

# Quinine, Malaria, and the Cinchona Bureau: Marketing Practices and Knowledge Circulation in a Dutch Transoceanic Cinchona–Quinine Enterprise (1920s–30s)

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## ABSTRACT

In this study, we will show how a Dutch pharmaceutical consortium of cinchona producers and quinine manufacturers was able to capitalize on one of the first international public health campaigns to fight malaria, thereby promoting the sale of quinine, an antimalarial medicine. During the 1920s and 1930s, the international markets for quinine were controlled by this Dutch consortium, which was a transoceanic cinchona–quinine enterprise centered in the Cinchona Bureau in the Netherlands. We will argue that during the interwar period, the Cinchona Bureau became the decision-making center of this Dutch cinchona–quinine pharmaceutical enterprise and monopolized the production and trade of an essential medicine. In addition, we will argue that capitalizing on the international public health campaign in the fight against malaria by the Dutch cinchona–quinine enterprise via the Cinchona Bureau can be regarded as an early example of corporate colonization of public health by a private pharmaceutical consortium. Furthermore, we will show how commercial interests prevailed over scientific interests within the Dutch cinchona–quinine consortium, thus interfering with and ultimately curtailing the transoceanic circulation of knowledge in the Dutch empire.

**KEYWORDS:** cinchona, quinine, malaria, Netherlands Indies, pharmaceutical industry, marketing, knowledge circulation

## INTRODUCTION

During the 1920s and 1930s, the international markets for antimalarial quinine were controlled by a Dutch pharmaceutical consortium of cinchona producers and quinine

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manufacturers who established a transoceanic cinchona–quinine enterprise centered in the Cinchona Bureau in the Netherlands. In 1932, according to *Fortune* magazine, the Cinchona Bureau was “perhaps the most scientific organization in existence for the controlled supply of a plant product and the controlled release of the material manufactured from it.”<sup>1</sup> In this study, we will argue that during the interwar period, the Cinchona Bureau became the decision-making center of this Dutch cinchona–quinine pharmaceutical enterprise and monopolized the worldwide production and trading of an essential medicine. We will show how the Dutch consortium was able to capitalize on one of the first international public health campaigns to fight malaria, led by the League of Nations, in their promotion of the sale of quinine as an antimalarial medicine.<sup>2</sup> The Cinchona Bureau’s rise as the center of the international quinine production and distribution networks during the 1920s and 1930s offers a unique insight into the dynamics of the relationships among the pharmaceutical industry, biomedical science, and international public health during an embryonic period for all three fields.

The historical trajectory of the Dutch pharmaceutical consortium can be understood in the wider historiography of early twentieth-century science and technology and specifically the history of the international pharmaceutical industry and the role of standards and control.<sup>3</sup> Since the early twentieth century, the pharmaceutical industry has been an important actor in the development of modern healthcare, functioning in a hybrid medical market with both health and commercial interests.<sup>4</sup> Furthermore, the pharmaceutical industry has been and is currently regarded as a prime example of an industry where science and technology’s (research and development—R&D) “push” and market “pull” factors are considered to be the main driving forces for (technological) innovation.<sup>5</sup> However, in the last two decades, scholars such as Alastair

1 “Cinchona–Quinine to You,” *Fortune* (February 1932), 83.

2 According to Nicolas King, the first international congresses and supra-national organizations were established to “address international health” during the second half of the nineteenth and early twentieth century. Nicholas B. King, “Security, Disease, Commerce: Ideologies of Postcolonial Global Health,” *Soc. Stud. Sci.*, vol. 32, no. 5/6 (Oct.–Dec. 2002), 763–89; 764–65.

3 J. P. Gaudillière, ed., *The Invisible Industrialist. Manufacturers and the Production of Scientific Knowledge: Science, Technology and Medicine in Modern History* (Basingstoke: Macmillan, 1998); J.-P. Gaudillière and V. Hess, eds., *Ways of Regulating. Therapeutic Agents between Plants, Shops and Consulting Rooms* (Berlin: Max Planck Institut für Wissenschaftsgeschichte, 2008); C. Bonah, C. Masutti, A. Rasmussen, and J. Simon, eds., *Harmonizing Drugs. Standards in 20th-Century Pharmaceutical History* (Paris: Editions Glyphe, 2009); and S. Anderson, ed., *Making Medicines. A Brief History of Pharmacy and Pharmaceuticals* (London: Pharmaceutical Press, 2005).

4 Frank Huisman and Rein Vos, “Farmacie: wetenschap, industrie en markt,” *Gewina*, 22 (1995), 5–11; 5. According to Jeremy Greene: “As individual pharmaceutical agents encourage action in the spheres of clinical research, clinical practice, and medical marketing, they bring the economics of medical knowledge and the economics of hard currency into close apposition.” Jeremy Greene, *Prescribing by Numbers: Drugs and the Definition of Disease* (Baltimore: John Hopkins University Press, 2007), 233.

5 Basil Achilladelis and Nicholas Antonakis, “The Dynamics of Technological Innovation: The Case of the Pharmaceutical Industry,” *Res. Policy*, 30 (2001), 535–88, 539 and Vivian Quirke, “Standardising Pharmaceutical R&D in the Second Half of the Twentieth Century. ICI’s Nolvadex Development Programme in Historical and Comparative Perspective,” in *Harmonizing Drugs. Standards in 20th-Century Pharmaceutical History*, ed. Christian Bonah et al. (Paris: Editions Glyphe, 2009), 123–50, 123. According to historian Joel Mokyr, “the growth of knowledge is one of the central themes of economic change.” Joel Mokyr, *The Gifts of Athena. Historical Origins of the Knowledge Economy* (New Jersey: Princeton University Press, 2002), 1.

Matheson and Jeremy Greene have highlighted the integration of R&D and marketing that reflects the integration of scientific claims and commercial positioning, which generates knowledge with implicit commercial functionality.<sup>6</sup> Others have argued that at the same time, the process of privileging marketing as the prime driving force in the pharmaceutical industry has resulted in a corporate colonization of pharmaceutical science and public health, at least in the United States.<sup>7</sup> We will argue that the Dutch cinchona–quinine enterprise’s capitalizing on the international public health campaign to fight malaria via the Cinchona Bureau can be regarded as an early example of corporate colonization of public health by a private pharmaceutical consortium.

This study also addresses knowledge circulation (central to the study of the history of science), highlighting the understanding of science as a practice and culture that is in constant flux.<sup>8</sup> In the case of medicinal plants, historians of science like Londa Schiebinger, Harold Cook, and Richard Grove have emphasized the interplay between colonial trade networks and the circulation and production of knowledge during the early modern period, conceptualizing this action as colonial botany and green imperialism.<sup>9</sup> Whereas these and other studies have addressed numerous forms of knowledge circulation (kinds of knowledge, how, where, when, for whom), the issue of blocking or deliberately engineering knowledge circulation as a result of commercial or other interests remains largely understudied.<sup>10</sup> In this study, we will show how science, industry,

- 6 Alastair Matheson, “Corporate Science and the Husbandry of Scientific and Medical Knowledge by the Pharmaceutical Industry,” *BioSocieties*, 3 (2008), 355–82; Jeremy A. Greene, “Attention to ‘Details’: Etiquette and the Pharmaceutical Salesman in Postwar America,” *Soc. Stud. Sci.*, April 2004, 34(2), 271–92 and Jeremy Greene, “Pharmaceutical Brands and Drug Standardization in the Twentieth Century. A View from the United States,” in *Harmonizing Drugs. Standards in 20th-Century Pharmaceutical History*, ed. Christian Bonah et al. (Paris: Editions Glyphe, 2009), 101–22.
- 7 Kalman Applbaum, “Marketing Global Health Care: The Practices of Big Pharma,” in *The Socialist Register, 2010 Morbid Symptoms: Health under Capitalism*, ed. Leo Panitch and Colin Leys (London: Monthly Review Press, 2010), 95–115 and Carl Boggs, “Big Pharma and the Corporate Colonization of American Medicine,” *New Polit. Sci.*, Vol. 27, No. 3 (September 2005), 407–21. See also King, “Security” and Abraham, “The Pharmaceutical.”
- 8 James A. Secord, “Knowledge in Transit,” *Isis*, Vol. 95, No. 4 (December 2004), 654–72. See also Toine Pieters, *Interferon: The Science and Selling of a Miracle Drug* (London and New York: Routledge Studies in the History of Science, Technology and Medicine, 2005).
- 9 Londa Schiebinger and Claudia Swan, eds., *Colonial Botany. Science, Commerce, and Politics in the Early Modern-World* (Philadelphia: University of Pennsylvania Press, 2005); Harold J. Cook, *Matters of Exchange. Commerce, Medicine, and Science in the Dutch Golden Age* (New Haven and London: Yale University Press, 2007); and Richard Grove, *Green Imperialism. Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600–1860* (Cambridge: Cambridge University Press, 1995). Recently, Cook and Walker have argued that the synergy between the history of medicine and pharmacy and economic and cultural history is necessary to comprehend the processes that shaped these “life-altering” exchanges. H. J. Cook and T. D. Walker, “Circulation of Medicine in the Early Modern Atlantic World,” *Soc. Hist. Med.*, 26, 3 (2013), 337–51, 338.
- 10 A major exception is the expanding scholarship in the field of agnotology, the production and maintenance of ignorance or noncirculation of knowledge at the intersection of science and industry, and specifically the scholarship regarding the tobacco industry in the United States. See, Robert N. Proctor, “Agnotology. A Missing Term to Describe the Cultural Production of Ignorance (and Its Study),” in *Agnotology. The Making & Unmaking of Ignorance*, ed. Robert N. Proctor and Londa Schiebinger (Stanford: Stanford University Press, 2008), 1–33.

and trade were increasingly interwoven within the Dutch transoceanic cinchona–quinine consortium, thus inducing a state of ignorance for the sake of business interests in the Dutch empire.

Last but not least, we would like to place this article in the context of other recent writings on the subject of the Dutch-controlled global quinine cartel. In many ways, this cartel was not just another cartel, but rather the ur example for later critiques of global oligopolistic collusion in the modern pharmaceutical industry; we refer in particular to Andrew Goss.<sup>11</sup> Central in Goss’s argument is the manipulative role of the Dutch colonial state (Netherlands Indies), and specifically colonial officials, to “stabilize the colonial Cinchona export-business by encouraging the integration of the quinine industry on a global scale.”<sup>12</sup> Goss showed how the Dutch cinchona–quinine consortium became the central actor in the international fight against malaria during the interwar period.<sup>13</sup> We will build on Goss’s study and at the same use an alternative analytical perspective with a focus on the interplay between science, industry, and the state. We argue that the Dutch-controlled global quinine cartel provides an early and telling example of the tensions between the global and local governance of a multinational pharmaceutical endeavor.

This article is structured chronologically and thematically around three aspects of control and governance. We begin with the logistics of organizing a monopoly and move to the business of blocking the circulation of useful knowledge for potential competitors. Next, we discuss the organization of an integrated public relations bureau that blended scientific marketing with the agenda-setting process of an emerging international health organization fighting malaria in the interwar period. In the first two sections, we will show how the Cinchona Bureau built on a high-quality and innovative raw material to become the decision-making center of the Dutch-controlled global quinine cartel. They were thus able to influence a process of diminished incentive for scientific innovation and purposefully manipulate the circulation of knowledge and nonknowledge. In the third and fourth sections, we will show how the Dutch cinchona–quinine enterprise, through the consolidation of the Cinchona Bureau as the decision-making center, was able to strengthen its control over the entire product chain from raw material to final product. For example, we will demonstrate how the enterprise was able to withstand external pressure from the Swiss pharmaceutical company F. Hoffmann-La Roche that attempted to undermine the Cinchona Bureau’s control of the product chain. In the last section, we will show how the Cinchona Bureau succeeded in colonizing the international public health campaign against malaria for commercial purposes.

