

## India and Science and Technology in the early PRC

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In what ways can materials located in India be useful to the study of the early People's Republic of China (PRC)?<sup>1</sup> I first became interested in this question because of a passing reference to a dinner. In 2009 I had just begun conducting preliminary research on what would become the subject of my doctoral dissertation—statistics and statecraft in the early PRC. That summer, quite by chance, I encountered a two-sentence news item on the front page of the *People's Daily* reporting that Chinese Premier Zhou Enlai 周恩来 had hosted the Indian statistician P.C. Mahalanobis 马哈拉诺比斯 (1893-1972) for dinner in Beijing on July 9, 1957.<sup>2</sup> Intrigued by this already unusual pairing of personalities, I soon found myself on an archival trail that took me from Beijing to Guangzhou and from Calcutta to New Delhi. Exchanges between Indian and Chinese statisticians spanned the entire 1950s, I discovered. And they helped me make arguments about the nature of Soviet statistical aid to China, the extent of Chinese disaffection with that aid, as well as the existence of genuine attempts at south-south technological knowledge sharing between China and India.<sup>3</sup>

It is precisely because the Sino-Indian statistical exchanges offered me a means through which to better understand aspects of early PRC and Cold-War history—something that other source material did not do—that I have been encouraged to consider more broadly what other China-India links might tell us about this period. And so, what began with an incidental encounter has over the years been transformed into an on-going project of steady archival accumulation. For this brief essay, I would like to look beyond the cultural and intellectual spheres and focus instead on encounters in the worlds of science and technology.<sup>4</sup> India, it turns out, was one of a handful of countries outside the socialist bloc that engaged in sustained scientific exchange with the PRC during the 1950s.

Scientific contact between the two can be dated to as early as 1951. In January of that year, a delegation from the Chinese Academy of Sciences (CAS) attended an academic symposium on the origin of crop varieties in New Delhi. As the delegation member and botanist Wu Zhengyi 吴征镒 (1916-2013) recalled, this was CAS' first foreign assignment (建国后第一个出国任务).<sup>5</sup> The delegation was led by the botanist Chen Huanyong 陈焕镛 (1890-1971) and also included the ecologist Hou Xueyu 侯学煜 (1912-1991) and the palaeobotanist Xu Ren 徐仁 (1910-1992). Among them, Xu was already in India, working since 1948 as a professor and museum curator at the Birbal Sahni Institute of Paleobotany in Lucknow. The prominent Indian physicist Satyendra Nath Bose (1894-1974) of boson fame was among the founding members of the India-China Friendship Association established later that year in Calcutta.<sup>6</sup> In 1952, the Indian

mathematician and Marxist historian D.D. Kosambi (1907-1966) led a sixty-member Indian delegation to the Asian and Pacific Regions Peace Conference in Beijing. In October 1954, the Indian physician and president of the Association of Scientific Workers of India, Sahib Singh Sokhey 索克少 (?-1971), was a guest of the Chinese Academy of Sciences. The following year, the lawyer and educator Qian Duansheng 钱端升 (1900-1990) led a Chinese delegation to the Indian Science Congress, where he “pleaded for a constant exchange of scientists, artists, and workers in various other fields between China and India to promote understanding and amity.”<sup>7</sup> Members of the delegation included the chemical engineer Hou Debang 侯德榜 (1890-1974), the hydrologist Wang Huzhen 汪胡楨 (1897-1989), and the pharmacologist Xue Yu 薛愚 (1894-1988).

1956 marked a qualitative shift in the interactions, clues to which can be found in reports filed by the cultural delegations that crisscrossed India and China that year. P.V. Bapat, the scholar of Buddhism and leader of the April 1956 Indian delegation to China, wrote about meeting with Zhou Enlai: “We discussed very frankly and unreservedly several problems common both to India and China and the general feeling on both sides was that it would be in the interests of both the countries if an exchange on a more lasting basis between scholars and Scientists or technicians of both countries is made possible.”<sup>8</sup> This desire for greater seriousness had been acknowledged by the January 1956 Wu Han-led 吴晗 (1909-1969) delegation to India as well. In their final report, they described receiving special instructions about their mission: “the evening before our departure, Prime Minister Zhou instructed us that the stage of general friendship visits was past and the present task was to deepen our engagement: to seriously study a few [new] things and return [to China].”<sup>9</sup>

The bilateral exchanges that ensued strike at the very core of the massive social, economic, and technological changes that India and China sought to bring about. And they involved planners, scientists, and engineers in full measure. Some of the highlights are listed below:

- 1956
- (1) Indian Planning Commission Delegation visits China
  - (2) Indian team visits China to study agrarian cooperatives
  - (3) Indian team visits China to study agricultural planning and techniques
  - (4) Chinese team visits India to study techniques of using bamboo in house construction
  - (5) Zhou Enlai visits the Indian Statistical Institute, Calcutta
  - (6) Chinese statisticians participate in the 25<sup>th</sup>-year

