

“航空救國”：民國時期航空技術的傳入與人才培養

包安廉 (Alan Baumler)

賓州印第安那大學歷史學系教授

Indiana University of Pennsylvania, History Department

baumler@iup.edu

漢學研究中心2023年度獎助訪問學人

第一次世界大戰後，西方理論主張無論民用或軍用航空，都不僅僅是單純的科技而已，將會導致社會轉型。中國政府從國外輸入技術以建立航空業，也嘗試創造一個現代而科技化的民族，外國政府與企業則願意與中國進行技術合作。中國試圖透過華僑與培養國內人才，以建立航空骨幹和航空文化。其中以大眾組織如中國航空建設協會、中國滑翔機總會特別重要。這些組織計畫籌措資金並再造人力與文化。

在中日戰爭與國共內戰期間，中國航空業有大幅度的發展。中國在汲取外國技術與自有運輸系統的改進方面取得成效。中國很成功的引進了外國技術，但無法規範中國人或外國人如何運用此一新的技術來控制中國的領空。

Aviation to save the nation:

Importing technology and cultivating talent in Republican China

After WWI, western theorists claimed that aviation (civil and military) was not just an ordinary technology, it would lead to a social transformation. Chinese governments built up aviation by importing technology, but also wanted to create a modern, technological Chinese race. Foreign governments and companies were willing to cooperate on technology. China tried to create aviation talent and an aviation culture in part by drawing on the Overseas Chinese and in part by cultivating domestic talent. Especially important were mass organizations like the Chinese Aviation Association and the Glider Association. These organizations planned to both raise money and reform the people and culture.

Please do not cite without author's permission.

During the War of Resistance and Civil War, China's aviation expanded massively. China was successful at both drawing on foreign technology and at transforming its own transport system. The Chinese government had less success in regulating how Chinese and foreigners used this new technology to control Chinese space. This paper will consist of three parts. First a short explanation of the importance of aviation in historiography, focusing on the idea of „Airmindedness“ and the social and personal transformation aviation was supposed to create. Second, an examination of how the Chinese state tried to create aviation talent, focusing on the post 1932 Aviation movement and the post 1941 Glider Association. Third, an analysis of how Chinese people (often against the will of the government) used the new technology to „annihilate space“ and in particular in how aviation fed into the chaos and hyperinflation of the post 1945 Civil War period.

There is a substantial literature on modern forms of transportation and communication in China and elsewhere. Steamships, railways, telegraphs etc have all been studied. All of these technologies were important forms of state building and nation building in China. All of them provided states, elites and sometimes ordinary people with ways to transcend space. All of them, probably railways most of all, led to social and economic change and were important political

issues.

Aviation has been little studied in China, although there have been many studies of it in other countries.¹ Aviation is similar to these other technologies, but different in two important ways. First is its utopian promise, second is its cultural impact. Even more than other technologies, aviation theorists claim that their machines would transform human society. Other technologies claimed to transcend space, aviation claimed to “annihilate space 湮滅空間”.² All modern technologies were economically and socially transformative, aviation promised to be more so. Aviation was also linked to culture. It would both require and create a new “air-minded” citizenry. The new technology would both require and create a new type of person.

The promise of aviation was summed up in the word “airminded”. This is a word that was used a lot in the west, and it implied more than an enthusiasm for aviation.

“Americans... never considered the flying machine simply as a way of moving people or things from one spot on the earth to another. Rather, it seemed an instrument of reform, regeneration, and salvation, a substitute for politics, revolution, or even religion.”³

What this would mean could be frustratingly vague. There were plenty of writers who asserted that it involved more than just wanting to fly, or having flown, that it was a whole modern mindset. It really is like the enthusiasm for “the internet” in the early 21st century. There was an internet, and could do amazing things, and there was also an amazing amount of hype and speculation about what the new internet connected world would look like.

Airmindedness is also a term Chinese were aware of. At least two authors made it clear that they were translating the English term. Zhou Xianshu translated it as 空军关心.⁴ Chiang Kai-

¹ Corn, Joseph J. *The Winged Gospel: America's Romance with Aviation*. The Johns Hopkins University Press, 2002; Courtwright, David T. *Sky as Frontier: Adventure, Aviation, and Empire*. College Station: Texas A&M University Press, 2004; Palmer, Scott W. *Dictatorship of the Air: Aviation Culture and the Fate of Modern Russia*. 1st ed. Cambridge University Press, 2009.; Wohl, Robert. *A Passion for Wings: Aviation and the Western Imagination, 1908-1918*. Yale University Press, 1996.; Wohl, Robert. *The Spectacle of Flight: Aviation and the Western Imagination, 1920-1950*. 1st edition. New Haven: Yale University Press, 2005; Young, Edward M. *Aerial Nationalism: A History of Aviation in Thailand*. Washington: Smithsonian, 1994. Literature on China includes Leary, William M. *Dragon's Wings: China National Aviation Corporation and the Development of Commercial Aviation in China*. Athens: University of Georgia Press, 1982.; Leary William M.. *Perilous Missions: Civil Air Transport and CIA Covert Operations in Asia*. University of Alabama Press, 2006.; Xu, Guangqiu. *War Wings: The United States and Chinese Military Aviation, 1929-1949*. Westport, Conn: Praeger, 2001; Wiethoff, Bodo, *Luftverkehr in China, 1928 – 1949: Materialien zu einem untauglichen modernisierungsversuch* Wiesbaden: Otto Harrassowitz 1975; 林志龍. 英國航空事業及其中國航線: 一九二七-一九四九. 初版. 史學叢書系列 99. 新北市: 稻鄉出版社, 2021.張興民, 從復原救濟到內戰軍運: 戰後中國變局下的民航空運隊 1946-1949 臺北, 國史館 2013.