11 Andrew Goss, “Building the World’s Supply of Quinine: Dutch Colonialism and the Origins of a Global Pharmaceutical Industry,” *Endeavour*, Vol. 38, No. 1 (2014), 8–18.

12 Goss, “Building the World’s Supply of Quinine,” 8.

13 *Ibid.*, 15–7.

## THE ESTABLISHMENT OF THE CINCHONA BUREAU AS THE DECISION-MAKING CENTER OF THE MONOPOLISTIC DUTCH CINCHONA–QUININE ENTERPRISE (1913–23)

In 1929, the industrialist and chemical engineer Arent Roelf van Linge (1870–1934), founder and director of the Dutch quinine manufacturer the Nederlandsche Kinine-fabriek (NKF) and member of the Cinchona Bureau's daily board, declared: "In 1923 we were the ruling party."<sup>14</sup> Thus, Linge pointed at the Dutch transoceanic cinchona–quinine enterprise's control over worldwide production and trade in quinine and its raw material, cinchona bark. A decade earlier, however, the worldwide quinine markets were still dominated by the first global pharmaceutical cartel that had been formed in 1894 and was led by three German pharmaceutical companies. In this section, we will show how over approximately ten years, three Dutch quinine manufacturers (one in the Netherlands Indies and two in the Netherlands) and 122 cinchona estates in the Netherlands Indies (represented by forty-five cinchona producers) formed a Dutch transoceanic cinchona–quinine consortium with the Cinchona Bureau as the decision-making center (see Figure 1).

By the turn of the twentieth century, the Netherlands Indies' cinchona cultivation industry had positioned itself as the leading supplier of cinchona bark in the world by building on their laboratory-developed *Cinchona ledgeriana* species.<sup>15</sup> At the same time, the Dutch quinine industry emerged as a successful challenger to the German-led quinine cartel and through a process of vertical integration, these two groups gradually formed a transoceanic cinchona–quinine network, thus creating the conditions for a shift in the balance of control over the entire product chain. Strongly supported by the Netherlands Indies' colonial government, this emerging transoceanic network took the initiative during the early 1910s to form a worldwide cinchona and quinine convention in order to halt the rapidly decreasing prices for cinchona and quinine.

The result was the signing of the Cinchona Agreement in 1913 between 122 cinchona producers in the Netherlands Indies and the seven major quinine manufacturers assembled in the quinine cartel. The objective of the Cinchona Agreement was to improve the prices by gaining control over the worldwide production and distribution of cinchona and quinine by matching the production of cinchona bark directly with the sales of quinine and bring stability to the highly speculative cinchona and quinine market.<sup>16</sup> To manage these objectives of control, the signatories agreed to form a Cinchona Bureau in Amsterdam, including a daily board of seven directors. Of these seven men, five were directors of Dutch companies (three cinchona producers and two quinine manufacturers) and only one member was a director of the German quinine manufacturer Buchler & Co. (Table 1). So, from the start, the Dutch dominated the Cinchona

14 Concept notulen vergadering oktober 16, 1929. Item 8979, Archief NHM, National Archive, The Hague.

15 Arjo Roersch van der Hoogte and Toine Pieters, "Science in Service of Colonial Agro-industrialism: The Case of Cinchona Cultivation in the Dutch and British East Indies, 1852–1900." *Stud. Hist. Philos. Biol. Biomed. Sci.*, 47 (2014), 12–22.

16 Arjo Roersch van der Hoogte and Toine Pieters, "Science, Industry and the Colonial State in the Dutch Empire: The Creation of a Dutch Controlled Cinchona and Quinine Monopoly," Forthcoming.

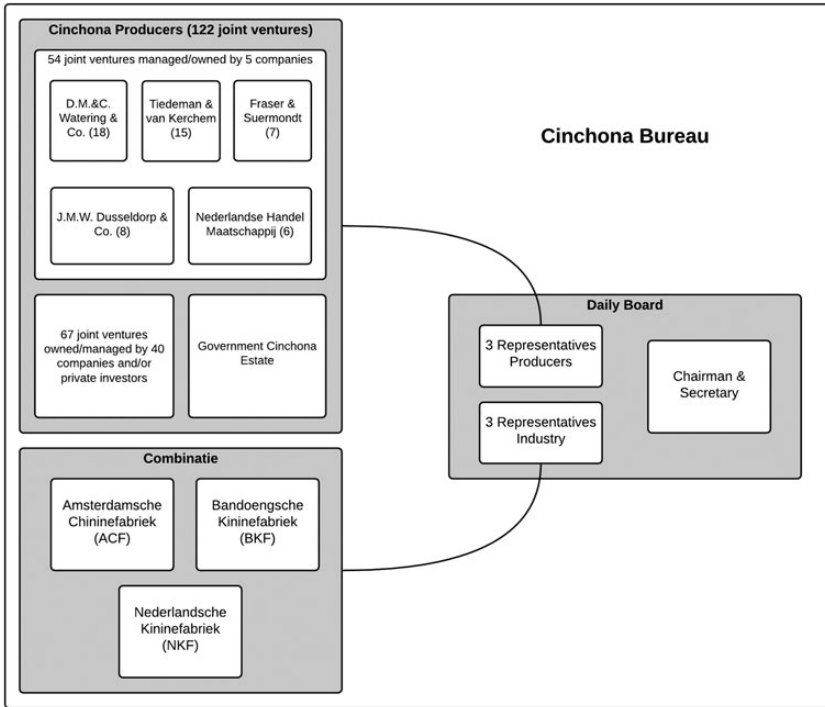


Fig. 1. The Cinchona Bureau, the decision-making center of the Dutch cinchona–quinine enterprise (1923).

Bureau, although the German pharmaceutical industry remained a strong and influential partner within the quinine cartel.<sup>17</sup>

In 1914, the First World War broke out and for the Dutch cinchona–quinine enterprise, the war functioned as a catalyst for establishing control over the worldwide quinine markets. The war isolated the German pharmaceutical industry and as a result, a totally Dutch-controlled Cinchona Bureau emerged by 1918 with the signing of a new Cinchona Agreement among the cinchona producers and the three Dutch quinine manufacturers—the Amsterdamsche Chininefabriek (ACF), the Bandoengsche Kininefabriek (BKF), and the NKF. In 1917, the German pharmaceutical companies reluctantly handed over their control of the Cinchona Bureau by entering into an agreement with the Dutch quinine manufacturers, who would supply the Germans with cinchona bark by subcontracts.<sup>18</sup> Furthermore, the 1918 Cinchona Agreement granted authority to the Cinchona Bureau to set production quotas for

17 M. Kerbosch, *Het Kina-Monopolie van Nederlandsch-Indië* (Nota voor het Ministerie van Overzeese gebiedsdelen, 1945), no. 106, Kerbosch-collection, KITLV, Leiden University.

18 Copy of the *Auszug Protokoll über eine Besprechung in Chininangelegenheit unter den Mitgliedern der Holländischen und Deutschen Gruppe*, in *Notulen der gecombineerde Vergadering van de Commissie tot voorbereiding van het nieuwe Kina-contract en de Nederlandsche groep Kinine-fabrikanten, 4 Oktober 1917* Item 9007, Archief NHM, National Archive, The Hague.

**Table 1. The First Board of Management of the Cinchona Bureau, 1913.<sup>a</sup>**

Name	Position and company	Producer or manufacturer member
W. F. van den Broek	Director of Dusseldorp & Co.	Cinchona Producer
Dr. Walter Buchler	Director of Buchler & Co.	Quinine Manufacturer
Dr. P. H. van der Meulen	Director of the Amsterdamsche Chininefabriek	Quinine Manufacturer
F. H. M. Koch	Director of Suermondt & Co.	Cinchona Producer
L. G. Schalkwijk	Representative of the Bandoengsche Kininefabriek	Quinine Manufacturer
J. Vorstelman	Director of D.M & C. Watering & Co.	Cinchona Producer
Mr. J. W. Ramaer <sup>b</sup>	Lawyer and political broker	Chairman

<sup>a</sup>Kina-bureau to NHM, November 1, 1913. Item 9007, Archief NHM, NA, The Hague. List of importers, auction July 14, 1910, No. 75, No. 666 Archief Makelaardij Westerman & Co, Stadsarchief Amsterdam.

<sup>b</sup>Ramaer was also a representative of the Netherlands Indies Sugar Syndicate and of great value as a “political broker” within the broader colonial business network. Taselaar, *De Nederlandse koloniale lobby*, 102–8.

cinchona bark and the worldwide quinine prices, thus enhancing their role as the decision-making center.<sup>19</sup> In this way, the Cinchona Bureau became the worldwide center for controlling the production and distribution of the entire product chain from raw material to final product. It also became the center of a monopolistic Dutch transoceanic cinchona–quinine enterprise that had been formalized by the 1918 Cinchona Agreement.

Within this developing transoceanic enterprise, the three Dutch quinine manufacturers formed a strong alliance. In 1916, the NKF and BKF bought the majority shares in the ACF from the German company Deutsche Gold und Silber-Scheideanstalt. The latter was the German pharmaceutical companies’ representative in the quinine cartel and their buyout initiated the close collaboration in 1920 that resulted in the establishment of the so-called Combinatie (Combination).<sup>20</sup> Although the three companies remained independent, they agreed that the “purchase of [cinchona] bark, the exploitation of the factories, the sale of all products will take place on a joint account.”<sup>21</sup> As a result, the Combinatie created a strong position within the Cinchona Bureau. Furthermore, during the war and early postwar years, they had gained considerable experience and influence in the international quinine markets. So, when there was stagnating

19 *Kina-overeenkomst 1918*, Boxmapinv.nr. PD.3.1.CHI—100556 Kina-Abkommen, Unterlagen und Verträge, Historischen Archive Roche, Basel.

20 *Geschiedenis der N.V. Amsterdamsche Chininefabriek 1881–1940*. Amsterdam: Unpublished report 1940. Brocacef Archive, Maarssen and J. H. H. Heuschen, “Maarssen en de Nederlandsche Kininefabriek NKF (1905–1967),” *Historische Kring Maarssen*, vol. 25, no. 2 (mei 1998), 32–48.

