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Youth and the "Great Revolutionary Movement"
of Scientific Experiment in 1960s-70s Rural China

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During the 1960s and 1970s, millions of young Chinese people moved to the countryside to be tempered by the "three great revolutionary movements." Originating in a May 1963 quotation from Chairman Mao, this became a stock phrase in the Cultural Revolution. But what were these three movements? The first two are familiar enough. Class struggle: political study meetings, criticism/self-criticism sessions, violent and sometimes deadly assaults on people identified as "class enemies." The struggle for production: back-breaking labor that defined life for rural people and offered a profound, and often bitter, lesson for sentdown urbanites. But what of the third? Rarely discussed in secondary literature, the "great revolutionary movement" of scientific experiment was nonetheless a significant experience for millions of people in rural China, and especially educated youth. In some areas, as many as one-third of urban, sent-down youth participated in scientific experiment.² Whether cultivating bacterial fertilizer in makeshift laboratories, observing insect behavior to develop more effective control technologies, or designing new agricultural machinery, youth provided key support to the state's goal of transforming agriculture, and participating in scientific experiment presented opportunities for

young people to pursue both intellectual and revolutionary dreams.

The idea that science should be pitched to youth is common in modern societies, but the Chinese case stands out because of the degree to which science itself was characterized as youthful, and youth themselves understood as agents of revolutionary scientific transformation. Nor was Mao the first in China to link science, youth, and revolution: he inherited this from the May Fourth Movement, which called for youth to rise up from under the traditions that demanded their subservience and which understood science as a fresh, new system of thought struggling to sprout amidst the thick and constraining roots of tradition. Mao saw science as a liberating force – a "weapon in [man's] fight for freedom."³ In his widely propagated essay *On Practice*, he defined "social practice" as "material production, class struggle, or scientific experiment,"⁴ a notion he expanded in 1963: "Class struggle, the struggle for production, and scientific experiment are the three great revolutionary movements for building a mighty socialist country. These movements are a sure guarantee that Communists will be free from bureaucracy and immune against revisionism and dogmatism, and will for ever remain invincible."⁵

Youth, too, represented a revolutionary force for Mao. On the eve of his victory in 1949, Mao counted the "student youth" among his most important supporters.⁶ And in 1955, he famously wrote, "The young people are the most active and vital force in society. They are the most eager to learn and the least conservative in their thinking."⁷ These qualities became the basis for the leadership role that youth were encouraged to take during the Cultural Revolution. They were certainly "active and vital" in their efforts to destroy the old society, but the same qualities were also the basis for the far more positive, constructive vision of youth involvement in science. The courage and energy they were seen to possess made youth apparently well suited

to the task of transforming science from a conservative, elite, bourgeois field of activity into one worthy of the new, revolutionary society.

Memoirs by former Red Guards dominate English-language literature on youth in the Mao era, such that our mental picture of young people in rural China collapses onto an image of the former Red Guard, urban, "sentdown educated youth" (*xiaxiang zhishi qingnian*). But long before 1968, rural youth had begun traveling to county seats to receive secondary education, only to return to their villages to rejoin agricultural labor. These "returned educated youth" (*huixiang zhishi qingnian*) were the original targets of Mao's declaration (another Cultural Revolution stock phrase, but dating to 1955): "All such educated young people who can go and work in the countryside should be glad to do so. The countryside is a big world where much can be accomplished."⁸ For the state, rural-to-urban migration of young people presented the twin problems of urban unemployment and rural brain-drain.⁹ Hence the need to convince rural youth that a return to the farm would not constitute a waste of talent (*qucai*), but rather a great opportunity for accomplishment (*dayou zuowei*). And hence the significance of rural programs to encourage youth to engage in scientific experiment. When urban youth began their massive migration to the countryside, they joined a "revolutionary movement" already in progress: rural, returned youth outnumbered urban, sentdown youth many-fold, and returned youth almost certainly made up the majority of participants in scientific experiment.¹⁰

Already in the 1950s, youth were central participants in efforts to extend new agricultural technologies and methods in rural areas.¹¹ This is not surprising: after all, young people were most apt to have an up-to-date education, and having studied science in secondary school, they were in the best position to apply scientific knowledge to such perennial agricultural problems as

soil fertilization, insect control, and breed improvement. Moreover, training youth in new methods represented a better long-term investment than training older peasants. By 1965, what were now called "rural scientific experiment groups" (*nongcun kexue shiyan xiaozu*) – with youth participation especially emphasized – had grown to more than 400,000 nationwide.¹²

Charting the history of this third "great revolutionary movement" requires careful, but also creative, interpretation of available sources, which include published books and articles, posters, archival documents, diaries, hand-copied fiction, memoirs, and interviews. Most of the books, articles, and even archival documents are easily identified as propaganda – that is, they were produced by state actors for the purpose of disseminating ideas the state wanted people to embrace. Despite their failure to portray reality, such sources are invaluable for the clarity with which they articulate the state's voice and thus allow us to recapture the vision of science that state actors disseminated to Chinese youth, which differed significantly from the perspective dominant today. Today in China, as in the West, science is largely accepted as the province of professionals. Propaganda materials present a very different perspective on science: as a "great revolutionary movement," scientific experiment was depicted as part of a larger effort to overturn the authority of experts in ivory towers and to break down the division between mental and manual labor.

Reconstructing the experiences of individuals who participated in scientific experiment constitutes a considerably more difficult challenge. Memoirs written in later years, along with oral history interviews, speak to the personal experiences of Mao-era youth in science. Freed of the need to conform to Mao-era politics, such sources are especially helpful in conveying the narrators' doubts and disappointments. However, they are also inevitably filtered through the

ideas and values of the era in which they were produced and therefore cannot be accepted as wholesale correctives to Mao-era propaganda. Diaries produced in the Mao era and published later present their own set of problems: not only is there the potential for selection and alteration after the fact, but youth are known to have kept politically virtuous diaries with the hope that they would be found by party officials. Nonetheless, some diaries offer insight into the ways youth actually experienced events; and in many other cases, they provide clear evidence of the degree to which youth had mastered the state's language and perceived the state's vision. I consider hand-copied fiction similarly as a type of source that, used thoughtfully, provides rare evidence as to the values of Mao-era youth and their appropriation of meanings conveyed in propaganda.

Bringing all of these sources together, I seek to make several related arguments, but none of them involves a claim about the overall success or failure of the rural scientific experiment movement. The post-Mao secondary literature on Mao-era agricultural policies has typically painted a very grim picture.¹³ Today some agricultural officials and scholars in China, along with a few scholars abroad, are seeking to revise that verdict as it relates to specific areas of agricultural science and technology, including agricultural extension and the scientific experiment movement.¹⁴ That is not my goal in this chapter, though I will touch on the meanings ascribed to failure in the historical sources themselves.

More centrally, I argue first that science -- and specifically youth participation in science -- mattered deeply to the Mao-era state, both because it was needed for the socialist economy and because it was seen as a revolutionary force in society. The priority placed on science drove the production of propaganda materials aimed at recruiting young people for the "scientific

experiment movement" and convincing them that science should be practiced in revolutionary ways. I further find that science mattered to youth, who often volunteered to participate in scientific experiment and who saw in science various opportunities -- including diversion, intellectual satisfaction, revolutionary heroism, adventure, and future education and employment. And although youth experiences by no means mirrored the vision projected by the state, I find enough resonance in the sources to argue that state propaganda had a significant impact on how youth understood science and their role in it. In the first four of the sections that follow, our goal will be to capture as closely as possible what vision the state sought to project to youth through its propaganda. We will then turn to the more challenging task of reconstructing youth experience, which will in turn allow us to consider to what extent youth themselves embraced the state's vision of revolutionary science.