² Saint-Amour, Paul K. “Air War Prophecy and Interwar Modernism.” *Comparative Literature Studies* 42, no. 2 (2005): 130–61. <https://doi.org/10.1353/cls.2005.0033>.

³ Corn, Joseph J. *The Winged Gospel: America's Romance with Aviation*. The Johns Hopkins University Press, 2002. pg30

美國人..... 從不認為飛行器只是把人或物從地球上的一個地方移到另一個地方的一種方式。相反，它似乎是一種改革、再生和救贖的工具，是政治、革命甚至宗教的替代品

⁴ 卓獻書. Zhuo, Xianshu. 戰時國土防空之理論與實際 / *Zhan shi guo tu fang kong zhi li lun yu shi ji*. 上海: 商务印书馆, 民國 24 [1935] Shanghai: Shang wu yin shu guan, 1935.

shek translated it as 空军意義.⁵ There were also various other phrases like 航空熱情與認識 that seem related but are perhaps not direct translations.

Chinese writers expounded on the revolutionary possibilities of aviation. Zhang Huichang suggested that aviation could improve the military, limit banditry, improve agriculture, forestry, fisheries, cartography and industry make famine relief easier, and (by making it easier to distribute publications) improve China's backwards (落後) and feudal (封建) culture.⁶ This is almost a catalog of the problems that reformers had identified with China.

This would involve a massive importation of new technology and training. Even more so than with other technologies, this was a moving target: aviation technology was advancing rapidly in the first half of the twentieth century. Another problem with this was that the western doctrine of "airmindedness" assumed that aviation would either require or create an air minded people. The Chinese were often held up as an example of a people who lacked this trait or were incapable of this transformation.⁷ The exact nature of the weakness of the Chinese was not clear. It was sometimes said to be a lack of inner-ear balance, or physical problems with the Asian eye. James McHugh, the American naval attaché in China speculated that Chinese lacked the innate mechanical ability of Americans, and that in any case there were unable as a race (his emphasis) to accept advice. He also claimed many Chinese pilots suffered from 'cockpit troubles, i.e plain cowardice.'⁸ The generally pacifist nature of the Chinese was also blamed.⁹ Thus, China needed not only to acquire new technology, but to transform its people to match it. As a rule, foreign observers tended to push Social Darwinist theories about the fundamental weakness of the Chinese race. Chinese were more likely to emphasize the backwardness of Chinese culture. Both stressed the importance of creating new people as well as importing new machines.

Sun Yat-sen, saving the nation and the race

Utopianism, technology, renovating the Chinese people. Unsurprisingly Sun Yat-sen was an early promotor of aviation. He coined the slogan "航空救國" and encouraged the early development of aviation. He got around China's lack of the appropriate technology and people by calling on the Overseas Chinese. Yong Sen Yat (楊仙逸 1893? -1923; Fung Joe Guey (馮珠九) 1883-1912; Tom Gunn (譚根) 1890-1924. are all Overseas Chinese who are invited to come from the U.S. to China by Sun. All of them were both engineers and pilots, building and flying their own planes. All of them were patriotic, in that they were willing to come to China to help the mother country, but they were also showmen and entrepreneurs who sold airplane rides. Some parts of this equation would change over time. Designing and building aircraft became more complex, and the roles of designer and pilot began to separate. Military and civilian aircraft also became increasingly different.

Other things did not change as much. Although there is not much data on the careers of these three men, all of them were difficult to control. All of them achieved fame in the United States (especially Feng Joe Guey) as pioneers of flight, and all of them seem to have found the

⁵ Chiang 1934, 34. The term is also translated as 航空心理化 in -青年空軍 #4 All of these are examples where it is made clear that this a direct translation of the English term.

⁶ 張惠長《民众对于航空事业应有之认识》《飞报》1930年9月15日, 22日

⁷ This sometimes applied to all Asians, but here I will focus on how this last vestige of Social Darwinism applied to the Chinese race.

⁸ Cornell University Library James M. McHugh papers box 2, folder 13, "The Chinese Air Force" June 7, 1938

⁹ John Magruder, "The Chinese as a Fighting Man." *Foreign Affairs* 9, no. 3 (1931): 469-76.

status of being a pilot as liberating. Tom Gunn used his status as a pilot to get engaged to one of San Francisco's most eligible young Chinese women, and found the possible dangers of working in China unattractive, and set up a flying school in the Philippines instead. Governments needed ways to not only attract these people but to control them. All of this was in keeping with the new culture of aviation in the West. Men learned to fly as a form of liberation and adventure, These men would be both culturally and physically hard to control. Although they have left little behind on their motivations for flying, their flamboyant showmanship would seem to indicate that like later flyers they saw flight as a form of adventure and escape.¹⁰ They usually had the option of literally flying away if they wanted. Tom Gunn and Yong Sen Yat were approached by both Sun Yat-sen and Yuan Shikai. In 1916 Sun's Guomindang established a flight school for Chinese-Americans in Redwood City California, under the direction of Lin Sen.¹¹ Yang Xianyi was one of the early graduates by 1920 he was recruiting new students in China and Hong Kong as well as the U.S. Pilots were also trained in Chicago and New York. While some of these people would "return" to fly for China, most did not. While the Guomindang (and other Chinese governments) were eager to attract Overseas Chinese talent and investment they would find that these people often had motivations of their own. Many Overseas Chinese wanted to learn how to fly as a symbol of their modern status in the U.S. or elsewhere, and while they were patriotic towards China they might see working in China as an adventure that would eventually end and they would return home.¹²

