition Field Research Station [Gambia]</td>
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<td></td>
<td>West African Fisheries Research Institute</td>
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<td>Sir Alfred Jones Laboratory [Sierra Leone]</td>
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<td>West African Veterinary Research Organisation</td>
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<td>Rice Research Station [Rokupr, Sierra Leone]</td>
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<td></td>
<td>West African Institute of Social and Economic Research</td>
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<td>West African Road Research Laboratory</td>
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<td>Central</td>
<td>Rhodes-Livingstone Institute [Northern Rhodesia]</td>
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<td>Agricultural Research and Experimental Station [Nyasaland]</td>
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<td>Tsetse Fly Research Unit [Northern Rhodesia]</td>
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<td>Fisheries Research Organisation [Northern Rhodesia]</td>
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<td>Caribbean</td>
<td>Low Temperature Research Station [Trinidad]</td>
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<td></td>
<td>Colonial Microbiological Research Institute [Trinidad]</td>
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<td></td>
<td>British West Indies Sugar Cane Breeding Station [Barbados]</td>
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<td>Ebini Livestock Experimental Station [British Guiana]</td>
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<td>Sugar Technology Laboratory [Trinidad]</td>
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<td>Asia</td>
<td>Timber Research Station [Malaya]</td>
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<td></td>
<td>Institute for Training in Fish Farming [Penang Island, Malaya]</td>
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<td>Pacific</td>
<td>Institute of Educational Research [Fiji]</td>
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[61]
Recipients of grants from the Research Fund communicated with the London-based committees about the work they did and it was the opinion of these bodies that mattered. This separation of research work from other types of medical and technical work was in many ways the reproduction of the system that had emerged in Britain in which the research councils were the sole determinants of the work done in the institutes they funded. Government departments did not set out the objectives of research done through the research council system, so that the Ministry of Health did not decide the subjects to be investigated by the MRC. Similarly, technical departments in the colonial governments did not determine all the research that happened in their midst.

The circumvention of local authority, and the central role given to the research committees at the Colonial Office when it came to the oversight of research, was intended to enhance the status of these London-based committees and the research staff they appointed to work on colonial problems. However, the semi-autonomous position of new research institutions in the colonies raised the issue of communication between technical departments and research workers. In some cases, new regional advisory committees were formed to enable some liaison between departments of agriculture and agricultural research institutes, for example. Scientific advisors at the Colonial Office were clear, however, that these arrangements did not mean that Directors of Research at East African research organisations would be Submitting to the authority of the Director of Agriculture of the Kenyan administration, for example.47

The Colonial Office firmly endorsed the new arrangements, explaining the principle of freedom for researchers and the special position of autonomy given to the CRC and other bodies that oversaw colonial research to African governors in 1947.48 Officials believed that the obstacle to a significant expansion in the amount of research carried out across the Colonial Empire was the fact that government departments and government service generally failed to attract the most well-qualified and research-orientated science graduates. The provision of working conditions that placed the control of research firmly in the hands of established research workers and the clear alignment of colonial research with the work of the domestic research councils were considered necessary in order to confer upon colonial research the prestige required to attract high-flying scientists to work on colonial problems.

A willingness by officials to see the administration of colonial research placed under the control of metropolitan committees also reflected a wider ethos at the Colonial Office that valued innovation
by metropolitan experts. The passing of the 1940 CDW Act, followed by the experiences of wartime mobilisation, led to a shift to a more assertive, interventionist and centralised approach by the Colonial Office to the pursuit of economic and social development in Britain’s colonies.49 Sydney Caine expressed his concern in a famous Colonial Office memorandum of 1943 that colonial governments were failing to submit sufficiently ambitious and well-articulated plans for development. Speaking about economic planning, Caine stated that the problem was that the colonial administrations did not have the necessary expertise to devise plans that would produce real change in the colonies. He urged the Colonial Office to move from its traditional role of merely assessing submissions as they came in from the colonies and seize the initiative in devising solutions to colonial problems. Caine expressed his approval of the CRC as a body that did not passively wait for colonial governments to submit schemes for approval but was active in producing plans for research and the new machinery needed for its prosecution.50