State Vision: Science as Opportunity

Youth participation in agricultural science was critical to the state's goal of agricultural transformation. The ideal "three-in-one" structure of agricultural experiment groups—designed to insure a mix of technical expertise, adherence to the party line, and revolutionary legitimacy—called for the involvement of trained agricultural technicians alongside local cadres and "old peasants." However, when the movement took off in 1965 there were simply not enough technicians to go around; the state needed to tap the energies of educated youth, and especially rural educated youth. The copious published accounts of urban youth settling successfully in the countryside and rural youth happily returning to help socialism in their home villages should be read at least in part as an effort to convince educated youth to view scientific experiment as "a

great opportunity."

An example of such an account can be found in a 1968 *People's Daily* article on an educated youth from Shanghai, Mei Minquan. The story went that young Mei went to the "Great Northern Wilderness" in response to Mao's call to "achieve great things" in the countryside. Finding himself assigned to a forested area with low productive value, Mei was said to have hatched a plan to import from the Shanghai area the fungus delicacy known as "silver ears" (or white tree ears) and let the forest "blossom with silver flowers." When he told others of his idea, he met with opposition. Some objected that the climates were too different; others questioned whether a middle-school graduate had the necessary microbiological knowledge. But the poor peasants were reportedly very supportive, saying, "For years it's been obvious that the timber has not been worth cutting. You youth have ambition and culture: go for the gusto!" Mei felt encouraged by the peasants' support, and he also appreciated the words of caution from the others. After some additional training at the agricultural institute in Shanghai, Mei succeeded in growing beautiful silver flowers in the Great Northern Wilderness. The moral of the story was that "silver ears and educated youth alike could settle down in the wilderness, and alike they needed to undergo struggle" to make that transition.¹⁵ The story thus at once justified the rustication movement, celebrated struggle, and offered inspirational testimony of the opportunities available to youth in improving agriculture through science.

Stories about returned youth similarly asserted the tremendous ultimate worth of an educated rural life; the chance to participate in rural scientific experiment offered the potential to apply one's knowledge to an endeavor recognized as both politically revolutionary and culturally advanced. A Communist Youth League document from 1965 reported on the experiences of ten

returned youth in Yangchun County, Guangdong. In the beginning, they reportedly thought that participating in agricultural labor would be a waste of their talent (*dacai xiaoyong*), but after they began participating in scientific experiment, they realized that in the countryside there was much they could learn (*dayou xuewen ke xue*) and much they could contribute. As a mark of how their thought had been transformed, the account highlighted that they had stopped talking about food and clothing all the time and had instead begun talking about science and studying technology.¹⁶

A 1974 collection of stories about Beijing-area youth involved in scientific experiment repeatedly highlighted this theme. One youth wrote:

I recalled that when we graduated, some of my classmates were worried that in participating in agricultural production they would lose the knowledge they had learned – how incredibly funny! Now I think not only was the knowledge I studied in the past not in danger of being lost, but it was really deficient. Take forecasting as an example. If you want to forecast whether a certain insect pest is going to appear, you need to use entomological knowledge to research the insect pest's life habits and how climate, geographical environment, and other conditions affect it, and you need to do lots of survey statistics; when you control the pest using chemical pesticides, if you don't have the necessary chemical knowledge then you'll have safety and usage problems. In sum, the physics, chemistry, and mathematics you study in secondary school are all needed.

Another wrote, "For educated youth, going to the countryside isn't the end of the study mission but rather the beginning of an important educational stage. The countryside is another big school, the poor and lower-middle peasants are our excellent teachers, and scientific experiment is one of the courses in this big school." Sending middle-school graduates back to the countryside was not

a case of "using a talented person in an insignificant position," nor of "water buffaloes jumping into a well." It was not a "waste of talent," but a "great opportunity."¹⁷

Propaganda accounts typically presented participation in scientific experiment as not only a "great opportunity" but a choice that youth were free to take or leave. In a 1966 Women's Federation document, a model youth named Huang Chunlai reported that others had encouraged her to take a job as a worker at the state farm because the pay was good and the workday only eight hours long. But she remembered that the party had sent her to an agricultural high school so that she could build the new countryside, and so she continued to devote herself to the struggle for production and scientific experiment.¹⁸ In a 1972 account, the opening of a new chemical fertilizer plant excited local people because the plant represented "modernization" and there was a real future in becoming a technician there. The returned youth Lang Yuping reportedly debated whether to head to the new factory or take the opportunity presented by the brigade party secretary to study to become an insect pest forecaster. "That night I was restless thinking it over. *Which one should I choose?* Then before my eyes floated an image of the party secretary carrying an insecticide sprayer and directing us to exterminate armyworm. He said that we can't let armyworms in just like we can't let class enemies wreak havoc in the fields... I realized that the countryside needed me and decided to stay and do pest forecasting."¹⁹ Presenting scientific experiment as a choice not only implied a certain amount of autonomy youth supposedly enjoyed but, more importantly, emphasized the nobility of individual commitment, especially when nobody could deny that other, more urban paths offered better chances for personal gain.

State Vision: Youth as Intellectuals

State dependence on experts presented an uncomfortable dilemma, especially for leaders committed to the radical agenda of overturning elite intellectual authority. Although they were hardly "ivory tower" elites, educated youth bore the politically ambiguous label "educated," and Mao and others frequently spoke of "the intellectuals and student youth" as a single category. The "little red book" even conflated the two by including in the chapter entitled "Youth" a quotation that dealt solely (and critically) with "intellectuals" and mentioned "youth" not at all.²⁰ Propaganda on the scientific experiment movement thus took pains to distinguish between scientific attitudes associated with bourgeois intellectual elites and properly revolutionary ones.

The first principle embraced at a 1965 national conference on youth in rural scientific experiment was that scientific experiment served the revolution, and was not for the purpose of gaining fame or private profit.²¹ The *People's Daily* reporting on the conference hammered this point home: where youth embraced revolutionary ideals they succeeded, and where they pursued science for personal fame or profit, they failed.²² In 1972, *People's Daily* introduced a group of youth sent down from Nanjing to a production brigade in rural Jiangsu: "At one time because some of the youth had been influenced by capitalist-class ideas about fame and profit, their experiment topics departed from the practical needs" of the production brigade. They were "seeking overnight fame" and kept "holding out their hand for chemical fertilizer" so they could achieve a high yield. The party branch organized them to engage in revolutionary criticism so they would realize that "scientific experiment is not about making individuals famous, but about transforming the face of the countryside."²³

Intellectuals were also allegedly prone to relying on books rather than immersing themselves in the politically more respectable form of knowledge that came through practice.