Aviation fever and heroic pilots

In the 1920s aviation was rare in China. The military had a handful of planes, and civil aviation was all but non-existent. This did not prevent Chinese elites from sharing some of the enthusiasm for aviation that was common in the West. While warlords and political factions used aircraft in combat, they tended to be used more for leafleting, observation and to induce panic in enemy troops.¹³ Warlords and political factions sponsored long-distance flights to demonstrate their modernity. The best known of these was the 1928 flight around China made by

¹⁰ On these themes, see Courtwright, David T. *Sky as Frontier: Adventure, Aviation, and Empire*. College Station: Texas A&M University Press, 2004.; Baumler, Alan. "Masculinity, Femininity, Sacrifice, and Celebrity during China's War of Resistance: Telling the Lives of the Aviators Yan Haiwen (1916-37) and Lee Ya-Ching (1912-98)." *NAN NÜ* 22, no. 1 (June 8, 2020): 70–115. <https://doi.org/10.1163/15685268-00221P03>.

¹¹ Liu Boji *Meiguo Huaqiao shi* (Taipei: Liming wenhua, 1981), 668. Although they had to raise money from the Chinese community to do this, it should be noted that aviation technology was advancing rapidly throughout this period, and in 1916 building a flight school was much less expensive and technically complex than it would be two decades later; 時事新報 1917.02.27; Korean Americans were also organizing aviation groups and training pilots at this time. Edward T. Chang and Woo Sung Han, *Korean American Pioneer Aviators: The Willows Airmen* (Lanham: Lexington Books, 2015). Some of the Korean pilots initially trained at Redwood City. A few Koreans also trained in Guangdong in the first class of (1926) of the Canton aviation school

¹² This is a section that can be expanded quite a bit. Many of those who did "return" to China found themselves less welcome than they would have hoped. Brooks, Charlotte. *American Exodus: Second-Generation Chinese Americans in China, 1901–1949*. First edition. Oakland, California: University of California Press, 2019. Most of these people (if they lived) ended up settling in the U.S. after the war. This is an important point, because while Overseas Chinese were an important source of talent and capital they in some respects remained as "foreign" as the non-Chinese pilots and capitalists the GMD relied on.

¹³ -航空隊與北伐空軍 1928 (17) p.1-4; -魯軍飛機空軍 1928 (18) p.48-50 many others

Zhang Huichang 張惠長 and other in the “Spirit of Canton” (廣州號) a plane modeled directly on Lindbergh’s Spirit of St. Louis. Long Yun of Yunnan sponsored the flight of the Golden Horse from Kunming to Shanghai, and provided aerial photographs of various cities and scenic spots to the Chinese press.¹⁴ The central government countered with heroes like Sun Tonggang 孫桐崗 who flew from Berlin to Nanjing. Amy O’ Keefe describes his presentation

Tonggang's portrait ... could be a movie poster. The photograph is set at a decorative angle, and a brave little plane flies across the upper edge of the page. The pilot's posture is casual, but his stance vis-a-vis his plane and the smirk on his face bespeak a manly, almost obnoxious confidence, a bravado that smacks of film heroes. The photo is clearly carefully posed, and it exhibits to great advantage the pilot's handsome features, positively lustrous skin, and dashing aviator's costume.¹⁵

While these heroic long distance flights demonstrated the modernity of the political factions that sponsored them, they served little practical purpose. At this point Chinese aviation remained small and closely connected to the military and a tiny, mostly male elite.¹⁶ It had little impact on the military, transportation, or any other aspect of Chinese society.

Shanghai Incident 一·二八淞滬戰 and the aviation movement

The aviation movement took off after the bombing of Shanghai in 1932. This was an event that was mentioned in countless later publications and by later pilots as an inspiration. They were shocked by China’s technological and social failure, by China’s lack of an effective

14 「滇飛機金馬號抵京之電告」中華實施周刊 1929,1(17)p.8

15 On Sun See Amy O’Keefe “Stars in the Nation’s Skies: The Ascent and Trajectory of the Chinese Aviation Celebrity in the Prewar Decade” In Pickowicz Paul G., Kuiyi Shen and Yingjin Zhang, eds. *Liangyou, Kaleidoscopic Modernity and the Shanghai Global Metropolis, 1926-1945*, Leiden: Brill, 2013. Sun was born and raised in China, and only went overseas to learn to fly after attending Whampoa military academy and being sponsored by Feng Yuxiang. 郁勃「飛行勇士孫桐崗」《黃埔雜誌》郁勃「飛行勇士孫桐崗」《黃埔雜誌》 accessed on-line 2016.6.19

http://www.huangpu.org.cn/hpsy/201209/t20120921_3112809.html Despite this he was sometimes identified in the Chinese press as an Overseas Chinese. 華僑半月刊 193(28) p.35 ; 王盾”孫桐崗飛行成功”《循環》1933,3(30) p.464.