**Research into colonial products after 1943**

Tropical products were subject to technical investigation by the state and business from the nineteenth century onwards but the creation of the CPRC in 1943 marked the beginning of a new episode. In the past, bodies such as the Imperial Institute had analysed and assessed commodities as part of a commercial intelligence service. In contrast, the CPRC promoted the fundamental chemical investigation of tropical products. This was a shift to long-term and exploratory laboratory research of the chemical constituents and synthetic pathways of natural products, the sort of in-depth investigation of tropical conditions and materials that many scientists had argued should be prioritised with the creation of the Research Fund of the 1940 CDW Act. The arrangements that were put in place for this research reflected many of the claims about the special conditions needed to facilitate fundamental research made by the CRC and other bodies of scientific advisors at the Colonial Office. The work of the CPRC in London contributed to the centralisation of colonial research, with control over decisions about the fields of scientific enquiry that would be pursued residing with metropolitan scientists, and researchers receiving funds from the CPRC given a great deal of freedom in their work. Colonial governments, technical officers in the colonies and businessmen made little contribution to the nomination of research problems. The idea of fundamental research as the investigation of the basic and general issues relating to the chemistry of natural products was also important
for the negotiation of the relationship between state funds and commercial interests in the vision of development promoted after 1940.

Before 1940 the evaluation and improvement of plant and animal products from the colonies had been one of the functions of the Imperial Institute. The institute opened in 1893 at South Kensington in London as part of a complex of buildings created to celebrate the Golden Jubilee of Queen Victoria. It had a number of functions that amounted to the promotion of empire to the British public and British business. The Scientific and Technical Research Department evaluated colonial products such as rubber, cotton, medicinal plants, tanning agents, fibres, oil nuts and minerals submitted by the colonies with the aim of encouraging greater utilisation of empire products by metropolitan firms. The value of this work was brought into question, however, as the colonies expanded their own capacity for the analysis of tropical products. British chemists were recruited in increasingly large numbers in the first half of the twentieth century for work in the Colonial Chemical Service and other branches of the colonial service.

A further push to employ state-funded science in the greater exploitation of empire products occurred in 1926 with the creation of the Empire Marketing Board. The EMB issued grants totalling around £3.5 million to universities and research institutions with the goal of improving the quality of tropical products so that commodities from the British Empire could compete with those from other sources. The EMB had a political function in promoting the domestic consumption of empire goods without recourse to the protectionist measures that were so unpopular with the public (the prospect of tariffs and increased food prices had led to the Conservatives losing their overall majority in the election of 1923). The decision to introduce imperial preference at the Ottawa conference in 1931 removed the original rationale for the existence of the EMB, however, and it was disbanded in 1933.

Business also took measures to evaluate and improve tropical commodities, not least in response to the threat to markets represented by the emergence of synthetic alternatives. Indigo planters in Bihar created new laboratories between 1898 and 1905 for chemical investigations to improve the quality and yield of the natural dye in the face of declining demand for their product with the development of synthetic indigo in 1897. In addition, firms carried out investigations intended to expand and improve their range of products. The Niger Company analysed vegetable oils and rubber in its London Produce and Development Department and undertook surveys in Nigeria to search for new mineral, botanical and animal products. By the Second World War, experimental stations to improve cash crops such as coffee, cocoa and rubber had been established in a number of colonies, funded in part or wholly
by business. In 1902 the British Cotton Growing Association was formed and established research stations in Africa for breeding disease-resistant strains of cotton.57

The role of the CPRC differed from these earlier attempts to aid the exploitation of natural products from Britain’s colonies. Rather than providing a service that assessed the quality of colonial products, or using plant-breeding techniques to improve them, the council sponsored laboratory research to identify new ways that existing products could be utilised. In the words of the Secretary of State for the Colonies, Oliver Stanley, in 1943 the goal of the CPRC was ‘to save the old products by finding new uses for them’.58 Investigations focused on reinventing tropical products as the raw materials for manufacturing synthetic goods at a point at which chemical firms in Europe and America were poised to produce increasingly large numbers of plastics, synthetic fabrics and therapeutic materials through organic chemistry. The focus of the CPRC was on the long-term and in-depth investigation of the many different chemical pathways and transformations of a substance like sucrose in order to take advantage of ‘the brave new synthetic world that is growing up around us’, in the words of the Manchester Guardian.59

