

DEVELOPMENT of AGRICULTURAL ECONOMICS
at the UNIVERSITY of NANKING
NANKING, CHINA, 1926-1946

J. LOSSING BUCK

NEW YORK STATE COLLEGE OF AGRICULTURE
A STATUTORY COLLEGE OF THE STATE UNIVERSITY
AT CORNELL UNIVERSITY, ITHACA, NEW YORK

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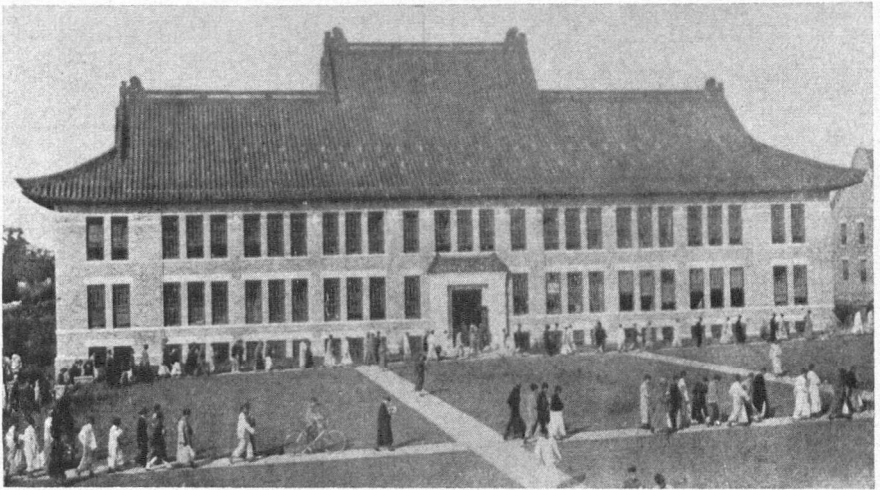
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John Lossing Buck



Bailie Hall. Named for Joseph Bailie who founded the College of Agriculture and Forestry at Nanking University and was its first dean, it housed the Department of Agricultural Economics during its early years.

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Preface

The College of Agriculture and Life Sciences at Cornell University has had a long history of working with peoples in other countries. Professor J. Lossing Buck became one of the pioneers in such work when he went to China in 1915, first as an agricultural missionary and subsequently as a professor of agricultural economics at the University of Nanking.

While at the University, he and his associates and students developed an extensive program of research and teaching in economics as applied to agriculture. Out of the research came his "Chinese Farm Economy" and the three-volume work entitled "Land Utilization in China".

Although Cornell had little direct participation in this development, Dr. Buck, himself a Cornellian, employed several young Cornell-trained agricultural economists on his staff and sent his outstanding Chinese students to Cornell for further training. He has consented to share his experiences with others by preparing this manuscript. As one of those who had the good fortune to spend a year with him and his staff, it is a pleasure to write this brief preface.

Glenn W. Hedlund
Professor of Agricultural Economics

September 1973

Development of Agricultural Economics at the University of Nanking, Nanking, China 1920-1946

John Lossing Buck*

The purpose of this monograph is to describe a successful effort in agricultural assistance to China. The term "technical assistance" to another country came into general usage with the Truman Point Four Program, first formulated in 1948. Technical assistance has been thought of primarily as taking special skills by citizens of one country to another country for a short period. But the type of assistance in agriculture at a much earlier period in China may be properly termed "educational assistance". The locale for the work discussed here was Nanking and the institution was the College of Agriculture and Forestry of the University of Nanking, established in 1913.

Agricultural Mission

During the first quarter of the 20th century, American missionary boards undertook to introduce improved methods of farming through agricultural missionaries. One such attempt was at the American Presbyterian Mission, Nanhsuchou, Anhwei Province, 200 miles north of Nanking, in the southern portion of the Great Plains of North China, a wheat region. The mission station was supported entirely through the American Presbyterian Board of Foreign Missions by the Madison Avenue Presbyterian Church of New York City. As the result of an interview with Dr. Henry Sloan Coffin, the pastor, in the summer of 1915, I was appointed to the mission for agricultural work.

After a 29-day trip on the S. S. Nippon Maru, I arrived in Shanghai in late November 1915. From December 1915 to June 1916 I attended the Nanking Chinese Language School. At Nanhsuchou much of the first year and a half was spent learning the language, riding a bicycle into the

* Cornell University graduate: B.S. 1914, M.S. 1925, Ph.D. 1933. 1915-1920, agricultural missionary in China. 1920-1944, various positions in the Department of Agricultural Economics and the College of Agriculture and Forestry, University of Nanking. 1934-1940, on partial leave as U.S. Government financial appointee. After 1944, head of Land Use Branch, FAO, and later, director of Agricultural Development Council. Now retired and resides in Poughkeepsie, N. Y.

countryside to observe farm operations, and talking with farmers to practice speaking the language. In this way I gained some understanding of the reasons for their methods.

Essentially, my first duties were similar to those of an agricultural extension agent in the United States—bringing new knowledge to the farmers about improved practices. However, because no previous research work had been done, there was nothing to extend that had been tested. Therefore our first efforts were to test the varieties of local crops, with special attention to the main crop, wheat. Seeds of some 60 varieties were obtained from the U. S. D. A. of not only American-grown wheat, but also of varieties from other countries. One that proved superior to the local wheat was multiplied and distributed.

In addition to crop-selection work, the mission offered courses in scientific agriculture. One on practical gardening was given in the mission high school, another was for 12 resident landlords, and a third was for young, potential farmers of the region. Mr. T. H. Shao, son of the local postmaster, who had 2 years' training in agriculture at Nanking, assisted in the landlords' class. Mr. Lei from the College of Agriculture at Peking assisted in the young men's class.

The average landlord attendance was 9. Afterwards, several of them tried innovations on their own land and also organized an agricultural society to promote improved farm practices and to help the farmers who could not read or write. Unfortunately, somehow the military governor of the province was made chairman, and other similar officials were appointed, thus destroying the usefulness of the organization. However, the experience indicated that resident landlords might be effective in introducing improved farming methods. Later Joseph Bailie, founder of the College of Agriculture and Forestry at Nanking, expressed the same opinion.

The short course for young men was so successful that another was requested for the following year to involve those from a wider area.

Frequent flooding, which often caused famine conditions, was the worst problem in the 3-county area. Although flood prevention was too challenging and complicated to be tackled by a mission station, the local government used Red Cross funds and excavated some channels, but the effort was almost totally inadequate. Bicycling 60 miles to the east of Nanhsuchou, near Szechou, I saw 10 gangs of 1000 farmers each excavating a channel some 15 feet deep and 50 feet wide with digging hooks, shovels, and baskets.¹ Later the Nationalist Government did undertake a comprehensive project, starting construction shortly before the war with Japan and resuming it between the war's end and before the advent of the Communist Regime in 1949.

¹ A detailed description of this project, including its financing and organization, appeared in *The Far Eastern Review*, Shanghai, December 1917, under the title "River Conservancy in Northern Anhwei", by J. L. Buck.

By late 1919, several problems became apparent. First, financial resources were insufficient to enlarge the experimental work. Second, approval of agricultural education in the high school was denied, perhaps chiefly for financial reasons. Third, a demand for training young men in agriculture became evident. Fourth, it became clear that the task of working with Chinese farmers was one primarily for the Chinese and not for foreigners.

Appointment to the University of Nanking

Simultaneously with the conviction that opportunities for the mission to develop a viable program were too limited, I received an invitation from John H. Reisner, Dean of the College of Agriculture and Forestry, University of Nanking, to develop a Department of Agricultural Economics or Extension at the university. Agricultural economics was chosen because it was important and was not being taught at Nanking or elsewhere in China. This was an opportunity to join others in training the Chinese in various aspects of agriculture. Moreover, the firsthand experience of working with farmers in a distinctively rural area provided an excellent background for training students.

College of Agriculture and Forestry

The University of Nanking and its College of Agriculture and Forestry offered a favorable environment for developing work in agricultural economics. The college was organized by Joseph Bailie in the foothills of Purple Mountain, just outside the city wall of Nanking. Initially, Bailie had been engaged in famine relief work but he concluded that training students in agriculture was a fundamental way to tackle the famine problem. Students for the first class in agriculture were selected in part on the basis of their willingness and ability to participate in the practical physical work of helping the refugees to grow crops and plant trees. The 8 men who survived the test were admitted as the first class of agriculture in the college in 1914. They proved to be good students and a number of them were employed by the college after graduation.

Bailie obtained the services of John H. Reisner in October 1914, a Yale graduate with a B.S. in Forestry and a master's degree in agriculture from Cornell. Arriving in time to assist with the instruction of the first class of students, Reisner was appointed dean in 1916, the year forestry was included in the curriculum. Bailie later resigned to start organizing industrial cooperatives. Within the college, Reisner developed successful research and extension programs in crop improvement, including cotton, in production of silkworm eggs on a large scale that were free from pebrine disease, and in the production and sale of vegetable seeds and nursery stock, as well as in collecting tree seeds for American nurseries.

Silkworm research

Financial assistance for the silkworm egg production was obtained by Reisner from the International Committee for the Improvement of Sericulture and from the American Silk Association.

The pebrine disease of silkworms is caused by bacilli discovered by Pasteur in France about 1865. They are present in the eggs, or seed, deposited by the moth from a diseased silkworm. The process of obtaining disease-free eggs is to crush each moth in a crucible and examine the liquid under a microscope for the bacilli. If free of disease, the seeds are stored for use during the next season. This procedure required the work of a large number of women from early summer to late winter. In 1925, the gross layings of eggs were 1,125,400, of which 16 percent were diseased and discarded. By 1927, only 5 percent were diseased. The amount of mulberry leaves used for feeding in 1925 was 112 tons, about one-third of which were produced on the college farms and the remainder were purchased from farmers.

Cotton research

After extensive tests of American varieties of cotton, some varieties appeared to be superior to Chinese cotton in yields and length of fibre. Funds for cotton improvement were granted by the Chinese Cotton Mill Owners' Association, Shanghai, and by the Shanghai Anti-cotton Adulteration Association, to employ an American cotton expert, J. B. Griffing, and to pay for his experimental work. After careful testing, under Griffing's direction, large quantities of the Trice cotton, an American variety, and the Million Dollar (developed from an unknown Chinese variety) were multiplied and distributed.

Financial assistance was not confined to research, for several provincial governments gave scholarship funds to the college. Governor Yen Shishan of Shansi sent 14 scholarship students and also provided funds for the College. After graduation most of these able students accepted positions in the College, including the Department of Agricultural Economics.

Cornell-Nanking Cooperative Project

The largest contribution to the College was the remaining unused funds (US\$675,000) of the American Committee for China Famine Fund of New York, approved in August 1923. Economic and farm management studies were financed as one of the projects.² Each year's proposed expenditures were approved by the China Famine Fund Committee of Americans in China appointed by the American minister, Jacob Gould Schurman.

² Full details of the grant and the entire program is described in: University of Nanking, *Agriculture and Forestry Series* 1 (9). May 1924. Also, Dean Reisner describes the background of obtaining these funds in his *Annual Report of the College* for 1922-23.

Part of these funds enabled the Department of Agricultural Economics to employ statistical clerks to analyze the large amount of farm management data already collected by students and to employ two associates, W. Y. Swen and C. M. Chiao from the Class of 1924. Dean Reisner, a man of foresight, used some of this money to establish the Cornell-Nanking Cooperative Project in Plant Breeding, whereby, for a period of 5 years, one Cornell professor came to Nanking during his sabbatic year to help train students and faculty in the most advanced methods of crop improvement. Dr. Harry H. Love was the first to arrive, in 1925.³

The project enabled the College to establish 8 cooperative crop improvement stations in 1924-25, chiefly at mission stations, to develop improved strains and varieties of crops adapted to local conditions. The Nanhsuchou Mission Station, where I began this type of work, was selected as one of these stations. It was found that the variety of wheat that I had introduced was still superior in northern Anwei to all other wheats tested during these years. At first, two assistants who were graduates of the Nanking one-year short course were employed to assist H. H. White, my successor. By April 1927, Mr. White left on furlough and did not return. By 1930, or earlier, Ma, Lien-yien, (B.S., Nanking) was appointed in charge of crop improvement. Thus, a Chinese trained at Nanking was working in a rural area, proving my contention that training Chinese for this type of work was essential.

Cornell in China Club

The Cornell in China Club should be recorded as another example of Cornell-Nanking cooperation. It was a voluntary organization of faculty members and students at Cornell, approved by the Cornell Board of Trustees, to promote friendly relationships between Chinese and American students and faculty and to assist the extension activities of the College, looking forward to supporting one faculty member in extension at Nanking. Its first contribution of \$600 was made in 1930 to finance extension work to control smut disease in grain crops. In 1933 and 1934, two separate contributions were made to the Division of Rural Engineering for part of the salary of Charles H. Riggs.

Eventually the club disintegrated, perhaps because the direct, personal contacts with the College decreased as result of the Sino-Japanese conflict, which began in July 1937 in China, and World War II.

College administration

During his administration (1916-1931), Dean Reisner initiated and maintained two very important policies. The first was to include a competent Chinese as a co-dean, thus creating a Chinese-American adminis-

³ This very successful project with up-to-date training of all plant breeders in China is described in a publication titled *The Cornell-Nanking Story*. Cornell International Agricultural Development Bulletin 4. April 1964.

tration of the College of Agriculture and Forestry and the Experiment Station. A list of the persons known to have filled this position is given here.

1920-21: K. S. Sie (B.S., Nanking, 1914; M.S., Michigan State, 1917). Associate dean, with J. L. Buck as acting dean while Dean Reisner was on leave to the United States.

1924-1929: T. S. Kuo (B.S., Cornell, 1914; M.S., Cornell, 1915). Co-dean and co-director of the Experiment Station with Dean Reisner. Died in March 1929.

March-November 1927: T. S. Kuo chairman of the University Administrative Committee until appointment of Dr. Y. G. Chen (B.S., Nanking; M.S., Ph.D., Columbia) as president of the university in November 1927. The committee was all Chinese because foreigners left temporarily after the Nanking Incident, March 24, 1927.

April-December 1929: The Executive Committee assumed the functions of dean until Dean Sie's appointment.

January 1930-June 1931: K. S. Sie co-dean with J. H. Reisner.

July 1932-1934: K. S. Sie dean, with C. W. Chang as associate dean.

1935-December 28, 1950: C. W. Chang (B.S., Nanking, 1922; M.S., Cornell) dean. Communists confiscated the University on December 28, 1950.

The second policy was the nearly equal emphasis on instruction, research, and extension, all three of which enlisted support for the College from both missionary organizations and government.

Instruction was at several levels: The 4 year college course; in the early years, a 2-year college course; a 1-year short course initiated by J. B. Griffing in 1922 for training of rural leaders; a 1-year course for rural teachers; summer schools, and occasional conferences.

In 1928, to comply with government regulations, the 1-year short course and the rural normal school were reorganized to form a 2-year rural leaders' training school. The Department of Agricultural Economics participated in these training groups by teaching subjects such as rural sociology, farm management, and agricultural economics.

In the period 1912-25, American missionary organizations became particularly interested in agricultural work as part of their efforts. Because of the acute need to strengthen instruction, in 1920 Reisner obtained the permanent assignments of an agricultural specialist, from each of four missionary boards. I became a Presbyterian representative in the College in February 1920, and Reisner continued to be supported by the Presbyterian Board of Missions, thus making two Presbyterian representatives. The cooperation of mission boards and that of various outside organizations materialized because Reisner had initiated viable projects that enlisted interest and support. It was in this environment that instruction, research, and extension in agricultural economics was initiated.

College budget, enrollment, graduates

A brief review of the College budgets, student enrollment, number of graduates, and occupation of graduates for the period 1914-15 to 1930-31 indicates the institutional situation in which agricultural economics de-

veloped. Table 1 shown below, indicates the budgets of the College of Agriculture and Forestry beginning with 1914, the year in which the College was organized. The marked increase in the budget, beginning with the year 1923-24, was provided by the allocation of left-over famine

Table 1. College of Agriculture and Forestry

Year	Silver dollars	Year	Silver dollars
1914-15	\$ 5,900.00	1923-24	\$175,639.00
1915-16	15,741.62	1924-25	166,567.00
1916-17	13,458.36	1925-26	148,205.00
1917-18	19,410.88	1926-27	187,188.00
1918-19	17,726.95	1927-28	167,820.00
1919-20	25,942.85	1928-29	174,873.00
1920-21	44,058.88	1929-30	168,466.00
1921-22	59,759.15	1930-31	188,702.04
1922-23	56,526.41		

Table 2. Statistics of College students and graduates

Year	Undergraduates*		Total	Graduates		Total
	Agriculture	Forestry		Agriculture	Forestry	
1914-15	14	15	29	—	—	—
1915-16	13	39	42	—	—	—
1916-17	27	27	54	—	—	—
1917-18	21	25	46	6	—	6
1918-19	17	25	42	4	12	16
1919-20	21	4	25	10	11	21
1920-21	17	4	21	6	2	8
1921-22	19	18	37	5	1	6
1922-23	28	21	49	6	4	10
1923-24	41	17	58	14	10	24
1924-25	38	20	58	5	6	11
1925-26	51	15	66	5	3	8
1926-27	75	13	88	6	2	8
1927-28	95	12	107	10	1	11
1928-29	119	20	139	20	3	23
1929-30	144	25	169	27	2	29
1930-31	140	23	163	27	7	34
Total				151	64	215

* *Author's note:* The term "undergraduates" as used here refers to the juniors and seniors only.

Table 3. Occupation of College graduates as of January 1931

Occupation	No. graduates
Agricultural education	67
Agricultural officials	28
Agricultural experiment stations	23
Studying abroad	13
Ordinary education	10
Business	8
Officials	6
No replies	17
Died	9
Total	181

funds to the University of Nanking by the American Committee for the China Famine Fund, New York City. Instruction, extension, and research shared about equally in the total budget.