21 N. V. Bandoengsche kininefabriek, *Verslag over het boekjaar 1919* (Semarang: Marsman en Stroink, 1919).

demand for quinine in the early 1920s, the Dutch cinchona–quinine consortium had to rely on the Combinatie's knowledge and experience to thrive.<sup>22</sup>

Between 1920 and 1923, the large profits from the war had ended and the Combinatie's directors such as Van Linge lobbied for a modified Cinchona Agreement. They argued that the current agreement (a fixed amount of cinchona bark would be supplied by the cinchona producers) did not correspond well with the stagnating demand for quinine. So, they proposed a new more flexible agreement in which the annual quinine sales by the manufacturers (including non-Dutch manufacturers) would correspond with the producer's supply of cinchona bark. Aware that the cinchona producers would not be enthusiastic about this modification because it would make them more dependent on quinine sales, the Combinatie's directors stressed that they had built a network of sales agents across the world that would help to create "a healthy market and hence serve the interests of both the producers and manufacturers."<sup>23</sup> Furthermore, the Combinatie had strongly advocated for the Cinchona Bureau's decision-making role and position as the center where this evaluation had to be made.<sup>24</sup> In the end, despite serious disagreement among cinchona producers, the Combinatie's arguments managed to convince the cinchona producers to accept the agreement modification because with it "a profitable cinchona cultivation was made possible and safeguarded for the future."<sup>25</sup>

In the meantime, the Cinchona Bureau's governance and control was further strengthened by the implementation of the Uniform Analysis Method and founding of the Cinchona Laboratory in 1920. Since 1820, when quinine was isolated, chemical analysis of the quinine content of cinchona bark became an essential part of production and trade in cinchona and quinine. For cinchona producers, chemical analysis was necessary to determine the value of their product, while quinine manufacturers needed chemical analysis to estimate the amount of quinine that could be extracted from the bark. However, until 1920, essential chemical analyses were dispersed across multiple laboratories and lacked standardization. To standardize the method, and thus control this essential tool within the entire product chain, the Cinchona Bureau established a specific "Commission for a Uniform Analysis Method."<sup>26</sup> The result was the creation

- 22 M. Kerbosch, *Het Kina-Monopolie van Nederlandsch-Indië* (Nota voor het Ministerie van Overzeese gebiedsdelen, 1945), no. 106, Kerbosch-collection, KITLV, Leiden University. According to Goss, production stabilized in the early 1920s, with bark prices higher than they had been before the war. However, this does not correspond with the minutes of the Cinchona Bureau and the decision to match cinchona production with the sales of quinine. Furthermore, Groothoff (former adjunct-director of the Government Cinchona Estate) stated in 1925, "during the last years the consumption of quinine has declined as the result of the reduced purchasing power of Russia and other countries." A. Groothoff, *De Kinacultuur* (Haarlem: H.D. Tjeenk Willink & Zoon N.V., 1925), 114 and Goss, "Building," 15.
- 23 Combinatie aan Kinabureau, November 21, 1923, Item 9010, Archief NHM, National Archive, The Hague.
- 24 *Mededeelingen van het Kina-Bureau* No. 5 Oktober 1921, II. Colonial Collection (KIT), Leiden University.
- 25 M. Kerbosch, *Het Kina-Monopolie van Nederlandsch-Indië* (Nota voor het Ministerie van Overzeese gebiedsdelen, 1945), no. 106, Kerbosch-collection, KITLV, Leiden University.
- 26 The commission was formed by the next six Dutch professors of chemistry and pharmacy: Prof. Dr. S. Hoogewerff, Prof. Dr. A. V. Holleman, Prof. Dr. J. Boeseken, Prof. Dr. G. van Iterson Jr., Prof. Dr. P. van Romburgh, and Prof. Dr. P. van der Wielen. *Mededeelingen van het Kina-Bureau*, No. 1 Januari 1920, I, Colonial Collection (KIT), Leiden University.



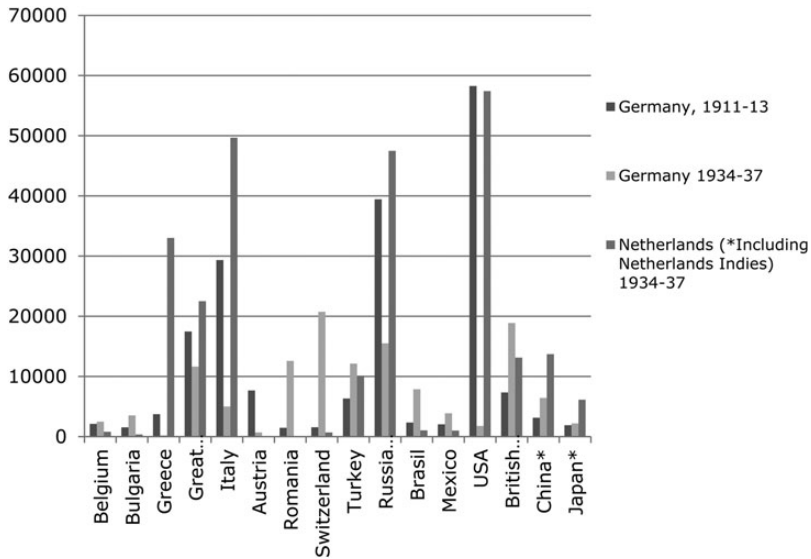


Fig. 2. The distribution of quinine by Germany and the Netherlands in kilograms in 1911–13 and 1934–37. W. Dethloff, *Chinin* (Berlin: Verlag Chemie, 1944), 240–8.

of a Uniform Analysis Method and founding of the Cinchona Laboratory. From then on, the Cinchona Bureau was the worldwide center for chemical analysis, hence strengthening its position of control over the prices for both cinchona bark and quinine medicines.

With the establishment of the Cinchona Laboratory and Uniform Analysis Method in 1920 and the signing of the 1923 Cinchona Agreement, the Cinchona Bureau became the decision-making center of a Dutch transoceanic cinchona–quinine enterprise, responsible for determining the quotas and prices for both cinchona bark and quinine. Furthermore, as illustrated by Figure 2, by the early 1920s, the Dutch cinchona–quinine enterprise was the largest quinine distributor in the world.

#### THE CINCHONA BUREAU AND CINCHONA FIELD STATION: LESS INCENTIVE FOR INNOVATIVE CINCHONA BARK PRODUCTION AND DELIBERATE INTERFERENCE WITH THE CIRCULATION OF KNOWLEDGE

An important element in the process of the Cinchona Bureau becoming the decision-making center was the tension between the local and global governance of this transoceanic pharmaceutical endeavor. Located on the premises of the Government Cinchona Estate (GCE) in the Malabar Mountains, south of Bandung, in the Netherlands Indies, the Cinchona Field Station (CFS) had functioned as an autonomous center for cinchona cultivation and significantly contributed to the monopolistic position of Dutch cinchona cultivation and the emergence of the transoceanic consortium that

controlled the entire product chain during the early twentieth century.<sup>27</sup> In this section, we will show how during the 1920s and 1930s, the CFS' position was challenged by the decision-making center of the Cinchona Bureau, diminishing the incentive for innovation and thus affecting knowledge circulation about cinchona cultivation.

The first signal of change was the implementation of the aforementioned Uniform Analysis Method and founding of the Cinchona Laboratory in Amsterdam. By 1923, the Cinchona Bureau decided that all cinchona bark shipped to Amsterdam would be analyzed by the Cinchona Laboratory, while the CFS would only analyze the cinchona bark produced by the GCE and bark supplied directly to the BKF in Bandung.<sup>28</sup> Because the majority of the cinchona bark was shipped to Amsterdam, this meant that the Cinchona Laboratory became responsible for the majority of the chemical analyses. Although the director of the CFS, Mathieu Kerbosch, called the decision "quite unfair with respect to the oldest of the two laboratories," the result was a substantial loss of revenue for the CFS (since producers paid small fees for every analysis).<sup>29</sup>

In 1926, the situation worsened for the CFS when the Cinchona Bureau declared that from then on all chemical analyses conducted by the Cinchona Laboratory in Amsterdam would be free of charge for the cinchona producers. In a letter to its representatives in the Netherlands Indies, the Cinchona Bureau's chairman, Mr. J. Gerritzen, was well aware of this decision about the CFS: "We must not overlook that the consequence of this would be that the source of revenue for the cinchona field station in the Indies, would decrease substantially."<sup>30</sup> So, to compensate for this loss and to "preserve the very useful and necessary scientific practice of the CFS," Gerritzen continued, the Cinchona Bureau is "willing to annually subsidize" the field station. However, there was an important "but" to this subsidy. The Cinchona Bureau would only subsidize the field station when the other small group of cinchona producers (who were not members of the Cinchona Bureau) were willingly to contribute more to the CFS.<sup>31</sup> In other words, by centralizing chemical analyses at the Cinchona Laboratory in Amsterdam, the Cinchona Bureau curtailed the CFS' most important source of revenue. At the same time, the Cinchona Bureau placed the responsibility of the viability of the field station in the hands of the non-Cinchona Bureau members.

One year later, in 1927, the CFS' autonomy was further restrained. After more than five decades of aiding scientific practices in the cinchona cultivation, the colonial government decided to stop financing the field station and turn it over to the private sector (although Kerbosch remained as director and the CFS remained on the premises of the GCE).<sup>32</sup> The cinchona producers vigorously discussed what to do with the field station. In the Netherlands, the cinchona producers (e.g., the Cinchona Bureau) argued that "considering the current circumstances there is not enough capacity to

27 Roersch van der Hoogte and Pieters, "Science in Service."

28 *Mededeelingen van het Kina-Bureau*, No. 3 July 1920, 1, Colonial Collection (KIT), Leiden University.

29 Kerbosch aan Kinabureau, december 6, 1923, and Kerbosch aan Kinabureau, augustus 5, 1924, Item 8977, Archief NHM, National Archive, The Hague.

30 Agenda vergadering Kinabureau oktober 1, 1926, Item 8977, Archief NHM, National Archive, The Hague.

31 *Ibid.*

32 *Jaarboek van het Departement van Landbouw, Nijverheid en Handel in Nederlandsch-Indië 1926*, 106–8, Colonial Collection (KIT), Leiden University.

exploit an autonomous field station,” while the producers in the Netherlands Indies recognized the necessity of a field station, but were not enthusiastic about contributing more than they already did.<sup>33</sup> In the end, the cinchona producers in the colony decided to continue with the CFS, however, shrinking its activities and the number of scientists.<sup>34</sup> In 1933, the CFS merged with the tea and rubber field stations and became one central field station, the West-Java Field Station.<sup>35</sup> Over the next few years, staff and research activities were reduced and by 1937, only five of the original nine full-time scientists remained in the service of cinchona cultivation.<sup>36</sup>

In addition to declining financial resources, two other factors influenced the further reduction in the CFS. First, cinchona overproduction was a significant problem by 1932. In a memo to the colonial administration, in 1932, Kerbosch advised, “the cultivation techniques do not have to make such advances, that the production capacity per hectare will rise.”<sup>37</sup> In other words, overproduction as a result of a steady increase in the number of hectares cultivated with cinchona and the CSF’s scientific work improving the cinchona bark had both interfered with profitable cinchona cultivation. The second factor was the largest cinchona producers’ ability to conduct an important part of the scientific practices normally done by the CFS. After decades of experience and knowledge exchange with the CFS, these producers had established their own high-quality experimental fields, seed selection programs, and cloning experiments.<sup>38</sup> In this way, the incentive to continue supporting a fully autonomous scientific field station had decreased considerably during the late 1920s and 1930s.

However, these events did not mean that scientific research on cinchona stopped completely. By the mid-1930s, the Cinchona Bureau decided that open publication of scientific work conducted in the Netherlands Indies regarding cinchona had to stop in order to prevent useful knowledge falling into the hands of potential competitors, which would have undermined the Netherlands Indies’ monopolistic position. In 1946, according to the botanist P. M. Prillwitz, “in line with the monopolistic structure of the cinchona cultivation publication was prevented or kept within a limited circle.”<sup>39</sup> An important reason to curtail the dissemination of information regarding cinchona

33 *Jaarverslag Departement Landbouw, Nijverheid en Handel Nederlandsch-Indië* 1926, 106–8 and Vergadering Bestuur Bond van Eigenaren Nederlandsch-Indische Kina-Ondernemingen, 27 maart 1928, Item 9010, Archief NHM, National Archive, The Hague.

34 Voorzitter Vertegenwoordiging der Bergcultures aan Algemeen Landbouw Syndicaat, mei 1, 1928, Item 9010, Archief NHM, National Archive, The Hague. See also, Wim van der Schoor, “Zuivere en toegepaste wetenschap in de tropen. Biologisch onderzoek aan particuliere proefstations in Nederlands-Indië 1870–1940” (unpublished Ph.D. thesis, University of Utrecht, 2012), 43–45.

35 Wim van der Schoor, “Zuivere en toegepaste wetenschap in de tropen. Biologisch onderzoek aan particuliere proefstations in Nederlands-Indië 1870–1940” (Ph.D. diss., University of Utrecht, 2012), 45.

36 Verslag over het jaar 1937 van Het Algemeen Landbouw Syndicaat, Colonial Collection (KIT), Leiden University. See also Harro Maat, *Science Cultivating Practice. A History of Agricultural Science in the Netherlands and Its Colonies, 1863–1986* (Dordrecht: Kluwer Academic Publishers, 2001), 79.