Fundamental research into the chemistry of natural products was considered a new area for the Colonial Office, and as with other fields of colonial research, it was considered necessary to form a committee of leading scientists drawn from British universities and research establishments in order to oversee spending from the Research Fund. The secretaries of the DSIR, MRC and ARC all sat on the CPRC and they were joined by a number of eminent chemists – Professor Norman Haworth, who headed a team of carbohydrate chemists at the University of Birmingham, Robert Robinson, Head of the Dyson Perrins Laboratory at Oxford, the Government Chemist Sir John Fox, Sir John Simonsen, appointed Director of Research of the CPRC, and Professor Ian Heilbron of Imperial College of Science and Technology. Two members of the committee, Haworth and Robinson, had been awarded the Nobel Prize by 1947. To further raise its profile, the CPRC was chaired by the high-ranking official Maurice Hankey. In 1938 Hankey had formally retired from an extraordinary career that had begun in naval intelligence and included the post of Secretary of the Committee of Imperial Defence for twenty-six years, Clerk to the Privy Council, and Cabinet Secretary. Hankey had taken an interest in scientific and technical issues over his career, often in relation to defence matters. Most recently he had contributed to the Barlow Report on improved pay and status for scientists in the civil service and he was appointed the Chair of the Scientific Advisory Committee to the War Cabinet
in 1940. This committee aimed to coordinate the wartime research efforts that were happening across government. Hankey combined a role as chair of the CPRC with a leading position in the post-war organisation of Britain’s programme of biological warfare research. In 1946 he was appointed Chair of the Bacteriological Research Advisory Board that created the Microbiological Research Establishment at Porton Down. The CPRC also included Gerald Clauson, who was head of the Economics Division of the Colonial Office, G. W. Thomson of the Trades Union Congress, Aneurin Davis of the Co-operative Wholesale Society, and Harry Lindsay, who was Director of the Imperial Institute.

At its first meeting the CPRC created a technical sub-committee from the chemists on the council to determine its research programme. This committee of Haworth, Robinson, Simonsen, Fox and Heilbron chose the commodities to be investigated by the council and then either undertook this research themselves or secured the services of chemists working at British universities to undertake the relevant investigations. The procedures of the DSIR were used as a guide for determining the salaries and contracts that the CPRC offered scientists receiving its funds. The DSIR was considered an appropriate model for the CPRC as its function was to encourage research in British universities and other laboratories related to the needs of British industry. Private business was expected to play a major part in fulfilling the ambitions of the CPRC, but no representative of a firm or a colonial government sat on the council, and business and technical staff in the colonies were not the main source of proposals for research. Instead, the scientists on the technical committee determined the scope of research undertaken by the CPRC and placed control over the direction of a research project in the hands of the scientists they sponsored.

Sugar remained the commodity of central interest. In addition to the production of alcohol for fuel, the committee focused on using sugar as a starting material for making solvents, plastics, drugs and anti-freeze agents. At the first meeting of the CPRC in January 1943 Haworth reiterated his claim that sugar was a cheaper starting material for the expanding organic chemical industry than oil or coal. Coal had been the raw material used by the German firm IG Farben and the American company Du Pont before the war, but Robinson stated to the CPRC that now, ‘Coal was on its deathbed except as a fuel’, confirming the need to explore alternative raw materials. Haworth’s claim of the potential of sugar as the starting compound for a range of synthetic chemical products was given credence by the news that some chemical derivatives of sugar were already under investigation by ICI. The chemical firm had contacts on the CPRC as it had sponsored research by Haworth and his colleague, Leslie Wiggins, at
Birmingham University in the past. In addition, Robinson had joined a research council created by ICI in 1927 where he made an important contribution to the development of one of the early plastics, polyethylene.65 News came in 1943 that ICI was investigating pathways from sugar to manufacture the versatile chemical intermediate furfural. Furfural was used for making lubricating oils and thermosetting plastics, and an industry producing this chemical was well established in the US, operated by the Quaker Oats Company. A search for cheap and accessible sources of furfural became an urgent matter during the Second World War. Furfural was key to the manufacture of synthetic rubber, a compound in high demand as natural rubber imported from the tropics became increasingly difficult to secure with Japanese control of Malaysia.66 Organic intermediates such furfural and levulinic acid were compounds of enormous utility, important for the manufacture of a huge range of industrial products. There was great demand for such intermediates by the chemical industry and therefore a lucrative opportunity appeared to exist if new and better chemical processes could be developed to produce such materials from sugar.