Table 2 shows the enrollment and growth of the College for the years 1914-1931. In the year 1930-31 this college enrolled more students than did either of the other two colleges of the University. In fact, it was one of the largest such enrollments recorded up to that time by an agricultural college in China.

The graduates received the degree of Bachelor of Science in agriculture and Bachelor of Science in forestry from the Board of Regents of the University of the State of New York.

Department of Agricultural Economics

The Cornell-Nanking plant breeding program was the forerunner of less formal arrangements in the Department of Agricultural Economics when special funds made it possible to obtain the assistance of 6 Cornell men and others from abroad to participate in the program during the 1930s.

From 1931-38, the men from Cornell were Dr. Stanley W. Warren for a year, Dr. Ardron B. Lewis for 3 years, Dr. John R. Raeburn for a year and 4 months, Dr. Glenn W. Hedlund for a year, Dr. Leonard A. Maynard for a semester, and Dr. W. M. Curtiss for a year. Dr. Walter F. Willcox of Cornell visited the department and gave a 2-week series of lectures on population statistics. Ogden T. King, a Cornell graduate student, spent a year with the department collecting and analyzing data for his Cornell Ph.D. thesis. The duration of this program and the quality of the participants greatly strengthened the instruction and research of the department and increased the number of students wanting to be majors.

The development of the department will be discussed in time spans of approximately 3 decades, 1920-1929, 1930-1937, and 1938-1946, in terms of personnel, instruction, research, and extension.

The Department of Agricultural Economics was first organized and recognized in 1921 under the name of Department of Agricultural Economics and Farm Management. In this publication it will be referred to as the Department of Agricultural Economics, even though the name included farm management in the earlier years.

The First Decade: 1920-1929

Personnel

The first associate of the department was P. H. Hwa. Coming from a small farming village in Chekiang Province, he graduated in 1920, and was soon transferred from extension to the department in September 1921. The second associate was Paul C. Hsu, of the first graduating class in 1918, who joined the staff in September 1922. For the first year he divided his time between administration and teaching but he began to work full time for the department in September 1923. The third and fourth associate appointments were W. Y. Swen in farm management and C. M. Chiao in rural sociology. Both were Shansi scholarship students. Swen graduated in January, and Chiao in June, 1924. Both were appointed immediately after graduation, with salaries derived from the College's unused famine funds.

Other later appointments were C. C. Chang (Chang Sing-I) (M.S. Cornell) from Kansu Province, in 1927, to teach agricultural economics and statistics and to make further tests of a crop reporting system started the previous year; H. Y. Shen, of Chekiang Province, a 1928 graduate, became the business manager of the department, and L. L. Chang, of Kiangsu Province, Class of 1929, was appointed in February 1929 to teach agricultural economics and prices and as a regional investigator for the Land Utilization Project.

Appointment of clerical assistants competent in the use of the abacus began in the autumn of 1922. The number increased as more data and the unused famine funds became available. Mr. Hwa, the first associate, rendered invaluable service in selecting competent local clerks from Nanking.

The chief clerical assistants during the period were H. C. Li, whose place was filled when he died by S. L. Ling, an expert with the abacus. He stayed with the department until the University moved to Chengtu in late 1937. S. F. Yang was another able statistical clerk. Both these men later worked in the Land Utilization Survey. P. K. Chen did statistical work and prepared the charts for *Chinese Farm Economy*. He, too, later worked for the Land Utilization Survey. T. L. Tsu did most of the cal-

culations of correlation coefficients in *Chinese Farm Economy*. R. H. Fang, employed as a typist, stayed with the department until late 1937. The *Twelfth Annual Report of the College* (1925-26) lists 11 clerical assistants for the department, most of whom were on the staff by late 1923. When the College moved into its own building, Bailie Hall, in 1924, the space was sufficient for the entire college staff.

Instruction Courses

Beginning in February 1920, I taught courses in 4 subjects: Agricultural economics, farm management, rural sociology, and farm engineering, during the spring and autumn semesters. Concurrently I carried College administration duties as acting dean, from October 1920-May 1922, with Sie, and with Kia-shen as co-dean during 1920.

In the college year of 1922-1923 the following courses were offered in the autumn semester: Agricultural Economics 150 (Rural) and Economics 161 (Rural Organization and Credit); in the spring semester: Farm Management 150 and Extension 161. In addition, electives were offered: Farm Management (advanced) 160 in the autumn, 161 in the spring, and Farm Management 162 seminar in the autumn or the spring. My teaching load increased and my courses for the year 1923-24 are listed in the *Annual Report of the College of Agriculture and Forestry* as follows: For the autumn semester: Agricultural Economics and Rural Sociology 150, 5 hours weekly; Rural Organization 161, 3 hours; Agricultural Economics 151 (Projects), 3 hours; and Agricultural Economics 163 (Projects), 5 hours, making a total of 16 credit hours. In the spring semester, I taught: Farm Management 151, 5 hours; Farm Management Seminar 166, 2 hours; Marketing (Agricultural Economics 167), 3 hours; and Extension 161, 2 hours, for a total of 12 credit hours.

Books for courses were made available from the University, partly in the library and partly by students purchasing them at cost from the University. The teaching method was reading assignments in books and bulletins with questions and explanations in class, laboratory exercises, and farm visits.

Chinese Farm Economy Surveys

After the first 2 semesters of teaching farm management from an American textbook, it became evident that the material was not relevant—the illustrations of principles were for American agriculture where the farms were much larger and the technology more advanced. To remedy this defect, President A. J. Bowen and the registrar, G. W. Sarvis, agreed in 1922 to give credit to qualified students who would return to their home areas and obtain farm management surveys for at least 100 farms.

In the summer of 1922, three students who had completed the junior year undertook farm management surveys for university credit. They were Tao, Yen-chiao for Wuhu, Anhwei Province, Pih, Ju-fan for Laian, Anhwei Province, and Liu, Tung-hsien for Chinhai, Chekiang Province.

Analysis of the data from 102 farms near Wuhu was begun immediately in the autumn of 1922 by the author and Hwa with the help of 2 clerical assistants. The College published the findings in 2 bulletins. The first (Dec. 1923) recorded preliminary results in a popular style with the title, "An Economic and Social Survey of 102 Farms, near Wuhu, Anhwei Province, China, Part I." The second, written in a more comprehensive and professional manner, was published as Part II in July 1924.

Since farm management surveys were an innovation, Dean Reisner made special note of them in his 1922-23 *Annual Report* (pp. 11-13):

Mr. Buck has been responsible not only for considerable administration work, particularly during the autumn semester, but in addition to his instruction work he has put in much time on gathering and analysing some extremely interesting and informing rural and farm surveys. . . .

All those interested in agriculture and village conditions have long felt the need for "real facts" regarding almost all phases of agriculture and rural life in China; facts that are reliable, and which for this reason, are extremely difficult to get, but which are absolutely necessary for a correct understanding of the real situation and on the basis of which recommendations for changes or improvements can be made. The problem has been approached from the scientific farm management standpoint and all data collected has been checked and rechecked with great care. In the working out of a survey blank, and in the gathering of the material, Mr. Buck's experience as agricultural missionary of the Presbyterian station in the typical region of Nansuchow, in Northern Anhwei, was of great value. The Survey data have been secured, entirely by his own students under his immediate direction, and in the analysing of the data he has been assisted by Mr. Hwa, Peh-hsiung, one of our own graduates, with much village experience, having been born and brought up in a small village in Chekiang Province. Of the three hundred and fifty farm surveys made, one hundred and two came from one-half the farms from each of three villages near Wuhu, Anhwei Province, care being taken to select both large and small farms.

In the summer of 1923, 6 other students obtained 1091 farm survey records, in 6 different areas. After 4 summers of farm surveys by students for university credit and by 2 other qualified employed students in 1924 and 1925, data had been obtained from 2866 farms in 17 localities of 7 provinces during the summers of 1922-1925. The major portion of the statistical work and the employment of staff, both clerks and associates, was made possible by a college grant in late 1923 of money from unused famine funds which had accrued to the College. Expenditures each year were approved by the China Famine Fund Committee. These limited funds enabled the department to employ additional clerks for data analysis. Mr. Hwa found qualified clerks and supervised them in the analysis of data from the 17 localities until he resigned July 31, 1926, and W. Y. Swen became supervisor of the clerks.

Among the records obtained in 1923, Tsiu, Yu-tsuin's 150 records from Yenshan, Chihli, a region subject to famines, were selected for the second analysis. After I completed the first draft of the study, we decided

to present the comparative data for the 9 localities of North China and the 7 localities in Central China, all in one publication, *Chinese Farm Economy*, rather than issue 17 separate studies. These data were analyzed to ascertain factors affecting the degree of success in Chinese farming. It was found that principles of success relating to size of farm business, efficiency in use of man and animal labor, and implements, and yields above average, were the same in China as in U. S. A.

Previously Prof. F. H. King, a soils professor at the University of Wisconsin, had visited China and Japan to study the agriculture. King's findings, published in 1911 as *Farmers of Forty Centuries*, emphasized the great skill of the farmers and the high yields; however, my study depicts the economic aspects in terms of management factors affecting income and the resulting level of living, including nutrition.

Regulations for Cooperatives

In June 1922, when the students started farm management surveys, Dean Reisner and I were appointed members of the Committee on Credit and Economic Improvement of the International Famine Relief Commission of Peking and were invited there to attend a committee meeting to draft regulations for rural cooperative credit societies. J. B. Taylor of England, the chairman, had been planning organization of cooperatives with funds that were offered by the commission. A set of regulations for rural cooperatives was drawn up, with the stipulation of unlimited liability for members of such cooperatives. After final approval by the commission, the regulations were printed and distributed, and arrangements were completed for allocation of funds to the committee for loans to societies, formed either by the personnel of the committee or by other institutions, one of which was the University of Nanking.

Activities of the First Four Associates

Each of the four associates of the department made their own vital contribution to it.

P. H. Hwa

The first associate, Hwa, came to the department after a year in extension for the College. A description of his activities as recorded in the 1920-21 College *Annual Report* indicates practical experience helpful in his new position.

Mr. Hwa Peh-hsiung, a graduate of the class of 1920, has been faithfully carrying on one of our most important and promising phases of work. In any effective extension work, it is necessary to know something of the conditions with which one is dealing, and for this reason it has been necessary for Mr. Hwa to make investigations into the economic and social conditions in the rural communities. Mr. Hwa has been using survey blanks in order that his investigations may be systematic. The work of investigation has always been combined with lectures to the government and mission schools of the locality, with talks with individual farmers

on better farming, with developing an acquaintance with the local district leaders, especially with those who have a deep interest in the improvement of agriculture, and with the distribution of the College bulletins. The results of this work are shown in the growing correspondence from individuals in the localities visited by Mr. Hwa and in the purchasing of farm implements, spray materials, etc., from the College. Some persons have even come in to visit the College.

This work has been carried on in close cooperation with the local missions, and enthusiastic reports are given by both the Chinese and foreign evangelists. . . .

Mr. Hwa spent two months during the spring in famine work in Shantung, and in this connection had opportunities to do some direct extension work in agriculture.

Rural community survey

In 1921-22 he assisted me in class work and participated in the revision of the rural community survey (or inventory) blank based on his previous year's experience with it. I had developed the original blank, which was less comprehensive, while at Nanhsuchow. Hwa translated the revised version into Chinese and 3000 copies were printed. The English version was mimeographed. It was to be used by persons such as teachers, preachers, and other leaders, to help them understand the economic and social conditions of rural areas, small or large. In addition to missionary groups, several government organizations used it extensively, including the Bureau of Social Affairs of the Greater Shanghai Municipal Government, the College of Agriculture, Chekiang University, the Bureau of Reconstruction of Hopei, and 5 other organizations planning rural development. A reprint was necessary in 1931.

During 1922-23, and 1923-24, Mr. Hwa assisted me in teaching rural sociology in the College's summer school, with rural sociology and farm management in the 1-year Year Short Course, and with the College courses in farm management and rural sociology. He also taught a course in agriculture to the students of the Nanking Theological Seminary. His major contribution was in selecting qualified clerks and supervising their tabulation of farm management data for *Chinese Farm Economy*. This work kept him very busy from the autumn of 1923 until he resigned in July 1926, to join the American Presbyterian Mission in Nanking for rural work. Thus the mission, instead of employing an agricultural missionary from abroad, was able to appoint a Chinese trained by, and with experience at, the University of Nanking.

Paul C. Hsu

Paul C. Hsu, who was on half-time with the department in 1922-1923, assisted me in teaching a course in rural sociology in the summer school of 1922 and in farm management for the 1-Year Short Course in the spring of 1923.

First rural credit cooperative

Hsu's interest in rural credit cooperatives was aroused by the decision of the International Famine Relief Committee to make loan funds avail-

able to rural credit societies. He began discussing credit needs with farmers. By November, 1923 he had organized the Feng-Run-Men Rural Credit Society at Nanking, a group of vegetable growers just outside the Nanking city gate. A loan was made to the cooperative from the International Famine Relief Commission's grant of \$1000 Chinese for this purpose. It was used chiefly to build a public privy from which the farmers could obtain fertilizer for their gardens. The society was successful year after year.

Hsu made many trips to find areas where societies might be organized and also conducted field studies of existing forms of credit and savings, including types of organizations among farmers. Another credit society was organized in 1924 in the Keng village near Hwaiyuen, North Anhwei.

Other claims on Hsu's time included an invitation by the Canadian Church Mission, Kaifeng, Honan, for Mr. Ritchey of the Agronomy Department and Mr. Hsu to give a course in agriculture at its summer conference of church workers on July 3-24, 1923. Enrolled in the course were 59 teachers, 39 men and 20 women. The course consisted primarily of laboratory and field work.

Exhibit at 134th decennial pageant

An outstanding exhibit on improved sericulture, in which Hsu and I participated, was arranged at the 134th Showyang Pageant celebration, a decennial event held at Chentseh, Kiangsu, near Wusih, an important silk area, April 4-18, 1924. The exhibit demonstrated the use of certified silk worm eggs to insure against losses from the pebrine disease, rearing worms under sanitary conditions, and the care and management of a mulberry orchard. The attendance at the pageant was estimated at 100,000. About 25,000 of these visited the sericulture exhibits, with many farmers returning for a second visit. The exhibit was in charge of Mr. Chow Ming-I, the chief extension man for the College, and Mr. Hsu. My extension class of 13 students cooperated in handling the crowds and explaining the exhibits. One old farmer, after he had been shown pebrine disease particles through a microscope, exclaimed: "Ah, now I know that silkworm diseases are not caused by the evil spirits but by the disease particles in the silkworm's body." Dean Reisner's comment on this remark was: "An important discovery—that millions of his fellow farmers will have to make before cocoon production in China can be placed on a scientific basis."

This pageant, called "Hwei" in Chinese, consisted of some 60-70 boat floats prepared by farmers in their own villages for a parade on the large canal passing through Chengtseh. Police boats were also provided by the villagers, together with 15-20 young men for each boat similar to a crew rowing shell, but longer and very fast.

Also in the spring of 1924, Hsu taught the 1-hour course in agricultural economics as part of the 1-year short course. In June of 1924, Hsu was

appointed acting head of the department during my absence on furlough. He and other associates, Swen and Chiao, took over the department's College and short courses and lectures for special conferences. One of Hsu's first tasks was to read the proof of the bulletin "An Economic and Social Survey of 102 Farms near Wuhu, Anhwei, China," Part II, published in July 1924.

In 1924-25, Hsu cooperated with the Hupeh Famine Relief Committee of Hupeh Province in a general agricultural survey of 3 districts where the committee had carried on engineering work to repair and build dykes. The purpose of the survey was to establish possible cooperation between the University of Nanking and the committee.

Cooperatives in 1926

By the end of spring 1926 the development of cooperatives had progressed notably. Hsu made 22 trips to different places for organizing rural cooperative credit and marketing societies. In most cases where connections could be made with rural communities, there were some good leaders who were able to influence at least a few farmers to start such an organization. Interest in cooperatives was also increasing in organizations able to loan funds. The China International Famine Relief Commission supplied funds for the organization and financing of two societies. On July 1, 1926, the College of Agriculture and Forestry made available a capital fund of NC\$5000 from its China famine funds for studies and organization of different types of cooperatives. I obtained a loan from the Shanghai Commercial and Savings Bank for 1925-26 through the bank's director, K. P. Chen, who hesitated at first because he thought farmers would be a poor risk.

After hearing of our successful experiences, he offered a loan of NC\$1000 for the cotton marketing and credit cooperative at Wukiang, if 3 faculty members would guarantee the loan. Hsu, Dean Reisner, and I were the guarantors. When this loan was returned, Chen recognized the success with cooperatives and his bank started organizing cooperatives and making loans as the government banks did. This was only the beginning of substantial support from Chen extended later in the 1930's. The reason for organizing the Cotton Marketing and Credit Cooperative was that the local cotton merchants refused to pay a higher price for the American cotton which the college, through J. B. Griffing, had introduced into the area of Wukiang. A longer staple made the American cotton far superior to its Chinese counterpart. I suggested to Hsu that he try to sell the American cotton from the Wukiang Cooperative to the Wusih mills. One agreed, and the cotton was sold to this mill for years, even though the following year the local merchants offered a higher price.

Following is a partial summary of the status and operations of cooperatives organized by Hsu given in the *12th Annual Report* of the College

of Agriculture and Forestry for 1925-26:

All the societies organized up to the present time are in sound condition. The Feng Rui Society at Nanking has carried out the rule of unlimited liability in paying back their fifth loan. More than 20 of its members advanced \$1.00 each for that part of the loan not collected from members at the time payment of the loan was due. All loans have been paid back in full on or before the date due, along with all service charges.