The group of Nanjing youth sent down to Jiangsu reportedly discovered the hard way that what they read in books about seed germination would not necessarily hold in practice.²⁴ Another story tells of a recently sent-down youth excited to improve crop production through application of cobalt chloride, which he had learned about in school. But the team leader gently admonished him that the coming heavy rains would make such efforts useless. At first the youth assumed that the team leader was merely ignorant of science, but when not long after a tremendous rain flooded the fields, he reportedly realized the truth of Mao's words: "If intellectuals do not unite with the masses of workers and peasants, then all they do will come to naught."²⁵

Nevertheless, propaganda of the 1960s and 1970s apparently could not avoid endorsing books as a key resource for youth in the scientific experiment movement. The most important books, of course, were those containing Mao's own words. But books on science and technology also played an important role. The account of Deng Yantang, one of the participants in the 1965 national conference on rural youth in scientific experiment, explicitly emphasized this issue. Abstaining from smoking and tea houses, Deng saved his money to buy books and magazines. He would go to town intending to buy food, enter bookstores to flip through a few books, and end by buying the books and returning home with an empty stomach. He began by reading pamphlets, then later books on agricultural theory. If he needed to understand the meaning of a term, he would look it up in one of his books or write to an expert at the provincial agricultural institute. He concluded, "In [acquiring] knowledge of breeding, practice is the foundation and books are the path."²⁶ A story from the 1974 collection handled the practice/book-learning dilemma in an innovative manner. A returned youth, Wang Chunling, experimented by taking weak piglets and placing them on the front nipples to help them grow more quickly. However,

she then learned from an "old comrade" that this had already been described long ago in books: she had taken a "circuitous path." Criticizing Liu Shaoqi, Lin Biao, and the theory of innate intelligence (in 1974 a crucial ingredient for political legitimacy), she concluded that books are the "synthesis of earlier people's experience." And so, she emphasized, in addition to pursuing one's own practice, it was important to read books so as to minimize circuitous paths.²⁷ This was the kind of politically savvy approach that state propaganda encouraged youth to heed as they made use of the book learning that had earned them the title "educated youth."

State Vision: Science as Revolutionary

Like their counterparts in the humanities, scientists faced persecution in Mao-era China because of their status as "intellectuals," "authorities," and "experts." But scientists had several things going for them that substantially reduced their risk. First, science was seen as both essential to socialist construction and capable of disproving traditional ways of thinking. Second, science often involved physical work – sometimes dangerous physical work – and thus had some claim to the privileged category of *labor*.²⁸ Thus it was never science itself that came under attack, but rather elite, bourgeois authority in science. This in turn shaped the way propaganda presented youth participation. Propaganda stories about model youth participants in scientific experiment thus took pains to highlight the political character of their efforts. It was not enough that their efforts should result in the implementation of more effective technologies and thus increase production. Rather, scientific experiment had to be revolutionary. In propaganda accounts, revolutionary science often involved hard physical labor or braving dangers to life and

limb, but most importantly it was explicitly rooted in class struggle and pursued through class consciousness.

Portrayals of the scientific work of educated youth typically highlighted the gritty, daring face of science in the field, rather than science as pursued in laboratories and libraries. Youth possessed the energy and courage necessary to try new ideas and to withstand physical hardships. In 1959, the media celebrated the discovery of large deposits of minerals by a "young girl" and geologist "hero" named Liu Jinmei. Liu "traversed some 7,000 kilometers in the towering ridges of the rugged Changpai Mountains in Northeast China, the haunt of tigers and bears."²⁹ In 1973 Lang Yuping, a returned youth in Miyun County (near Beijing), sought to control a wheat virus with a highly toxic insecticide: "One time I really was poisoned, dizzy, nauseous, sweating... I was scared to death that I... would lose the fall crop. I went to the clinic, got an injection, and continued work. The party branch [official] told me to go to the hospital to get a check up and rest a few days, but I didn't go..."³⁰ Nominally self-critical, the account in fact emphasized the youth's courageous and willing self-sacrifice. Other examples abound of young people celebrated for braving cold, rain, mosquitoes, and sweat, and going so far as to refuse medical treatment when ill, all because of their dedication to science and to production.³¹

But no amount of grit could entirely remove the ambiguity surrounding the intellectual character of educated youth. Thus stories of youth in science also frequently framed scientific experiment within the larger narrative of class struggle. According to one story, published in 1974 about an incident in 1969, county leaders called on returned educated youth to hybridize sorghum, but many people were doubtful. When the initial experiments failed, "class enemies" reportedly took the opportunity to attack science. But, as the story went, the production brigade

party branch organized the youth with the commune masses to struggle against the class enemies and study Mao, with the result that the youth learned to sex the sorghum plants more accurately and ultimately achieved success.³²

In most stories, opposition from reactionary forces was balanced by the enthusiastic support of the peasants – and especially the "poor and middle peasants." But sometimes poor peasants themselves were said to have opposed the research. Deng Yantang (from the 1965 conference) successfully created hybridized rice strains, but he reportedly encountered criticism from old peasants who said that the hybrids looked good but tasted bad, and that "high lanterns see far, but not close." The party secretary affirmed the peasants' criticism and reminded Yantang that scientific experiment must serve production. Yantang reread Mao's "Serve the People" and his thoughts clarified: "Yes! Cultivating superior breeds appears to be a question of technology, but first is the political-orientation question of breeding for whom and serving whom. If the orientation is wrong, the experiment will go off track."³³

The concern that youth follow the lead of peasants was very much in keeping with Mao's own statements and with the dominant policy thrust of the late 1960s and 1970s. Thus such stories almost invariably emphasized at least their cooperation with, and usually their reliance on, or even subservience to, peasants. For example, a group of sent-down youth in Hebei province set up an experiment station with the support of the local party branch. Instead of allowing themselves to be guided by the "old peasants," however, they pursued impractical ideas in an attempt to "startle" people with their innovation, such as hybridizing cotton and paulownia to create a perennial "cotton tree." And so the story continued with local party officials becoming aware of the problem and educating the youth about the importance of uniting with the masses,

with the youth reportedly then becoming very successful in designing new forms of pest control and fertilizer.³⁴

In many cases, references to youth being led by the masses appeared merely ritualistic, with little evidence as to the relevance of the education they were supposedly receiving. But some accounts were more specific in this regard. In one story, when a rural youth graduated from middle school and returned to the countryside, he was assigned to a weather station where poor and lower-middle class peasants observed leech behavior to forecast the weather. At first he reportedly had a negative attitude and did not realize how much he could learn from the peasants. Then came a day when the youth carelessly lost his leeches. He found a new leech, but his next forecast failed. A peasant explained that there are three kinds of leeches, and he had collected the wrong kind. The youth then realized that old peasants had a wealth of experience watching weather patterns: he visited more than 80 old peasants to collect their knowledge of observing animals to predict weather.³⁵ Such stories underscored the Maoist class-based philosophy of science, in which “old peasants,” by virtue of their class status, possessed knowledge of critical importance to the pursuit of agricultural science.

Warnings about the potential for youth to become divorced from the peasant masses and acquire bourgeois attitudes about knowledge, fame, and profit existed in tension with encouragement to imagine themselves as revolutionary heroes. Propaganda often directly encouraged youth to aspire to heroism and so provided plenty of room for celebrating individual efforts and achievements. The books that came out of youth conferences on scientific experiment highlighted the experiences of notable individuals to offer models and inspiration. Young people who related their stories spoke of “my own personal practice” (*ziji de qinshen shijian*) as a source

of knowledge.³⁶ And third-person narratives portrayed youth in highly individualized, even romantic ways. Deng Yantang "had a tanned face and short hair, wore a blue shirt with bare feet, and was dirty from head to toe." This exquisitely humble young man pursued new strains of rice "like a brave explorer finding the path"; his "influence over youth throughout the county grew day by day," and he achieved a following of other young technicians who continually sought him out to ask questions and learn from his experience.³⁷ A 1974 magazine celebrated an urban youth named Xin Wen, recently graduated from junior high school, who volunteered to be sent down to Yunnan to plant cinchona (the plant from which quinine is made). Elected unanimously as the leader of an experiment group, Xin Wen quickly began demonstrating strong leadership qualities. She sacrificed her siestas to experiment with different ways of addressing evaporation and the cinchona plants' weakness in pushing through thick soil. Soon, the entire group began using her methods. When the weather turned cool and rainy, she determined that the group should heat soil in pots to keep the young trees warm. She worked the longest hours, shouldered the heaviest responsibilities, and made all the big discoveries. And she was honored for it.³⁸