A number of meetings took place in 1943 between researchers from ICI and Haworth, Wiggins and Simonsen and an agreement was made in which ICI would provide Haworth with samples of catalysts for his work along with some confidential information, and the CPRC would supply ICI with some bulk samples of colonial products that were in short supply with the outbreak of war.67 ICI suggested that the results of the work of the CPRC should be made available to all firms through the Association of British Chemical Manufacturers, as was the practice of the DSIR’s Chemical Research Laboratory at Teddington. This arrangement was intended to remove any suggestion that the CPRC was providing unfair advantage to ICI.

The CPRC sponsored research into sugar derivatives at Birmingham University, under the direction of Haworth and his former student, Leslie Wiggins. Their team focused on the chemical reactions of sucrose and they generated large numbers of compounds that were then tested for any useful properties, particularly analgesic, chemotherapeutic or plasticising effects. The number of compounds generated by this approach could be substantial, with over 100 new substances produced from levulinic acid, a derivative of sucrose, in 1945/46.68 By the following year, the researchers at Birmingham were being assisted in the laborious task of screening these compounds to find useful substances by the Department of Pharmacology at the University of Oxford and by a researcher at the Physiology Department, Birmingham.69 In 1945 the research at Birmingham was extended to include the chemistry of starch, under the supervision of Wiggins and Stanley Peat. Starches

[ 67 ]
from a number of colonial sources were investigated, including cassava and arrowroot from the Windward Islands, and a researcher was appointed in East Africa to survey sources of starch in this region. In 1948 starch research was transferred from Birmingham to the University of North Wales at Bangor on the appointment of Peat to a position there.

The CPRC also sought to identify new uses for natural commodities that had seen their markets undermined by the development of synthetic alternatives. One example was the flavouring vanillin. This substance had previously been derived as a natural product from clove oil exported from Zanzibar, but synthetic alternatives to vanillin were now being produced more cheaply from either guaiacol, a coal tar product, or from plant lignin. The possible collapse of the market for natural vanillin was considered especially worrying since the economy of Zanzibar was almost entirely reliant on the export of cloves. The CPRC decided to address this particular problem by initiating research into eugenol, the main component of clove oil, at King’s College at Newcastle upon Tyne. Similarly, the market for lime juice from the West Indies as a source of citric acid had been eroded through the development of fermentation processes for producing citric acid from molasses. Professor Ian Heilbron, who sat on the CPRC, was asked to embark on an investigation of the components and chemistry of lime oil, as well as other citrus oils, in his laboratory at Imperial College.

In the body of their annual reports, the CPRC laid much emphasis on the fundamental nature of the work they sponsored, saying, for example, ‘It has been recognised from the outset that it would prove extremely difficult to find new uses for eugenol and its derivatives, and this can only result from fundamental research.’ The generation of large quantities of new compounds through fundamental research and the subsequent screening of these chemicals was a highly speculative approach to the discovery of useful substances. New compounds were tested for their suitability for a considerable range of new uses and this took enormous time and effort. The research sponsored by the CPRC was lengthy, laborious and unpredictable, and the council frequently cautioned readers of its annual reports against the expectation that rapid results might ensue from this work. This particular characterisation of fundamental research as long-term and in-depth fundamental study can be seen as an argument against interfering in the work of scientific researchers by setting targets or trying to force early results. In the rhetoric of the annual reports of the CPRC, high-quality research was assured as scientists were afforded the opportunity to pursue their studies in the way they saw fit.
In the reports of the CPRC the term ‘fundamental research’ was also used to refer to work that explored the most general, basic, chemical reactions of a compound.\(^75\)