37 M. Kerbosch, Nota betreffende den toestand en de vooruitzichten der kinaacultuur in Nederlandsch-Indië (1932), no. 48, Kerbosch-collection, KITLV, Leiden.

38 K. Ebes and G. Verhaar, “Kina,” *Chron. Nat.*, 106, 6 (Juni 1950), 267–70.

39 Nota No. 18, in W. C. Heusden, *Kina*, Colonial Collection (KIT) Leiden University. The last issue of *Cinchona*, the CFS journal, was published in 1933, but reappeared briefly in 1951. Colonial Collection (KIT), Leiden University.

was the growing threat of cinchona cultivation programs in other parts of the world, foremost in the Belgian colony of the Congo.<sup>40</sup> In other words, the once autonomous local scientific center of the Netherlands Indies' cinchona cultivation was subordinated to the global commercial interests of the cinchona–quinine enterprise. At the same time, global control by the Dutch transoceanic cinchona–quinine enterprise was consolidated by strengthening the Cinchona Bureau as the decision-making center.

### THE CINCHONA BUREAU CONSOLIDATING CONTROL OVER THE ENTIRE PRODUCT CHAIN: THE F. HOFFMANN-LA ROCHE CASE (1920s)

In 1924, a German trader in colonial commodities, Emil Helfferich, confessed in a conversation with the Swiss pharmaceutical firm F. Hoffmann-La Roche: “I have come to realize that the German manufacturers are completely dependent on the Dutch.”<sup>41</sup> Helfferich referred to the Dutch incorporation of the renewed international quinine cartel under the Cinchona Bureau. In 1922, the quinine cartel was formally re-established, although it had never ceased to exist. However, this time, the cartel leadership was placed in the firm hands of the Combinatie with the founding of the Bureau Central des Fabricants de Quinine in Amsterdam.<sup>42</sup> The three German quinine manufacturers—C.F. Boehringer & Söhne, Chininfabrik Braunschweig Buchler & Co., and the Verenigte Chininfabriken Zimmer & Co.—had high hopes that through the cartel, they could restore their prewar status and regain their position inside the Cinchona Bureau. However, for the Dutch, this was not an option and both the cinchona producers and Combinatie agreed to keep the Germans out of the Cinchona Bureau.<sup>43</sup> By the mid-1920s, Dutch control was no longer challenged by the German companies or the other companies in the quinine cartel, but rather by one Swiss outsider, the pharmaceutical firm F. Hoffmann-La Roche. In this section, we will show, how the Dutch succeeded in consolidating their control over the international quinine cartel and hence international quinine markets with the example of F. Hoffmann-La Roche.

In approximately 1921, F. Hoffmann-La Roche entered the quinine business, however, aware of Dutch dominance in the market, they were not willingly to subject themselves so easily to Dutch control (as the German companies had done).<sup>44</sup> Instead, as explicitly stated by director Emil Barrell, F. Hoffmann-La Roche wanted to break the Cinchona Bureau open and have “real equality with all manufacturers

40 Kina-Legger (April 24, 1938–January 31, 1940), Item 8991, Archief NHM, National Archive, The Hague.

41 Bericht über die Besprechung mit Herrn Emil Helfferich in Basel am Januar 13, 1925, PD.3.1.CHI—102361 Chinin/Chinarinde, Historischen Archive Roche, Basel.

42 The offices of the Bureau Central were located in the same building as those of the ACF and BKF (the Combinatie headquarter) at De Wittenkade 48, Amsterdam. *Geschiedenis*, 33.

43 Concept verkorte notulen vergadering van het Kinabureau, juni 5, 1924, Item 8977, Archief NHM, National Archive, The Hague.

44 According to Hans Conrad Peyer, F. Hoffmann-La Roche founder Frits Hoffmann and the company's senior management did not have high hopes for cartels and hence preferred to do business without them. Hans Conrad Peyer, *Roche. A Company History 1896–1996* (Basel: Editions Roche, 1996), 96–99.

[of the quinine cartel] having a seat and vote in the Cinchona Bureau.”<sup>45</sup> To do this, Barell stated, “the supply of cinchona bark has to be secured.”<sup>46</sup> So, in 1923, F. Hoffmann-La Roche signed contracts with three cinchona producers in the Netherlands Indies (who were not part of the Cinchona Bureau) for the supply of cinchona bark.<sup>47</sup> This caused major concerns within the Cinchona Bureau and by 1924–25, various meetings were held to discuss how to manage this “outsider.” By late 1925, however, F. Hoffmann-La Roche and the Combinatie (representing the Cinchona Bureau) agreed that the Swiss company could join the cartel in return for several exclusive privileges, such as a substantial production quota and continuation of their contracts with the three cinchona producers in the Netherlands Indies until 1928.<sup>48</sup>

Despite Dutch courting, F. Hoffmann-La Roche maintained their goal to open up the Cinchona Bureau. In correspondence with the other non-Dutch members of the cartel, F. Hoffmann-La Roche management repeatedly stated that their goal was still to force the Dutch to open up the Cinchona Bureau to the other cartel members and share their control of cinchona bark stocks. In this endeavor, they received enthusiastic reactions from the other non-Dutch members, who were extremely annoyed by the attitude and ruthless behavior of the Combinatie within the Cinchona Bureau who were exclusively focused on gaining increasing control over the quinine markets. As Barell explained the Dutch way of doing business in 1927:

If a manufacturer learns that a government, e.g. in Bulgaria, intends to buy 100 kilos of a certain quinine salt, he writes or cables immediately to Amsterdam, mentioning the fact and asking the permission to offer an inside price. If the Quina-bureau agrees with the proposal, the other manufacturers cannot quote at the same price, but have to keep in the background. Unluckily very often the Dutch refuse and simply state that the Quina-bureau has decided to give the Dutch group the right to sell in that case. A systematic campaign has been launched to increase more and more the power of the Dutch who insensibly may try to impose on the quinine market their own trade mark.<sup>49</sup>

The dynamics of the non-Dutch manufacturers’ submission to the will of the dominant Dutch Combinatie made the British manufacturer and cartel member Howards & Co. write in 1927, “You know that we very heartily agree with you as to the desirability of converting our Convention from an Autocracy into a Republic.”<sup>50</sup> At the

45 Emil Barell to Hans Engelhorn, May 31, 1926, PD.3.1.CHI—102364 Korrespondenz mit Boehringer Mannheim-Waldhof (1926), Historischen Archive Roche, Basel.

46 Emil Barell to Hans Engelhorn, September 9, 1924, PD.3.1.CHI—102364 Korrespondenz mit Boehringer Mannheim-Waldhof (1924), Historischen Archive Roche, Basel.

47 Alfred J. Fuchs, *Über die Tätigkeit von F. Hoffmann-La Roche & Co. A.G. auf dem Chinin-Gebiet* (1958. Hergestellt Reproduzentrale Roche Basel, 2002).

48 Various documents in Item 8977, Archief NHM, National Archive, The Hague.

49 Emil Barell to Roche New York, January 22, 1927, PD.3.1.CHI—102364 Korrespondenz mit Boehringer Mannheim-Waldhof (1927), Historischen Archive Roche, Basel.

50 Howards & Son to F. Hoffmann-La Roche, February 2, 1927, PD.3.1.CHI—102364 Korrespondenz mit Boehringer Mannheim-Waldhof (1927), Historischen Archive Roche, Basel.

same time, however, the non-Dutch members, and especially the Germans, did not dare to openly criticize the Dutch because of the “danger that much larger damages would be inflicted” and because of the “importance of the export.”<sup>51</sup> F. Hoffmann-La Roche’s campaign was thus strongly welcomed by the non-Dutch members of the cartel in their fight to dethrone the Dutch. However, to open up the Cinchona Bureau, F. Hoffmann-La Roche needed to find support among a number of the cinchona producers.

Informed by its agents in the Netherlands and Netherlands Indies, F. Hoffmann-La Roche relied on the growing unrest and criticism that was boiling among a number of the cinchona producers in the Netherlands Indies to achieve its goal.<sup>52</sup> As mentioned earlier, since the early 1920s, demand for quinine had stagnated and in response, the Cinchona Bureau (as the decision-making authority) had decided to restrict the production and export of cinchona bark.<sup>53</sup> This had caused major unrest particularly among smaller cinchona producers, who were left with unsold bark on their estates and a loss of profit. They felt they were not well represented in the Cinchona Bureau and accused the Cinchona Bureau of being “tied to a leash” of the Combinatie, which was not acting as a neutral organization serving the interests of both groups.<sup>54</sup> As a result, several of these producers began to threaten that they would leave the Cinchona Bureau by 1928, arguing that on the free market, they would be able to sell their entire output for better prices.<sup>55</sup>

It was this criticism and uncertainty among a number of the producers that gave F. Hoffmann-La Roche the idea that opening up the Cinchona Bureau was feasible. However, F. Hoffmann-La Roche’s agents had misjudged the strong cooperation between the cinchona producers and the Dutch quinine manufacturers within the Cinchona Bureau and had overlooked the central role of the director of the GCE, the pharmacist Mathieu Kerbosch (1880–1972). Since the 1890s, the GCE had positioned itself as the largest individual cinchona producer, but more importantly as the organizational center of the Netherlands Indies’ cinchona cultivation.<sup>56</sup> In line with his predecessors, Kerbosch’s main objective as director was to guarantee the future and

51 Dethloff, *Chinin*, 196.

52 For example, the pharmacist and cinchona producer C. M. Pleyte D’Ailly who had left the Cinchona Bureau in 1923 because of his criticism of the Combinatie’s strong influence on the Cinchona Bureau. By the mid-1920s, he was one of the central figures in the criticism of how the Cinchona Bureau was led, and this is nicely illustrated in his pamphlet from 1926, *Kina-Producenten versterkt Uwen Band!* A copy can be found in the Colonial Collection (KIT) at the Leiden University.

53 M. Kerbosch, *Het Kina-Monopolie van Nederlandsch-Indië* (Nota voor het Ministerie van Overzeese gebiedsdelen, 1945), no. 106, Kerbosch-collection, KITLV, Leiden.

54 Notulen van de commissie van advies i.z. wijziging van de kina-overeenkomst, januari 7, 1927, no. 15, Kerbosch-collection, KITLV, Leiden. See also A. J. Doorman, “Eenige algemeene beschouwingen over de Kinacultuur in verband met de Kina-Overeenkomst,” *Algemeen Landbouwweekblad voor Nederlandsch-Indië* 12<sup>e</sup> jaargang, zaterdag oktober 29, 1927, no. 18.

55 Notulen van de commissie van advies i.z. wijziging van de kina-overeenkomst, januari 7, 1927, no. 15, Kerbosch-collection, KITLV, Leiden.

56 Roersch van der Hoogte and Pieters, *op cit.* (fn. 15).

prosperity of cinchona cultivation, which by the mid-1920s, he believed was best guaranteed through cooperation with the Combinatie via the Cinchona Bureau.<sup>57</sup>

By the mid-1920s, it became painfully obvious to the members of the Cinchona Bureau that something had to be done and Kerbosch was asked to step in. In 1925, he was made chairman of a Netherlands Indies cinchona producer's commission, which had the task of drafting a proposal for the new 1928 Cinchona Agreement to convince the smaller producers to stay within the Cinchona Bureau.<sup>58</sup> After two years of meetings, visiting planters and discussing the demands of the planters in the Netherlands Indies, Kerbosch drafted a final proposal with one main stipulation—all cinchona producers had to be equally represented in the Cinchona Bureau.<sup>59</sup> As a result, the *Vereniging voor Kinabast Producenten* (Cinchona Producers Association, CPA) was formed in 1927, and became the sole representative of all the cinchona producers in the Cinchona Bureau.<sup>60</sup> In this way, the smaller cinchona producers had a visible representative in the Cinchona Bureau, which also strengthened cooperation within the Cinchona Bureau and simultaneously took the wind out of the sails of F. Hoffmann-La Roche's initiative.