This was what we might call the "Lei Feng paradox." Lei Feng's claim to fame was his humble life studying Mao's thought, which ended in a suitably humble death under the weight of a fallen utility pole. He achieved recognition and glory, ironically, for being utterly commonplace and unprepossessing. The campaign to emulate Lei Feng crystallized a much broader tension in the state's mandate to youth, found also in the vision of revolutionary science that the state presented to youth. It called on them to be revolutionary heroes and simultaneously mere "bolts" in the revolutionary machine.³⁹

State Vision: Failure as the Mother of Success

One of the most striking themes in the literature on youth and scientific experiment was that of failure. Far from blanket optimism, propaganda emphasized the difficulties associated with agricultural experiment and recognized failure as a common – almost universal – experience. The frequent return to this subject makes clear that experiments commonly failed and that the state faced a major challenge to convince people that failure was acceptable, and even revolutionary. So soon after the massive famine that followed the experiments of the Great Leap Forward, rural people needed a lot of convincing if they were to overcome fears that new experiments would end equally badly, leading to loss of valuable land and consequent lack of sufficient food.⁴⁰

A key cause of failure commonly identified in post-Mao critiques is the inappropriate application of models: celebrated, stereotyped practices were forced on local communities in defiance of on-the-ground realities. *Chen Village* relates just such a scenario: compelled to emulate Dazhai by leveling hills to plant trees, the village invested vast amounts of labor and resources and ended up producing acres of land with insufficient topsoil to support the new crop.⁴¹ Debacles like these – and they were undoubtedly common – are certainly worthy of criticism; and in fact Mao-era propaganda accounts themselves are full of critical reports of just this type. Throughout the 1960s and 1970s, we find rural experiment groups dedicated to testing new seeds and methods to determine local suitability and producing new varieties and techniques on site that better matched local conditions. The second principle cited at the 1965 conference on youth in scientific experiment proclaimed the need for tailoring experiments to "suit local

conditions" and "serve production in the here and now."⁴² Propaganda frequently identified importation of unsuitable seeds or methods as a chief reason for initial failures.⁴³

Failure was so common that the 1965 conference on youth in scientific experiment embraced as a core principle, "When experiments fail, we must diligently analyze the causes and explain it clearly to the masses."⁴⁴ And in 1969, when Huarong County (Hunan) established a new model network for scientific experiment, the plan highlighted the need to "help people develop a correct understanding of the relationship between success and failure."⁴⁵ Most of the inspirational propaganda stories on youth and science included some degree of failure before the eventual success of the experiments: this provided opportunities for kindly party secretaries and poor peasants to offer encouraging words like "Failure is the mother of success" and reminders of Mao's wisdom, especially the "winding road" that led to the production of new things and the need to emulate the Foolish Old Man Who Moved the Mountains and who was not afraid of failure.⁴⁶ Initial failures supposedly only sweetened the feelings accompanying success. And youth were expected to grow as a result. As a story published in 1974 explained, "The failure was a loss for the collective's production, but for the science team, especially for us youths, it was a great education: it made us deeply experience the process of integrating theory and practice and the process of receiving reeducation from the peasants and changing our worldview."⁴⁷ Thus, according to the vision presented in state propaganda, even failure was beautiful when it imparted revolutionary lessons and planted seeds for future success.

Youth Experience: Science as Opportunity?

So much for the propaganda. How did youth really feel? The very existence of so much propaganda designed to convince them of the opportunities in store for them should alert us to the likelihood that urban and rural youth alike often had trouble reconciling themselves to the prospect of building their futures in the countryside. Indeed, for the "senteddowners," agricultural labor meant unprecedented physical challenges and rural life unprecedented physical hardships; moreover, many urban youth landed in remote places where they had no family to help them adjust to their new lives. Rural, returned youth faced a different, but no less difficult, set of challenges. They had intimate knowledge of life in the countryside, but this in itself could be a problem, since they knew all too well the limited opportunities that faced them. Attending secondary school in the city offered the hope of urban employment; returning to the countryside meant picking up the hoe again, perhaps forever.⁴⁸

Nevertheless, diaries and interviews offer evidence that at least some educated youth in fact did get to choose whether to participate in the scientific experiment movement, and they sometimes spoke of this decision with revolutionary sentiment worthy of the state's best propaganda. One interviewee remembers that when the call came for someone to attend a training session on scientific experiment, local peasants thought it would be a waste of time; it was "her own motivation" that led her to pursue this opportunity.⁴⁹ A young Nanjing man sent down to Inner Mongolia wrote in his diary in 1971 that recently many youth were responding to the call for industrial workers by entering factories. He had decided not to join them because his work producing the plant hormone gibberellin (in Chinese, "920") would suffer. The production brigade had committed to scientific farming with investments of time and money; to abandon the scientific experiments at this early stage would be a big blow to the brigade. "So I have decided

to subordinate my individual interests to the interests of the revolution; I will stay here and not go."⁵⁰ Another sent-down youth reported no such alternate option, but he still savored his decision, which for him amounted to a deeply philosophical consideration. On November 26, 1971, he wrote, "Of course, I still haven't made up my mind, because the conditions are not yet ripe..." On December 12 and 16, with passionate language, he committed himself to the project of producing gibberellin in the laboratory: "Whether I live or die, I'll do this work well."⁵¹

For these educated youth, the chance to participate in the scientific experiment movement offered a rare opportunity to choose a path for oneself—the choice itself gave a sense of autonomy and even liberation. One interviewee, Chen Yongning, remembers the meeting in the production team in which they discussed the need to improve scientific farming technology by creating an agricultural science group. He volunteered and was made the leader of the group. The members of the group still spent most of their time working in the fields, but when they had experiment responsibilities, they told the production team leader and went off to do the experiment work by themselves. When he entered college in 1978, he studied plant protection at the Guangxi Institute for Agriculture (Guangxi nongxueyuan). This was his own choice, an interest formed when he was a sent-down youth.⁵²

Of course, "choice" and "opportunity" are relative terms. Volunteering to work in the scientific experiment group was a decision made when larger decisions about what to do and where to be were out of the question. (A comparison could be made here to the situations faced by migrant workers in market-era China: rural people may "choose" to move to the cities to work grueling hours in factories, but as Anita Chan reminds us, their "apparent freedom of choice" must be viewed within the larger context—in many cases, extreme poverty—that compelled it.⁵³)

Another interviewee, Cao Xingsui, remembers the feeling of being torn between wanting to use his knowledge to help the very poor local people in the village to which he had been sent down, and thinking about his own life ambitions. He told me, "We felt if we had the opportunity we would want to leave the village. But while we were still there and had no way out, we were very happy to have the chance to help the local peasants."⁵⁴

Not everyone experienced even as much choice as these two sent-down youth. Many people who wanted to participate in the scientific experiment groups must have been disappointed. Cao recalls that "everyone, whether they were returned or sent-down educated youth, wanted to participate in the groups because of the opportunity to go to the commune or county level to receive training."⁵⁵ However, spots were limited: at Chen's site, leaders picked just twelve of the forty or fifty rural youth and twelve sent-down youth in the production team.⁵⁶ Moreover, some sent-down youth gained opportunities to participate in agricultural science and technology in the villages only to find themselves later shut out of the far more significant opportunity of attending college.⁵⁷ For rural returned youth this was a far more common experience, and just as disappointing. The story told by one man I interviewed exemplifies this. After he had graduated from secondary school in 1974, he returned to his village, participated in the scientific experiment group, and in 1977 became the third of three "plant protection specialists" (*zhibaoyuan*) to serve his production team. When I asked him how he studied the material, he said it was not real "studying": he had some books he consulted, and he recorded every day what insects he saw and how many. When I asked whether as a student he had been particularly interested in science, he replied that because it was the Cultural Revolution, there was no point in being particularly interested in anything since there was "no opportunity": by the

time the college entrance exams started again in 1977, it was too late for him to apply.⁵⁸ The bitterness felt by educated youth who missed the chance to attend college overwhelms any sense that their earlier participation in scientific experiment represented "choice," "opportunity," or even real "studying."