Number of Societies previously organized	2
(Date of organization of first society was Nov. 1923)	
Number of Societies organized this year	14
Number of Societies in process of organization	5
Total membership of organized Societies	370
Number of Societies making loans	6
Amount of money borrowed last year	\$5,530
Amount of money borrowed since organization of first society	\$7,380
Amount of money paid back in this year	\$4,520
Amount of money now on loan	\$2,900
Value of loans due but unpaid	None

The Wukiang Cooperative Credit and Cooperative Marketing Society, the first marketing cooperative in China, consists of 25 members all of whom grow cotton. Mr. C. C. Li, teacher of the Rural Normal School at Wukiang, under the direction of Department of Rural Education, is supervisor of the society and helped in organizing it. One regulation of the society makes it obligatory for all members to pool their cotton and to sell directly to a cotton mill. The cotton was graded into improved (foreign) cotton and ordinary (Chinese) cotton. Adulteration with water or powder or any other material was absolutely forbidden. Cooperative bailing (sic) was also practiced and all of the cotton sold was bailed (sic) with iron bands so as to reduce the transportation cost and the risk from fire and stealing. Insurance was taken out to cover the cotton while in transit and storage. The shipment consisted of 14.5 piculs of improved cotton and 49 piculs of ordinary cotton and was sold to the Hsin Shen Third Cotton Mill at Wusih. In spite of difficulties of transportation and the loss of weight in shipping and the falling price of cotton, the cooperative society nevertheless sold its cotton at a much higher net price than would have been realized from local sales, as shown by the following figures:

	Per picul
Price received for improved cotton sold through cooperative society . . .	\$42.00
Price for ordinary cotton sold through cooperative society	38.00
Cost of bailing, transportation, rent of warehouse, insurance, etc.	3.16
Net price for improved cotton	38.84
Net price for ordinary cotton	34.84
Local price at Wukiang for ordinary cotton	30.00
Local price at Wukiang for improved cotton	32.00

This indicates an additional income of \$4.84 per picul for ordinary cotton and \$6.84 per picul for improved cotton through cooperative selling. The society made three short term loans amounting to \$1,300 from the Department to finance the members while the cotton was being marketed. Five per cent of the net profit over local selling was turned over to the society by the members as a reserve fund against general expenses and for future development.

The results of a farm credit survey by Hsu is summarized in the 1926-27 College *Annual Report* (pp. 23-24), as follows:

A detailed study of credit conditions has been made in three rural districts and among a total of 486 farmers. Five types of credit loans in the form of cash or

grain, land mortgage, pawn shop credit, Yao Hwei (a loan society) and shop credit. Large, medium, and small size farms were included in the study and all made loans of some kind. The amount of credit per farmer for the three places was quite variable, being \$43 for Chuchow, Anhwei, \$144 for Shwenhwachen, Kiangsu, and \$292 for Yienchiawei, Kiangsu.

Of the total farmers 38 per cent made short term loans for productive purposes and 80 per cent for non-productive purposes. From 60 to 75 per cent of the farmers in the three places borrowed for the purpose of purchasing food. From 11 to 41 per cent borrowed for such purposes as funerals, weddings, and New Year holiday expenses. Loans made for productive purposes were chiefly for labor, fertilizer and land improvement. The seasonal distribution of loans shows that the proportion was greatest in winter, being 25 per cent in January and 23 per cent in February, and was lowest in August, 5 per cent.

The average rate of interest for these loans in the three places is 34.8 per cent per annum. The highest rate was 96.6 and the lowest 18 per cent per annum. The latter is offered by a modern rural cooperative credit society organized by this department. The average period of short term credit is six and one-half months and that of long term is 4.1 years. The longest period found was six years.

Most small and middle class farmers are short of capital but rather than borrow at exorbitant rates of interest they prefer to use inferior farm practices. Interest rates of 36 per cent per annum are very common and rates of 80-100 per cent per annum are not infrequent. Profits from farming are small and therefore make it impossible to pay such high rates on loans for productive purposes. It is because the profits fail to meet high interest rates that farmers when once in debt can never pay back unless it is through some special assistance. High rates are caused by the monopoly of the professional money lender, the insufficient supply of capital, and the small amount of credit that the farmer can command.

The department has found in its experiments in the organization and conduct of cooperative credit societies that these societies offer one good solution of credit problems.

The continued progress of cooperatives is documented in the *13th Annual Report* of the College (pages 24, 25) :

Rural Co-operative Societies. In spite of disturbed conditions the cooperative activities of the Department not only continued without any serious difficulties but even progressed to the extent of the organization of four new societies and more would have been organized if funds had been available. However, disrupted transportation and communication services and bandit outbreaks did cause some of the societies to suspend their marketing activities.

The outstanding accomplishment during the year was the cooperative mulberry planting by seven cooperative societies at Shangtang, near Chinkiang, Kiangsu. The land at Shangtang is chiefly rolling and the previous dry seasons have resulted in crop failures for three successive years. Irrigation is difficult because of the long distance from any water source. A large amount of uncultivated rolling land made it desirable to introduce a drought resistant crop which would not interfere with the established cropping system. After careful consideration of all possibilities it was decided to start the sericulture industry so that even in years of failure of the rice crop, there might be a profit from silkworms. It was through the help of the Shangtang Church that three Societies were organized a year ago, and four this year. Seventy thousand mulberry trees were planted during the spring of 1927 by 115 members of the seven societies. They purchased, shipped, and planted the mulberry trees cooperatively. With the aid of the Department of Sericulture, demonstrations were made for each society on methods of soil preparation, application of fertilizers, the triangular system of planting trees, etc. These directions were followed and the trees are growing very well. This illustrates the influence of a co-operative society in relation to agricultural extension in that it makes possible the carrying out of improved methods.

The following statistics show the extent of the work in the cooperative credit societies for the current year.

Number of societies previously organized	16
Number of societies organized this year	4
Number of societies in process of organization	3
Total membership of organized societies	473
Number of societies making loans	15
Amount of money borrowed last year	\$ 3,740
Amount of money borrowed since organization of first society	\$11,120
Amount of money refunded this year	\$ 2,210
Amount of money now on loan	\$ 4,430
Value of loans due but unpaid	None

After I returned in the autumn of 1925, the associates continued with a considerable share of College instruction including the various short courses of the College. Hsu was also acting head of the Department from April 1927 to October 1927 after the Nanking Incident.

Dean T. S. Kuo was especially interested in the organization of better and more easily available credit for farmers through cooperative organizations. His hope for this was in part realized in 1928 when the government organized the Farmers' Bank of Kiangsu with a paid-in capital of \$1,000,000. Because of the difficulty in securing satisfactory personnel to manage this undertaking, he himself became general manager of the bank and held this position until a permanent successor could be found.

The first draft of rural cooperative legislation by any government organization in China was promulgated by the Kiangsu provincial government in 1928 under the title: Provisional Cooperative Legislation for Rural Cooperatives. The original draft was prepared by Hsu at the request of the planning committee of the Kiangsu Provincial Farmers' Bank, which in turn had been requested by the provincial government to prepare such legislation. Soon thereafter Hsu was loaned for a half year to the Kiangsu Farmers' Bank to develop methods for organizing societies and the field work and for preparing report schedules.

Thus, as in many other cases, government organizations and other institutions adopted programs that had first been developed by the College of Agriculture and Forestry, University of Nanking.

W. Y. Swen

The third associate, Swen, appointed in February 1924, was particularly interested in farm management and food studies. He taught a course in farm management of one hour per week during the spring semester of 1924 to students in the 1-year short course. The first of his 3 types of farming studies was at Lin-I, Shantung, in cooperation with Mr. Torrey of the American Presbyterian Mission. Lin-I suffered from periodic famines and Swen's study was a follow-up of the College's extension at Lin-I, the previous years, described by Dean Reisner in the *Annual Report*.

At the invitation of Rev. R. A. Torrey, of the Presbyterian Shantung Mission at Tsinan, we took part in a big Agricultural Institute in Lin-I hsien, Shantung.

Mr. Buck, Mr. Ritchey, Mr. Chow Ming-I and four students spent four days, lecturing, exhibiting improved samples of farm crops, demonstrating a foreign plow, and giving plays in the local theatre on themes relating to agricultural improvement and social betterment. The magistrate co-operated heartily, and the Institute reaching several thousand village leaders and villagers was an unqualified success.

Dramatizing improved methods of farming was initiated by J. B. Grifing, the cotton expert, who had a keen interest in people and hence in extension work. Chow Ming-I and Shao Teh-hsing were excellent actors, who, with some students, often gave performances to large crowds of farmers on rural open air theatrical stages.

The other two types of farming studies were at Weihsien, Shantung and at Nanhsuchow, Anhwei. The Weihsien study was published in a mimeographed series of the College. Swen's recommendations for Lin-I and Weihsien were more acreage in intensive crops to increase income or food supply, or both, and to bring about a better semi-monthly distribution of labor. The average number of crop mow per farm at Weihsien, Lin-I, and Suhsien were 42.4, 62.5, and 118.8 respectively, while the man work units per crop mow were 6.0, 5.1, and 2.9. Primarily, they reflect differences in quality of land and, therefore, significant variations in intensity of farming. At Nanhsuchow, the high crop mow per farm is due to a large amount of so-called lake-land, which floods in the summer. It normally dries in time to plant wheat in the autumn, and can usually be harvested before flooding again in early summer. Drainage was the great problem, which only large-scale engineering works could solve.

A study of current and historical Chinese weights and measures was made by Swen in 1924-25. The variation in measures were great, even within short distances. The conclusion was that only a more stable government could standardize weights and measures. Standards were promulgated in 1928 or 1929 by the Nationalist Government, but time was required for their complete adoption.

Farm bookkeeping and accounts

Swen, who was interested in practical farm bookkeeping, prepared a bulletin on the subject, published in July 1926 in Chinese. It was distributed to literate farmers chiefly through rural teachers and preachers. Earlier in 1925 two farmers had cooperated with him to successfully complete sets of farm accounts that were used in farm accounting practice for students. In 1926-27 at Yenchiawei, 16 miles south of Nanking, he made arrangements with a rural teacher for 20 sets of accounts to be kept by pupils from farm families and checked by the teacher. It was the teacher who suggested that such accounts be part of the school curriculum.

The Ministry of Agriculture and Mining reprinted 5000 copies of Swen's bulletin on farm practical bookkeeping. The bulletin was also

used by the Kuomintang Extension Service in its short course to train leaders for organizing cooperative societies.

After Hwa resigned in July 1926, Swen supervised the clerical assistants in tabulating data from the numerous research studies, including *Chinese Farm Economy*. During my furlough in 1924-25, Swen taught the farm management courses and continued to do so for several years.

Cost of producing and marketing peanuts

Swen and Hsu conducted a survey in 1926 on the cost of growing and marketing peanuts in China for the year 1925, with the help of qualified students, for whom it was part of a project. The U.S.D.A. requested this survey and supported it with a grant of funds. It included 543 farms in the provinces of Shantung, Chihli, Honan, Hupeh, and Hunan, for 17 different areas. The crop area in peanuts per farm increased from 4 percent in 1900 to 32 percent in 1924 and then decreased slightly to 31 percent in 1925. Farmers had discovered that peanuts were well adapted to the rotation system on the sandy soils and that the demand from the United States created a good export market. The profit per acre was \$24.60 in Chinese currency for an average of 3.7 acres of peanuts per farm.

The cost of marketing peanuts for 36 recorded transactions showed that the farmer received 60.9 percent of the destination price at Shanghai. The average annual profit of the local merchant (peanut hong) was \$1029 Chinese currency. A report was transmitted to the U.S.D.A. and the detailed study was published in the *Chinese Economic Journal* in 1929.

Swen was given a leave of absence from December 1928 to May 1930 to accept a position under Dr. Carl Alsberg, director of the Food Research Institute, Stanford University, for a study of trends in food consumption in the Orient. He produced two papers on the subject: "Japan as a Producer and Importer of Wheat" and "When the Japanese Eat Wheat". During this time he earned his M.S. degree at Stanford in 1930 and also interested Dr. Alsberg in a grant toward the food consumption portion of the survey on land utilization in China.

C. M. Chiao

C. M. Chiao (Chiao Chi-ming) class of 1924, was the fourth associate who joined the department in July 1924. His special interests were rural community activities, farm tenancy problems, standard of living, and growth of population.

The rural community

His first research was mapping rural community interests, which he grouped as economic, social, educational, and religious. Four such centers

were mapped, but only the one at Yao Hwa Men, a market town, was published as a small brochure, under the title "Mapping the Rural Community". It was published first in the *Chinese Recorder*, December 1924, and a reprint was issued by the College in its Series No. 4, December 1924, a 4-page pamphlet with an insert map. The largest area was a religious one for worship at the main temple located just outside of the trade area and near the city gate of Yao Hwa Men. The next largest was that for trade. The third was the "Public Goodness Society". The fourth was that of a small worship area at the temple just outside the market town itself. The area served by a modern school located in the market town was slightly smaller than the small worship area. There were 30 old-style schools scattered in villages throughout the trade area, where learning was by rote.

Chiao's description of the organizational aspects of worship demonstrate the fundamental democratic nature of Chinese farmers.

The large worship area serves a radius of 20 *li* and all the villagers make an annual pilgrimage to the temple. Each large village has its own worship club, but several of the smaller villages usually co-operate together to organize a small worship club. Each club has its own name given to it by its members and often reflects the dominant interests of the club membership. Each club also has a president and a business manager, chosen by turn each year. The order of the name list is posted on a permanent wall for this purpose in a prominent place in the village. The meetings of the club are held either in the home of one of the farmers or in the tea shop.

The funds to be collected for the expenses of the worship are divided equally among the farm families. If a family does not wish to attend the annual worship at the big temple, no money is collected from them. March is usually the month of worship and on a prearranged date the club goes to the temple. The incense, paper money and perhaps local musicians are prepared by the president and business manager of the club. The members of the club proceed to the temple in a body. The worshippers kneel before the altar and after that the incense is burned. It is placed in the incense box by the president. After this act of worship, the priest asks the president for a contribution. The name of the club subscribing the largest amount is put on a stone tablet roll of honor. During the day, the members of the club are fed from the public funds of the club. Custom prescribes that the president shall contribute the largest amount of money. The same process is repeated each year.

This community study was made and published to encourage local rural leaders such as preachers and teachers to use mapping community interests as a means to better understand the people they try to serve.

Farm tenancy

Chiao's studies on farm tenancy were spurred by the attention given to the problem by the revolutionary forces advancing from the south. Because of public interest, his published survey of farm tenancy in Quinsan and Nantung, Kiangsu and in Suhsien, Anhwei as a bulletin in Chinese, May 1926, was in great demand and was used extensively by the legislative Yuan for drafting laws relating to farm tenancy problems for reference by the Committee on Landlord and Tenant Affairs of Chekiang.

Quinsan and Nantung are two counties in the lower canalized Yangtze River delta area in the rice region. Suhsien, Anhwei, is in the southern portion of the wheat region of the Great Plains of North China. Cash rent and absentee landlords using agents to collect rent were typical customs of the lower Yangtze Delta area, near Shanghai, while share rent collected by the landlord personally, was prevalent in Suhsien. The system of agents to collect rent represented a small portion of the total landlords in China. It was a bad system because so many agents cheated both the landlords and the tenant. The studies indicated that the relations between the tenants and landlords were poor; that they were suspicious of each other; that each was trying to get too much from the other. In all three areas, in the order as given above, the computed interest income on the landlord's investment was lowest for the good land, 10.6, 4.2, and 9 percent; higher for medium land 12.6, 4.6, and 15 percent.

These differences within each area could be caused by too low an estimated value for the lower grades of land or, more probable, too high a rent for the poorer land. Because of the variability found in the proportion of the tenant's and landlord's input into the farm business, the government attempts in Chekiang and Kiangsu to reduce rents by 25 percent were inequitable. However, it caused a sizable number of landlords in Kinagsu Province to sell their land and to use the proceeds for a more profitable investment in industry in Shanghai and other big cities in the Yangtze Delta area. The bulletin also contained a bar chart with data for each province and the weighted average for all provinces of the percentage of farmers who were owners, part-owners, or tenants, computed from the Statistical Report of the Ministry of Agriculture and Forestry, Peking (1919). The percentage (weighted average) for owners is 58.7; for part-owners, 22.9; and for tenants, 18.4 percent. Data from 16,786 farms in 22 provinces in the study on land utilization in China (to be described later) reveals 54 percent as owners, 29 percent as part-owners and 17 percent as tenants.

This research of Chiao's on farm tenancy was so comprehensive in the many aspects of land tenure that it deserved the public attention it received.

Population

The population study that Chiao and I made of 4216 farm families in 11 localities of 8 counties in 4 provinces of Anhwei, Honan, Kiangsu, and Shansi was published under the title "Composition and Growth of Rural Population Groups in China" by the *Chinese Economic Journal*, March 1928. Data were for the period of one year, 1924-25, a normal period. They revealed a doubling of population every 70 years, but all years were not normal. Data were compared with 27 other countries. The concluding sentences were of interest:

Such increase, however, is accomplished with much human misery and with considerable economic waste because of the high birth and death rates. China's problem in addition to seeking an optimum population density is also one of producing a population at less cost and with less human anguish.

Because of the great need for amusement and recreation in rural areas, Chiao participated in recreation centers established by the Department of Rural Education of the College, as described in the *Annual Report*, 1926-27 (p. 32).

Amusement and recreation. During the year two recreational centers have been established in cooperation with the Department of Rural Education. The aim is to make these centers a part of the community by having a local committee responsible for the type of activities and for obtaining the cooperation of other departments of the University. Each Saturday and Sunday afternoon Mr. Chiao has been the leader of games for children at these two centers. Occasionally lantern slides or movies are shown for the adult population. During the Chinese New Year holidays some of the old forms of recreation have been revived and these so occupy the time of the farmers in preparation and in performing that little time is left for gambling and other vices common to the holiday season.