16 There were a handful of female pilots, most tied very clearly to the nation and political elite. Zhu Mufei, 朱慕菲 the “fervently masculine” “朱慷慨有男儿气” daughter of 朱卓文 a key associate of Sun Yat-sen. was flying in combat, or at least observation, in the early 1920's. Li Yuying, fiancée of the revolutionary artist Liang Dingming also flew for the Canton government. 權基玉 Kwon Ki-ok 권기옥, was trained in Yunnan and was flying in combat for Feng Yuxiang in the 1920's. women like the Korean Kwon or Zhu Mufei could fly for China. The Soviets did train at least a couple female pilots in Canton in the 1920's, but there was little impetus for women to fly as part of a broader vision of Chinese modernity. On early women fliers see 张先章。民国广东航空资料选辑 广州，广东航空联社会：1994 pp.246-252, also 关中人 中国妇女航空钩沉 广州：广东省中山图书馆，1988;. See 微笑 1926(1)p10；圖畫時報 1927 (391) p.4；良友 1928(26)

air force, or an air defense system. Japanese planes (some launched from aircraft carriers) bombed Shanghai repeatedly, maintaining a steady pace of operations and dominating the skies over the city, which was, among other things, the center of China's newspaper and publishing world. There are many aspects to this mass aviation movement. China expanded its direct contact with foreign powers to build up military aviation, most notably through Italian and American military missions.¹⁷ China expanded civil aviation, in part through deals with Lufthansa and Pan-Am to create two joint venture airlines, Eurasia and CNAC. Students were sent to the Netherlands to learn aerial mapping.¹⁸ A number of organizations, eventually consolidated into the central-government controlled 中國航空建設協會, were established to increase awareness and above all raise money.¹⁹

I will skip over these in this paper. To some extent the government's goal in all of these was to have people donate money and then keep quiet. One of the most spectacular of these events was the purchase of over 100 aircraft for Chiang Kai-shek's 50th birthday in. This is a perfect example of the official aviation movement. It was centrally controlled funneling money towards the central air force not Canton. It drew on the Overseas Chinese, but gave them little role beyond donating money. Of the 123 planes given to Chiang Kai-shek in 1936 overseas money paid for 29, with Malaya paying for 13, the largest single contingent.²⁰ While donations from overseas were voluntary, inside China they were more of a shakedown, with every government department apparently being required to get donations out of every government department.²¹ The purchases were supposedly highly corrupt, which was a common complaint throughout the aviation movement. The centrally controlled aviation movement did have some success. By 1937 China had three small civil airlines, a fledgling air defense and warning system and a much larger air force that was built around direct contact and support from major foreign powers, particularly Italy, the USA, and later the Soviet Union. The Air Force in particular did far better in the early days of the War of Resistance than it had in 1932. In February of 1938 the Chinese Air Force bombed Songshan airfield in Taiwan, and in April of 1938 there was a major air battle over Wuhan where the Chinese managed to put 67 planes in the air. Even at this point however, China was still highly dependent on foreign help. All the pilots who bombed Taiwan were Russians, as were a third of those who fought at Wuhan. China was still highly dependent on foreign aid, and the Chinese Air Force almost vanished after the Soviets cut back on their assistance.

In 1933 *Sheng huo* 生活 magazine pointed out that the movement was insufficient for China's needs. Aviation was a method to encourage patriotism, but only in countries that already had modern nationalism and heroism. These nations could count on heroes like Lindbergh or

¹⁷ Leary, William M. "Wings for China: The Jouett Mission, 1932-1935." *Pacific Historical Review*, 1969; Orazio Coco (2021): The Italian Military Aviation in Nationalist China: General Roberto Lordi and the Italian Mission in Nanchang (1933-1937), *The International History Review*, DOI: 10.1080/07075332.2021.1984277

¹⁸ 王之卓 “十年来之航空摄影” *测量* 1943 3.1 pp. 16-22. Etc.

¹⁹ 看李雷 “1931-1937年‘航空救国’运动探析” 云南大学硕士论文, 2014

²⁰ 李雷 “1931-1937年‘航空救国’运动探析” 云南大学硕士论文, 114-120

²¹ 孔祥熙, 全国航空建设会经收飞机捐款专册, 1936 (<https://taiwanebook.ncl.edu.tw/zh-tw/book/NCL-9910017499/reader>)

Balbo to inspire the people to greater patriotism with heroic flights.²² Even those who failed could inspire with their daring. For a colonial country to do this was simply silly. The heroism of slaves was a joke, airplane factories were just a way to get money out of gullible peasants, and pilots were only appointed because of their official connections.²³ While not everyone associated with the movement was this critical, there was a general agreement that China needed a much broader “air-mindedness” than it currently had.

Expansion of talent inside China 中國滑翔總會

One aspect of this expansion was the growing need to create talent inside China. Chinese aviation personnel, at least the better documented pilots, were almost always trained abroad, or under close foreign supervision. While China had begun to build an aviation industry, the chief wartime goal was simply to create the ability to assemble and repair foreign aircraft.²⁴ There were wartime and postwar attempts to expand formal and informal education of mechanics, and to expand China’s ability to build aircraft.²⁵ All of these efforts were focused on the state goals of building a modern Air Force and, to a lesser extent, modern airlines. The glider movement was intended to create talent for these as well, but also to create a broader “air-minded” culture. Although a few gliders had been built in China in the 1930s, the Chinese National Glider Association (中國滑翔總會) was only formally established on April 4, 1941 (Boy’s Day). The association was in charge of the glider movement, the parachute movement, and the model airplane movement. Each of these needs a bit of explanation. The gliding movement was inspired by German models and intended to create future pilots. The parachute movement was inspired by Russian models to create a mass air minded citizenry. The model airplane movement (which I will skim over here) was probably inspired by American examples and intended at creating boys who understood the basic principles of aviation. The association was created at the instigation of Wei Chao 韦超 (1911-1940) 广西永福人. He had been inspired by the glider overflights at the Berlin Olympics while studying in Europe, and he studied gliding in Germany. In his time in Germany he not only set high marks for altitude and distance of flight, he imbibed a lot of German ideas about the importance of gliding. The German glider movement of the 1930s was in part an attempt to get around the restrictions of the Treaty of Versailles against training military pilots and creating an air force. It was also a way of creating the new fascist man. Parachute clubs, first popularized in the Soviet Union, (and in China also under the purview of the glider association) were also supposed to feed directly into military preparedness, but also into the creation of a new Soviet man.²⁶ Wei Chao made all these arguments while urging the

22 On Lindy and his importance to world aviation culture, see intro to Wohl, Robert. *The Spectacle of Flight: Aviation and the Western Imagination, 1920–1950*. New Haven: Yale University Press, 2005.