Youth Experience: Science as Revolutionary... and Romantic

Evidence from recent memoirs indicates youth were strongly attracted to science in the Mao era and that participation in scientific experiment was deeply meaningful to them. Even as intellectuals of their parents' generation were suffering humiliation, imprisonment, and physical abuse, a surprising number of youth dreamed of becoming scientists. Several contributors to a recent volume of memoir essays by Chinese women who grew up during the Cultural Revolution specifically recall positive memories of their engagement in science and aspirations to careers in scientific fields. One remembers how much she loved the children's encyclopedia collection *A Hundred Thousand Whys* (Shiwan ge weishenme). "I had learned from it why there are little holes in bread, why a zebra has stripes on its body, why hens lay more eggs in summer, and why I would have a different weight on Mars. I wanted to be a scientist or an astronaut so that I could ask more whys and publish the answers in books."⁵⁹ Another contributor remembered hoping to become a biologist.⁶⁰ A former Red Guard relates, "I believe many little girls and boys of my generation dreamed of being a geological prospector... Propaganda for recruiting young people to work in this area was very effective. When my neighbor's daughter was accepted by the geology department of a prestigious university, we all envied her for her future prospects of an adventurous life."⁶¹ She makes clear in her account that she considers such propaganda to have

been generally a positive influence, or at least more positive than the propaganda that leads American girls to aspire to be cheerleaders.

It can be difficult to uncover through interviews or memoirs the extent to which the state's vision of revolutionary science resonated with youth: the very different politics of the intervening years often inhibit people's ability to recapture (or in some cases, perhaps, to admit) the political perspectives they once held. Evidence of any kind that youth embraced the idea of scientific experiment as class struggle is rare, and even the less radical notion that "old peasants" were valuable sources of knowledge is hard to uncover.

However, it is clear that youth were captivated by the romance of revolutionary heroism, and they shared with the state a notion that science could provide the framework for such a narrative. Evidence of this can be found, ironically, in their illicit, underground reading material. The memoirs of former Red Guards frequently emphasize the joy they found in reading, but with the exception of Mao's writings and technical manuals (such as those on scientific farming), there was little that was safe to read. Despite the danger, youth kept and circulated novels and other cherished books; many even copied such books out by hand. The most widely read of such hand-copied literature was an unpublished novel by Zhang Yang entitled *The Second Handshake* (Di'erci woshou). The story revolves around two patriotic young scientists who fall in love in the early decades of the twentieth century. Fate separates them when the woman, Ding Jieqiong, goes to the United States to study and then to work on the atom bomb project, which she eventually exposes as a weapon for killing civilians. In 1959 she is reunited with her old flame in the fatherland – but too late to pick up where they had left off.

Zhang Yang has recently published a book-length account of his writing of the novel in which he traces the childhood origins of his passion for science and his deep affection for scientists, though the memoir's tremendous resonance with the values of the post-Mao era – the adulation for Zhou Enlai, the bitterness about the treatment of intellectuals, the faith in science over politics – reminds us to use this source with caution. Zhang recalls following the political travails of intellectuals through the 1950s and 60s, suffering vicariously when the anti-rightist movement crushed the hopes of the mid-1950s "March toward Science" promoted by Zhou Enlai, and worrying about the fate of "regular scientists" when the Sixteen Articles on the Cultural Revolution called for "greater protection for scientists making contributions." As he explains his decision to write the story of *The Second Handshake*, "Since I could not become a scientist myself, I used my pen to portray scientists, to represent them, to eulogize them so that my readers could understand them, respect them, and love them just as I did!" The scientists he chose to present were of his uncle's generation, educated in the "old society" but ready and enthusiastic to participate in revolutionary work, for example by researching methods to combat the germ warfare allegedly waged by U.S. forces during the Korean War. Notable also is his decision to place a woman in the most prestigious scientific role: Ding Jieqiong inspired untold numbers of young women with scientific aspirations – in later years an official with a similar name was driven to distraction by fan letters asking her advice and encouragement.⁶²

The book's presentation of scientists as courageous, patriotic, and romantic clearly resonated with young readers. It also strikingly mirrored many themes found in state propaganda. But political leaders in 1975 saw too much that was threatening about the descriptions of American cities, the prominence of Premier Zhou Enlai (then out of favor with the radicals), and

the risqué love scenes, which no doubt became more elaborate as copiers added their own details. Official critics blasted Zhang Yang for suggesting that science, rather than Marxism, would "save China," a charge Zhang did not deny.⁶³ Possessing the book brought the risk of imprisonment or worse, and Zhang Yang himself endured four years of prison. But in 1979, after the end of the Cultural Revolution and the birth of a new regime, China Youth Press printed 3.3 million copies of a cleaned-up version of the novel. By the late 1980s, it was "the most widely circulated story of any kind in the history of the People's Republic."⁶⁴ That youth in the Cultural Revolution would choose such a novel in defiance of political authorities -- and that of all the novels circulated one featuring heroic scientists would be the most popular -- speaks volumes about their internalization of the value of science.

The passion that some youth felt for science as a revolutionary practice, along with their struggles to reconcile their own values with those presented in propaganda, comes through vividly in the diary of Shen Dianzhong, sent in 1968 to a state farm in Liaoning Province. While waiting for news of his impending transfer, Shen seized the free time to read on science, especially the development of quantum physics. He wrote with interest on Marxist interpretations of the history of science, and he quoted Marx on the relationship between studying science and serving the people: "Science must not be a selfish pleasure. Those who have the good fortune to be able to devote themselves to scientific pursuits must be the first to place their knowledge at the service of humanity."⁶⁵

In November 1971, Shen began discussing his thoughts on joining a scientific experiment group engaged in the production of the plant hormone 920. "The process of doing scientific experiment is in actuality a process of struggle. This kind of struggle is a struggle I love, a

struggle I want to go for, a struggle I welcome, a struggle I support." He went on to list the three main reasons in favor of his participation: For three years he had been enthusiastic about the scientific experiment activities others were pursuing on the farm; he wanted to make a contribution to the "battle to transform Liaoning's agriculture"; and it would be a learning experience and a way to transform himself.⁶⁶

In an early diary entry, years before his participation in rural scientific experiment, Shen Dianzhong pondered an issue made familiar in propaganda materials: "Why do we do scientific experiment? Is it to 'make a name' for oneself as an individual, or do we do scientific experiment for the revolution? Does one close the door and do it by oneself, or do we go into the wide fields and unite with the masses?" Despite his concern, he later invited criticism by talking too openly about wanting to write a book: others were quick to chastise him for seeking fame. Shen wrote defensively that his critics were "focusing on the motivation question." But, he countered, "experience can offer profound warnings to people (for example the lessons from the 920 work experience)."⁶⁷ (Indeed, as we will see below, Shen's experience with 920 served, if anything, as negative example.) Shen's diary thus provides invaluable insight not only into the ways youth shared the state's vision of science as revolutionary, but also their active agency in wrestling over the meaning of revolutionary science and their own relationship to it.