In addition to these various studies, Chiao spent much time in 1926 and 1927 assisting and contributing to the analysis of the chapters on farm ownership and tenancy, the farm family and population, the standard of living, and food consumption, for publication in *Chinese Farm Economy*.

Chang, Lu-lwan

Chang Lu-lwan, after graduation in February 1929, joined the department and assisted in testing and finishing the survey schedules for the Land Utilization Survey.

Prices

He also began a study of prices from 800 old account books collected at Wuchin, Kiangsu Province, 300 of which were usable. Index numbers were computed for products sold by farmers, 1894-1926, and for 64 commodities purchased by farmers 1910-1927. A preliminary study of all commodities indicated that prices in silver increased 4 times and prices in copper coins 6 times since 1894. Chang's study was first published in 1932 under the title: "Farm Prices at Wuchin, Kiangsu" as a monograph.

Crop Reporting

Crop reporting was started in 1926. Following is a description from the *Annual Report* of the College for 1926-1927:

In an attempt to demonstrate the possibility of effective crop reporting, to gain some experience in the undertaking, and for the intrinsic value of the reports themselves, a crop reporting system was initiated with the cooperation of about 100 reporters in Kiangsu and Anhwei provinces, consisting chiefly of Christians, school teachers, and church workers, a few other rural workers and a few merchants. Unfortunately, only a small percentage of them have sent back reports on account of the changed political situation. However, a summary of 15 good reports

for 1926 from various regions in these two provinces indicate the value of the undertaking. The median percents of a normal yield were 80 for wheat, 70 for rice and 40 for yellow soy beans. The chief cause reported for such a low yield of soy beans was that of too much rainfall and the chief causes for the reduction in the yield of rice were drought and damage by insects. The plan is to obtain the cooperation of new reporters and continue it even if on only a small scale at first.

With the appointment in August 1927 of C.C. Chang (B.S., Iowa State; M.S., Cornell), the crop reporting work was continued. Because such reporting was primarily a function of a government agency, it was transferred to the Bureau of Statistics of the Legislative Yuan when Chang accepted a position with the Yuan in the summer of 1930. By 1932 there were 4000 crop reporters. The College of Agriculture and the department cooperated in this endeavor, in part, by supplying the crop reporters with free copies of the agricultural and forestry newspaper issued weekly in Chinese (Nung Ling Sin Pao). In 1933 the system was turned over to the newly established National Agricultural Research Bureau, which continued the reports until the Communist take-over in 1950.

The Nanking Incident

In 1927, when I was still working on *Chinese Farm Economy*, the College and academic community were sorely affected by an event that was part of a Chinese internal conflict, since known as the Nanking Incident. At this time the Kuomintang and the Communists were united, both for self-seeking purposes, in an effort to subdue the northern warlords and take over that part of the country. On March 24, the Nationalist army division in the area implemented a Communist plan to rid Nanking of the enemy, while also looting, and even killing, the foreigners in Nanking.

The first real evidence of this plan occurred when the invading army took over the city and we were alerted to possible danger by rumors of advice to the natives to loot foreigners. The vice-president of the University, accosted by a young soldier whom he tried politely to dissuade from taking a sentimentally prized possession, his father's watch, was shot and killed by his young assailant. Immediately upon the news of this shocking incident and the reported murder of Catholic priests, Chinese in the missionary and educational section of the city sought means and places to seclude their foreign friends—in cisterns, lofts, coal bins, and other unlikely places. We were sheltered by a servant in his hut nearby. Some brave Chinese physically intervened between the soldiers and intended foreign victims. The alien business community faring less well, took refuge in a private home and finally, having communicated with American naval vessels in the Yangtze River, escaped under a barrage laid down by the ships' guns.

By the following day, Bailie Hall had been established as a place of protected refuge and we congregated there with all possible haste. Chinese friends and colleagues came to express sorrow and to give assistance.

The Chinese Red Cross soon came and escorted the group of about 120 persons to the two American destroyers, just in time to prevent a second shelling. Although only 2 civilians were allegedly killed by the gun barrage, the Communists were said to have reported in Canton the death of 5 million persons—or a number larger than the actual population.

I repaired to Uzen, Japan, to work on my manuscript, which I had kept close by me during the crisis. No data were lost and I was in touch with the Chinese department members. I returned in September of that year, living and working in makeshift quarters, but my family remained in Shanghai for a year until our home had been made habitable.

Most writers on China ignore the Nanking Incident, chiefly perhaps because they know nothing, or very little, about it. It was the turning point in the Kuomintang's close relationship with the Communists, an important historical event. The Generalissimo soon ousted the Communist officials in control of Nanking and purged the Communist elements in the army, reportedly by the thousands.⁴

Following the Incident, the University carried on under a newly appointed Chinese administrative committee which was able to negotiate with Communist elements to maintain the integrity of the University. From March 25 to November 1927, T. S. Kuo was chairman of the University Administrative Committee until appointment of Dr. Y. G. Chen, (B.S., Nanking; M.S. and Ph.D., Columbia) as president of the University in November 1927.

Funds for Publication of *Chinese Farm Economy*

Shortly after the *Chinese Farm Economy* manuscript was completed in late 1927, Dr. J. B. Condliffe, research secretary of the Institute of Pacific Relations, and Dr. L. T. Chen, secretary of the China Council of the Institute, visited the University in early 1928. After reading the study, they recommended its publication. When I readily agreed but informed them that the University had no funds, Dr. Condliffe offered to finance it through the China Council under the title of *Chinese Farm Economy*. It was published in the summer of 1930.

This resumé illustrates that one can start a new work with nothing but one's salary. Collecting the data was a good educational experience for the students. Its usefulness in teaching was demonstrated when the college gave a small grant to complete analysis of all the data. Then, with a finished manuscript containing useful research information, an

⁴ Accounts of the Nanking Incident appear in various places: in the periodical *Presbyterian of the South*, July 20, 1927, under the title "The Barrage at Nanking" by Dr. Frank P. Price; also in J. L. Buck's letter to his mother, published in the *Poughkeepsie Eagle*, Poughkeepsie, N. Y., May 31, 1927.

The effect of the Nanking Incident on the University property and administration is described in the *Thirteenth Annual Report of the College of Agriculture and Forestry*, pp. 9-13.

interested organization supplied funds for its publication.

Land Utilization in China Survey

But the chain of events did not end with the approval and funds to publish *Chinese Farm Economy*. Dr. Condliffe referred to a proposed project for the study of Chinese land use to be done in Washington, D. C. I suggested that the study should be carried out in China. Chen agreed, and Condliffe requested that a project outline be submitted. The object was to ascertain relationships between land and water resources, type of and success in, land use, population, and standard of living (including food consumption, housing, furniture, and clothing). After the research committees of the China Council of the Institute of Pacific Relations, of the Social Science Research Council in the United States, and of the Institute of Pacific Relations in New York scrutinized the proposed project it was approved. The funds from the latter, amounting to \$10,000 per year for 1929, 1930, and 1931, were channeled through the China Council of Pacific Relations to the treasurer of the University of Nanking. Later there were additional grants of \$5000 and \$2500. The encouragement and interest in the project extended by Dr. D. K. Lieu and Dr. Franklin L. Ho, research secretaries of the council, and by Dr. L. T. Chen were helpful and greatly appreciated.

As a first step in implementing the program, the institute suggested that I visit specialists on land utilization in the United States in the autumn of 1928 to become acquainted with their work, to obtain suggestions, and to discover personnel for the project. When I returned in late February 1929, I had to perfect survey schedules and train regional investigators.

It was necessary to make a decision in 1928 whether to carry out the field work, province by province, or to carry it out in different parts of China at the same time. The latter method was adopted for 3 reasons; first the investigator had to know the spoken language of the region to which he was assigned; second, the unsettled conditions made it impossible to fix schedules as to where work could be done at a given time; and third, several provincial boundaries included more than one regional agricultural area.

The preliminary field schedules were tested in the summer of 1929 and revised where necessary. Thus by the end of the first decade, the department was ready to train regional field investigators and to begin field work in 22 provinces of China.

Review of Instruction

The annual number of junior and senior students in agriculture for the 1919-20 to 1929-30 periods, were 21, 17, 19, 28, 41, 38, 51, 75, 95, 119, and 144 students. In the first 4 of these college years, some 90 percent

Table 4. Hours instruction by Buck, Hsu, Swen, and Chiao of Department of Agricultural Economics—college years 1925-26 and 1926-27

Type of course	1925-26		1926-27*	
	Teaching hours	Student hours	Teaching hours	Student hours
College course	315	8,148	406	9,318
1-Year Short Course	86	3,544	66	2,640
Summer School course	20	2,280	60	1,410
Total	421	13,972	532	13,368

* Attendance at 1-Year Short Course decreased in 1926-27 because of unsettled conditions.

took the main courses in agricultural economics and the agricultural engineering course that I taught. With the arrival of Cornell faculty members for the Cornell-Nanking Crop Improvement Program, the number of majors increased more rapidly in agronomy than in other departments. New graduates also were attracted to positions in the Agronomy Department because it had funds for their employment. In the early 1930's the number of majors in agricultural economics increased proportionately because the students had become aware of the importance of that subject, *Chinese Farm Economy* had been published, and the department had been strengthened by the addition of foreign faculty and those with advanced degrees.

The 4 associates taught the Department of Agricultural Economics courses in 1924-1925 while I was on furlough, including those in the 1-Year Short Course, the Rural Normal School and the Summer School. A brief resumé of college teaching by the department staff in 1925-1926 and 1926-1927 is taken from two *Annual Reports* of the College that give information on teaching and student hours (table 4).

Student projects

An important improvement in instruction was announced by Dean Reisner in his *Annual Report* for 1923-1924:

One of the steps which is being taken to improve our instruction is to give the students more practical work in the form of projects. There has been a strongly felt need for such work not only on the part of the teachers but also by the students who have repeatedly asked for it. Beginning in the autumn of 1924 definitely outlined projects will be required of each student during his last two years in College. These projects will be such that they should equip our students with a degree of experience in handling practical problems which students leaving the college in the past have not all had.

Summarizing the accomplishments of the Department of Agricultural

Economics, the 1925-1926 *Annual Report* (p. 22) states:

The investigations carried on by this department have now made available so much data that in some courses practically all of the material used to illustrate general principles are from Chinese sources.

The Second Period—1930-37

The year 1930, which begins the second period, was a momentous one in several respects. It was marked by a number of events and changes: *Chinese Farm Economy* was published, 12 new associates from a large graduating class were added, field work on the land utilization survey was started, new staff came from abroad, and the department moved from crowded Bailie Hall to the former Chinese Language School building of the University of Nanking at Siao Tao Yuen, a block from the main campus. The department occupied all of the building except for a small area assigned to the Chinese Agricultural History Section, which became part of the department in 1932. Unlike other buildings on the campus, it was modern, with a central heating system, which increased efficiency by at least 25 percent.

Personnel

The staff from abroad included well-known, short-term visitors who were lecturers and consultants and those employed for 1 to 4 years for research and instruction. Altogether, there were 19 during the 8-year period.

Land Utilization in China Survey

Field surveys

Fortunately, in 1930 a number of able students had graduated who could be employed as regional investigators and in other capacities for the survey of land use. In addition, Shao Ten-hsing, (Nanking, 1921) joined the department in 1930. He had been employed by the College as a farm superintendent and in extension and was a person with practical experience among farmers. Each regional investigator was required to travel extensively to locate sampling places, typical of as large an area as possible. Then, a local man was selected, usually a high school graduate who was familiar with farmers and who spoke the local dialect. Introductions were obtained from local respected organizations or individuals. Missionaries were particularly helpful because of their close contacts with the people. The fact that the survey was by a private university obviated fears that would have occurred from a survey by a government organization. The local enumerators were trained in the use of the schedules and the completed field schedules were checked in the field by the regional investigator.

Personnel Organization of the Land Utilization in China Survey

- Director of the Survey: John Lossing Buck
Acting director: Wen-yuh Swen (July 1932-Oct. 1933; Nov. 1934-May 1935)
Statisticians: Stanley W. Warren (Sept. 1931-Aug. 1932); Ardron B. Lewis (Oct. 1933-June 1936)
Associate statisticians: Meo Yieh (June 1929-Mar. 1934); Ming-tsong Yang (March 1934-)
Geographers: H. Brian Low and Lan-yin Chen, assistant
Business managers: Hsien-yao Shen (July 1929-Feb. 1933); Peh-hsiung Hwa (Dec. 1934-Aug. 1936)
Director of food consumption survey: Wen-yuh Swen
Director of population and vital statistics survey: Chi-ming Chiao
Technical assistants: Shih-ru Cheng, Si-ling Ling, Tsai-lung Tsu, and Shu-fang Yang
Regional investigators: C. C. Chang, Lu-luan Chang, Chi-ming Chiao, Ming-liang Li, Ren-t'ao Liu, Hong-sheng Pan, Teh-hsing Shao, Wen-yuh Swen, Ruh-tsun Tsui, Siu-tsoo Wei-chi, Wei Yang, and Lien-ken Yin
Contributing authors: B. Burgoyne Chapman, A. B. Lewis, H. Brian Low, Chi-ming Chiao, J. Hanson-Lowe, Leonard A. Maynard, Frank A. Notestein, James Thorp, Wen-yuh Swen.

In most places, conditions were sufficiently peaceful for the investigators to proceed with their work, although there were areas where there was some interference. In all, 8 or 10 robberies occurred, one of which resulted in the loss of all baggage, clothing, and completed schedules. It is remarkable that the work could be carried on over such a wide area without greater difficulties in a period of political instability.

The field work of the land utilization and population studies was completed in March 1934. Two days after the last regional investigators had returned they were sent out on the new project of the Four Provinces Survey, described later. The number and kind of schedules obtained are as follows: 191 hsien schedules, 223 locality schedules, 16,787 farm schedules from 22 provinces, 2727 farm family food schedules from 21 provinces, and 46,601 farm family population schedules from 16 provinces.

Professional Assistance from Abroad

Since funds were available and the task was immense, specialists from abroad were engaged to help. The first one was Dr. Charles E. Shaw, who came during his sabbatical leave in 1930 from the University of California to train regional investigators in soil identification. Subsequently, his findings were published in *Soils of China* by the National Geological Survey. With Dr. Shaw's recommendation, this publication led to the formation of a soil survey section in the geological survey at Peking. Dr. Robert L. Pendleton, who had previous experience in India and the Philippines, was then employed by the soil survey and also assisted in training the regional investigators. He was followed by James Thorp, formerly with the U.S.D.A. Soil Survey, for a 3-year period. He

helped in the soil aspect of the Land Utilization Survey and wrote the chapter on soils. The National Geological Survey published his excellent work, *Geography of the Soils of China*. Dr. W. H. Wong, its director, co-operated in loaning both Pendleton's and Thorp's services.

In the meantime, the population section of the Land Utilization Survey received special attention, with services donated by 3 experts. Mr. Edgar Sydenstricker, director of the Milbank Memorial Fund, visited the department in the spring of 1930, lectured to students and staff on statistical procedures, made a grant of US\$3000 for a population and vital statistics survey of rural families as part of the Land Utilization Survey, and arranged machine tabulation of data by the fund, with instructions on preparation of data for such analysis. Dr. Frank Notestein of the fund supervised the machine tabulation of data and with C. M. Chiao also coauthored the chapter on population.

Sydenstricker was followed by Dr. Walter F. Willcox of Cornell University in 1930, who lectured to students and consulted with staff on population statistics for 2 weeks.

Dr. Warren S. Thompson of the Scripps Foundation for the Study of Population Problems taught a course on population problems that began in October 1930. He granted funds and gave personal supervision with C. M. Chiao for a test experiment to record vital statistics for families in Kiangyin, Kiangsu Province, a project separate from the land utilization study.

When W. Y. Swen was at Stanford University for 2 years (1928-30), both as assistant professor and as candidate for the master's degree, Dr. Carl Alsberg became interested in the food consumption aspect of the Land Utilization Survey. Late in 1930 he made a small grant that was sufficient to insure an adequate sample of the food consumption of rural families.

Arrangements between the department and Cornell University made it possible for Dr. Leonard A. Maynard to spend a part of his sabbatic leave, the spring semester of 1934, at Nanking to assist with the analysis of the food data and to collaborate with W. Y. Swen in writing the chapter on nutrition. Maynard also taught a nutrition course.

Three other contributors were of particular importance to the project. Two of them involved the services of B. Burgoyne Chapman of Australia and J. Hanson-Lowe of England, both residents in Nanking at the time of the Land Utilization Survey. Mr. Chapman, whose field was climatology, began in 1930 to collect all existing meteorological data in China and later wrote the chapter on climate. Mr. Lowe, a specialist, wrote the chapter on topography. Dr. George B. Cressey, the geographer at the Shanghai Baptist College, gave suggestions and prepared the base map for presentation of data.

In the period 1930-33, Dr. R. H. Tawney of the London School of Economics was in China to write his book *Land and Labour in China*.

He lived with me in Nanking and gave a series of lectures on the agrarian situation in Europe and England.

The first agricultural economist to join the project was Dr. Stanley W. Warren of Cornell, who came in 1931 for a year. An expert in handling statistics, he prepared work sheets, systematized methods of analysis, and trained the assistant statisticians for tabulation of the Land Utilization Survey schedules. At the peak of the statistical work, there were more than 100 clerks using their abacuses for calculations. The task of tabulating data to show relationships was huge because of the large quantity of data. The population data had to be prepared for machine tabulation by the Milbank Memorial Fund. Farm data on land use were summarized for each subject matter item by the averages of 100 farms for each of 167 localities, for each of the 8 agricultural areas, for the wheat region, for the rice region, and the averages for all 167 localities.