In the end, F. Hoffmann-La Roche's activities made the quinine cartel a more enlightened autocracy in the sense that the Combinatie became aware of the animosity it had created and took action to ensure that the other cartel members would experience a more equally managed cartel. At the same time, the Cinchona Bureau remained closed to non-Dutch members and the F. Hoffmann-La Roche campaign had only further consolidated the position of the Cinchona Bureau as the decision-making center for worldwide production and trade in cinchona bark and quinine. By the establishment of the CPA, the Netherlands Indies' monopoly over the worldwide cinchona bark supplies was further centralized at the Cinchona Bureau. Together with the Combinatie, which still controlled the international quinine cartel, the Dutch transoceanic cinchona–quinine enterprise was able to further strengthen its monopolistic position in the worldwide markets (see Figure 3). The new 1928 Agreement, once again signed only between the cinchona producers (through the CPA) and the Combinatie, represented the consolidation of the Dutch control over international cinchona and quinine markets.<sup>61</sup>

## GOVERNMENT RESTRICTIONS AND THE CONSOLIDATION OF THE CINCHONA BUREAU AS THE DECISION-MAKING CENTER (1930s)

F. Hoffmann-La Roche's failed attempt to open up the Cinchona Bureau resulted in the strengthening and consolidation of the Dutch transoceanic cinchona–quinine

57 See, for example, M. Kerbosch, "Cinchona Culture in Java: Its History and Development," *Proceedings of the Celebration of the Three Hundredth Anniversary of the First Recognized Use of Cinchona. Held at the Missouri Botanical Garden, St. Louis, October 31–November 1, 1930* (St. Louis, Missouri, 1931), 181–209.

58 See the various letters between Kerbosch and the planters during the years 1926 and 1927, no. 15, Kerbosch-collection, KITLV, Leiden.

59 Notulen van de commissie van advies i.z. wijziging van de kina-overeenkomst, januari 7, 1927, no. 15, Kerbosch-collection, KITLV, Leiden.

60 Ibid.

61 Departement van Economische Zaken, *Verslag over de werking der kina-restrictie gedurende het tweede restrictiejaar (1 januari 1935 tot 1 januari 1936)* (Batavia: Landsdrukkerij, 1936).

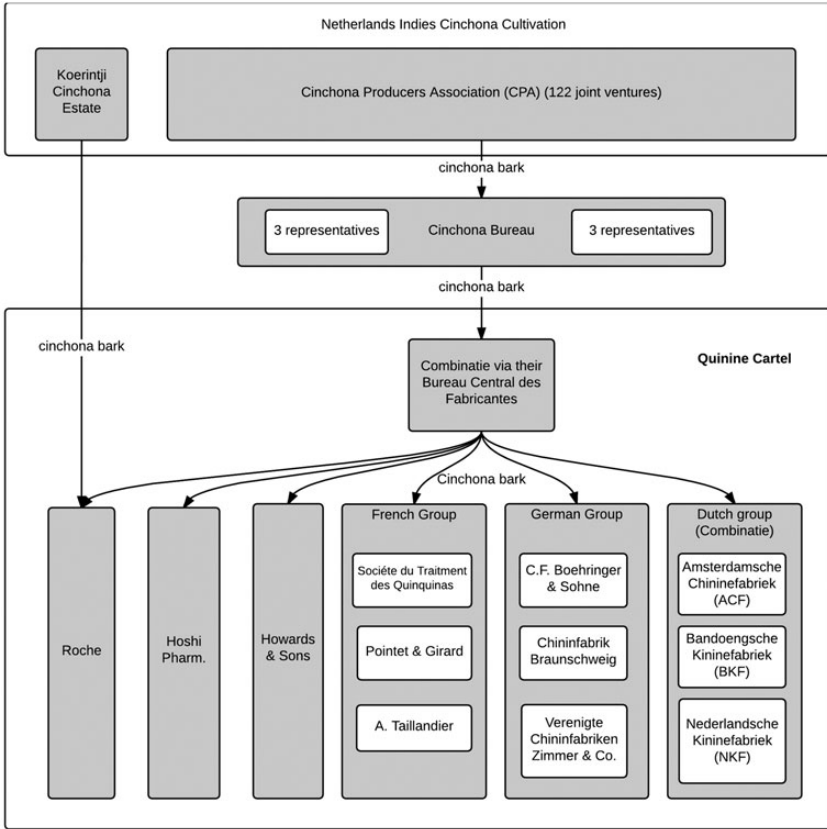


Fig. 3. The Cinchona Bureau as the decision-making center by 1928–29.

enterprise and the decision-making role of the Cinchona Bureau, during the 1920s and early 1930s. However, the Cinchona Bureau’s authority as the center of the cinchona–quinine consortium was still contested by a number of the cinchona producers. As we have shown, the 1928 Cinchona Agreement and continuing control of the cinchona–quinine consortium were strongly influenced by the activities of the director of the GCE, Mathieu Kerbosch. In this section, we will show how by the mid-1930s, the Cinchona Bureau became the uncontested decision-making center of cinchona cultivation and hence the transoceanic cinchona–quinine enterprise as a result of the implementation of Dutch government restrictions.

By the late 1920s and early 1930s, the Dutch cinchona–quinine consortium firmly controlled the worldwide quinine markets. The CPA controlled more than 90 percent of the raw material and as such provided the Combinatie with the power to control the worldwide production and distribution of quinine medicines through the quinine cartel. In practice, this meant that every quinine manufacturer and buyer in the world had to pass by the Cinchona Bureau before being allowed to produce or buy



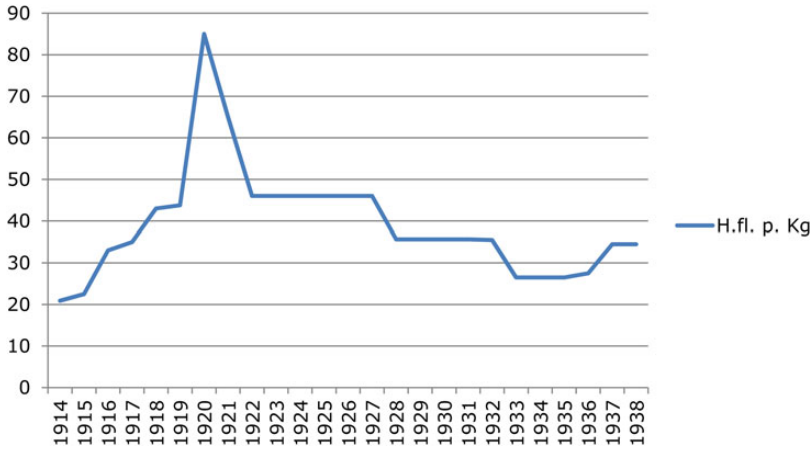


Fig. 4. The price for one kilogram of quinine sulfate in Dutch guilders. Dethloff, *Chinin*.

one kilogram of quinine.<sup>62</sup> As a result, prices for quinine were relatively high, which resulted in growing international criticism of the Cinchona Bureau's policy (see more in the next section) (Figure 4). There were also increasing amounts of cinchona bark offered on the international markets by a small group of "outsider" producers. At the same time, the high productivity of cinchona cultivation and the Cinchona Bureau's policy of matching the sales of quinine with cinchona bark supply had resulted in only 50 percent of the cinchona bark produced by the cinchona producers being taken by the quinine manufacturers. In other words, half of the bark production was left on the estates and for the smaller producers in particular this resulted in a loss of income.<sup>63</sup> To stimulate demand, the Cinchona Bureau decided to lower the prices of quinine. However, this did not stimulate the Cinchona Bureau members' cinchona production and only encouraged several outsider producers to raise their production distribution output.

Thus, the main question for the Cinchona Bureau was how to address the problem of overproduction and how to maintain control over the production and trade of cinchona bark in and from the Netherlands Indies.<sup>64</sup> The answer was found in government restrictions. Since the outbreak of the worldwide economic depression in 1929, several agricultural export sectors, like sugar, rubber, and tea in the Netherlands Indies, were confronted with declining demand and hence profits. In order to support these important economic sectors, the colonial government initiated several restrictions to control production and exports.<sup>65</sup> Although cinchona cultivation was not hit hard by the crisis, the Cinchona Bureau regarded government restrictions as a good solution to

62 M. Kerbosch, *Het Kina-Monopolie van Nederlandsch-Indië* (Nota voor het Ministerie van Overzeese gebiedsdelen, 1945), no. 106, Kerbosch-collection, KITLV, Leiden.

63 M. Kerbosch, Nota betreffende den toestand en de vooruitzichten der kinacultuur in Nederlandsch-Indië (1932), no. 48, Kerbosch-collection, KITLV, Leiden.

64 These issues were central during the many meetings of the Cinchona Bureau during 1930 and 1931. See Items 8980 and 8981, Archief NHM, National Archive, The Hague.

65 See amongst others Arjen Taselaar, *De Nederlandse koloniale lobby. Ondernemers en de Indische politiek 1914–1940* (Leiden: Research School CNWS, 1998).

ensure control over the growing sector of outsider cinchona producers.<sup>66</sup> In this opinion, the Cinchona Bureau was strongly influenced by Mathieu Kerbosch who was convinced that the colonial government had a moral obligation to support the cinchona cultivation, as it had done during the late nineteenth and early twentieth centuries.<sup>67</sup> Over the course of 1933, Kerbosch cooperated intensively with the chairman of the Cinchona Bureau, P. Leendertz, in drafting a proposal for the colonial government to restrict the production and export of cinchona from the Netherlands Indies.

In January 1934, the Netherlands Indies People's Council (*Volksraad*) approved the restrictions, thereby making the Netherlands Indies government responsible for controlling all cinchona production and exports. This situation continued until the Japanese invaded the Netherlands Indies in 1942.<sup>68</sup> The new restrictions, which were to be controlled by the colonial Department of Economic Affairs, divided cinchona cultivation into three groups. The first and largest group consisted of the cinchona producers who were part of the Cinchona Bureau. The second group included the so-called free cinchona producers (or outsiders according to the Cinchona Bureau) and the third and smallest group consisted of several native cinchona producers.<sup>69</sup> As a result of the restrictions, both the second and third groups of producers had little choice other than to sell their cinchona bark to the Cinchona Bureau (through the CPA), since they were the only buyer with permission from the colonial government to export cinchona bark. As a report of the Department of Economic Affairs clearly stated, "the current cinchona legislation leaves the Cinchona Agreement [e.g. Cinchona Bureau] untouched and secures her from the growing meaning of the outsider-producers."<sup>70</sup> An exception was made for F. Hoffmann-La Roche, who had an exclusive contract (as agreed upon in 1928 when they signed the new Cinchona Agreement) with the largest "free" or outsider producer, the Koerintji estate on the island of Sumatra (see Figure 3).

As a result of the restrictions, the colonial government had assumed control over the production and distribution of the cinchona cultivation and as already illustrated, the colonial government regarded the Cinchona Bureau as its most important partner (or buyer). In this way, control over the cinchona cultivation and hence the raw material was firmly centralized at the Cinchona Bureau making it the undisputed center of the

66 Memorandum vergadering Kinabureau juli 18, 1933, Item 8984, Archief NHM, National Archive, The Hague.

67 Kopie van het rekest aan de Gouverneur-Generaal, mei 16, 1933, Item 8983, Archief NHM, National Archive, The Hague.

68 *Volksraad Zittingsjaar 1933–34*, no. 44, Kerbosch-collection, KITLV, Leiden and Departement van Economische Zaken, *Verslag over de werking*. The Dutch (colonial) government was one of the European governments that explicitly supported the establishment or continuation of cartels by the 1930s. Harm G. Schröter, "Cartelization and Decartelization in Europe, 1870–1995: Rise and Decline of an Economic Institution," *J. Eur. Econ. Hist.*, Vol. 25, No. 1 (Spring 1996), 129–53 and Bram Bouwens and Joost Dankers, "The Invisible Handshake: Cartelization in the Netherlands, 1930–2000," *Bus. Hist. Rev.*, 84 (Winter 2010), Special Forum National Business Systems: Focus on the Netherlands, 751–71; 754–56.