23 “航空熱一”,” 航空熱二” 生活 1933.7.29.

24 On the growth of an aviation manufacturing base see 發動機製造廠文獻編輯委員會原著 航空救國—發動機製造廠之興衰 1939-1954 臺北市：河中文化實業出版 民 97. While these efforts laid the foundations of Taiwan’s later aerospace and technology industries, they were unable to keep up with the progress of wartime developments

25 On education for mechanics see 錢昌祚 “航空機械兵訓練問題之研究” *航空機械* 1937.7 2.2 pp 1-6. The process seems to have been pretty haphazard and abusive towards new workers. On building airplanes see 發動機製造廠文獻編輯委員會 *航空救國—發動機製造廠之興衰* 臺北，河中文化 2009

26 Fritzsche, Peter. *A Nation of Fliers: German Aviation and the Popular Imagination*. First Edition.

establishment of gliding in China. Gliding would train pilots and increase national technology (without using up gasoline) pg 68. Wei Chao convinced the Da Gong Bao newspaper to divert some of the money they had collected to buy aircraft in celebration of Chiang Kai-shek's 50th birthday (in 1936) and used the money to buy a modern glider in Germany, which he finally managed to get into China via Hanoi.²⁷ Wei made a number of propaganda flights over Chengdu and other cities, dropping leaflets and spreading the gospel of gliding. He was killed in a crash in 1940, although his brothers carried on his work. Gliding stations were set up at Beibei, Chengdu, Guilin, Chongqing, Kunming, Lanzhou, Qujiang and at CAF schools.²⁸ There were at least some plans to have Overseas Chinese in the United States donate money for a total of 500 gliders, but this seems to have never been realized.²⁹ Singapore money was to pay for another 100.³⁰ Eventually some 200 gliders were built, with domestic materials. 100 of these were dedicated in special ceremonies in 1942.³¹ While the purpose of these classes (and gliding more generally) was to begin the training of future pilots, they also had the broader purpose (and effect) of increasing the technological and spiritual level of the trainees. Classes were recruited from those with a middle-school education, and the students who wrote about their education at least implied that they were of more common origin (百姓) than those recruited directly into the Air Force. A fair number of them were female.³² The *Dagongbao* claimed that 中國青年們記着：無論男女都得有上天的；此後凡是大學畢業年齡以下的青年若沒有上過天，就不配做中國的國民³³ This brings up the question of why- What was the purpose of all these people, male and female, going aloft, assuming that most of them were not going to become pilots? This can be divided into several parts. First, glider clubs were expected to build their own gliders, and this would give them a knowledge of materials and tools. They would also learn basic aeronautics and air science. The movement created art and literature about gliding, and held exhibitions. As with the broader aviation movement, the purpose of art was to expose the population to aviation. Zheng Zao claimed that the purpose of bombing literature was to “express the surrounding reality” to those who had not experienced it themselves. This made bombing a better subject than many other things, since writers were more likely to have experienced this person.³⁴ Zhang Baili (蔣百里 1882-1938) claimed that the literature of the air force was journalistic battle accounts.³⁵ Gliding admittedly could not match the emotional impact of a

Harvard University Press, 1994. Palmer, Scott W. *Dictatorship of the Air: Aviation Culture and the Fate of Modern Russia*. 1st ed. Cambridge University Press, 2009.

Palmer, Scott W. “Peasants into Pilots: Soviet Air-Mindedness as an Ideology of Dominance.” *Technology and Culture* 41, no. 1 (2000): 1–26. <https://doi.org/10.1353/tech.2000.0028>.

²⁷ 韦鼎峙 “中国滑翔运动创始人——韦超” *广西文史资料* 21:2 pp. 66-73 pg

²⁸ 滑翔运动的初创

<https://web.archive.org/web/20150521052250/http://hgzx.sport.gov.cn/n16/n33193/n33223/n35064/n2530890/n4196511/4270181.html>

²⁹ 滑翔機勸募委員會組織規程與勸募辦法 1942 GSG 014000003746A

³⁰ 東南日報 1941.07.25: 2 頁

³¹ GSG 001000004835A

³² 中国滑翔 1.4 pg 56 claims that 1/3 of the author's class of 49 were female.

³³ “青年飛上天去” *Dagongbao* http://202.55.1.83/history/history_news.asp?news_id=119438

³⁴ 鄭造 “航空文化與滑翔運動” *中国滑翔* 2.3 pg.4

³⁵ 蔣百里所認許—空軍文學-大半是空軍實錄的報告文學

dogfight, although glider pilots did write about the experience of soaring. While all of this was intended to encourage youth to glide and encourage donations of money, it also had the goal of spreading modern knowledge and attitudes beyond a group of trainee pilots.

This adds up to a new person, who is courageous, scientific, and technical. Creating this sort of talent was the key thing the wartime state was trying to do, from importing them as Americans or Huaqiao, New Life, 從軍運動. etc.