From October 1933 to June 1936, Dr. A. B. Lewis, another agricultural economist, assisted the department in analyzing the Chinese land utilization data, in preparing material for and writing a chapter on prices and taxation, in research on silver and the Chinese price level, and in teaching elementary statistics and prices.

Brian Low of New Zealand, an economic geographer, joined the department in October 1933, the same month as Dr. Lewis, for a period of over 4 years. Until January 1937 he devoted full time to the Land Utilization Survey data, particularly to delineating the 2 agricultural regions and the 8 agricultural areas, to preparing the atlas volume that depicts geographically shown data, and to proof-reading the atlas and the statistics volumes.

Professor H. Zorner of Germany, who visited China in 1936, gave lectures and seminars on Russian agricultural collectives that were of great interest to students, faculty, and the public.

By arrangement between the Department of Agricultural Economics of Cornell University and its counterpart at Nanking, Ogden T. King came for the college year 1935-36 to undertake a survey of farm implements in east central China and to write his Ph.D. thesis under the supervision of the department. This was helpful to the department because he trained Pan Hong-shen and other staff members in field work and the analysis of data.

Reconnaissance Travel

Travel was part of the interesting task of delineating the 8 agricultural areas. Buck, T. H. Shao, and Brian Low travelled with Thorp's soil group in the spring of 1934 to the northwest as far as the Kokonor Lake, crossing the border line between farming and grazing land in Tsinghai Province, a short distance beyond Wanh sien. The route was by rail, from Nanking in the rice region to Hsuchowfu in the wheat region, and then

on to Sian, Shensi Province. From there, the group travelled in an open truck, part of the way through a rough dry stream bed to Lanchow, Kansu Province. On the way they crossed the demarcation line between the winter wheat millet area and the spring wheat area. Upon entering Tsinghai Province from Kansu Province, not a single opium poppy was seen because the Tsinghai government forbade poppy production. Upon return to Lanchow, I took a plane to Ningsia, Shensi Province, over hilly desert areas into a plain irrigated from the Yellow River some 2000 years ago. One of the localities studied in the survey was an irrigated area at Ningsia, where production was above the average of all localities in the spring wheat area. However, the rice crop just outside the city was affected seriously by accumulating alkali.

Another trip was made in 1935 with A. B. Lewis from Peking by rail to Paotingfu where the International Famine Relief Commission had installed a large irrigation project with water from the Yellow River. Here the farms were large, and weeds were growing as lushly as the crops, an unusual sight in China. From Paotingfu we travelled by bus, south through Shensi Province to Sian, Shensi.

On previous trips I had been in Szechwan, Hunan, and Kiangsu Provinces, by rail from Nanchang, Kiangsi to Hangchow, Chekiang and by rail from Hangchow to Peking a number of times. Also I had flown along the coast from Hongkong to Shanghai to Peking and had trips in Kwangtung from Canton. These and other trips helped to verify the boundaries of the 8 agricultural areas in the 22 provinces. The only province never visited, except for a plane stop, was Sikang, west of Szechwan Province where agriculture was important only in the lower elevations.

Silver and the Chinese Price Level

In 1932-33, while I was at Cornell for my Ph.D. degree, I arranged for Dr. A. B. Lewis to go to Nanking. Travelling to China together we read an article in a Hongkong newspaper stating that the United States economic depression had crossed the ocean. In Shanghai, the newspapers were describing the deterioration of the rural villages. At the suggestion that he might be able to ascertain the cause, Lewis determined that a rising silver value induced a falling price level and, consequently, a depression. His findings were published in a college bulletin entitled "Silver and the Chinese Price Level", December 1933, also translated into Chinese.

Shortly thereafter, Dr. Leonard S. Hsu, sociologist at Yenching University, having read the study, visited the department and suggested the formation of a government committee on a study of silver and prices. He discovered that the only governmental organization interested was the Ministry of Industries. However, a committee was formed, with Dr. Hsu as chairman and Dr. Lewis, Dr. Buck, and Chang Lu-lwan as the representatives from the University of Nanking.

The other members of the committee were: Ch'en Chung-sheng, deputy director of the Bank of China and a 1918 graduate of the University of Nanking; Chen Ping-ch'uan, also an early graduate of the University of Nanking, Dr. Y. C. Koo, who became the general director of the Bank of China at Chungking during the Sino-Japanese War and was China's representative to the World Bank for Reconstruction and Development, Washington, D. C., for about 20 years. The other member was Tang, Ching-po. Dr. Lewis and Chang were requested to do the necessary research.

Silver abandoned

Dr. Lewis prepared the final report, titled "Silver and Prices in China". After the committee approved the report, it was transmitted with a letter by Dr. Hsu to the Honourable Chen Kung-po, Minister of Industries. It was published by The Commercial Press, Shanghai, in 1935.

Dr. Hsu presented the manuscript and the findings to top officials in an urgent meeting on the subject. By the Decree of November 3, 1935, China abandoned silver on November 4, 1935, and changed to a managed paper currency not tied to any other currency, although it was managed so as not to fluctuate with the pound sterling. The new currency brought prices back to the 1926 pre-depression level. Business, farming, and foreign trade returned to normal. The value of the currency was upheld by balanced trade relations with other countries, until the Japanese had taken possession of all important coastal ports.

Two articles by Lewis in *Pacific Affairs* give an adequate description of the silver, prices, and economic situation in China in the early 1930's.

Effect of United States silver policy

Another aspect of the rising value of silver in the early thirties was the Silver Purchase Act of June 19, 1934, passed by the U. S. Congress when the pro-silver senators argued that a higher price for silver would aid China. Instead, it increased the value of silver and aggravated the depression in China.

Secretary of Treasury Henry Morgenthau was compelled by legislation to buy all the silver offered the U. S. Treasury. Concerned about implementation of the Silver Act with least possible harm to China, he sent Prof. J. H. Rogers of Yale, treasury adviser, to China in the summer of 1934 to appraise the situation. Rogers visited the Department of Agricultural Economics where he was informed of the results of the research on silver and prices.

Shortly after Rogers returned to Washington, I received a cable from Morgenthau asking me to come to Washington for the month of November, to explain the situation. He arranged for me to meet with President Roosevelt and selected cabinet members to explain the situation. The one

month stretched to about five as I became a monetary adviser, and then Morgenthau requested a full-time appointment for me as treasury representative in China. A compromise of part-time was made so I could continue with the land utilization project. This appointment lasted until April 1939, nearly 2 years after the beginning of the war with Japan. I was in Washington when the Japanese attacked Lu Ko Chiao (Marco Polo Bridge) in July 1937, and Morgenthau asked me if this meant real war; when I replied affirmatively, he urged me to return to China immediately.

Editing, Indexing, and Publishing *Land Utilization in China*

Miss Enid Sanders, secretary to the author, edited the land utilization manuscript. Miss Margaret Turner assisted with the proofreading on the text volume of *Land Utilization in China* after Brian Low left in early January 1937. Dr. Curtiss, with the help of Margaret Turner, prepared the index to this work in the summer of 1937 in Hongkong.

When the atlas and statistical volumes were ready for publication, His Excellency, Dr. H. H. Kung, assisted in gaining the financial support of the National Economic Council (NC\$20,000) and the Central Bank (NC\$15,000), to pay for their printing.

By autumn of 1937, the study on land use was published in 3 volumes totalling 1200 pages: *Land Utilization in China* (in English), a summary by agricultural areas and regions; *Land Utilization in China—Atlas* (bilingual); and *Land Utilization in China—Statistics* (bilingual), which contained averages of 100 farms for each of 167 localities grouped by agricultural areas, the wheat region, the rice region, and for all areas,

After the translation of the text volume into Chinese by W. Y. Swen, the National Publication Board of China in 1941 honored me in Chengtu for the best book published in China since 1938. In response, I insisted that the honor be shared by the staff of the department and others who contributed to its success.

Selected features of the study

A unique feature of the project was the assembling of a large number of personnel from differing subject matter fields into a single comprehensive study, where relationships could be shown between resources, types of farming, success in farming, population, and level of living. Moreover, besides Americans, the personnel included individuals from England, New Zealand, and Australia and, most important of all, a large number of able Chinese without whom the study could never have been successful. The research made it possible to improve instruction because both the Chinese and foreign staff participated in the teaching.

Another aspect of the land utilization study was the use of quantity of



Figure 1. *Agricultural areas of China. The land utilization research provided the basic information for dividing China into 2 major agricultural regions and 8 subregions called "areas". Each area's name indicates the dominant crop or crops produced in it.*

production rather than money value in comparing efficiency by size of farms. Quantities were ascertained in terms of the main food grain crops of a locality, such as wheat, rice, or millet. Other crops were converted to grain-equivalent in terms of the exchange value of the other crops or the equivalent food value. For instance, the production of grain-equivalent per man-equivalent per year in kilograms by size of farm groups from the smallest to largest farm group was as follows: 833, 1174, 1456, 1689, and 2073 kilograms; or an average of 1393 kilograms per farm. On a per capita basis of all household members by size of farm groups, the

grain-equivalent was 225, 353, 479, 558, and 773 kilograms, or an average of 446 kilograms per capita in the farm household.

A major accomplishment of the study was that we mapped the two major agricultural regions of the 22 provinces, namely, the wheat and rice regions, and the 8 agricultural areas—3 in the wheat region and 5 in the rice region. In many instances the regional and area boundaries cut across provincial boundaries. Therefore, in planning development or in recording agricultural statistics, these regions and areas are more indicative of the agriculture of China than are provincial data (see map).

Calamity Surveys

Flood of 1931

This flood, sometimes referred to as the Great Flood, was the first of its magnitude in 70 years. Caused by 2 weeks of heavy rain, with an accumulation of 24 inches of precipitation, it affected 25 million persons in the farming area on the flood plains of the Yangtze and Hwai rivers. At that time, a colleague and I took a day's trip by sampan into the inundated area south of Nanking to test a sample schedule for ascertaining the severity of flood losses to farmers. We communicated the results to Dr. T. V. Soong, director of the National Flood Relief Commission, suggesting that the experienced staff of the Department of Agricultural Economics could make an economic study of the losses throughout the flooded plains as a basis for determining relief needs. After much delay, the commission granted funds of NC\$15,000 on October 16, 1931.

Regional investigators were sent to 7 key centers in the flood areas, the first leaving on October 21. Schedules had already been tested and were printed immediately. For the more distant places, schedules were air-mailed so as to be on hand when the investigators arrived. We telegraphed various missions asking for release of local persons, mostly preachers and teachers, to come to the mission center to be trained to use the schedules. The cooperation was excellent.

The sampling method used 3 types of schedules; the hsien, the village, and the farm. Data were obtained from representative villages within the flooded area of a hsien, and 50 farm schedules were obtained from 2 of the villages in each hsien. The most satisfactory data came from the farm schedules, the next best from the village, and the least satisfactory was the hsien schedule. A total of 11,791 farm family schedules were obtained from 245 localities in the areas covered by 89 hsien village schedules.

The flooded area affected parts of 7 provinces. The first delineation of the flooded area by air was by Col. Charles Lindbergh for the Chinese government.

The analysis of the data was a major undertaking in which students from Ginling College, a women's college in Nanking, and from the Uni-

versity of Nanking voluntarily participated with the department's clerical staff to hasten completion. Dr. Stanley Warren helped to organize the work sheets and data analysis.

In 87 hsien, representing 11,791 farm families, the average maximum height of water above the floor of the residences was 4.2 feet. These dwellings were not habitable for 51 days. Most dwellings were on ground higher than the fields, where the average maximum depth of water was 9 feet. The total losses for these farm families were NC\$45,700,000, distributed by percentages as follows: Crops flooded 47.1, buildings 23.7, labor animals 7.1, implements 6.2, stored grain 4.1, clothing and bedding 3.6, fuel 3, furniture 2.8, productive animals 1.6, and fodder 0.8 percent.⁵

The Shanghai Incident

After the Japanese attack on Shanghai, known as the "Shanghai Incident of 1932", T. V. Soong asked the department to make a survey of war losses in the city of Shanghai and rural counties surrounding it. Agreement was reached with the department for only a survey of losses in the rural areas and funds of NC\$5000 were granted. The method used was to visit a large number of villages to locate and identify the different types of conditions. Information was obtained from 632 villages scattered throughout the hsiens of Paoshen, Kiating, Kunshan, Taitsang, and the rural section of the Shanghai municipality. On the basis of obtaining at least 75 family schedules for each type of condition, a total of 1483 farm family schedules were obtained. Little damage was done to the spring crops, which were only beginning to grow with early spring weather, and few villages were seriously damaged by bombing. Schedules were prepared and printed, field surveys were conducted with the help of students from Soochow University and the Baptist College in Shanghai, data were summarized and the confidential report was written in English and Chinese and delivered—all within 3½ week's time. This was possible because of the large and experienced staff, although the two calamity surveys did delay the land utilization study.

Rural economic survey of 4 provinces, 1934-1936

After the government forces had routed the Communists from Kiangsi, Hupeh, Honan, and Anhwei provinces, Generalissimo Chiang Kai-shek ordered the Farmers' Bank of China to conduct an economic survey as a basis for programs of development. The bank turned to the Department of Agricultural Economics for help. This could be granted because the land utilization regional investigators had just completed their field work. The bank allocated NC\$100,000 Chinese currency for the study. The survey, under the direction of W. Y. Swen, included

⁵ Findings of the survey published under the title *The 1931 Flood in China*, Bul. 1 (NS), April 1932. 74 pp.

studies of marketing, efficiency and methods of financing the farmers, a typical study of the organization and management of the present co-operatives, studies of special agricultural industries such as tea and tobacco, land classification, farm tenancy, indigenous organizations, and the collection of existing economic data pertaining to the four provinces. Field investigators began work in March 1934. A series of reports in Chinese were submitted to the Bank which proved helpful in its lending policy. R. T. Tsui was responsible for the large land classification section of the study with the assistance of Dr. Lewis in analysing the data and preparing a report as coauthor (in Chinese).⁶

The experiences with the flood survey, the Shanghai Incident survey, and the Four Provinces Survey aroused interest in the ability of the department to undertake almost any size of survey. The department had a large enough experienced staff and facilities to be, what in terms of farm management could be called "a department economic in size".

The information on the following four subjects is quoted from the *Annual Report* of the College for 1931-1934, bound in University of Nanking Bulletin 8:2.

Other Department Surveys

VITAL STATISTICS REGISTRATION AREAS

The grant made by the Scripps Foundation through Dr. W. S. Thompson in February 1931, made possible the establishment of a vital statistics and registration area at Shiao Chi-cheng, Kiangyin, Kiangsu province. Under the direction of C. M. Chiao, the project included 218 villages with 4,547 families. A total of 179 village heads and other literate persons were used as registrars. Preliminary statistics of the results of the survey follow:

	1931-32	1932-33
Total population	21,687	21,704
Average size of family	4.7	4.8
No. of males per 100 females	113.8	112.4
Birthrate per 1,000	47.6	40.2
Death rate per 1,000	41.5	31.1
Marriage rate per 1,000	9.7	5.6

A second registration area was established at Wukiang, the extension demonstration center of the College. This included 50 villages and 1,056 families. The total population in July 1933, was 5,436; the average size of family, 5 persons; the ratio of males to 100 females, 103; the birthrate, 33.8, the death rate, 23.4, the infant death rate 163, and the marriage rate, 9.7 per 1,000 population. It was somewhat easier to collect information in this area because of the connections already established and the fact that the confidence of the people had already been secured.

STUDY OF SWENHWACHEN RURAL COMMUNITY INTERESTS

This study by C. M. Chiao was made to ascertain the best rural unit for rural organization plans. The sub-political units of a hsien (county) are the "chu" and "hsiang". The "chu" is too large and the "hsiang" too small for an efficient administrative unit. The hsiang is an arbitrary boundary made by the National

⁶ A summary appears in *Economic Facts*, No. 3, Nov. 1936, pp. 141-153.

Government for a new local constructive unit. It seems to need further adjustment in relation to the market town or trade area.

The market town or "chen" is a distinctive farmers' service center. It reaches a larger and more definite area than most other rural groups and is therefore considered the best size and unit for rural organization plans, although poor communication is a limiting factor. The religious groups are the most usual farmers' interest groups in the rural districts but most of them are too small to perform efficient social service. In some respects the farm village itself is the best unit for certain group activities. The efficient unit of organization should be based upon

Source of loan funds	Banks*	China Famine Fund†	National Christian Council‡	Total
No. societies previously organized	13	10	27	50
Nature of societies:				
Cotton production & marketing	1	0	1	2
Wool weaving	0	1	0	1
Home industry	0	0	1	1
Credit & productive	12	9	25	46
No. of societies making loans	0	10	18	28
Total membership of societies	308	172	792	1272
Membership shares:				
Total no. membership shares subscribed	308	172	946	1426
Total value membership shares	640	344	2766	3750
Amount of money	291	13	1975	2279
The total membership fee paid up	12	2.60	413.80	428.40
Total capital§	17166.00	5437.40	22594.20	45198.40
Total outstanding loans 	16645.80	5103.80	21332.40	43082.00
Amount of loans borrowed from university	16354.80	5090.80	19339.40	40785.00
Uses for productive purposes:¶				
Seeds	1254.30	192.74	920.50	3267.54
Fertilizers	1190.00	0	507.00	1697.00
Implements	994.00	810.00	3673.50	5477.50
Cultivation	90.00	721.46	4400.00	5211.46
Animal	1556.00	764.00	3080.00	5400.00
Irrigation	1080.00	2246.00	0	3326.00
Marketing	1400.00	80.00	658.00	2138.00
Supplementary industry	169.00	71.60	1500.00	1740.60
For non-productive purposes:¶¶				
Liquidation of old debts	3575.00	0	1273.00	4848.00
Redemption of land	0	50.00	640.00	690.00
Taxes and rents	1357.50	45.00	710.00	2112.50
Storage of food	591.50	0	710.40	1301.90
Supplies and furnishings	169.50	0	244.00	413.50
Food	943.50	60.00	849.00	2852.50
Other	83.50	50.00	174.00	308.50
Loans return:				
Principal	16354.80	1559.22	7634.40	25548.42
Interest	1397.48	493.25	221.20	2111.93
Amount of money on loan	0	3531.58	11705.00	15236.58

Notes: * Originally China Famine Fund Societies; now supported by banks or other local organizations.