69 Departement van Economische Zaken, *Verslag*.

70 *Ibid.* See also Norman Taylor, *Cinchona in Java. The Story of Quinine* (New York: Greenberg Publisher, 1945), 76.

Dutch transoceanic cinchona–quinine enterprise. Ten years later in 1945, Kerbosch described the position of the Cinchona Bureau as follows:

Because of the near monopolistic position of the Netherlands Indies cinchona cultivation, because of the Cinchona Agreement and the Cinchona-Restriction legislation, the Cinchona Bureau as a matter of fact controls the almost complete world production of cinchona bark. It is the Cinchona Bureau that decides over all major transactions and which holds in total control the price-fixing.<sup>71</sup>

### THE BLENDING OF QUININE SCIENTIFIC MARKETING AND THE AGENDA-SETTING PROCESS OF THE INTERNATIONAL ANTIMALARIA CAMPAIGNS

Yet another dimension of the Dutch transoceanic cinchona–quinine enterprise's control during the 1920s and 1930s was the commercial colonization of the first international public health campaign to eradicate malaria. In this last section, we will focus on the organization of an integrated public relations bureau that blended scientific marketing with the careful integration of the results of the agenda-setting process of the League of Nations' Malaria Commission.

Since the isolation of quinine in 1820, the medical profession has adopted the alkaloid quinine as the most essential and effective antimalarial medicine. However, limited supplies and high prices prevented the broad application of the medicine during most of the nineteenth century.<sup>72</sup> Nevertheless, by 1914, malaria was “almost considered as an anachronism” in large parts of Europe as a result of improved housing conditions, hygiene, agricultural techniques, and scientific knowledge regarding the vector of malaria, the *Anopheles* mosquito.<sup>73</sup> Unfortunately, the First World War disrupted this development and millions of Europeans were infected with malaria. By 1923, one leading health officer of the League of Nations called malaria “undoubtedly the most important epidemiological problem of Europe.”<sup>74</sup> In response, the League of Nations' Malaria Commission was founded in 1923–24, and institutionalized the creation of an active international network of scientists dedicated to malaria from nearly all European nations. In the next two decades, the Malaria Commission, in collaboration with the Rockefeller Foundation, developed an international public health

71 M. Kerbosch, *Het Kina-Monopolie van Nederlandsch-Indië* (Nota voor het Ministerie van Overzeese gebiedsdelen, 1945), no. 106, Kerbosch-collection, KITLV, Leiden University.

72 James Webb, *Humanity's Burden: A Global History of Malaria* (New York: Cambridge University Press, 2009), 106–10.

73 Iris Borrowy, *Coming to Terms with World Health: The League of Nations Health Organisation 1921–1946* (Frankfurt, Peter Lang GmbH, Internationaler Verlag der Wissenschaften, 2014), 112–13. In regard to scientific research on the mosquito as the vector for malaria, see amongst others Gordon Garrison, *Mosquitoes, Malaria and Man: A History of the Hostilities since 1880* (London: John Murray, 1978) and Webb, *Humanity's Burden*.

74 Cited in Borrowy, *Coming to Terms*, 113. See also Gabriel Gachelin and Annick Opinel, “Malaria Epidemics in Europe after the First World War: The Early Stages of an International Approach to the Control of the Disease,” *História, Ciências, Saúde-Manguinhos*, Vol. 18, No. 2 (abr.–jun. 2011), 431–46, 432.

campaign led by a “new science of public health” to fight malaria across Europe.<sup>75</sup> From the start, the Malaria Commission considered malaria as a social disease in which the social–economic condition of the malarial patient was central. In this way, the administration of affordable and large quantities of quinine (clinical and prophylactic) was stimulated throughout the interwar period as an important part of the campaign.<sup>76</sup>

In 1923, the Cinchona Bureau founded the Bureau for the Increasing Use of Quinine (*Bureau ter Bevordering van het Kininegebruik*). As mentioned before, by the early 1920s, demand for quinine had stagnated and the Cinchona Bureau decided to restrict the production of cinchona bark in the Netherlands Indies. The cinchona producers reluctantly accepted this decision because the Combinatie had promised to set up and pay for a marketing department (“*propaganda bureau*”) within the Cinchona Bureau to stimulate the sales of quinine sulfate and quinine and hence the demand for cinchona bark.<sup>77</sup> So, over the course of 1923, a marketing department was established under the active directorship of the pharmacist S. Camphuis van Velzen, director of the BKF and ACF and board member of the Cinchona Bureau. In the following year, the first steps in setting up a marketing department were initiated by identifying significant knowledge from scientific articles, journals, and publications, not only regarding malaria and quinine, but also in the broader fields of “hygiene, public health and the combat of contagious and endemic diseases.”<sup>78</sup> The first product of the department was the publication of *Chininum*, in 1923, a bundle of scientific articles on the positive therapeutic results of quinine, and which was intended for distribution among professors of medicine and physicians worldwide.<sup>79</sup>

In the following years, the activities of the Bureau for Increasing Use of Quinine increased and in addition to the more scientific *Chininum*, the Bureau also began distributing more popular pamphlets like *Malaria and Quinine* and *Malaria and the Large Cultures* (“*Malaria en de groote Cultures*”) among planters, entrepreneurs, and local governments in colonies like the Netherlands Indies, British India, and French Indochina. In these pamphlets, the Bureau closely integrated the daily experiences of planters and/or their indigenous employees (*koelies*) regarding malaria with expert scientific

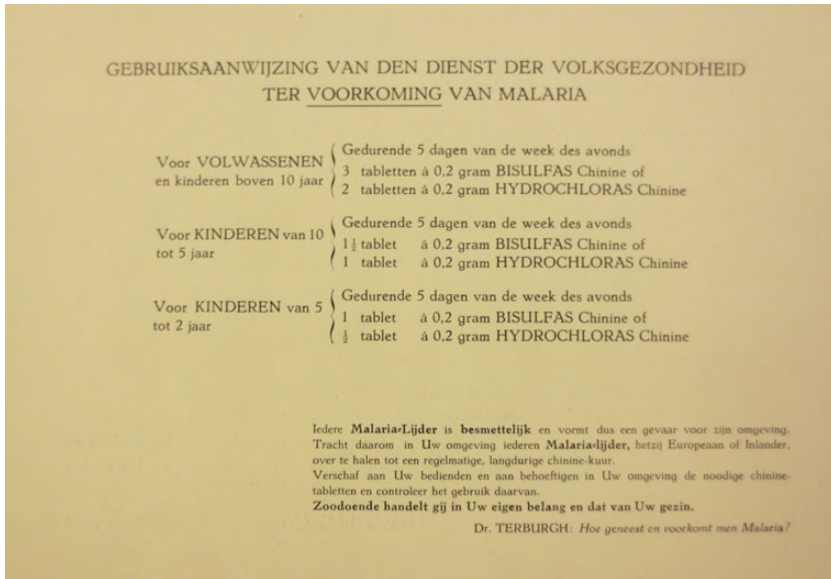
75 For an overview and discussion of these approaches, see Borrowy, *Coming to Terms*, 239–55 and Gachelin and Opinel, “Malaria Epidemics.” On the new science of public health, see Illana Löwy and Patrick Zylberman, “Medicine as a Social Instrument: Rockefeller Foundation, 1913–45,” *Stud. Hist. Philos. Biol. Biomed. Sci.*, 31 (2000), 365–79; 371.

76 Borrowy, *Coming to Terms*, 239–55, Gachelin and Opinel, “Malaria Epidemics” and Jan Peter Verhave, *The Moses of Malaria. Nicolaas H. Swellengrebel (1885–1970) Abroad and at Home* (Rotterdam: Erasmus Publishing, 2011), 98.

77 *Kina-Mededeelingen* No. 4, I (November 1920) and No. 5, II (Oktober 1921), Colonial Collection (KIT), Leiden University and M. Kerbosch, “Nota betreffende de kina-situatie, behoorende bij het schrijven van den directeur der Gouvernements Kina-onderneming dd. 13 januari 1927 No. 25 aan den directeur van Landbouw, Nijverheid en Handel te Buitenzorg. No. 98 Kerbosch collection, KITLV, Leiden.

78 *Jaarverslag Bureau ter Bevordering van het Kininegebruik* 1924, Item 8977, Archief NHM, National Archive, the Hague. Similar developments have been recorded for other pharmaceutical companies. See, amongst others, Thoms, “Standardizing Selling” and Liebenau, “Marketing High Technology.”

79 *Jaarverslag Bureau ter Bevordering van het Kininegebruik* 1924, Item 8977, Archief NHM, National Archive, The Hague.



**Illustration 1.** A page from a pamphlet distributed by the BKF among planters in the Netherlands Indies (ca. 1930). Item 8980, Archief NHM, National Archive, The Hague.

statements on quinine (see Illustration 1).<sup>80</sup> For this purpose, the Cinchona Bureau’s marketing department collaborated closely with the quinine cartel members.<sup>81</sup> So, stimulated by the commercial objectives of both the cinchona producers and quinine manufacturers, marketing increasingly became the driving force of the Cinchona Bureau’s policy during the 1920s.

From the beginning, in addition to regular quinine marketing, the Bureau for Increasing Use of Quinine spearheaded the objective to make “contact with different institutions of importance in the field of public health” and position the Cinchona Bureau as “intermediary between the sufferers of malaria, who need quinine, and the authorities, who are engaged in combating malaria.”<sup>82</sup> So, in the year that the Malaria Commission was established (1924), Camphuis van Velzen traveled to Geneva to meet Dr. Norman White, chief epidemic commissioner of the health

80 This new approach was implemented throughout the entire European pharmaceutical industry and seems to be closely linked to the growing cooperation and mutual dependency between the pharmaceutical industry and the medical profession. Wolfgang Wimmer, “Die Pharmazeutische Industrie als ‘ernsthafte’ Industrie. Die Auseinandersetzung um die Laienwerbung im Kaiserreich,” *Medizin, Gesellschaft und Geschichte*, 11 (1992), 73–86, Thoms, “Standardizing Selling” and Arjo Roersch van der Hoogte and Toine Pieters, “Advertenties voor hypnotica en sedativa in het *Nederlands Tijdschrift voor Geneeskunde*, 1900–1940: historische veranderingen in de vorm en inhoud van een informatiebron voor artsen,” *Studium*, 4 (2010), 139–54.

81 *Jaarverslag Bureau ter Bevordering van het Kininegebruik 1926, 1927, 1928, 1929*, Item 8977, Archief NHM, National Archive, The Hague.

82 *Jaarverslag Bureau ter Bevordering van het Kininegebruik 1924*, Item 8977, Archief NHM, National Archive, The Hague.

committee of the League of Nations to inform him about the “organisation between the producers and manufacturers” (e.g., Cinchona Bureau) and how they could contribute in the international struggle against malaria.<sup>83</sup> Furthermore, national governments and (inter)national health institutions like the Red Cross were informed of the possibility of contacting the Cinchona Bureau for supplies of quinine sulfate and/or quinine medicines.<sup>84</sup> Thus, from the start, the international public health campaign in the fight against malaria was aligned with the Cinchona Bureau’s marketing activities to stimulate the sales of quinine. By the late 1920s, these activities gained more importance as a result of the growing international criticism of the Cinchona Bureau’s price policy.