- celebration of the Indian Statistical Institute, Calcutta
- 1957 (1) Chinese statisticians spend one month in India studying random sampling methods  
(2) Statisticians PC Mahalanobis and DB Lahiri visit Beijing, lecture on statistics  
(3) Indian writer and mineralogist 高士 and wife arrive in Beijing  
(4) Mathematician D.D. Kosambi visits China
- 1958 (1) Statisticians Wu Hui 吴辉 and Gong Jianyao 龚鉴尧 spend an year in India studying statistical techniques  
(2) Indian demographer Sripati Chandrasekhar visits China
- 1959 Indian team visits China to study irrigation and water conservancy
- 1960 Mathematician D.D. Kosambi visits China

These encounters and exchanges generated a whole host of materials, including official reports, personal papers, media reports, archived materials (correspondence, memoranda, etc.), and publications. And they can be found in a range of sites across India and China: national and provincial archives, institutional archives, libraries, and private collections.<sup>10</sup> Oral history remains another potent, if increasingly endangered, source of information.<sup>11</sup> Taken together, these materials can help us study the history of the early PRC in a variety of ways. Below, I discuss briefly two of the more obvious routes: looking at official delegations and at individual-level contact.

*Delegations*—As indicated in the list above, a range of Indian delegations visited China during the second half of the 1950s. In each instance, they produced lengthy reports detailing their activities. For the purposes of illustration, let us look more closely at the 1959 delegation, which was charged with studying irrigation and the agronomical and engineering aspects of soil conservation. The three-man team arrived in Guangzhou on January 20, 1959, at the very height of the Great Leap Forward (1958-1961). Over the following six weeks, the three men crisscrossed much of the heartland of the People's Republic, including the provinces of Hebei, Henan, Hunan, Hubei, and Guangdong. They traveled 3000 miles by air, 2000 miles by train, and a further 1000 miles by road. Upon their return to India in early March, they filed a detailed 110-page report to the Government of India, outlining twenty-one specific recommendations.<sup>12</sup>

The real value of this report, however, lies not in the twenty-one recommendations but in the sixty-odd pages that comprise a day-to-day diary of events: what the team saw, who they met, their impressions, as well as a vast amount of quantitative data. We discover that the team spent time not just in big cities like Beijing, Wuhan, and Guangzhou but also in the countryside. In each province, they met with experts and technicians working in a wide variety of fields such as water conservancy, agriculture, irrigation, and construction. Theoretical discussions in Agricultural Colleges and Technical Institutes were complemented by extensive tours of actual

works in-progress and works completed. Such granular detail helps identify key individuals (frequently by name), institutions, and specific projects/sites across all levels—local to national—in China.

This wide range can help us approach the diversity as well as specificity of water management with a far greater degree of nuance, whether we think along the lines of technology, labor, scale, capacity, manufacturing, or anything else. And furthermore, it opens up the possibility of interrogating the interconnectedness of these processes. And perhaps most significantly, given that the itinerary for the team's travel was drawn up by the Chinese and was meant to showcase China's achievements in hydrology and soil management, the report provides a window onto Chinese best practices. In that sense, it constitutes a somewhat unique source, which when combined with archival research in China can help paint a more comprehensive picture of the whole range of hydraulic activities being pursued during the 1950s.

*Individual Contact*—The second approach is to look at scientists and the materials generated by their travels. Here again, we are confronted by a range of interesting figures. I have already mentioned the mathematician D.D. Kosambi's 1952 visit, the statistical exchanges between 1956 and 1959, and the palaeobotanist Xu Ren's employment in India. To that list we can add the demographer Sripati Chandrasekhar, who spent over a month in China in late 1959 and went on to write prolifically on China's population and general state of affairs. There is little doubt that further digging will uncover other interesting figures.

Consider the case of D.D. Kosambi.<sup>13</sup> A Harvard-trained mathematician and Marxist historian known for pioneering the application of statistical methods to the study of ancient Indian history, Kosambi's first traceable involvement with China took place in 1946. At that time, he was a professor at the recently established Tata Institute of Fundamental Research (TIFR) in Bombay and trying to bring the mathematician Shiing-Shen Chern 陳省身 (1911-2004) over as a visiting professor.<sup>14</sup> Chern had himself just returned to China to help set up the Institute of Mathematics within Academia Sinica. That same year, Kosambi and the director of TIFR, the physicist Homi Jehangir Bhabha (1909-1966), were also involved in discussions with Julian Huxley and Joseph Needham at UNESCO to set up two Institutes of Mathematics in Asia. The countries chosen: China and India.<sup>15</sup>

From what I can tell, Chern, whose affinities after 1949 lay with Taiwan and the United States and not the PRC, never did visit India (though he was made an honorary member of the Indian Mathematical Society in 1950). But Chern's Tsinghua roommate from the 1930s, the mathematician Hua Luogeng 华罗庚 (1910-1985), was instrumental in inviting Kosambi to visit the PRC in 1957. A famous autodidact, Hua had left a professorship at the University of Illinois in 1949 to return to the PRC. In 1952 he helped set up the Mathematical Institute within the Chinese Academy of Sciences. Kosambi's 1957 visit presumably also led to his only academic publication in Chinese.<sup>16</sup> He would visit again in 1960, though by that time it seems geopolitical concerns had begun to overshadow scientific ones and he spent much of his time in Beijing attempting to mediate the mounting territorial

disagreement between China and India. Even so, on both his visits he was granted extended interviews with Zhou Enlai.