Models, parachutes, and direct experience

The glider association also took responsibility for building the parachute tower in Chongqing and organizing model airplane contests around the country. Both of these were intended to broaden the social transformation beyond a small elite of gliding cadets. In theory each of these things was also supposed to lead directly into military training. Learning to jump with a parachute was a useful skill for a future pilot or paratrooper. Model building could teach principles of aeronautics at a young age. Even more than gliding, however, these spread far beyond any possible group of future aviation personnel to a broader public.

In Soviet Russia the parachuting movement was wide-spread, but in China a parachute tower was built only in Chongqing. This was intended to part of a “massification” of aviation “航空衆大化”³⁶ The movement was to increase member’s interest in and knowledge of aviation.³⁷ In the first year 13, 091 males and 1,842 females jumped from the tower. Most between the ages of 11 and 26, although two 6 year olds and one 63 year old also jumped. Most were listed as students although soldiers, workers and writers were also represented. Most were from Sichuan, although almost every province was represented. Most jumped 1-10 times, although two hardy souls jumped over 70 times.³⁸ By 1945 some 50,000 people had jumped from the tower.³⁹

What was the purpose of this? As with gliding, part of the purpose was the training of future pilots (and paratroopers) but even more so than in the gliding movement the purpose was to change the people. As with gliding, parachutists were interviewed and published about their experiences. They spoke of the physical disorientation on the first jump (which declined later), their growing self-confidence, and their fellow-feeling with other parachutists. While the glider movement was intended to create aviation talent it was also intended to create a broader aviation culture.

Part Three Annihilating Space before and after 1945

Expansion of foreign contacts-The Americans before and after the war

The other important aspect of the expansion of aviation was the war. After 1937 China

鄭造 “航空文化與滑翔運動”中国滑翔 2.3 pg.4

³⁶ 郝更生 “中國第一跳傘塔” 學生之友 1942 , 5.3) pp.38-9 pg 38 This term was almost certainly a Soviet borrowing

³⁷ “提高他們的航空熱情與認識” 郝更生 “中國第一跳傘塔” 學生之友 1942 , 5.3) pp.38-9 pg 38

³⁸ 中国滑翔 2.2 pg 42; 朱洪元 跳伞训练与跳伞塔 中国滑翔出版社, 重慶? 1942 p.41; (時事新報) 1942.04.04: 3

³⁹ After the war parachute towers were apparently built in Nanjing and Suzhou.

was able to get more aid (in the form of planes and pilots) from foreign powers (especially the Soviets and the Americans). The Chinese military needed lots of things, but aviation technology and its associated personnel and organization were things China was entirely dependent on foreigners for. The Soviets and later the Americans -gave- military equipment, training and advice to Chiang's National Revolutionary Army, but they established their own independent (or semi-independent) air contingents in China.

American aid increased radically after Pearl Harbor. Aviation became the most important link between China and the United States. The Hump was the most important transport link between China and its allies, support of the American 14th Air Force was the most important military aspect of the Chinese/American alliance, and Claire Chennault was one of the most important people in the Chinese-American relationship.

The Chinese-American Composite Wing 中美空軍混合團, CACW), which combined American and Chinese personnel in combat units, became operational in October 1943. The Fourteenth Air Service Group (14th ASG), which mobilized Chinese-Americans for service supporting the U.S. war effort in China, was activated in July 1943.⁴⁰ Each of these organizations was intended to continue the connection between China and overseas nations.

The Chinese American Composite Wing was never particularly large, in the summer of 1944 it only had an average of 31 fighters and 11 medium bombers assigned.⁴¹ One month before V-J Day the CACW's strength reached 107 P-40s and P- 51s and 57 B-25s.⁴² It was significant because it was intended to be a formalization of the training relationship between China and its foreign patrons. Experienced Chinese pilots (about half of the current air force) were brought to India for training on advanced American aircraft. One of these was Wang Guangfu 王光復 who had previously trained at Loyang under Chinese instructors, at Kunming under Chinese and American instructors and at Lanzhou under Russian instructors. After training in India he spent the last years of the war flying advanced American made planes in the CACW with a mix of Chinese and American comrades.⁴³ Wang went to Taiwan after 1949, and his war record would almost certainly have led to a significant role in the Republic of China Air Force on Taiwan and its relationship with the U.S. had his sister not married Liu Shaoqi. Other members of the group did have such a role, especially those who trained in the U.S. These were educated youths with no flying background who were expected to go through the entire process of training in the U.S. While all this expansion of training was important, the growth of air transport inside China is more important to this paper

The Hump

The India-China air route (The Hump 駝峰航線) Is the best known example of air transport during the war. As various sea and land routes to China were cut off the air route became the

⁴⁰ K. Scott Wong, *Americans First: Chinese Americans and the Second World War* (Cambridge: Harvard University Press, 2005.)163

⁴¹ Hakan. Gustavsson, *Sino-Japanese Air War 1937-1945: The Longest Struggle*. (Herts, England :Fonthill Media, 2016), 151

⁴² Xu Guangqiu. "The Issue of US Air Support for China during the Second World War, 1942-45." *Journal of Contemporary History* 36, no. 3 (2001), 463

⁴³ Wang called CACW "a model of Sino-US military cooperation during the Anti-Japanese War" "Feihu yingxiong Wang Guangfu" *Zhuanji wenxue* 635 (April, 2015) See also http://www.flyingtiger-cacw.com/new_page_167.htm

only way to get supplies and people into Free China.⁴⁴ It is worth mentioning that the Hump was exactly the sort of thing that aviation theorists had promised that aircraft could do. It enabled China and its allies to transcend geography or “annihilate space” in a way that was only possible because the war made the Americans willing to bear the huge financial and human costs of the route. Although Chiang Kai-shek appreciated the supplies the route brought in he could not have been unaware that the main thing the Hump was supplying was the Hump-most of the supplies went to the American Air Transport Command and 14th Air Force. China was not really in control of this route or its use.⁴⁵