† Loans from China Famine Fund.

‡ Loans from returned rehabilitation loans made by the National Christian Council.

§ Includes total of membership shares, membership fees, and loans from the University.

¶ Includes membership shares paid up, plus loans from the University.

¶¶ Not including use of membership share capital.

its population, wealth, and the cultural traits of the people as a whole. The mapping of rural community interests helps the local government and rural leaders to have a clear understanding of their own community activities before attempting new types of organization, such as the location of a school, or church, which are logically based upon the natural community areas.

RURAL COOPERATIVE SOCIETIES

The Department has promoted rural cooperative societies since 1923. The cost of membership share is low, from two to five dollars. Members assume unlimited liability. In 1926, a grant of NC\$5,000 (from the College, JLB) was made to the Department to provide for experiments in cooperative effort and organization (including a cooperative of local cooperatives, JLB).

In 1931, the Flood Relief Committee of the National Christian Council (with a grant of funds, JLB) asked the Department to undertake relief work at Moh Lin Kwan near Nanking and at Wukiang, Anhwei province, by organizing "farming societies" which are a simple form of cooperative credit societies. Eleven societies were organized at each of these localities and all of the original loans have been paid back.

In the fall of 1932, the Rural Church Committee of the National Christian Council decided to entrust to the Department for a period of three years the returned rehabilitation loans issued after the 1931 flood; these funds to be used to develop rural cooperatives in the previously flooded areas. The total amount turned over was NC\$37,258.31 but there is an additional sum of NC\$19,045.00 which has not yet been returned (in the form of notes and obligations to be collected by the Department, JLB).

Following is a statement concerning the organization of rural cooperative societies from the beginning through 1934. Since the organization of the first society, the amount of NC\$40,785 has been loaned out. About 70 percent of the money is used for productive purposes such as the purchase of seeds, fertilizers, implements, animals, etc.; the other 30 percent is used for taxes, liquidation of old debts, food, and furnishings. To date, 50 societies have been organized with a total membership of 1,272.

The statistics [on p. 43 of this publication] cover rural cooperative organizations from the time of organization to June 30, 1934. (All values are in National Chinese currency [NC].)

COLLECTION OF COST ACCOUNTS

One of the small scale extension activities has been the collection of complete farm cost accounts from farmers in Yincheng hsien, Kiangsu Province; 20 accounts in 1932, 40 in 1933 and 1934. The Department is also supervising the collection of 50 accounts at Wukiang in cooperation with the National Agricultural Research Bureau of the Ministry of Industries.

Faculty Study Abroad

During the period 1930-1938, six Chinese members of the department obtained M.S. or Ph.D. degrees in the United States, five of which were at Cornell.

W. Y. Swen, in connection with his 2-year assignment with Dr. Carl Alsberg, obtained his M.S. degree in food consumption at Stanford in 1930.

Mr. Hsu Chen, for a period of 2 years from July 1930, was granted a fellowship from the Social Science Research Council, New York, for study and travel. He received his M.S. degree in cooperatives at Cornell in 1932, and travelled in America, Europe, India, and Japan, making a

study of various types of cooperative effort and organization.

C. M. Chiao obtained his M.S. degree at Cornell in rural sociology in 1933.

W. Y. Yang (Yang Wei) on a Tsing Hwa College scholarship obtained his Ph.D. at Cornell in 1935. Wang Li-O received his M.S. degree at Cornell in cooperatives in 1937. Liu-Rwen-tao obtained his M.S. degree at Cornell in marketing in 1937.

Economic Facts, a Periodical

Dr. Lewis was the founder and first editor of the department's monthly, *Economic Facts*, first published in September 1936 in both Chinese and English. The purpose was to provide a medium for faculty research papers that would be of interest to those concerned with the economic and social aspects of rural China. Because of the Sino-Japanese War and the transfer of the University to Chengtu, Szechwan Province, there were no issues from May 1941 to December 1942. By January 1943, re-publication began in English on thin and poor-quality wartime paper with Buck as editor. Issues appeared every month until April 1946, after which the University returned to Nanking and financial difficulties terminated its publication.

Funds for College Instruction in Rural Cooperatives and for Loans

The successful efforts of Paul C. Hsu in establishing cooperative credit societies led finance houses to contribute to the department to encourage such organizations. The Shanghai Commercial and Savings Bank through K. P. Chen, the director, made a grant of NC\$60,000 in 1933 for 2 professorial chairs in cooperative organization and a grant of NC\$3000 for student scholarships. The chairs were filled by C. F. Strickland of England, 1934-1935, who had extensive experience with cooperatives in India, and by Dr. W. M. Stevens, an American specialist in cooperative marketing, 1934-1936. Strickland served for nearly a year and Dr. Stevens for about two years. Nine treatises on cooperative organization and management were prepared for use by students, teachers, and officers of cooperatives. Dr. Stevens prepared seven of these, with emphasis on business management and marketing societies.

Strickland and Stevens were followed by Dr. Glenn W. Hedlund of Cornell from September 1936 to June 1937. Primarily he taught cooperatives, with emphasis on the business aspects of successful cooperatives, farm management, and economics. Through the quality of his teaching and the time devoted to it, Hedlund strengthened the instruction in the department.

Also in 1934, the Shanghai and Commercial and Savings Bank earmarked NC\$390,000 for loans to cooperatives at Wukiang. The Bank of

China earmarked NC\$400,000 for loans to societies at six different places. By the end of 1935, the number of credit societies and credit and marketing societies had increased to 113 with a membership of 2916 farmers.

Graduate Instruction

In 1935, the University of Nanking requested the Chinese Ministry of Education to grant permission to organize an Agricultural Research Institute for students to study for a master's degree. Approval was given in June 1936. In the summer of 1936 students were examined and selected to begin their graduate study in the autumn. Tsu, Chwan-hwai was the first graduate student to begin his studies in 1936. He received his M.S. in 1938 from the department after it moved to Chengtu.

Farm Management in China Textbook

Dr. W. M. Curtiss followed Hedlund to teach marketing subjects. He arrived in Hongkong on July 1, 1937, just at the beginning of the Sino-Japanese conflict when joining the University in Nanking appeared precarious. Even after the University moved to Chengtu by January 1938, accommodations were very limited and Americans with wives were advised not to bring them to Chungking, or Chengtu for residence. Curtiss and I prepared a textbook titled *Farm Management in China* by using the research in the department, in the United States, and in other countries for comparative purposes. He and Margaret Turner prepared the index to *Land Utilization in China*.

Statistics Pertaining to Instruction

The relative position of the Department of Agricultural Economics in the College in terms of students and courses is indicated in the tabulated

Table 5. Enrollment for regular* and special instruction

Student rank	1931-32		1932-33		1933-34	
	Fall	Spring	Fall	Spring	Fall	Spring
Freshmen	62	44	83	93	76	93
Sophomores	39	27	41	43	55	55
Juniors	49	34	37	36	42	41
Seniors	42	19	43	30	33	22
Special	2	1	1	7	4	3
Graduates	2	2	0	0	0	0
Total	196	127	205	209	210	214

* All college students.

Table 6. Rural leaders training school

Student rank	1931-32		1932-33		1933-34	
	Fall	Spring	Fall	Spring	Fall	Spring
First year	39	15	55	58	55	54
					26*	21*
Second year	31	30	20	20	51	36
Total	70	45†	75	78	132	111
Vocational sericulture for girls		20		20		20
Crop Improvement Institute		43		‡		‡
Correspondence course in forestry		43		38		38

* Shensi. † Sino-Japanese trouble in spring 1932 responsible for low figure.
‡ Now conducted by National Agricultural Research Bureau.

Table 7. Courses of study offered in the College, 1933-1934

Department	No. courses	No. credits
Agricultural Economics	24	61
Agronomy	23	48
Botany	16	48
Horticulture	17	43
Forestry	29	66
Rural Education	4	8
Sericulture	6	12
Total	119	286

Table 8. Majors and minors by departments

Department	Majors		Minors	
	1932-33	1933-34	1932-33	1933-34
Agricultural Economics . .	37	59	40	48
Agronomy	81	94	39	48
Botany	4	5	15	19
Forestry	30	22	4	10
Horticulture	37	34	62	68
Rural Education	0	0	3	14
Sericulture	0	0	3	1
Unclassified (freshmen) . .	15	0	38	6

Table 9. Vocational classification of all graduates of the College of Agriculture and Forestry

Occupation	College		Rural leaders		Sericulture T.S. for girls	
	No.	Percent	No.	Percent	No.	Percent
Agricultural experiment & research	117	39	114	50	16	80
Agricultural teaching . . .	110	34	83	29	1	5
Agricultural administration	30	10	29	10	2	10
Commercial agriculture . .	19	6	9	3	0	0
Study abroad	9	3	2	1	0	0
Others	2	1	7	2	1	5
No answer	10	3	9	3	0	0
Died	13	4	7	2	0	0
Total	300	100	290	100	20	100

information from the *Annual Reports* of the College of Agriculture and Forestry 8 (2) and of the Experiment Station for 1931-32, 1932-33, and 1933-34. The Rural Leaders Training School is included because the department was responsible for teaching such subjects as agricultural economics, farm management, and rural sociology. The preceding 5 tables are reproduced essentially as they appear in the original.

Instruction Courses

The courses given by the department during fall term 1929 and for 1930 and 1931, the number of students taking the courses, and the teachers giving the courses are recorded in the *Annual Report of the College of Agriculture* 7 (10), reproduced here in table 10. The requirements for majoring in agricultural economics are given in table 11.

Prices

The research and instruction in prices was intensified by the appointment in September 1936 of Dr. John R. Raeburn. He became the editor of *Economic Facts* and published the first issue shortly after his arrival. By the end of 1939, there were 34 papers on prices, as compared with 20 for all the other topics.

New graduates employed for research and instruction in prices were

Table 10. Courses offered by the Department of Agricultural Economics from September 1929 to June 1931

Name of course	Course no.	No. credits	No. students	When offered	Teacher
Economic Geography . .	140	3	24	Fall 1929	K. C. Hwang
Agricultural economics .	150	3	61	" "	C. C. Chang
Introduction to Rural Sociology	152	2	34	" "	C. M. Chiao
History of Agriculture in China	154	3	31	" "	K. T. Wan
Agricultural Marketing .	167	3	24	" "	P. C. Hsu
Farm Tenancy	168	4	1	" "	J. L. Buck
International Trade in Agricultural Products	141	3	16	Spring 1930	K. C. Hwang
Rural Organization . .	161	3	2	" "	P. C. Hsu
Agricultural Statistics .	162	2	59	" "	C. C. Chang
Rural Sociology	162	5	2	" "	C. M. Chiao
Study of Famine in China	163	3	14	" "	K. T. Wan
Method in Agricultural Economics Research .	168	3	2	" "	J. L. Buck
Population & Food Supply	170	3	12	" "	W. S. Thompson
Agricultural Economics	150	5	14	Fall 1930	H. K. Lee
Humanistic Geography .	152	5	5	" "	B. B. Chapman
History of Chinese Agriculture	154	3	25	" "	K. T. Wan
Advanced Farm Management	163	5	3	" "	J. L. Buck
Seminar	165	1	15	" "	J. L. Buck
Agricultural Policy . . .	169	5	11	" "	H. K. Lee
Population Problems . .	170	3	12	" "	W. S. Thompson
Farm Management . . .	151	5	26	Spring 1931	T. H. Shao
Research in Agricultural Economics . . .	153	3	20	" "	W. Y. Swen
Agricultural Statistics .	162	3	8	" "	J. L. Buck
Advanced Farm Management	164	1-3	6	" "	M. Yieh
Seminar	165	1	17	" "	J. L. Buck
Rural Problems	172	1	21	" "	J. L. Buck

Table 11. Required courses for majors in agricultural economics—1930-1931

Courses	Course no.	Credit
Rural Economics & Rural Sociology	150	5
Farm Management	151	5
Humanistic Geography	152	5
Research Method in Agricultural Economics . .	153	—
Agricultural Economics	154	3
History of Chinese Agriculture	155	3
Rural Organizations	161	2
Agricultural Statistics	162	—
Advanced Farm Management	163	—
Seminar: Farm Management	—	1
Marketing	167	3
Agricultural Policy	169	5
Population and Food Consumption	170	3
Chinese Land Tenure	171	3
Famines in China	173	3
Thesis	—	2

Hu, Kwoh-hwa, of Chekiang Province in July 1935, Ko, Fuh-ting of Anhwei Province in July 1936, Miss Lu, Sheng-hwai of Kiangsi Province in July 1936, and Wang, Yin-yuen of Anhwei Province in September 1937.

Farmers' Associations

One of the significant forms of extension by C. M. Chiao in the early 1930's was the organization of farmers' associations to help members obtain information about improving farm practices, procuring improved seeds and equipment, organizing credit and marketing cooperatives, and organizing elementary schools and local clinics. Through these associations, farmers with small land holdings could help develop their own communities by obtaining the necessary assistance from extension agencies, such as the University of Nanking, and from the government extension organization. Membership fees were only 50 cents, Chinese currency.

A graduate of the 2-year course in agriculture was employed by the College of Agriculture and Forestry for extension work at Wukiang and in particular to organize and assist farmers' associations. He was a former pastor with previous experience in rural areas and was an effective organizer. During the first few years, he was paid by the Extension Department of the College. After he had organized several viable farmers'

associations, the associations employed him as their own expert. By about 1936, there were 6 farmers' associations with membership of more than 4000. In fact, on one occasion these associations won a lawsuit against the magistrate of the county.

The associations were so successful under Chiao's guidance that the national government passed legislation legalizing their formation throughout the countryside. They developed rather rapidly and became an excellent medium for introducing improved farm practices.

Before the Japanese advanced into the Wukiang area in December 1937, the associations were requested to close their books. One had total assets of NC\$1385. When the Japanese occupied the area, the associations offered stiff resistance to any interference. The cotton marketing and credit society continued to ship cotton to the mill at Wusih.

These farmers associations were a distinct aid in the creation of credit and marketing cooperatives through the effective work of Paul C. Hsu.

Extension

The first extension work of the College at Wukiang, Anhwei, about 30 miles northwest of Nanking, was done when J. B. Griffing and Chow Ming-I introduced American cotton early in the 1920s. As usual when an American goes to the countryside, he is approached and implored to cure this or that malady, particularly of children. Thus, as the extension of cotton culture progressed in Wukiang, the University of Nanking Hospital agreed to set up a clinic in the town of Wukiang. Since there was interest in a primary school, the college assisted in organizing a school and engaged a teacher. The following description from the College's *Annual Report* for 1931 to 1934 (pp. 40-42) under the topic, "Extension", portrays the framework within which the Department of Agricultural Economics did its extension work at Wukiang, primarily with farmers' associations and cooperatives:

As stated earlier in this report, the extension work of the College has been re-organized so that each department is responsible for the subject matter of extension projects related to that department. The Extension Department coordinates the extension work of the whole College and is assisted in this by the Extension Committee composed of representatives from each department. The Committee decides on extension policies and passes on budgets for each project, while the head of the Extension Department acts as secretary for the Committee.

The Department is concentrating on the development of a model rural community at Wukiang, about thirty miles from Nanking, to demonstrate what can be done in one locality to raise the standard of living of the rural people. In addition, one man from the Department is located in Shantung and one in Hopei to assist in extension work. It has been found that more effective results are obtained by this concentration of effort than by scattered activities over a larger field.

In 1930-1931, the Wukiang Extension Center was operated as a cooperative undertaking between the College and the Central Agricultural Extension Committee of the National Government. In the fall of 1931, the government stopped its monthly allowances. In addition, the crops were so badly damaged by the flood that most of the seed was lost. The farmers suffered serious losses of crops, animals, food, clothing, houses, and fuel. The main task was to organize rural

credit societies which secured loans from the National Christian Council and the Shanghai Commercial and Savings Bank, and wheat loans from the Flood Relief Committee. The total amount loaned to farmers in the Wukiang territory was NC\$72,491.

Following is a list of other activities at Wukiang during the period from 1931 to 1934.

1. In 1931, 2,600 cattles of cotton seed were distributed, and in 1933, 5,400 cattles were distributed to farmers and 1,600 cattles were used on our own seed farm.

2. The distribution of wheat seed in the fall of 1930 was 260 cattles; in 1931, 1,950 cattles; and in 1932, 9,477 cattles. We bought back from farmers 15,560 cattles (for seed), which was distributed the following year in Wukiang.

3. A cooperative irrigation society was organized in 1930, 12 rural credit societies were formed in 1931, and 19 more societies were organized in 1932. In 1933 a union society was formed to consolidate these 31 rural credit societies.

4. A cooperative grain storage was formed by 12 cooperative societies, including 209 farmers in 1932, and 3,971 piculs of hulled rice were stored. The purpose of this is to provide a place for the farmers to hold their surplus until a better price can be obtained. Credit societies make it possible for them to secure loans to carry them until the crop is sold. The stored rice is taken as a security for loans. The farmers gained about one dollar per picul because of this storage.

5. In 1930 there were thirteen evening schools for farmers to teach the thousand characters and give some lectures on agricultural improvement. (These later developed into the Farmers' Union, or Association [JLB].) The Farmers' Union grew from 56 members in 1930 to 580 members in 1933, and 1100 in the spring of 1934. They have elected their own officers and participate in the extension program such as seed distribution, education for adults and children, the rural clinic, animal diseases control, etc.