Youth Experience: The Pain of Failure

The prettiness of the state's mantra that "failure is the mother of success" contrasted poignantly with the experiences of youth involved in failed experiment projects. A Beijing youth sent down to Shaanxi, Ye Wa enthusiastically volunteered to join the scientific experiment team

when offered the chance to get out of the village for a little while and go to the county seat. She learned to create bacterial fertilizers and acquired an improved breed of sorghum to introduce to the village. Upon her return, she was given a piece of the most fertile land to plant the sorghum. As the plants matured, she suspected the harvest would not be as good as expected – or even as good as an ordinary crop. Ashamed to have wasted the land that the peasants gave up to her, she strategically arranged to leave the village when harvest time approached. We should all be able to empathize to some degree with the shame of failure. However, to understand what it meant for this young woman at the time, we need to consider that sent-down youth were by no means sheltered from the realities of poverty around them. A few years earlier, when the harvest had been poor, she had witnessed the death of three village children from illnesses associated with malnourishment. To her horror, she had even inadvertently directed the mother of one of these children to work in a field where the child's decomposed body lay abandoned—no one had had the strength to give her a proper burial. Today, Ye Wa remembers the episode with painful vividness; at the time, this and other experiences with extreme poverty undoubtedly did much to provide the framework within which she viewed any failure on her part, any waste of good land, any poor harvest.⁶⁸ This was a far cry from the youth in state propaganda who easily wrote off losses to the production team and declared their failure a "great education."

Shen Dianzhong's diary offers poignant evidence of how well some youth learned to anticipate failure, and how devastating that failure could nevertheless be. Shen's early entries on his decision to embark on 920 production are filled with words of self-warning and self-encouragement that could be taken straight from the pages of propaganda stories. "If I really do it, I may encounter setbacks and losses, and I may have to travel a winding road. I must really

make failure into the mother of success." He went on, "I deeply understand that the road before me will have many difficulties, including some difficulties I cannot even imagine and some that would give people thoughts of faltering."⁶⁹

On January 22, 1972, Shen recorded his sadness upon the event of his first failure. More than a week later he was still preoccupied with it. "Everything I have prepared for has come to pass. Now, only now, do I understand something; now, only now, have I been put to this real, solemn, profound, merciless test." Then on February 12, "Another failure has come before my eyes. This kind of blow is really too severe, it just makes it hard for me to breathe, just makes me fall over. But I cannot, absolutely cannot, I must straighten up and move on, must stand and be steady, must coldly and tenaciously persevere, working without stop. If I fall I must crawl, if I fail I must do it anew."

Spring Festival came and went with no mention – just a short entry on enthusiasm and the need to persevere. The next day he sought out the production brigade leader, who gave him a ray of hope about the future of the work but warned it would get harder, not easier. This turned out to be the case, and Shen plunged into increasingly despairing discussions of failure. In June he wrote a lengthy "summary" of the 920 work in his diary, and in July he composed a "report" to submit to the district party committee youth group, which subsequently discontinued the experiments and apparently offered Shen little in the way of consolation. Shen wrote, "Recent events have stripped me of any right to 'work' ... Who will work with me in the future, and whom will I be able to work with? Maybe nobody! ... I had best face death calmly. Of course, this is not a death of the living flesh, but a death of my political life. Although I'll never be able to accept this death, I will ultimately find some significance in it and survive... I will not be

pessimistic or timid, but will pledge my life to upholding the truth."⁷⁰

Was this making failure into "the mother of success"? Propaganda stories were never so sad or fatalistic. Still, the stark differences between Shen's account and those found in propaganda materials betray an underlying sameness. Painfully clear is just how deeply Shen had internalized the values associated with the state's vision for revolutionary science. The same passion that had inspired him to participate in scientific experiment in the first place left him susceptible to the shame of failure, and the harsh climate of political criticism did little to bolster his confidence in the future.

Epilogue: Bourgeois Science? The Post-1978 Transformation of Youth and Science

After the death of Mao and arrest of the "Gang of Four," urban sentdown youth and their supporters increasingly resisted the rustication policy. In 1978 and 1979, coinciding with the widespread pro-democracy actions throughout the country, great numbers participated in protests calling for a return of sentdown youth to their homes.⁷¹ The leadership had no ready solution for the problem of the rusticated youth. On one hand, Hua Guofeng and Deng Xiaoping had both condemned the travesties wrought by the "Gang of Four." On the other hand, bringing 14 million young people back to the cities and finding jobs for them was no easy matter. The publication in 1979 by the Agricultural Press of a collection of stories about urban, sent-down youth, entitled *Young People Bravely Scaling the Heights: The Scientific Experiment Achievements of Educated Youth on State Farms*, reflected these political tensions.

In some ways, the stories in this 1979 collection were very much in keeping with earlier accounts. They celebrated the positive scientific contributions youth were making in the

countryside. They continued the familiar narrative in which youth faced opposition from politically suspect characters but flourished under the guidance and with the enthusiastic support of the peasantry and the party (now represented by Chairman Hua). And they still emphasized the courage of youth in overcoming adversity and boldly trying new ideas. Whether skipping meals and sleep or braving bad weather to observe conditions in the fields, youth were participating in the same kind of heroic scientific endeavor that had been celebrated throughout the 1960s and 1970s.⁷²

Nonetheless, the 1979 stories differed from those of earlier years. Not only did they identify the "Gang of Four" as the principal obstacle to scientific progress, but they emphasized book learning in a far more unambiguously approving way. In several of the stories, the youths in question were positive bookworms. In one story, a youth was celebrated for having resisted the "anarchism" of the Cultural Revolution and the political labeling of the "Gang of Four" by continuing on his own to study math, physics, mechanics, and combine harvester theory and design.⁷³ The title story of the collection introduced a youth who since middle school had loved to read science fiction stories and science magazines. When assigned to be a "plant protector" (*zhibaoyuan*), he bought books from the bookstore on preventing plant diseases and pests. Once he sacrificed a bus ticket in order to buy books, even though it meant traveling back to the farm by boat. He read during every possible moment – while eating, instead of sleeping, and even while walking down the street. One day, lost in thought about the books he was studying, he walked right into a utility pole before coming to his senses.⁷⁴ This story resembles the 1965 account of Deng Yantang, who abstained from smoking and even went without lunch to buy agricultural books. But in Deng Yantang's time, an anecdote presenting an urban youth with such

pronounced bookishness would undoubtedly have signified the need for intellectuals to put away their books, get their heads out of the clouds, and forge solid relationships with peasants who had real experience in agriculture. Now, bookish leanings were unambiguously a point of pride, indicating a keen mind not distracted by such mundane things as buses or utility poles.

Young People Bravely Scaling the Heights was among the last gasps of support for the rustication movement, a policy that could not be saved in the new political climate.⁷⁵ The tide was turning: intellectuals would no longer be called to be reeducated in the countryside. In keeping with this trend, in 1979 the popular science magazine *Scientific Experiment* (Kexue shiyan) suddenly but decisively accomplished a shift in orientation. Where in previous years, agriculture along with other obviously "mass" sciences had filled the pages, it now disappeared as a category in the index. Instead, the magazine began publishing more articles of general interest to urban youth, for example on breakthroughs in computer technology or new knowledge about Mars from NASA's Viking space probes. We can imagine them curiously poring over the stories in their city homes, without thought of applying the knowledge in the here and now. Not only are these urban youth now returned to urban settings, but rural youth disappear almost entirely from the stage.