Air transport inside China before and after 1945

More significant for this paper is the role of air transport inside China both before and after 1945. During the war China’s airlines (CNAC, Eurasia, and then Central Air Transport) were small operations, but their changing cargo loads were significant.⁴⁶ In prewar period both airlines were mostly airmail operations.⁴⁷ By 1943, partly because of supplies of new American aircraft, they had begun shipping substantial amounts of freight, mostly at the bequest of the government and military. The Japanese invasion had disrupted land and water communication, but air transport could be re-routed much more easily. New networks centered on Chongqing and Kunming could be built. In 1945-6 there was a huge spike in passenger traffic. The Hump route was shut down as soon as the war ended, but now people wanted to get back to the East China. Air transport could quickly be used to do whatever was wanted, although it is worth noting that while the government wanted freight moved around in 1943, it was less happy with a chaotic rush to the East in 1945-6. As we will see below, this new form of transport was hard to control.

After 1945 the American Air Force withdrew, but aviation expanded rapidly and most importantly, this is a time when air transport becomes fully Chinese, or at least not fully foreign.⁴⁸ The Chinese government moved to put things like weather information and radio beacons under government control rather than having them run by individual airlines.⁴⁹

Air transport was done by the Chinese Air Force (CAF), some by CNAC (80% Chinese owned by this point), some by Central Air Transport Corp. (中央航空运输公司), successor to Eurasia. The most interesting, however, was Chinese National Relief and Rehabilitation Administration Air Transport (行政院善后救济总署航空运输队) or CAT, a company with both Chinese and American financial backers headed by Claire Chennault. It was originally created to fly U.N. relief supplies to the interior, but had the right to fly any cargo it could get on the return trip. While the airline did fly a great deal of relief supplies, other cargo quickly took precedence.⁵⁰ CAT used mostly American pilots and surplus American planes, and was in theory

⁴⁴ There were actually a series of routes used at different times, Goods came in by rail via French Vietnam, by road and air via Xinjiang from Russia and, eventually, over the Burma road. The Hump route was geographically difficult, but politically it ran from an area of solid British control to one of solid Chinese control, with relatively little upfront investment.

⁴⁵ Only a small percentage of the total tonnage

⁴⁶ Table from 民用航空 行政院新聞稿 n.p.1947 19 頁

⁴⁷ CNAC Commemorative pg.60

⁴⁸ Perhaps mention that military bombing and air support does not matter much. That takes a lot of coordination and knowing what you are doing, and the Chinese Army is not really up to it, even if Air Force has P-51s and B25s (which of course they can’t use all that well either).

⁴⁹ See weather book, stats thing

⁵⁰ “Other Cargo” went from 11.25% of the 40,117 ton-miles flown in February of 1947 to 62.28%

a civilian organization, although it sometimes used U.S. military planes with the markings obscured and was constantly flying military supplies into war zones. This military role grew rapidly as the Civil War worsened. Wang Xingmin calls his book on the airline “從復原救濟到內戰軍運”. Eventually it would become Air America, financed by the C.I.A. and carrying out the same sorts of paramilitary missions it had done in China all over Asia.⁵¹

In China, however, it was primarily a cargo airline, and CAT, along with its competitors, flew a staggering amount of people and material around China during the Civil War years. This could be highly profitable. In 1946 there were 50,000 people in Kunming looking to fly to Shanghai and willing to pay black market prices for tickets.⁵² The simple matter of flying U.N. supplies to the interior was quickly supplanted by flying almost everything anywhere. In 1947 CAT flew

300 tons of wolfram ore from Kunming to Liuchow for the National Resources Commission; 138 baskets of silkworm eggs from Kunming to Shanghai, which when hatched would supply one-quarter of China's silk export; 3,000 tons of cotton and tobacco from Peking to Taiyuan; tons of high-denomination bank notes to cities throughout the country; 748 Japanese repatriates from Taiyuan to Peking; 220 orphans, 19 Sisters of Charity, 67 Trappist monks and mission staff, and 8 cows from Shihchianchuang to Peking; and 55 Russian refugees from Lanchow to Shanghai. Requests for air transportation far exceeded supply. Ma Kuo-yi, chairman of the Sinkiang Moslem Cultural Association, implored CAT to fly 500 tons of critically needed cargo to Sian for delivery to Sinkiang by truck. The goods—paper, movie projectors, printing machines, well drillers, water pumps, and cotton—had been sitting in Shanghai for months. Without these items, Ma wrote, "the sufferings of the Sinkiang people will be greatly increased."⁵³

Some of this was direct military airlift. CAT flew 1,250 trips to besieged Jinan in 1948, and took 10,000 people out of Shenyang in the final 20 days before it fell.⁵⁴ CAT and the other airlines were also keeping the Chinese economy afloat in a time of chaos by flying raw materials and food to factories and consumers. This was partially driven by chaotic conditions that made it impossible to ship goods more cheaply on the surface, but it was also driven by the fact that China now had the infrastructure to really fulfill the promises of a new way of life that aviation dreamers had promised in the 1920s.

of the 690,948 ton-miles flown in September of that year. 張興民 Zhang, Xingmin 從復原救濟到內戰軍運：戰後中國變局下的民航空運隊 1946-1949 臺北，國史館 2013 114-5

⁵¹ Catherine Forslund. *Anna Chennault: Informal Diplomacy and Asian Relations* New York, NY: Rowman & Littlefield, (2002), 32. Air America fits in with what the airline was doing in China quite well. It was an unofficial arm of American power that was useful and difficult to control specifically because of its anomalous status.