In 1927, the Malaria Commission published its second general report and one main conclusion was that the demand for cinchona alkaloids (e.g., quinine) far outstripped the supply. In addition, the Cinchona Bureau was criticized for keeping prices of quinine too high and the Malaria Commission began to encourage initiatives to cultivate cinchona bark outside the Netherlands Indies.<sup>85</sup> In addition, governments confronted with malaria epidemics and endemics within their borders complained they lacked sufficient funds for large supplies of expensive quinine as a result of the high prices set by the so-called Quinine Trust.<sup>86</sup> The Cinchona Bureau (and hence the Dutch cinchona–quinine enterprise) thus faced an issue of trust. In a meeting of the Cinchona Bureau in 1930, Van Linge argued for a quinine price reduction to improve the reputations of the Cinchona Bureau and the Dutch, so that “everybody who is part of it would not be regarded as extortionists and usurers.”<sup>87</sup>

By the late 1920s, the Cinchona Bureau had already implemented the so-called two-price system, based on two separate prices for two distinct quinine markets. The first price would be the regular high price set for the normal quinine markets, while the second price, much lower, would be reserved for governments who were in need of bulk quantities of quinine in their fight against malaria.<sup>88</sup> In continuation, the Bureau for Increasing Use of Quinine began to inform government health officials and public welfare institutions like the Red Cross and the Red Crescent of this new price system and the possibility of buying cheap quinine.<sup>89</sup> In these letters, the marketing department closely interlinked the Cinchona Bureau’s position with the health campaign objectives of the Malaria Commission: “here we have two organizations which are complementary to each other; the League of Nations is in want of

83 Goss, “Building,” 16.

84 *Jaarverslag Bureau ter Bevordering van het Kininegebruik 1924*, Item 8977, Archief NHM, National Archive, The Hague.

85 Webb, *Humanity’s Burden*, 150–51 and Borowy, *Coming to Terms*, 239–55. Drug pricing is still one of the most contested issues in the present-day debate regarding the pharmaceutical industry and public health. Graham M. N. Dukes, “Accountability of the Pharmaceutical Industry,” *Lancet*, 360 (November 23, 2002), 1682–84.

86 Webb, *Humanity’s Burden*, 149–50.

87 Concept notulen gecombineerde vergadering Kinabureau en Bestuur VKP, mei 9, 1930, Item 8980, Archief NHM, National Archive, The Hague.

88 M. G. J. M. Kerbosch, “Enkele beschouwingen omtrent de economische positie van de Kinacultuur,” *Landbouwkundig Tijdschrift*, Vol. 51, No. 625 (June 1939), 276–82, 279. See also Goss, “Building,” 16.

89 *Jaarverslag Bureau ter Bevordering van het Kininegebruik 1932*, Item 8981, Archief NHM, NA, The Hague.

quinine for treating malaria patients and the Cinchona Bureau can offer this quinine at a low price.”<sup>90</sup> To enhance the restoration of trust, the Cinchona Bureau also supplied regular amounts of free quinine samples to the Malaria Commission for scientific experiments. For example, as Iris Borowy has mentioned, the Commission tested two preparations “placed at their disposal by two quinine factories in Amsterdam and Turing” in hospitals in Algeria, Spain, Italy, Romania, and Yugoslavia.<sup>91</sup> In other words, the Cinchona Bureau was boosting its trusted image by reconciling the needs of the Malaria Commission (affordable quinine medicine) with its commercial role as quinine producer and supplier.<sup>92</sup>

By the late 1920s, the international community of scientists involved in the fight against malaria brought together in the Malaria Commission and Rockefeller Foundation became divided along two lines of actions: first, the eradication and control of the Anopheles mosquito and second, quininization—the distribution of quinine as a prophylaxis and first measure to fight malaria as a social disease in combination with general sanitary measures.<sup>93</sup> The majority of the Malaria Commission favored the use of quinine or cheaper alternatives over the significantly more expensive measure of mosquito control.<sup>94</sup> By the 1930s, several experiments were coordinated across the world by the Commission (for example, in Algeria, Italy, Malay, and Russia) to compare the safety and efficacy of several synthetic drugs with quinine and find cheap alternatives for quinine.<sup>95</sup> These synthetic antimalarial medicines, branded plasmoquine and atebrine, were launched in 1926 by the German chemical giant I. G. Farben and since then have been marketed across the world as effective alternatives for quinine.<sup>96</sup> In continuation, physicians and public health officials throughout the world began to show more interest in these synthetic quinine medicines.<sup>97</sup>

By the 1930s, the Cinchona Bureau’s marketing activities began to focus more on these developments and in the process they capitalized on the Malaria Commission’s emphasis on malaria as a social disease and the use of affordable and cheap antimalarial medicines. By the late 1920s, the Cinchona Laboratory had already anticipated these developments by extending its activities to comparative testing of the therapeutic

90 Ibid.

91 Borowy, *Coming to Terms*, 244.

92 This fits well with what Joseph Gabriel has described as “the efforts to reconcile the ethical norms of medical science with the need for commercial firms to successfully introduce new products to the market in order to remain competitive.” Cited in an interview with Gabriel on the points blog of the ADHS regarding his new book *Medical Monopoly: Intellectual Property Rights and the Origins of the Modern Pharmaceutical Industry* (University of Chicago Press, 2014). <http://pointsadhsblog.wordpress.com/2014/11/04/the-points-interview-joseph-m-gabriel/#more-11796>, consulted November 5, 2014.

93 Borowy, *Coming to Terms*, 239–55; Gachelin and Opinel, “Malaria Epidemics”; and Verhave, *Moses of Malaria*.

94 Verhave, *Moses of Malaria*, 133.

95 Borowy, *Coming to Terms*, 252–53.

96 M. Kerbosch, Nota betreffende den toestand en de vooruitzichten der kinacultuur in Nederlandsch-Indië (1932), no. 48, Kerbosch-collection, KITLV, Leiden. See also David Greenwood, “Conflicts of Interest: The Genesis of Synthetic Antimalarial Agents in Peace and War,” *J. Antimicrob. Chemother.*, 36 (5) (1995), 857–72 and W. U. Eckart and H. Vondra, “Malaria and World War II: German Malaria Experiments 1939–45,” *Parassitologia*, 42 (1–2) (2000), 53–58.

97 Webb, *Humanity’s Burden*, 143–44.

efficacy of quinine, other cinchona bark alkaloids, and synthetic antimalarial medicines.<sup>98</sup> During the 1930s, the goal was formulated to “find [new] derivatives based on the cinchona bark, which can be applied in those cases in which quinine does not work, so that people do not seek solace in the quinine allied synthetic preparations” and to “investigate systematically the therapeutic value of these derivatives and quinine in other fields than malaria control.”<sup>99</sup>

Parallel to investigations in the Cinchona Laboratory, the Bureau for Increasing Use of Quinine began to align the growing scientific knowledge circulated by the Malaria Commission regarding quinine and the synthetic medicines and their emphasis on cheap medicines within their marketing activities. This is well illustrated by two pamphlets, which were distributed by the Cinchona Bureau worldwide during the second half of the 1930s. The first was *The Therapeutics of Malaria*, issued by the Cinchona Bureau in 1933, which was strongly based on the third general report of the Malaria Commission (1933). This pamphlet addressed the “most important drugs available for malaria control,” namely quinine and the two synthetic antimalarial medicines atebriane and plasmoquine. In the last pages, the pamphlet summarized several main conclusions and cited the Commission’s report in capital letters:

The Malaria Commission wishes it to be understood quite clearly that, in their opinion, the new synthetic remedies now available are still in the experimental stage, and they consider that the time has not yet come when any of these drugs can be recommended as substitutes for, or in preference to, quinine and other preparations of cinchona bark.<sup>100</sup>

In the second pamphlet, titled *Can Nature Be Equaled by Synthesis in Malaria?* (1936), the Bureau for Increasing Use of Quinine further capitalized on the Malaria Commission’s idea of malaria as a social disease and the availability of cheap, but safe and effective, antimalarial medicines. In this pamphlet, the *Short Quinine Treatment* was stressed, which according to the pamphlet was successfully applied by the medical health services in the Netherlands Indies and Greece and “from an economic standpoint is of the outmost importance, as the number of relapses is decreasing considerably.”<sup>101</sup> Thereafter, followed various expert statements in which several side effects of the use of the synthetic medicines (like “saturation of the liver” or “psychoses; collapse”) were emphasized. The pamphlet concluded with two expert statements regarding the safety and efficacy of quinine and its affordable price. The first stated, “The two great advantages of quinine are (a) the rapidity with which it reduces fever and alleviates symptoms and (b) its safety” and the second, “The practical utility of quinine is

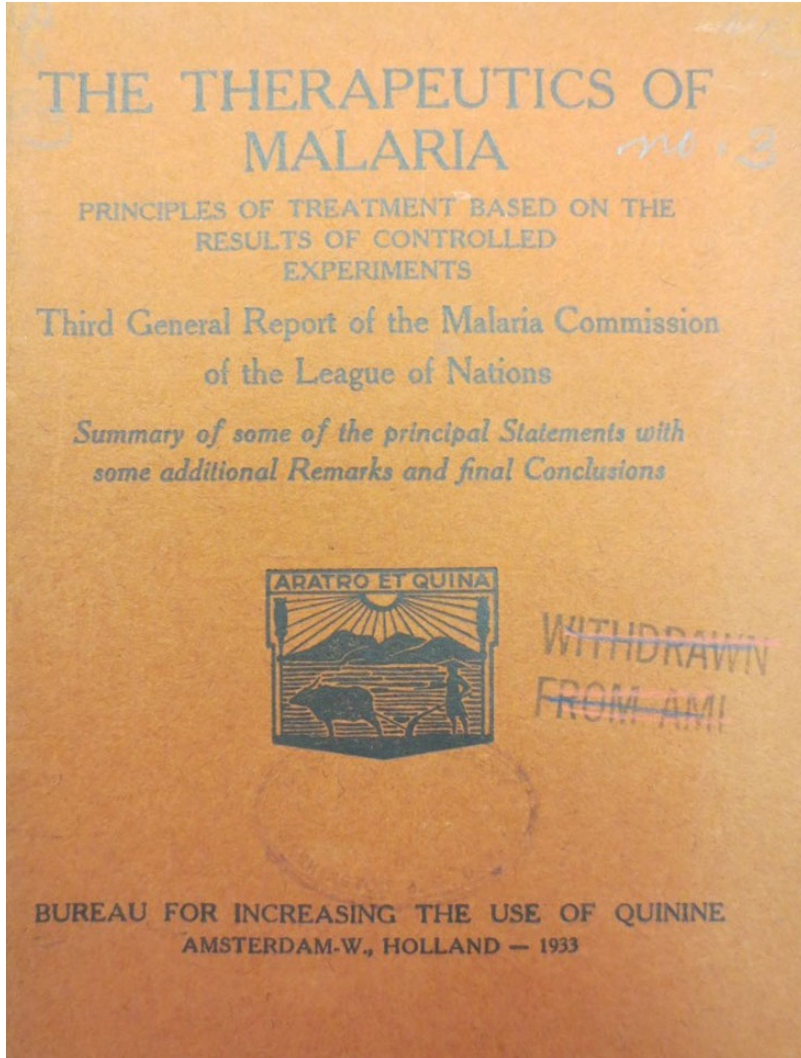
98 Verslag Commissie Toezicht Kinalaboratorium, 1932, Item 8983, Archief NHM, National Archive, The Hague.

99 Jaarverslag Kina Laboratorium 1934, Item 8986, Archief NHM, National Archive, The Hague.

100 Bureau for the Increasing Use of Quinine, *The Therapeutics of Malaria* (Amsterdam-W., Holland, 1933).

101 Bureau for the Increasing Use of Quinine, *Can Nature Be Equaled by Synthesis in Malaria?* (Amsterdam-W., Holland, 1933).