From their initiation, it was recognised that the experiments having as their object the finding of alternative uses for eugonol and vanillin were highly speculative and the most promising lines of attack lay in the study of the general chemical reactions of these substances.\(^76\)

And

In view of the great importance which the sugar cane crop has for the economy, not only in the West Indies, but also in other parts of the Colonial Empire, the council has decided that an investigation of the reactions of sucrose (cane sugar) should be started on a broad basis.\(^77\)

The use of ‘fundamental research’ to denote work of a broad or generic nature was significant when it came to determining the appropriate role of government in the promotion of industrial development. The CPRC did not fund the study of limited and narrow lines of scientific enquiry as this type of study was likely to be of benefit to only a small number of firms. Using state funds in this way compromised the operation of market competition as it advanced the interests of one company over another. The exploration of general principles in the chemistry of materials such as sugar was acceptable, however, as the results were of potential benefit to an entire sector of chemical manufacturing. Individual companies would be able to take up the new information that came from investigations in sugar research and develop those findings along lines that were particular to the business of that firm. The focus on general investigations, then, provided a rationale for state-funded laboratory research of benefit to industry by allowing intervention by the state in the process of economic development while still leaving the initiative largely in the hands of business. This was a vision of the relationship between scientific research and economic development that was liberal in character.

Not all the work sponsored by the CPRC amounted to such long-term and basic elucidation of the chemistry of natural products. Other research projects overseen by the CPRC were concerned with making use of previously unexploited natural resources available in the Colonial Empire. The surveying and assessment of colonial products in this way was not dissimilar from the kind of investigations that had been carried out at the Imperial Institute as part of its commercial intelligence service.\(^78\) At Liverpool University, research into the composition of a range of colonial fats and oils, including oils from linseed, citrus seeds, rubber seeds, wheat germ, groundnuts and sunflowers, was done under the direction of Professor T. P. Hilditch,
in order to determine their commercial value. In a similar vein, the CPRC funded the survey of plants from the colonies in the laboratory of Professor A. R. Todd at Cambridge University, in order to ascertain if they had any useful insecticidal or medicinal effects. Other projects included research into uses for colonial timbers and their resins at the DSIR’s Forest Products Research Laboratory, Princes Risborough, and an investigation to find a use for theobromine, a by-product of the cocoa industry, at the University of Manchester. The CPRC also contributed to the post-war search for a British source of cortisone by evaluating the amount of ergosterol yielded by different strains of yeast. Corticosteroids had been discovered in 1949 to be effective in the treatment of rheumatoid arthritis but the dollar shortage had forced Britain to find a way to manufacture its own cortisone rather than rely upon imports from the US.

When it came to the research prosecuted in British universities, a relationship with industrial development was more assumed than overseen. The CPRC’s Director of Research, Simonsen, made direct contact with Cadbury’s, ICI, Unilever, Trinidad Leaseholds, Glaxo and Boots during the 1940s in order to publicise the results of the council’s work. The CPRC, however, generally followed the model of the research councils in Britain when it came to the dissemination and uptake of its findings. The CPRC publicised its results and then it was up to business to make use of this information. The annual reports of the CPRC described the work undertaken with funds from the council with a list of papers in scientific journals and patents. During the 1940s, these were dominated by the sugar and starch research at Birmingham and Bangor. At the end of the 1940s, the CPRC took further steps to ensure that its work contributed to the development of the British Caribbean by creating two new laboratories in Trinidad, close to producers of sugar.