⁵² Leary, William M. *Perilous Missions: Civil Air Transport and CIA Covert Operations in Asia*. (Tuscaloosa: University of Alabama Press, 2006), 10

⁵³ Ibid, 33

⁵⁴ Ibid, 49

This did not save the Nationalist regime of course. All of the besieged cities supplied by air eventually fell, and while air freight could prop up a collapsing economy it could not save it. It may have made things worse. One of the things CAT flew were central government banknotes that were needed in ever greater numbers as hyper-inflation took hold. Although accounts of CAT do not mention smuggling the airline was buying up and flying out whatever tangible goods it could as its profits quickly inflated away. The CAF certainly seems to have been engaging in black marketeering. The CAF was accused of flying planeloads of cigarettes to Mukden while CAT was flying in food and ammunition.⁵⁵ Wang Xingmin mentions some cases.⁵⁶ Why do cigarettes matter? It is partly that tax revenue was not being brought in, but cigarettes were not one of the key commodities like rice or coal that governments needed to control and stabilize. They were, however, the perfect way to make a quick profit selling a commodity with almost universal demand. They were also the type of thing that pilots and others could smuggle on their own. While companies and the Air Force may have formally smuggled large amounts of cigarettes, the pilots and others at the airfield could as well. One CNAC pilot had to turn back after takeoff due to sluggish controls, which he discovered were caused by the ground crew stuffing the tail assembly with cigarettes. He told them to just smuggle them in the main compartment in the future.⁵⁷ These stories are not just colorful, they show how little control the state had over the movement of goods. Wang Shuming found profiteering off of vital transport “unfair and demoralizing 無公平甚悶”.⁵⁸

Gold and dollars

More important to the state was the smuggling of financial assets. As inflation turned into hyper inflation, and particularly in the Gold Yuan reform of August 1948, the central government wanted to control the flow of silver, gold and foreign currency, all of which were to be exchanged for the new Gold Yuan.⁵⁹ This reform was famously unsuccessful, in part because the state was unable to convince or force wealthy people to turn in their gold, silver and foreign currency. CAT smuggled both gold and U.S. dollars.⁶⁰ These were exactly the kinds of goods that were easy to smuggle by air. CAT in particular did business as much as possible in U.S. dollars, and was based in Hong Kong, the source of Hong Kong dollars, the other main hard currency available in China. All three airlines flew into Taiwan and the Northeast, China's other two currency zones. Wang Shuming noted that the chief black market for U.S. Dollars in Beijing was right outside CAT headquarters.

Smuggling, supplies and morale

There were many reasons the nationalist government was unable to keep control of currency and commodities in 1946-9, but the ease with which valuables could be flown from place to place by anyone who could afford air freight was no doubt part of it. There were many reasons the moral of the GMD armies collapsed, but the (often well-founded) fear that their commanders might soon fly off to Shanghai, or Taiwan, was perhaps part of it. The nationalist government

⁵⁵ Ibid, 47

⁵⁶ 王興民, 從復原救濟到內戰軍運 pg. 193

⁵⁷ This is in one of the CNAC memoirs. Find it when you get home.

⁵⁸ 王叔銘 日記 1949.5.4

⁵⁹ 王叔銘日記 1948.8.19 -This is day of the major public announcement

⁶⁰ 徐國懋“陳納德所辦的民用航空公司”文史資料選輯 第7卷 第25輯 徐國懋“陳納德所辦的民用航空公司”文史資料選輯 第7卷 第25輯

115-127, 121 The author was a banker and one of the investors and directors for the company

and the Americans made a number of attempts to maintain isolated positions using air transport. All of them, the Northeast, Taiyuan, Guizhou, Xichang, were failures. This was in part because of China's limited aviation capacity. The siege of Taiyuan is a good example. This took place at almost exactly the same time as the Berlin Airlift. Although Yan Xishan had close connections to CAT and Chennault (he was one of the investors in CAT), Taiyuan could not be saved in part because CAT did not have enough planes, but also because it lacked the massive network of support and supplies necessary to keep an airlift running. CAT (and other airlines in China) could fly in and out with a few symbolic flights, but they could not keep remote armies supplied well enough to fight.⁶¹

More importantly, I suspect that air transport was directly demoralizing for Nationalist troops. Most GMD positions fell not because of defeat in battle, but because of demoralization and surrender/defection. This is well known in the literature, although it is a difficult thing to quantify and explain. Loads of cigarettes flying in and valuables flying out could not have improved morale. Wang Shuming made the same point about the Nationalist government using its scarce air resources to fly its gold reserves to Taiwan. More importantly every soldier in the Nationalist armies must have known that while they were likely to be stuck with coming to some sort of an agreement with the Communists, their superiors all had the option of flying out. Yan Xishan famously claimed that he had enough cyanide capsules that he and all his troops could kill themselves rather than surrender. What happened was either that Yan abandoned his troops and flew to Nanjing or (in the account he put in his diary), he flew to Nanjing for routine consultations and Chiang Kai-shek ordered him not to fly back to the doomed city.

Regardless of which story is true, air transport gave elite and non-elite soldiers and civilians very different relations to space. Those who had the connections (and money) could engage in wildly profitable speculation, while those at the bottom were stuck with only local connections. The elite could fly to Taiwan, and ordinary people had to deal with the Communists. The way aviation changed space did not necessarily work to the advantage of the Nationalist state.

⁶¹ They also brought in (and out) raw materials and goods to keep Taiyuan's economy afloat. This was even more beyond their capacity.