In the pages of a brand-new science magazine, *Science for Children* (Shaonian kexue), we can see still more clearly the changes that the post-Mao era would bring. Its inaugural issue, published January 1979, began with the reprinting of a letter Mao wrote to his sons in 1941 urging them to "take advantage of your youth to study more natural science and talk a little less about politics."⁷⁶ This was followed by a poem by the famous science popularizer Gao Shiqi entitled "Spring," which brought to children the theme China's top leaders had embraced for the

beginning of the new era: "Springtime for Science" (*kexue zhi chun*).⁷⁷ The idea was that China would now move away from the political struggles that had dominated recent years and instead focus on modernizing the country by investing in science and technology – which along with agriculture, industry, and national defense constituted the "four modernizations" now enshrined as cornerstones of Deng Xiaoping's platform. "Where is spring?" Gao asked, and then answered, "Spring is you; You are the ancestral country's spring." He further elaborated, "Today you study science culture; tomorrow you'll turn around and realize the great responsibility of the four modernizations."⁷⁸

The use of "spring" as a metaphor for science and youth was certainly not a dramatic break from the past. Rather, it strongly recalled the May Fourth legacy that had also infused the 1960s and 1970s, when young people were called to give their "youth" (literally, their "young spring") to their country and when scientific experiment was contrasted with the old, dead knowledge to be found in the ivory tower. Nonetheless, there is a subtle but important way in which this "spring" was unlike that evoked during the Mao era. Instead of being called to transform the present with their energy and courage, young people after 1978 were portrayed as China's future. In issue after issue of *Science for Children*, distinguished scientists wrote articles encouraging children to study hard because "the future of science rests on your shoulders."⁷⁹

This is far more similar to the conceptualization of the value of youth and children found in capitalist countries: they are to be invested in for future dividends. It is no coincidence, then, that this shift occurred as the post-Mao leadership began to steer China in a direction dominated by the logic of a market economy rather than revolutionary politics. It was part and parcel of the more sober sense of planning that characterized Deng's economic program, which celebrated not

the glory of struggle today but the possibility for a better tomorrow. Immersed in such political values and perspectives on science as we are (and as our informants have now been for decades as well), it requires considerable effort to understand the Mao-era state's vision of science and to appreciate the ways that vision shaped youth experience at the time.

- ¹ For their generous help, I thank Jeremy Brown, Cao Xingsui, Lei Duan, Gail Hershatter, Matthew Johnson, Shuyu Kong, Ye Wa, Wang Zheng, members of the UMass History Department's history of science reading group, students in my UMass undergraduate history seminar on the Cultural Revolution, and two anonymous reviewers. I also thank the many people who generously granted me interviews, some of whom are credited below.
- ² Song Haiting, "'Wenhua dageming' zhong zhishi qingnian shangshan xiexiang yundong shu lun" (The up-to-the-mountains, down-to-the-villages educated youth movement during the Cultural Revolution), *Dangdai Zhongguo shi yanjiu* 1995.5: 73.
- ³ Mao Tse-tung, *Quotations from Chairman Mao*, second edition (Peking: Foreign Languages Press, 1966), 204.
- ⁴ Mao Tse-tung, "On Practice," in *Selected Works of Mao Tse-tung*, Volume I (Peking: Foreign Languages Press, 1967), 296.
- ⁵ Mao, *Quotations*, 40.
- ⁶ Mao Zedong, "Cast away Illusions, Prepare for Struggle," in *Selected Works*, Volume 4, 427.
- ⁷ Mao, *Quotations*, 290.
- ⁸ Mao Tse-tung, *Selected Works of Mao Tse-tung*, vol. 5 (Peking: Foreign Languages Press, 1977), 264.
- ⁹ Han Dongping, *The Unknown Cultural Revolution: Life and Change in a Chinese Village* (New

York: Monthly Review Press, 2008), 29. Thomas Bernstein, *Up to the Mountains and Down to the Villages: The Transfer of Youth from Urban to Rural China* (New Haven: Yale University Press, 1977), 61-62.

- ¹⁰ Bernstein comes to this conclusion (pp. 224-5), and my sense of the sources agrees. On the complexity of interpreting statistics on sentdown and returned educated youth, see Bernstein, *Up to the Mountains*, 22-32.
- ¹¹ She Shiguang, ed., *Dangdai Zhongguo de qingnian he gongqingtuan* (Youth and the Communist Youth League in contemporary China) (Beijing: Dangdai Zhongguo chubanshe, 1998), 289-292.
- ¹² She Shiguang, *Dangdai Zhongguo de qingnian*, 291.
- ¹³ On environmental consequences of Mao-era agricultural policies, see for example, Vaclav Smil, *The Bad Earth: Environmental Degradation in China* (Armonk, N.Y.: M. E. Sharpe, 1984); Judith Shapiro, *Mao's War against Nature: Politics and Environment in Revolutionary China* (Cambridge: Cambridge University Press, 2001).
- ¹⁴ Dongping Han, "Rural Agriculture: Scientific and Technological Development during the Cultural Revolution," in *Mr. Science and Chairman Mao's Cultural Revolution: Science and Technology in Modern China*, ed. Chunjuan Nancy Wei and Darryl E. Brock (Lanham, Mass.: Lexington Books, 2013), 281-303. My own current research also highlights some of the more successful aspects of Mao-era agricultural science, as do many of the Chinese agricultural officials and technicians I have been interviewing. The current Chinese political interest in revisiting Mao-era agricultural policies parallels the interest in revisiting the barefoot doctor program. See Xiaoping Fang, *Barefoot Doctors and Western Medicine in China* (Rochester, N.Y.: University of Rochester Press, 2012).

¹⁵ *Renmin ribao*, December 20, 1972, 2.

¹⁶ Tuan shengwei Yangchun xianwei gongzuozu, "Guangdong Yangchun Sanjie dui qingnian kaizhan kexue shiyan huodong de jingyan" (The experience of youth in Sanjie Brigade, Yangchun, Guangdong carrying out scientific experiment activities), 1965, Guangdong Provincial Archives, 232-1-0084-106~108.

¹⁷ *Nongcun zhishi qingnian*, 21-22, 49, 64, 67. See also Gongqingtuan zhongyang qingnong bu, ed., *Wei geming gao nongye kexue shiyan* (Agricultural scientific experiment for the revolution) (Beijing: Zhongguo qingnian chubanshe, 1966), 40.

¹⁸ Lianjiangxian fulian, "Shengchan douzheng, kexue shiyan de jieguo, bian wo geng re'ai nongcun" (Results of the struggle for production and scientific experiment have deepened my love for the countryside), June 11, 1966, Guangdong Provincial Archives, 233-2-0332-23~29.

¹⁹ *Nongcun zhishi qingnian*, 19-20. Emphasis added.

²⁰ See the sixth quotation in chapter 30, "Youth."

²¹ Gongqingtuan, *Wei geming*, 4.

²² *Renmin ribao*, October 30, 1965, 3.

²³ *Renmin ribao*, October 16, 1972, 4.

- ²⁴ *Renmin ribao*, October 16, 1972, 4.
- ²⁵ Lu Youshang, "Guangkuo tiandi dayou zuowei" (In the vast land, great achievements are possible), *Kexue shiyan* 1976.7, 27.
- ²⁶ *Kexue zhongtian de nianqing ren*, 10.
- ²⁷ *Nongcun zhishi qingnian*, 3.
- ²⁸ Merle Goldman, *China's Intellectuals: Advise and Dissent* (Cambridge, Mass.: Harvard University Press, 1981), 135-38; James H. Williams, "Fang Lizhi's Big Bang: Science and Politics in Mao's China" (Ph.D. Dissertation, University of California at Berkeley, 1994), Book 2, 679; Sigrid Schmalzer, *The People's Peking Man: Popular Science and Human Identity in Twentieth-Century China* (Chicago: University of Chicago Press, 2008), 124-125.
- ²⁹ "Young Girl Fulfills Geological Prospecting Task by Several Times," *Survey of China Mainland Press* 2136 (November 7, 1959), 8-9.
- ³⁰ *Nongcun zhishi qingnian*, 25.
- ³¹ E.g., *Nongcun zhishi qingnian*, 29, 50.
- ³² *Nongcun zhishi qingnian kexue shiyan jingyan xuanbian* (Selected experiences of rural educated youth in scientific experiment) (Beijing: Beijing renmin chubanshe, 1974), 36.
- ³³ *Kexue zhongtian de nianqing ren*, 14-16.