The CPRC was created with the aim of contributing to the economic development of Britain’s colonies after 1940. By finding new markets for tropical products, the council hoped that it would help to improve the poor social conditions that existed in places such as the British West Indies. The Secretary of State for the Colonies, Oliver Stanley, told the CPRC that ‘the welfare of 60,000,000 people depended on the success of this work’. These development objectives were to be achieved, in part, by state-funded research in British universities that worked out in detail the chemical constitution and reactions of products from the empire. Responsibility for allocating funds for the research programme lay with the CPRC in London, and research projects did not arise through requests by colonial governments or administrative staff of the Colonial Office, or in response to any enquiry from business. The researchers that received funds from the
CPRC were free to undertake time-consuming and long-term projects of work along lines they decided were appropriate. Some of the development needs of Britain's colonies, and aspects of their future economic growth, were determined by a group of eminent British chemists in London who were afforded a substantial degree of autonomy in making their decisions by the Colonial Office during the 1940s.

Conclusion

In 1940 a new approach to colonial development was launched at the Colonial Office that emphasised the necessity of centrally conceived and implemented projects. The 1940 CDW Act was given an important function in restoring Britain's reputation as an imperial power after the revelations of social deprivation and economic stagnation in the colonies that emerged by the late 1930s. A large commitment to scientific research was presented as evidence that in the future Britain sought to place development on a sure foundation of knowledge. As well as a practical necessity, the creation of a dedicated research fund was explained to the Treasury as being politically expedient. A major new commitment to comprehensive colonial research signalled to critics of previous colonial policy the willingness of Britain to take real action to remove obstacles to development in the colonies.

The idea that scientific research was the essential first step in a longer process of development appeared to have been belied in practice, however, by the distance that was created between the work of scientific researchers and the other functions of colonial governments or the operations of industry, as new apparatus for colonial research was introduced during the 1940s. If the concept of ‘fundamental research’ had symbolic value for officials, it had rhetorical power for the elite scientists who advised the Colonial Office. New research committees, including the CPRC, used the idea that the successful prosecution of fundamental research required particular working conditions to persuade officials to introduce arrangements for colonial research that aimed at freedom for research workers from oversight by other categories of officer. This was a discourse on the nature of research that served to legitimise and naturalise the preferences of elite scientists drawn from Britain’s research councils. Colonial Office officials accepted claims of the necessity for freedom for researchers and central direction of research because of a belief that this was essential for the recruitment of high-quality scientists.

The creation of programmes of fundamental research into sugar and other tropical products was cast as having an important function in restoring prosperity to colonies that were overly dependent on the
export of agricultural materials. Long-term and exploratory laboratory research aimed to identify new uses in chemical manufacturing for commodities in oversupply. The means by which knowledge would move from British universities and be taken up by business was not an issue that was well elaborated by the CPRC during the 1940s. As with the domestic research councils, the CPRC focused its efforts on creating the necessary conditions for research, therefore, it said, ensuring the high quality of this work, and it remained for business to capitalise upon the results of these investigations. By the end of the 1940s, however, the CPRC decided to create two new laboratories in Trinidad that undertook research into sugar and other products in order to help spur industrial development. The next chapters consider the relationship between the work of these laboratories and policy for the industrialisation of the British Caribbean as it evolved in the post-war period.

Notes

2 TNA, CO 847/13/13.
7 Frank Stockdale commented in his role as Agricultural Adviser at the Colonial Office in 1938 that the creation of a research fund would be the perfect opportunity to bring into effect the recommendations made by the Lovat Committee in 1927 for an expansion of research institutions across the Colonial Empire.
11 The allocation for research for the MRC for the years 1945 to 1950 was as follows: 1945–46, £295,000; 1946–47, £465,000; 1947–48, £698,000; 1948–49, £1,135,000; 1949–50, £1,618,000. The allocation for research for the ARC for the same period was: 1945–46, £300,000; 1946–47, £300,000; 1947–48, £400,000; 1948–49, £450,000; 1949–50, £777,000. The annual allocation for the Research Fund under the CDW Act of 1945 was £1,000,000.
12 The size of this fund makes its absence from accounts of the development of state-funded research in Britain during the twentieth century all the more surprising. The main accounts are P. Gummett, *Scientists in Whitehall* (Manchester: Manchester University Press, 1980); Wilkie, *British Science and Politics Since 1945*; S. Rose and H. Rose, *Science and Society* (London: Penguin, 1969); J. B. Poole and K. Andrews,


14 TNA, CO 847/13/13.

15 Ibid.


18 TNA, CO 850/180/6.


20 J. Austoker and L. Bryder (eds), Historical Perspectives on the Role of the MRC: Essays in the History of the Medical Research Council of the United Kingdom and its Predecessor, the Medical Research Committee (Oxford: Oxford University Press, 1989).