6. Trees distributed include 200,000 pine seedings and 67,000 small trees including oak, black locust and fruit trees.

7. In the summer of 1933, a cotton marketing cooperative with between four and five hundred members was organized for the ginning and marketing of cotton. A shipment of 42 bales was made to the Wusih mill in the autumn of 1933. Cotton merchants attempted to force the cooperative out by offering higher prices to the farmers. However, the mills have found that cotton purchased from merchants is apt to be "watered" and prefer to purchase through the cooperative. Farmers gained 4 dollars on each picul by selling it to the mills instead of to the local market.

8. In the spring of 1933, the cooperatives organized by the Shanghai Commercial and Savings Bank in the vicinity of Wukiang were placed under the supervision of the College of Agriculture, thus making them part of the whole program of rural improvement at the Wukiang center.

9. A one-month winter course for farmers was first organized in 1932. The subjects are: the thousand characters, health education, cooperative organization, use of improved seed, citizenship and group games. Each student brings his own rice and fuel so there are no expenses in connection with the school.

10. In the fall of 1931, the National Christian Council turned \$6,000 over to the College to be used for emergency relief measures at Molinkwan and Wukiang for farmers suffering from the flood. "Farming Societies" similar to cooperative societies, but simpler in organization, were formed in which each farmer received a loan of fifteen dollars. The loans were repaid after harvest. The work was carried on in cooperation with the Methodist church at Molinkwan and the Advent Christian Mission at Wukiang.

11. In 1933, the primary school was on the verge of closing for lack of funds. Mr. Fang, the Chairman of the Farmers' Union, and his nephew gave their services as teachers in the school without salary in order to keep the school open. Fathers and brothers of the children in the primary school give a portion of their time to the cultivation of the school farm and the money received from the sale of the products is used for the running expenses of the school.

The Department Moves to Hankow and Then to Chengtu, Szechwan

As the Sino-Japanese War drew closer to Nanking, the Department of Agricultural Economics moved to Hankow in September 1937, together with the senior students majoring in agricultural economics. At Hankow research work on prices and publication of *Economic Facts* continued. In Hupeh Province in cooperation with the Cotton Market Administration and the Bureau of Cotton Anti-adulteration, Dr. W. Y. Yang surveyed 150 cotton farms in northern Hupeh to obtain costs of production and relationships of size of farm, size of field, cotton yield, tenancy, and labor efficiency. It was discovered that in a normal year, cotton was a more profitable crop than corn, millet, or kaoliang, but in a year of unfavorable weather, cotton was less profitable because of higher cash expenditures in production.

In December 1937 and early January 1938, the University of Nanking fled to Chengtu, Szechwan Province, just in time to avoid the Japanese take-over of Nanking. The department also left Hankow and arrived in Chengtu on Christmas Day 1937.

One can imagine the difficulties of such a move when other educational institutions, factories, and businesses were also moving west by any possible mode of travel, some persons even walking. Thus, the second period of growth and maturity ends, but with some doubts about the future. Because of my assignment with the United States Treasury, I was traveling extensively and therefore was already "on the move" in 1937.

Third Period 1938-1946

Upon arrival in Chengtu, the Department rented one-story buildings in the city for the staff. Regular classes were held in buildings of the West China Union University, an organization of several Canadian missions. The University had just completed several large buildings so it could offer refuge to the University of Nanking, Ginling College from Nanking, and Cheloo University from Tsinan, Shangtung Province. Miss Priest of the University of Nanking acted as treasurer for all of the institutions. By late summer of 1940 the department moved to rented new buildings amongst rice fields at the edge of the University campus.

Because of a shortage of books and equipment for the department, the Rockefeller Foundation ordered US\$2000 worth of books and equipment in 1940 to 1941. It also continued its contribution of several thousand dollars toward price studies, as it had been doing since about 1935.

Personnel

In 1940, Chiao Chi-ming, the head of the department, resigned to become general manager of farm loan section of the Farmers' Bank of

China, whereupon L. K. Yin became acting head of the department.

When I returned to the University in September 1940, I was responsible for the agricultural economics seminars, for the student projects of the junior and senior students, and for editing *Economic Facts* when it resumed publication in January 1943. My furlough and leave of absence to the United States began in April 1944, during the Sino-Japanese War. However, transportation problems, having to do with cars, planes, boats, and Japanese submarines, caused a series of delays so that we did not arrive in California until August 12, 1944.

As of 1946, the faculty of the Department of Agricultural Economics was composed of 6 professors, of whom one, J. L. Buck, was on leave; 5 associate professors, of whom 2 were on leave; 6 assistant professors, of whom 2 were on leave; 3 instructors, 3 technical assistants, 8 clerks, 1 librarian, 1 Chinese secretary, 1 English secretary, and 1 business manager. This is a total staff of 35, including those on leave, for the department in January 1946, as compared with 51 in the spring of 1941. The difference was caused chiefly by 16 fewer clerical assistants.

Faculty study abroad

Chinese members of the department who studied abroad were: L. K. Yin, receiving a M.S. degree from Cornell in 1938 in land economics; H. Y. Shen, with a M.S. degree from Cornell in 1938 in farm management; R. T. Tsui with a M.S. degree from Cornell in 1942 in farm management; and H. S. Pan in 1949, with M. S. degree in farm management from Washington State University.

Courses

The courses of the department for undergraduates and graduate students are listed in table 12 as recorded in the report of the 25th anniversary of the department in January 1946. A few of these courses may not have been available in the early years at Chengtu from 1938 to 1940.

The training of graduate students for the Master of Science degree was a very important part of the instruction from 1938-1946. Seventeen students received the master's degree during this period.

Student Projects

Students were required to take a course in the spring semester of the junior year on research methods, to select projects of special interest, to collect data during the summer vacation, to analyse the data in the fall semester of the senior year, and to write a thesis in the spring term on the results of their research. This type of requirement had been in existence through most of the second period 1930-1938.

However, in 1942, when the number of project students for the spring semester had reached 35, the need for a change became evident. The task

Table 12. Courses of instruction, Department of Agricultural Economics, University of Nanking, January 1946

Course no.	Name of courses	Credit	Semesters
For under-graduates			
140	Agricultural Economics (Intr.)	3	Autumn & spring
150	Farm Bookkeeping	3	Autumn
151	Farm Management	4	April & autumn
152	Agricultural Economics Geography	3	Autumn
153	Land Economics	4	April
154	Chinese Agricultural History	2	Autumn
155	Rural Sociology	3	Spring
158	Farm Prices	3	Autumn
157	Rural Organization	3	Autumn
156	Agricultural Statistics	4	April & autumn
169	Agricultural Finance (Marketing)	3	Autumn
160	Advanced Agricultural Statistics	3	Autumn
161	Agricultural Policy	3	Spring
162	Advanced Farm Management	3	Autumn
163	Agricultural Economics Research Methods	3	Spring
164	Agricultural Cooperatives	2	Spring
165A	Agricultural Economics Seminar	2	Autumn
165B	Agricultural Economics Seminar	2	Spring
167	Transportation Cooperatives	2	Spring
166	Export of Farm Products	3	Autumn
168	History of Chinese Rural Economic Sociology	2	Spring
169P	Student Research Projects	3	Spring & autumn
169T	Thesis	2	Spring & autumn
For Masters' degree			
170	Advanced Rural Sociology	8	Spring
171	Enterprise Organization and Management	3	Spring
172	International Trade in Farm Products	3	Spring
173	Farm Tenure Policy	2	Autumn
174	Population Problems	2	Spring
175	Land Utilization	3	Autumn
176	Advanced Farm Prices	3	Spring
177	Advanced Farm Marketing	3	Autumn
178	Advanced Agricultural Economics	4	Spring
179	Agricultural Problems	3	Autumn
180A	Agricultural Economics Seminar	1	Autumn
180B	Agricultural Economics Seminar	1	Spring
189P	Student Research Projects	8	Autumn & spring
189T	Master's Thesis	8	Autumn & spring

of approving and supervising each student individually, scattered about in the field as they would be, appeared too formidable, but an acceptable alternative was found. At this time, the new hsien government at Pengh-

sien, about 50 miles from Chengtu, had been established to test the new system of *hsien* government. Dean Chang of the College of Agriculture and Forestry contacted the Penghsien magistrate in regard to the need for surveys as a basis for a development plan and offered the assistance of the College and my 35 project students for the summer of 1942.

Upon the request, and with the cooperation, of the new Penghsien government, the Department of Agricultural Economics undertook an economic survey by project students and a few staff members of the department. Other organizations participating were the field station of the Ministry of Agricultural Improvement Bureau and the Szechwan Agricultural Improvement Bureau. Financial contributions to the department from these three organizations amounted to 38,000 yuan (or NC\$). The Division of Plant Pathology and the Department of Forestry of the College also conducted studies pertaining to their own fields. The Szechwan Agricultural Improvement Bureau also sent four of its investigators for surveys in the *hsiang* which are subpolitical units of the *hsien*. Each project student took as his topic a particular aspect of the economic survey, and all the findings were combined into one economic study.

The field supervisor of the students and contact person for the department with the Penghsien government was H. S. Pan, a member of the department since 1930. During the study, I travelled criss-cross over the *hsien* by bicycle to become acquainted with the area and with the progress of the students' surveys. Two-thirds of the area to the west was mountainous, rising to 12,000 feet at the northern extremity. One walked and climbed in this area where the higher rocky parts produced only shrubs or nothing. Small valley areas and slopes not too high produced trees and the lower, tiny valleys were devoted to rice near the main stream. A copper mine was located in a comparatively low mountain area. Other industrial materials available were coal, iron, porcelain, clay, and cement rocks. Silver and gold were reported in the higher mountains. On the lower mountain slopes near the plain, corn was the prevalent crop. The chief crop on the plain was rice, but the dam to impound water from the mountain stream was frequently destroyed by floods during the wet season. This had happened at the time of the survey. Consequently, 76 percent of the plain area, even though served by irrigation channels, was reported to have insufficient water.

This contrasted greatly with most of the Chengtu plain, which was irrigated annually by diverting water from a branch of the Ming River at Kwanghsien. Over 2000 years ago an official by the name of Li engineered diversion of the river water to the Chengtu plain by cutting a channel through a low ridge. Each year the diversion channel is filled with flood debris that must be removed to a certain depth. Knowing the frailty of human nature, Li had a large block of iron buried in the river bed at the depth to which debris must be removed. Every year all of the *hsien* within the irrigated area are required to send men and bamboo to

Kwanghsien for repair of the channel. The bamboo is used to weave long nets filled with large stones, commonly called sauages, to line the banks of the channel. One spring I had the opportunity to watch the large number of men at work uncovering the iron block.

The students finished analyzing the data in the autumn semester in time to be used for a large exhibit in February 1943, at the celebration of an anniversary of the University of Nanking. A topographical model of the 3 major areas—high mountains, low mountain slopes that were farmed, and the fertile plain area—created considerable comment. Economic data relationships were shown by chart exhibits and on maps of the three areas. The data indicated that the production and standard of living of the low mountainous slopes were half that of the plains area.

Two students had studied the economics of transport on an improved road as compared with the old type of roads and paths. They discovered that the improved road reduced expense of transportation enough to pay its cost within a year's time. Another student compared the yields of corn on the high, middle, and lower mountain slopes and the difference in severity of erosion. The results showed that yields were lowest on the upper slopes, next lowest on the middle slopes, and highest on the lower slopes. A live soil conservation exhibit attracted special attention.

Governor Chang Chun who visited the exhibit was so impressed that he asked the University to reproduce it at his expense, to be used at a forthcoming training conference for magistrates from the hsien of the province.

The Penghsien area represented most, if not all, aspects of economic development. It was small enough to understand the problems of development that apply to large units of states and countries. Six major economic problems affected the welfare of the people of Penghsien: the mountains (which were also an asset), water control and use, transportation, industrial development of raw materials from the mountainous area, agricultural development, and the dense population.⁷

In the following year, the next group of project students surveyed Hwayang *hsien*, just east of Chengtu. There, on some of the rolling land, farmers had given up "gambling with heaven" because of frequent shortage of water for irrigating rice, and thus a good crop only once in 4 years. In China, as hill lands were brought under cultivation, farmers who had grown only rice and whose diet was rice, naturally continued the same type of farming on higher land where ponds could be used to catch run-off water. Unfortunately, the supply of water was unreliable; hence, the common farmers' expression "gambling with heaven."⁸ Meanwhile they had discovered that corn and soybeans, intercropped, and

⁷ A summary of this survey appears in *Economic Facts*, Nos. 27-32 listed under section 8, "Land Classification and Land Utilization" of Appendix IV.

⁸ The results of the Hwayang Survey were published in *Economic Facts*, Nos. 37-38 as recorded in Appendix IV, item 8, "Land Classification and Utilization".

sweet potatoes, were more profitable than rice. This observation and the data led me to conclude that much of the rolling land in China, now producing rice, would be more profitable in other crops.

Farm Management in China Textbook

My first project at Chengtu in 1938 was to edit *Farm Management in China*, a text primarily for Chinese students that was prepared with the cooperation of Dr. W. M. Curtiss. Dr. Clyde Sargent, a professor of English at Cheloo University at Chengtu, suggested re-editing the manuscript into simplified English of not more than about 1700 different words, for the benefit of Chinese students. I accepted this idea and made the revision, finding many places where change clarified the exposition. The book was published in 1942. Later it was translated into Chinese by F. T. Ko and Y. Y. Yang and published on April 8, 1946.

Table 1. Student enrollment of the College, 1940-1941

Courses	Fall 1940	Spring 1941
Post graduate		
Division of Agricultural Economics . .	8	8
Division of Agronomy	5	5
Research Fellows	10	8
Under-graduate		
Regular 4-year		
Agricultural Economics	111	125
Agronomy	54	59
Horticulture	24	36
Forestry	9	9
Entomology and Plant Pathology . .	2	2
Applied Botany	2	3
Agricultural Education	—	1
Teacher Training	24	27
Two-year	24	55
Extension		
Training extension supervisors	19	—
Correspondence school in forestry . . .	2	1
Farmers' foundation school	70	60
Farmers' elementary school	50	40
Total	434	439

Statistics Pertaining to Instruction

The position of agricultural economics in the College of Agriculture and Forestry in relation to the entire student body and the subjects taught are recorded in Dean C. W. Chang's *Annual Report* for June 1940-July 1941, (tables 1-4, pp. 2, 3, 4) as reproduced here:

Before the war, the College had an enrollment of four hundred students in both the College proper and the Rural Leaders Training School. But when the University moved to the West China Union University campus in the Spring of 1938, there was a sudden drop due to the encouragement given to students by other institutions. However, as time went on, there has been steady increase as shown in the following table:

*Table 2. Student enrollment of College on steady increase**

	1938	1939	1940	1941
Spring	197	201	266	330
Fall	208	228	293	--

* Only covering graduate and undergraduate student enrollment.

Table 3. Courses of the College, 1940-1941

Department	Fall term			Spring term		
	No. courses offered	No. credits	Total no. student credit hours	No. courses offered	No. credits	Total no. student credit hours
Agricultural Economics . .	13	32	575	14	35	665
Agronomy . . .	16	35	327	17	36	397
Horticulture	10	20	167	12	29	238
Forestry	11	24	157	11	26	192
Applied Biology . . .	17	36	196	18	45	201
Agricultural Education . .	5	10	73	4	9	296
Seri-culture	3	7	7	1	2	12
Total . . .	75	163	1443	77	181	2091

The size of the graduating class of the four year course for 1940-1941 was comparatively small due to the moving of the institution from Nanking to Chengtu in the winter of 1937. (This refers to late 1937. The spring semester began on schedule in 1938. [JLB])

Table 4. Graduates of the College for 1940-1941

Courses	Fall 1940	Spring 1941	Total
Post-Graduate (MS)			
Agricultural Economics	—	4	4
Under-graduate			
Four-year (BS)			
Agricultural Economics	5	5	10
Agronomy	3	5	8
Horticulture	1	—	1
Forestry	3	1	4
Phytopathology	—	1	1
Two-year	—	28	28
Extension Training			
Training for Extension Supervisors . .	—	19	19
Correspondence School in Forestry . .	10	2	12
Farmers' Foundation School	—	23	23
Farmers' Elementary School	—	13	13
Total	41	83	123

Those students who graduated at the end of the fall term, 1940, were all placed in work for which they are trained. The demand for their services is always in excess of our supply.

Up to date (July 1941) the total number of graduates of the College is 1,699, of which nine are from the Post Graduate School of Agriculture, 633 from the College proper; 607 from the Rural Leaders Training School; 71 from the Rural Normal School, and all the rest from various short term training courses which have been conducted in cooperation with other institutions.

Occupation of Graduates

A classification of the known occupations of all graduates from the Department of Agricultural Economics as of January 1946, indicates 61 with government ministries, 56 with government banks, 37 studying abroad, 22 on the staff of the Department of Agricultural Economics, and 8 with cotton factories and government taxation bureaus. There were 60 in various other occupations and 50 whose occupations were unknown (table 13).

During the period 1920-42, faculty of the Department of Agricultural Economics taught 15,732 College student credit hours. Student hours of instruction by the department in short courses and institutes numbered 15,252. Department members taught 902 students in various other training groups organized by government and private bodies. In addition, they frequently lectured to government groups.

Table 13. Occupation of graduates from the Department of Agricultural Economics (1924-1946) as of January 1946

Position	No. graduates
Government ministries	
Agriculture and forestry	31
Agricultural extension stations	11
Provincial agricultural colleges	6
Economics	4
Education	4
Foreign affairs	3
Finance	2
Total	61
Banks	
Farmers' Bank	35
Bank of Communications	9
Central Bank	7
Bank of China	5
Total	56
Study in the United States	37
Department of Agricultural Economics, University of Nanking	22
Cotton factories	4
Government taxation bureaus	4
Various occupations	60
Unknown	50
Total	177
Grand total	294

Prices and Production and Marketing Costs

Because of the increasing inflation and its different effects upon various groups of commodities, wages, and salaries, the department concentrated on systematic collection and analysis of price data. Table 14 illustrates the tremendous inflation. Beginning in November 1939, the department printed 5 tables of prices in its new publication, *Economic Weekly*, to supply information to the public.