- ³⁴ Peter Seybolt, ed., *The Rustication of Urban Youth in China: A Social Experiment* (New York: M. E. Sharpe, 1975), 60-63. This is a translation of a Chinese collection entitled *Reqing guanhuai xiexiang zhishi qingnian de chengzhang* (Have a warm concern for the maturation of sentdown educated youth) (Beijing: Renmin chubanshe, 1973). See also Heilongjiang sheng Binxian Xinlisi dui keyan xiaozu, "Bai ying dadou wang de xuanyu" (The selection of white-breast soybean king), *Nongye keji tongxun* 1973.12, 4; Zhang Renpeng, "Houlu duizhang Yang Liguo kexue zhongtian chuang gaochan" (Houlu Brigade leader Yang Liguo achieves high yields through scientific farming), *Xin nongye* 1974.14, 26.
- ³⁵ Zhejiangsheng Huangyan xian Haimen qu baodao zu, "Pinxia zhongnong de 'guantianbing': zhishi qingnian Su Fuxing" (The poor and middle peasants' "soldier who manages the heavens": the educated youth Su Fuxing), *Kexue shiyan* 1974.3:8-9.
- ³⁶ *Nongcun zhishi qingnian*, 5 and 21
- ³⁷ *Kexue zhongtian de nianqing ren* (Youth in scientific experiment) (Beijing: Zhongguo qingnian chubanshe, 1966), 3, 12, 19-20.
- ³⁸ Yunnan shengchan jianshe bu dui mou bu sanjiehe keyan xiaozu, "Jinjina shumiao shi zenyang peizhi chenggong de?" (How are cinchona saplings successfully cultivated?) *Kexue shiyan* 1974.3, 6-7.
- ³⁹ Carma Hinton, Geremie Barmé, and Richard Gordon, dir. *Morning Sun*, Long Bow Group (2003).
- ⁴⁰ See also Chan et al, *Chen Village*, 95.

⁴¹ Chan et al, *Chen Village*, 239-240

⁴² Gongqingtuan, *Wei geming*, 4.

⁴³ See, e.g., Heilongjiang sheng, "Bai ying dadou wang," 4. On the other hand, a smaller number of cases warned against the opposite kind of error, that of assuming plants or methods from one area would fail in another – as in the story of the successful cultivation of the southern crop of white tree ears in a northern region. *Renmin ribao*, December 20, 1972, 2.

⁴⁴ Gongqingtuan, *Wei geming*, 5.

⁴⁵ Zhonggong Hunansheng Huarongxian weiyuanhui, "Women shi zenyang ban nongcun kexue shiyan wang de" (How we created a rural scientific experiment network), *Kexue shiyan* 1974.12: 1-3

⁴⁶ *Kexue zhongtian de nianqing ren*, 1966, 27-8, 31, 64; *Renmin ribao*, October 16, 1972, 4.

⁴⁷ *Nongcun zhishi qingnian*, 37.

⁴⁸ Bernstein, *Up to the Mountains*, 22.

⁴⁹ Interview with Ye Wa, March 2012. See also the account in *Chen Village*, which finds a small silver lining in that "the amateur researchers enjoyed their adventures" because "however futile the results, they liked the opportunity to use their initiative." Anita Chan, Richard Madsen, and Jonathan Unger, *Chen Village under Mao and Deng* (Berkeley: University of California Press, 1992), 238.

⁵⁰ Shi Weimin, *Zhiqing riji*, 160-161.

- ⁵¹ Shen Dianzhong, *Sixiang*, 249, 255
- ⁵² Interview with Chen Yongning, June 2012.
- ⁵³ Anita Chan, "The Culture of Survival: Lives of Migrant Workers through the Prism of Private Letters," in Eugene Perry Link, Richard Madsen, and Paul Pickowicz, ed. *Popular China: Unofficial Culture in a Globalizing Society* (Boulder: Rowman & Littlefield, 2002), 181.
- ⁵⁴ Interview with Cao Xingsui, June 2012.
- ⁵⁵ Interview with Cao Xingsui, June 2012.
- ⁵⁶ Interview with Chen Yongning, June 2012.
- ⁵⁷ Interview with Pan Yiwei, June 2012.
- ⁵⁸ Interview with former returned educated youth, June 2012.
- ⁵⁹ Bai Di, "Wandering Years in the Cultural Revolution," in Zhong, *Some of Us*, 92.
- ⁶⁰ Lihua Wang, "Gender Consciousness in My Teen Years," in Zhong, *Some of Us*, 121.
- ⁶¹ Wang Zheng, "Call Me Qingnian but Not Funü," in Zhong, *Some of Us*, 37.
- ⁶² Zhang Yang, "*Di'erci woshou*" *wenziyu* (The literary inquisition of *The Second Handshake*) (Beijing: Zhongguo shehui chubanshe, 1999), 91-99, 104, 105, 129, 405-407.
- ⁶³ Zhang Yang, "*Di'erci woshou*" *wenziyu*, 149.
- ⁶⁴ Perry Link, "The Limits of Cultural Reform in Deng Xiaoping's China," *Modern China* 13.2 (April 1987), 158.
- ⁶⁵ Shen Dianzhong, *Sixiang chenfu lu* (Record of the ebb and flow of my thoughts) (Shenyang:

Liaoning renmin chubanshe, 1998), 3-7; Paul Lafargue, "Reminiscences of Marx," in *Marx and Engels Through the Eyes of Their Contemporaries* (Moscow: Progress Publishers, 1972), 23.

⁶⁶ Shen Dianzhong, *Sixiang chenfu lu*, 249.

⁶⁷ Shen Dianzhong, *Sixiang*, 10, 360.

⁶⁸ Interview with Ye Wa, March 2012.

⁶⁹ Shen Dianzhong, *Sixiang*, 249-250.

⁷⁰ Shen Dianzhong, *Sixiang*, 297.

⁷¹ Bin Yang, "'We Want to Go Home!'— The Great Petition of the Zhiqing, Xishuangbanna, Yunnan, 1978–1979," *The China Quarterly* 198 (2009): 401-421.

⁷² Guojia nongken zong ju kejiào ju, *Yong yu pandeng de nianqing ren* (Young people bravely scaling the heights) (Beijing: Nongye chubanshe, 1979), e.g. 46.

⁷³ Guojia nongken, *Yong yu pandeng*, 37-38.

⁷⁴ Guojia nongken, *Yong yu pandeng*, 5.

⁷⁵ On protests by sent-down youth in Yunnan, see Bin Yang, "'We Want to Go Home!' The Great Petition of the Zhiqing, Xishuangbanna, Yunnan, 1978–1979," *China Quarterly* 198 (June 2009): 401-421.

⁷⁶ Mao Zedong, "Mao Zhuxi gei Mao Anying, Mao Anqing tongzhi de xin" (A letter from Chairman

Mao to Mao Anying and Mao Anqing), *Shaonian kexue* 1979.1, 3.

⁷⁷ *Renmin ribao*, April 4, 1978, 4.

⁷⁸ Gao Shiqi, "Chuntian" (Spring), *Shaonian kexue* 1979.1: 6-7. The slogan "springtime for science" emerged from the March 1978 national science conference.

⁷⁹ Zhou Peiyuan, "Kexue de weilai jituo zai nimen de shenshang" (The future of science rests on your shoulders), *Shaonian kexue* 1979.10: 1.