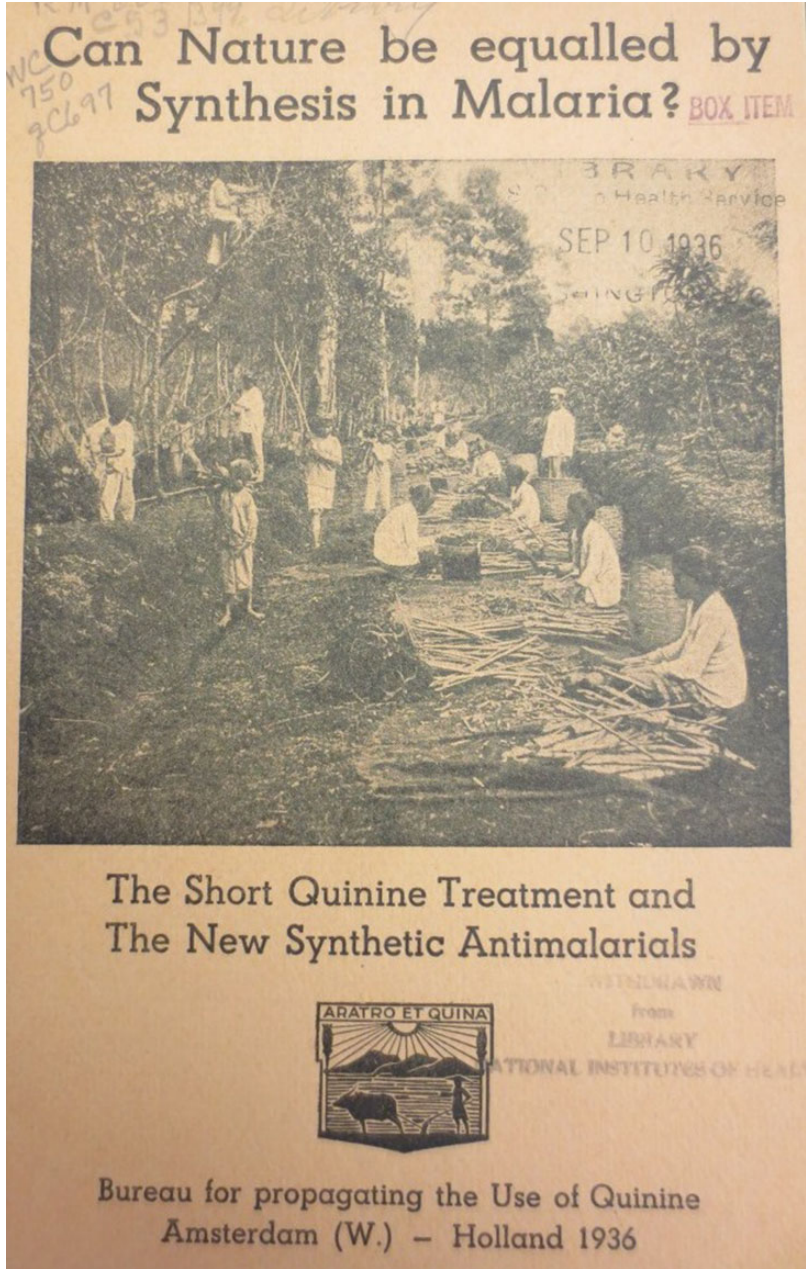


**Illustration 2.** Forefronts of *The Therapeutics of Malaria* (1933). The pamphlet is located at the National Library of Medicine, Washington, DC.

not lessened. It is still our cheapest and, it would seem, our safest antimalarial drug.”<sup>102</sup> So, the message of the Cinchona Bureau through these two pamphlets was quite straightforward—the best way to fight malaria was by the administration of cheap and affordable quinine (Illustrations 2 and 3).

By 1935, the League of Nations Health Committee had further coordinated international studies on the synthetics atabrine and plasmoquine and by the mid-1930s

102 Ibid.



**Illustration 3.** Forefronts of *Can Nature Be Equalled by Synthesis in Malaria?* (1936). The pamphlet is located at the National Library of Medicine, Washington, DC.

urged that a conference in which the “present state of production in relation to present and future world requirements, the production costs and retail prices, and methods of distributing drugs” should be considered.<sup>103</sup> Although all member governments expressed interest, the conference was never organized and according to Borowy, “it is unclear whether this failure resulted from lobbying activities of the quinine production industry, from the approach of the war, from simple bureaucratic inertia or a combination of all.”<sup>104</sup> Although, we do not have sources that indicate direct lobbying practices by the Dutch cinchona–quinine consortium, the marketing strategies of capitalizing on (colonizing) the international public health campaign by the Cinchona Bureau seemed to have paid off during the second half of the 1930s.

In 1936, the Bureau for Increasing the Use of Quinine was reorganized in the Cinchona Institute. The staff was extended, and included a fully paid and appointed medical advisor and in addition to the Dutch members of the Cinchona Bureau, the non-Dutch cartel members were more strongly involved in the activities of this new institute. Furthermore, new subsidiaries of the institute were founded in the Netherlands Indies (under supervision of the BKF), in New York City (the Cinchona Products Institute, Inc.), and in Brazil during the second half of the 1930s.<sup>105</sup> In 1937, the Cinchona Institute received almost three-quarters of a million guilders from the cinchona producers, the Combinatie, and the non-Dutch quinine cartel members to spend on marketing and promotion activities.<sup>106</sup> The establishment of the Institute and its subsidiaries across the world indicate how the marketing activities of the Cinchona Bureau were strongly imbedded in the daily organization of the transoceanic cinchona–quinine enterprise. Furthermore, by capitalizing on the international public health campaign to fight malaria, the Cinchona Bureau had managed to stimulate the administration of quinine and hence the commercial interests of both the cinchona producers and quinine manufacturers. As the Indian pharmacologist R. N. Chopra described in 1942:

The Cinchona Bureau has tried and has been successful in effecting regulated and gradual reduction of the cinchona areas to proportions fitted to what the world can afford to buy and not what it really needs. In this way the price has been maintained at a level that leaves a profit both for the plantations and the factories.<sup>107</sup>

## CONCLUSION

On June 11, 2009, the World Health Organization (WHO) signaled that a global pandemic of 2009 H1N1 “swine flu” influenza was underway and advised governments to

103 Cited in Borowy, *Coming to Terms*, 253.

104 *Ibid.*

105 Concept verkorte notulen vergadering dagelijks bestuur Kina-Bureau, juni 30, 1939, Item 8992, Archief NHM, National Archive, The Hague.

106 Propaganda 1937, Item 8988, Archief NHM, NA, The Hague.

107 Cited in “Malaria and Antimalarials,” *Curr. Sci.*, Vol. XI, No. 9 (September 1942), 347–50; 349. In regard to Chopra and quinine in India, see Patricia Barton, “‘The Great Quinine Fraud’: Legality Issues in the ‘Non-Narcotic’ Drug Trade in British India,” *Soc. Hist. Alcohol Drugs*, Volume 22, No. 1 (Fall 2007), 6–25.

stockpile Tamiflu and other anti-flu medicines in anticipation of the development of a vaccine. This action raised questions about the pharmaceuticalization of public health and an economically driven change in the concept of public health, from prevention and clinical care to merely drugs.<sup>108</sup> In this study, we have shown how eighty years earlier, a Dutch pharmaceutical consortium of cinchona producers and quinine manufacturers was able to capitalize on one of the first international public health campaigns to fight malaria led by WHO's forerunner, the League of Nations, thereby promoting the sale of quinine drugs in the fight against malaria at the expense of other community-based malaria control techniques and strategies.<sup>109</sup>

The historical trajectory of the Dutch transoceanic cinchona–quinine enterprise and the development of the Cinchona Bureau as the decision-making center of a global pharmaceutical monopoly can be regarded as the ur example of the dynamics of the burgeoning international pharmaceutical trade, the increasing global circulation of pharmaceuticals and the global inequalities that emerged from and were reinforced by a pharmaceutical cartel. This experience demonstrates how pharmaceuticals can be attached to and transform medical markets and practices through the corporate colonization of international public health efforts. Corporate colonization was not realized by bribing or lobbying in the strictest sense, but rather by a subtle colonization of the public health campaign message against malaria. This narrative reveals the extent to which the Dutch consortium's coopting of scientists, government-officials, public health officers, and drug company executives was mutually conceived (despite inequalities in power relationships) and mutually beneficial in terms of political and economic stakes. Scientists' central role in providing guidance, expertise, and credibility proved critical for structuring the consortium's symbiotic relationship with the Dutch government. Scientific knowledge regarding malaria, quinine, and public health in general was gathered and networks of experts were created to assess the opportunities and limitations of research and scientific literature. In this way, the Cinchona Bureau was positioned as the intermediary between the international expert community formulating the international public health efforts in the fight against malaria (e.g., the Malaria Commission) and the ultimate buyers and consumers of quinine. Furthermore, the Cinchona Bureau's marketing campaign capitalized on the Malaria Commission's message of malaria as a social disease by emphatically highlighting the scientific comparisons made between quinine and synthetic antimalarial medicines for safety, efficacy, and affordability. The Cinchona Bureau thus colonized the international public health campaign by branding quinine as the best and cheapest way to fight malaria and promoted a particular aspect of the intersection of science, public health, and public relations to advance a straightforward economic interest. Despite

108 Andreas Zumach, "Who Is Really Helping the WHO?," *Deutsche Welle*, May 21, 2012. <http://www.dw.de/who-is-really-helping-the-who/a-15965508>, consulted November 6, 2014. See also John Abraham, "The Pharmaceutical Industry as a Political Player," *Lancet*, 360 (November 9, 2002), 1498–502.

109 According to Nicolas King, the first international congresses and supra-national organizations were established to "address international health" during the second half of the nineteenth and early twentieth century. Nicholas B. King, "Security, Disease, Commerce: Ideologies of Postcolonial Global Health," *Soc. Stud. Sci.*, Vol. 32, No. 5/6 (Oct.–Dec. 2002), 763–89; 764–65.

the differences in nature and scale, the monopolistic and manipulative politics of science and governance shown in the quinine case is exemplary for how the international pharmaceutical industry in the postwar period continued to orchestrate its activities toward the pharmaceuticalization of public health.<sup>110</sup>

Our study also shows how the monopolization of an essential medicine and the privileging of marketing over science resulted in a diminished incentive for scientific innovation and in curtailing the free circulation of knowledge. The commercial interests of both the cinchona producers and quinine manufacturers in stimulating quinine sales resulted the Cinchona Bureau's decreased interest in continuing the scientific work at the CFS in the Netherlands Indies as an essential driving force of the cinchona–quinine enterprise. As a result, staff and research facilities were reduced and the CFS lost its autonomy as the scientific center for cinchona cultivation. This was further made clear when the free circulation of knowledge regarding scientific innovation of the cinchona cultivation was blocked to protect the Dutch enterprise's global commercial interests during the second half of the 1930s. So, with the development of the Cinchona Bureau as the decision-making center of this global pharmaceutical monopoly, commercial interests prevailed over scientific interests in cinchona cultivation. This resulted in a strategic engineering of the transoceanic circulation of knowledge and eventually in a knowledge blockade that would undermine innovation and ultimately threaten Dutch market dominance in the postwar period.

#### ACKNOWLEDGMENTS

The authors would like to thank Hieke Huistra, Keetie Sluyterman and Ernst Homburg for their useful feedback and ideas. We also like to thank Julia Challinor for her English manuscript correction services and the anonymous reviewers for their valuable comments and suggestions.

110 Dominique A. Tobbell, *Pills, Power and Policy; The Struggle for Drug Reform in Cold War America and Its Consequence* (Oakland: University of California Press, 2012), Adryana Petryna, Andrew Lakoff, and Arthur Kleinman, eds., *Global Pharmaceuticals; Ethics, Markets, Practices* (Durham: Duke University Press, 2006).