22 TNA, CO 900/1.

23 TNA, CO 874/36/4.

24 TNA, CO 927/1/3.

25 TNA, CO 927/1/3.

26 TNA, CO 847/13/13.

27 Edward Mellanby (1884–1955), research student under Frederick Gowland Hopkins, Cambridge University, 1905–07; qualified in medicine, St Thomas's Hospital, 1909; lecturer and professor in physiology, King's College for Women, 1913–20; Professor of Pharmacology, Sheffield, honorary physician, Royal Infirmary, 1920–33; secretary MRC, 1933–49; Fullérian professor, Royal Institution, 1936–37.

28 William Whiteman Carlton Topley (1886–1944), assistant director of pathological laboratory, St Thomas's Hospital, 1910; Director, Pathology Department, Charing Cross Hospital, 1911–22; Professor of Bacteriology, University of Manchester, 1922–27; Professor of Bacteriology and Immunology, University of London and Director, Division of Bacteriology and Immunology, LSHTM, 1927–41; member of MRC, 1938–41; secretary of ARC, 1941–44.

29 Edward Appleton (1892–1965), assistant demonstrator, experimental physics, Cavendish Laboratory, 1920; Wheatstone Professor of Physics, University of London, 1924–36; Jacksonian Professor of Natural Philosophy, Cambridge, 1936–39; secretary, DSIR, 1939–49; Nobel Prize for Physics, 1947; President of British Association, 1953; President, Radio Industry Council, 1955–57.

30 Archibald Vivian Hill (1886–1977), Fellow Trinity College and then Kings College, Cambridge, 1910–25; Brackenbury Professor of Physiology, University of Manchester, 1920–23; Nobel Prize for Physiology and Medicine, 1922; Jodrell Professor of Physiology, University College, London, 1923–25; secretary of the Royal Society, 1935–45; member, University Grants Committee, 1937–44; Chairman, executive committee, National Physical Laboratory, 1939–45; Scientific Adviser, Government of India, 1943–44; chairman, Research Defence Society, 1940–51; and a number of other committees during the 1950s.


32 On the involvement of Topley and Mellanby in the development of a bacteriological research programme, see B. Balmer, Britain and Biological Warfare: Expert Advice and Science Policy, 1930–65 (Basingstoke: Palgrave, 2001).

33 In 1948 the Colonial Research Committee underwent a change of name to the Colonial Research Council with some changes in its membership. King was appointed to the Colonial Research Council at this time (representing the Advisory Council on Scientific Policy) until leaving on his appointment as Chief Scientific Officer at the DSIR in 1950.

Civil Service: Scientists as Insiders During the Interwar Period” [DPhil, University of Kent at Canterbury, 1997].

35 TNA, CO 859/40/13; CO 859/79/13.
36 Jeffries, Review of Colonial Research.
37 Colonial Research, 1942–1943, Cmd 6486.
38 TNA, CO 852/588/2.
40 Colonial Research, 1942–1943, Cmd 6486.
41 Edgerton, Warfare State, p. 348.
42 Colonial Research, 1943–1944, Cmd 6535.
43 TNA, CO 927/88/5.
44 TNA, CO 927/88/6.
45 TNA, CO 900/2; Colonial Research, 1945–1946, Col. No. 208.
47 TNA, CO 927/88/6.
48 TNA, CO 847/36/4.
58 TNA, CO 899/1.
61 TNA, CO 852/506/11.
62 TNA, CO 899/1.
63 Ibid.
64 Ibid.
67 TNA, CO 899/1.

Ibid.


See Chapter 5 of this book.


TNA, CO 899/1.