Reconstructing in greater detail the sequence of these events and the different motivations driving them can cast light on several related issues: mathematical (scientific) networks and cooperation in Asia and how they were affected by 1949; links between mathematics and Marxism, as exemplified by Kosambi's motivations and his reception in China; and the role of science and scientists in international politics and diplomacy.

These are but two examples where China-related materials located in India can help open up interesting questions in the history of science of both countries. At the same time, such stories—much like in the case of statistics—frequently have ramifications beyond the two countries concerned and can even be instructive to historians who work on Sino-Soviet and Sino-US history. And yet, lest I leave the reader with a picture of untold opportunities, it remains important to observe that much like in China, access to archives in India is neither straightforward nor consistent. If anything, the modern Indian state's approach to its own history is distinctly cavalier.<sup>17</sup> But outside of state archives (including the mostly excellent NMML and the recently much improved National Archives) there exist other sources—most notably institution-level repositories—that remain largely untapped and where access is often more easily negotiated. The challenges notwithstanding, opportunities still beckon.

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## NOTES

<sup>1</sup> Early-PRC here refers to the years leading up to 1962. Such a periodization is informed by the Sino-Indian war that broke out late that year. The war effectively froze bilateral relations and most other kinds of communication and exchange. As such, it remains unclear whether the research opportunities identified here exist for subsequent decades.

<sup>2</sup> *Renmin Ribao*, July 10, 1957: 1.

<sup>3</sup> For more on these exchanges, see my article "Accepting difference, seeking common ground: Sino-Indian statistical exchanges 1951–1959," *BJHS Themes Volume 1* (January 2016): 61-82. <https://doi.org/10.1017/bjt.2016.1>

<sup>4</sup> I consider the more general question of 1950s China-India history in my article, "Before 1962: The Case for 1950s China-India History," forthcoming in *The Journal of Asian Studies*.

<sup>5</sup> "吴征镒先生访谈录", 《院史资料与研究》, 1992 no. 3: 1-13, India visit discussed on pp. 5-6. Wu likely meant this was the first visit to a non-socialist country. I would like to thank Wang Zuoyue for drawing my attention to Wu's interview.

<sup>6</sup> Named in honor of Bose, the boson is one of two basic classes of subatomic particles and follows Bose-Einstein statistics (the other class being fermions, which follow Fermi-Dirac statistics). The Higgs boson, the existence of which was experimentally verified at CERN recently, is one type of boson. For more see: *Dictionary of Physics—Vol. 1* (London; New York: Macmillan Publishers, 2004): 266.

<sup>7</sup> *Times of India*, January 12, 1955: 3.

<sup>8</sup> File EA FEA\_4(4)-FEA/56: 41, National Archives of India, New Delhi. The seventeen-member delegation had as its deputy the Calcutta biochemist Bires Chandra Guha (1904-1962).

<sup>9</sup> "...一般友好访问阶段已过去,今后应深入活动并认真地学习些东西回来." File 002-008-00068: 18, Beijing Municipal Archives, Beijing.

<sup>10</sup> The sites in India that I have personally visited include: the National Archives of India, Nehru Memorial Museum and Library, the Institute of Economic Growth (all in New Delhi); the National Library of India, the Indian Statistical Institute (both in Kolkata); the Tata Institute of Fundamental Research (Mumbai); the Birbal Sahni Institute of Paleobotany and Lucknow University's Tagore Library (both in Lucknow).

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<sup>11</sup> For instance, it was during an interview with the statistician Debkumar Bose in Kolkata that I learned that two Chinese statisticians had spent a full year at the Indian Statistical Institute in the late 1950s, indicating that the statistical exchanges did not end with Mahalanobis's China trip. I was eventually able to track both these statisticians down and interview them as well.

<sup>12</sup> *Report of the Indian Delegation to China for Study of Irrigation and Water Conservancy projects during January-February 1959* (New Delhi: Government of India, Ministry of Food and Agriculture, 1959).

<sup>13</sup> Some of Kosambi's papers are located in the archives of the Tata Institute of Fundamental Research, Mumbai. In 2012, I also conducted a brief interview with Kosambi's daughter, Prof. Meera Kosambi.

<sup>14</sup> On Chern, also see Wang Zuoyue's essay in this volume.

<sup>15</sup> I have yet to ascertain whether these institutes were actually set up.

<sup>16</sup> 高善必 (1957). "最小二乘法" [The Method of Least Squares], *Advances In Mathematics* 《数学进展》, 1957 (03): 485-491.

<sup>17</sup> See, for instance, my op-ed: "[Killing Humanities in India](#)," *The Times of India*, August 13, 2015.