When publication of *Economic Facts* was resumed in January 1943, seven tables on various aspects of prices and currency were published

in each issue, the last issue being April 1946. The tremendous inflation is illustrated by the selected items from this research in table 14. The importance given to prices is evidenced also by the 58 research articles on prices published in *Economic Facts* from 1938 to April 1946. The chief contributors in the department were Y. Y. Wang, K. H. Hu, W. Y. Yang, and I.

Four important studies of production and marketing costs were made in 1938 because of new demands for products, such as cotton in West China and wood-oil for export, under the conditions of Japanese occupation of coastal ports which necessitated new transportation routes.

Table 14. Index numbers of price changes at Chengtu, Szechwan
January-June 1937 = 100

	November, 1942*	March, 1946†
Wholesale prices		
All commodities	6,501	311,836
Domestic products (excluding items exported)	6,226	295,486
Imported goods	15,561	579,029
Exported goods	3,556	198,573
Raw materials	5,234	251,618
Manufactured producer goods	5,438	280,888
Manufactured consumer goods	6,356	377,800
Cost of living		
General index	4,731	238,417
Food	4,401	189,187
Clothing	19,259	420,155
Rent	775	28,721
Fuel and lighting	6,976	613,700
Miscellaneous	4,911	273,653
Purchasing power		
Purchasing power of the <i>yuan</i> in terms of wholesale prices of domestic commodities	1.6	0.3
Farm prices	(October 1942)	(June 1946)
Prices received	4,384	137,955
Cost of production	4,725	170,218
Crop rent	4,384	135,916
Purchasing power of farmers	93	79

* *Economic Facts*, No. 16, 1943, pp. 20-26.

† *Economic Facts*, No. 55, 1946, pp. 835-841.

In July 1938, the Foreign Trade Commission of the Ministry of Finance requested department aid in making surveys of costs of production and marketing of export products, of which wood-oil was the most important. The purpose was to establish fair prices to encourage farmers and exporters. Studies were conducted in the provinces of Hupeh, Hunan, Chekiang, Kwantung, Kwangsi, and Szechwan under the leadership of W. Y. Yang. The survey was completed in 3 months in spite of difficulties caused by the Sino-Japanese hostilities.

W. Y. Swen, with the aid of a graduate student, Chu Sheo-lin, surveyed the production, processing, and marketing of wood-oil in Szechwan Province. The wood-oil trees were comparatively young, 55 percent being less than 9 years old, but improvements in the industry had to be made to meet the demands of the international market.

The government organized the Foo-Shing Trading Corporation in 1938 primarily for the export of wood-oil to the United States to repay a loan. This required increasing truck transportation, and purchasing more trucks. In 1939-40, as an adviser to the Ministry of Finance, I helped facilitate the export of wood-oil and transport of military goods from Haiphong to Kunming.

In 1938, Liu Ren-tao surveyed costs and methods of marketing cotton in Suining and milk in Santai and Nanchung, all in Szechwan Province.

Tobacco production was studied by Pan Hong-shen with the assistance of Sie Cheng. The larger farm areas produced tobacco at a lower cost and a greater profit than the smaller areas did. Likewise, merchants handling a large volume of business made greater profits than those with a small business.

In *Economic Facts*, No. 32, May 1944, I published a summary of all department research on costs of production. At 33.6 percent, labor cost was the highest per shih mow of all such items. Use of land was the next highest cost, amounting to 29 percent of all costs. The article concludes with the statement that attempts to reduce costs would be most effective if applied to reducing man labor costs.

Land Classification

A land classification survey of Szechwan Province was started in November 1938 by L. K. Yin. A total of 66 hsien were classified within 4 years. The primary purpose was to suggest a method for a more equitable appraisal of farm land for taxation purposes. An example of this classification appears in an article by L. K. Yin and C. L. Feng,⁹ for Hwayang hsien. Five distinct land classes were delineated. Land values for classes I to V in yuan per shih mow were 903, 631, 552, 370, and 150 yuan. The yields of rice in shih cattles per shih mow were 528, 438, 400, 357, and 304 shih cattles. The yields of wheat were 270, 220, 180, 151, and 120 shih

⁹ *Economic Facts*, No. 17, February 1943, pp. 29-42.

catties. This work revealed that the tax rates were not fully adjusted to the economic values of each class of land.

An Agricultural Survey of Szechwan Province

In February 1941, Dr. Y. C. Koo, general manager of the Farmers' Bank of China, organized the Szechwan Rural Economics Committee to study the rural economic situation as affected by the Sino-Japanese War. Professor C. M. Chiao was appointed as director of the survey which was conducted with cooperation of the Department of Agricultural Economics and with costs paid by the bank. The survey included farm management studies of 408 farms in 10 hsien including tenant and owner farms, farmers' credit for 216 farms, business studies of 42 cooperative banks and 562 credit societies, marketing businesses in 16 important centers, farm prices, and mapping of 9 agricultural areas within the province. At the bank's request, I made a summary in English, titled *An Agricultural Survey of Szechwan Province*, of the Chinese publication of the survey. It was printed by the bank and also published and distributed by the International Secretariat, Institute of Pacific Relations, in 1943.

Agricultural History

Under the leadership of Chen Tsu-Kwei, the following studies continued at Chengtu: the history of cultivated plants in China; rural socio-economic conditions in the Sung and Yuan Dynasties; and a compilation of agricultural sinica containing references pertaining to agriculture in premodern Chinese literature.

A brief summary of the quantity of research of the department by the end of 1942 may be expressed in terms of units studied and the number of pages published. The chief unit of study—the farm and the farm family—amounted to 90,000 units in 22 provinces. Publications supplied 12,000 pages. In agricultural history, including the period 1922-31 before it was part of the department, 21 million words had been collected and filed by subjects from 870 works of historical literature pertaining to agriculture.

Farmers' Associations and Cooperatives

From 1938 to 1946, Department extension at Chengtu continued to be an important activity. Dean C. W. Chang was interested in establishing an extension center similar to that in Wukiang, Anhwei Province, described in the discussion of the second period. After a long search for a suitable area, the government of Wenkiang Hsien, about 15 miles from Chengtu, offered to cooperate.

At Wenkiang a reconstruction committee was organized with members from the hsien government, the hsien Kuomintang Party headquarters, the University of Nanking, and other local improvement organizations.

The 4 main divisions of the committee were: social, production, economy, and education. The social division promoted, organized, and supervised farmers' associations. By 1942 there were 16 associations with a membership of 5811 farmers and a hsien farmers' association federation of these 16 associations.

The education division assisted the farmers' associations in promoting vocational and night schools in cooperation with local primary schools and other institutions. Association members were required to attend only special classes such as first aid and specific farm practices.

The production division introduced improved seeds developed by the College. A group of farmer-members was supervised in operating a paper factory with a beginning capital of NC\$1500 producing 1000 sheets of paper per day but insufficient to meet the demand. The division head also supervised the operation of a cotton mill with 15 looms. Hog anti-cholera injections were another activity.

The economic division was primarily concerned with the organization of cooperatives, with Li Hwei-chien of the Department of Agricultural Economics as the chief leader.

The first grant of NC\$400,000 from the Szechwan Provincial Cooperative Bank was made available to the department in 1938 for loans to cooperatives at Wenkiang. In 1943 there were 169 registered cooperative credit societies with a membership of 8913 farmers. In 1942 there were 2 cooperative marketing societies and 5 cooperative credit federations. A loan of NC\$289,410 was granted by the Wenkiang Cooperative Bank in 1942, which in turn had been borrowed from the Farmers' Bank of China. It was used for 1570 member families.

A business analysis of cooperative credit societies, Wenkiang, Szechwan Province, 1937-1943 was published in *Economic Facts* No. 40, January 1945. Because of inflation, loans per society member increased each year, but in terms of the 1937 currency value, they decreased from NC\$19.83 in 1938 to NC\$3.71. Moreover, in 1942 and 1943, the number of members borrowing were about one-fifth of the 1941 highest number borrowing. In general, inflation was decreasing the actual credit assistance to farmers.

One unfortunate episode occurred when the minister of finance H. H. Kung received a letter from Communist sources in Wenkiang accusing Li Hwei-chien, the organizer and supervisor of the cooperative societies, of financial irregularities. The Minister contacted President Chen of the University of Nanking, who in turn referred the matter to Dean Chang and the Department of Agricultural Economics. Li Hwei-chien was known to be honest and the request was refused. The Communists had hoped to put their own man in charge of the cooperatives.

An evaluation survey of farmers' associations for the period June to August 1943, was conducted for 5 hsien associations adjacent to Chengtu

by L. K. Yin and Y. C. Wang. The study was published in March 1944.¹⁰ Eighty percent of the 95 hsiang in the 5 hsien had organized hsiang associations with total membership of nearly 34,000. Three of the hsien had hsien associations. The following two paragraphs indicate reasons for successful and unsuccessful associations:

The flourishing societies gave various reasons for their success. Twenty percent attributed success to good management; 29 percent to good cooperation within the association; 12 percent to effective extension; 12 percent to the fact that members received actual benefits; 6 percent to sound financial condition; 6 percent to ability to obtain loans; 6 percent to cooperation with outside groups; 6 percent to good personnel; and 3 percent to effective war propaganda and demonstrations.

In unsuccessful associations failure was put down to several factors. Eighteen percent felt failure was due to poor management; 16 percent to financial difficulties; 11 percent to friction in the association; 9 percent to poor organization; 9 percent to ignorance of members; 8 percent to lack of responsibility of the officers; 6 percent to lack of work to be done; 6 percent to distrust of the association; 5 percent to lack of actual benefit to members; 5 percent to inability to obtain loans; 4 percent to failure in extension work; 2 percent to lack of effective extension; and one percent to lack of a definite place for headquarters.

The members held differing opinions on as to how to improve the association generally. The chief needs seem to be better organization, better training of members, encouragement of officers, better connections with outside groups, increase in budget, more help from the government, more confidence from the members, actual work to be done, definite times and place for meeting, outside promotion, improved seeds and implements, easily obtained credit, and actual benefits for the members.

25th Anniversary of The Department of Agricultural Economics

In January 1946, the department celebrated its 25th anniversary of organization as a department and the 22nd anniversary of Professor W. Y. Swen as a teacher in the department. The report of the anniversary was published in Chinese with information on the faculty, courses being taught, master's degree students with titles of their theses, and a list of occupations and addresses of all graduates of the department since its inception.

At the anniversary, plans were advanced for the building of an agricultural economics building to be called Buck Hall, at Nanking, to honor my part in the development of agricultural economics in China. A sketch of the proposed hall appears in the commendatory volume. Collection of funds for the building were also begun, but continued inflation, unsettled conditions, and finally the Communist confiscation of the University, December 28, 1950, prevented accomplishment of this goal.

Return to Nanking

After the end of World War II, the University and most of the senior staff moved back to Nanking in the late spring of 1946. The *Economic Weekly* was continued because inflation was still increasing. Extension

¹⁰ *Economic Facts*, No. 30.

work was resumed at Wukiang, Anhwei on an even more organized and extensive program than in the 1930's.

I was again in Nanking from June to October 1946 as a member of the 1946 China-United States agricultural mission, which I helped to organize in Washington, D. C., under the auspices of the Office of Foreign Agricultural Relations, U.S.D.A. I visited the Department of Agricultural Economics, where W. Y. Swen who was then head, had reserved my office for my return.

This mission was unusual in organization because there were an equal number of Chinese and American members and 2 co-chairmen, one American and one Chinese. There was never a division on issues between Chinese and Americans; the only schisms were between the co-chairmen and the members. Another difference between this and most missions was that the report was written in China and presented to the government before the Americans left. As soon as it was completed, the Chinese members contacted government officials to begin implementing the recommendations. It did not disappear in the files, as had so many previous reports formulated by primarily foreign, rather than bilateral, groups.

Conclusion

The degree of success realized in the development of agricultural economics in China was possible only within the framework of a college of agriculture where the students were encouraged to conduct research, do extension work, and to undertake practical projects as part of their education.

The employment of well-trained young Ph.D.'s from abroad proved to be an excellent part of the department's program in training because of their ability, energy, and their understanding of students. They also had an appointment of sufficient length and a place in the organization to do their teaching and research. No time was lost in finding a task to be done as has so often happened in current technical assistance programs.

The more experienced foreign professors who were at the department for a short time performed essential services and gave additional prestige to the department. Combining young men with new ideas and experienced persons with reputations proved to be an excellent use of talent.

Research was necessary not only to provide teaching and extension material but also as a method for students to learn by participation. Placing of responsibility for projects with the various members of the staff was another important factor.

A significant aspect of the Department of Agricultural Economics was the development of an institution that gained the confidence and cooperation of the national and provincial governments, as well as non-government agencies such as the Shanghai Commercial and Savings Bank. These agencies used the results of the published research, granted funds

to department projects, and enlisted the aid of the department in cooperative projects. Members of the department served on government committees and with national nongovernmental organizations.

The importance of institution-building in assistance abroad is illustrated also by the government committee on establishment of an agricultural research bureau. Dr. H. H. Love and I were appointed members of the committee in 1931, with Dean P. W. Tsou of the College, of Agriculture of Southeastern University, Nanking, as chairman. The purpose was to establish an institution within the government framework that would have continuity of tenure for able personnel. Before the bureau was established, research personnel were changed with each incoming minister of agriculture. The committee was able to obtain approval and funds for the establishment of the bureau. The names of the committee members were placed in the cornerstone of the new bureau building in 1934. Dean K. S. Sie of the College of Agriculture and Forestry, University of Nanking, resigned to become director of the Agricultural Research Bureau about 1934 and survived many changes in ministers of agriculture over a period of some 12 years. The bureau became well established with effective programs in research.¹¹

These three institutions, the College of Agriculture and Forestry of the University of Nanking, the Department of Agricultural Economics of the College, and the National Agricultural Research Bureau are examples of the importance of institution-building in any program of assistance to developing nations.

As to programs of development, much greater attention should be given to creating farmers' organizations such as associations and cooperatives similar to the cotton marketing cooperative, and the establishment of government marketing regulatory services, including grading of products and improved storage and handling. For instance, wheat was imported by Shanghai flour mills because it was easier and cheaper to order it by cable from abroad than to purchase it from the Nanshuchow area, 400 miles from Shanghai. There the wheat was ungraded, agents had to be sent to purchase it and to accompany it by train to prevent pilfering. At the mill, specially installed machinery was required to screen out the dirt and stones.

After the University of Nanking was confiscated on December 28, 1950 by the Communist regime, it was reported that the College of Agriculture had been detached from the University of Nanking and moved to Tsinan, Shantung Province.

As to what the various former members of the department did under the Communist regime, nothing is known with the exception of C. M. Chiao who continued with the Farmers' Bank in Peking, and later by

¹¹ References to the committee and the bureau appear on pp. 43 and 44 of *The Cornell-Nanking Story*, by H. H. Love and J. H. Reisner (N. Y. S. Coll. Agr. I.A.D. Bul. 4. Apr. 1964).

preference, was principal of an agricultural college in Shansi Province. In the bibliographies of Communist literature on agriculture issued by the National Agricultural Library, U.S.D.A., no names of former staff members appear except that of Wan Kuoh-ting, who developed the work on agricultural history before it was transferred to the Department of Agricultural Economics. In fact, the collection of reference material on agriculture at the National Library has few references pertaining to economic and social aspects. Politically it was a more sensitive area, and literature pertaining to the subject was, perhaps, more difficult to obtain and apparently more scarce.

No member of the staff of the Department of Agricultural Economics moved to Taiwan.

One member, W. Y. Yang, joined the Economics Division of the Food and Agriculture Organization of the United Nations in 1948 and later transferred to the Land-Use Branch of FAO, which I headed, to work in farm management. Another student, Ong Shao-er, at the department in Chengtu, left China before the Communist take-over to study for his Ph.D. in the United States. Later he became FAO regional officer in farm management at Bangkok, Thailand. Both Yang and Ong did an excellent job of bringing about an understanding of the importance of farm management through 5 regional conferences supported in part by funds from the Council on Economic and Cultural Affairs that I arranged as director for agricultural economics. The interest and number of persons in the field of farm management has increased rapidly, as may be seen by consulting the issues of *Farm Management Notes for Asia and the Far East*, published by the Regional Office of FAO, in Bangkok, Thailand.

Thus the influence of the Department of Agricultural Economics has extended beyond the borders of China into a world organization and to many countries, particularly those in Asia and other Far Eastern areas.

Glossary

catty	1 $\frac{1}{3}$ pounds before standard weights and measures were adopted, about 1928
hsien	a county
hsiang	a township
li	1/3 mile
mow	1/6 acre
NC\$	symbol for Chinese National Currency
shih catty	1.1 pounds
shih mow	1/6 acre
yuan	1 Chinese dollar

Appendix

Personnel of the Department of Agricultural Economics College of Agriculture and Forestry University of Nanking, Nanking, China (February 1920-January 1946)

PART I. February 1920-December 1937 (including tenure beyond 1937).

BUCK, JOHN LOSSING. Feb. 1920-Apr. 1944. B.S. 1914, M.S. 1925, Ph.D. 1933—all at Cornell. Teaching: Feb. 1920-June 1934, Sept. 1940-Apr. 1944. Research: Sept. 1921-July 1937, Sept. 1940-Apr. 1944. Acting dean: May 1920-Sept. 1922; head of department: 1921-Oct. 1934. On leave with part time for the department: U. S. Treasury Department as monetary adviser, Dec. 1934-May 1935; as U. S. Treasury representative in China, June 1935-Mar. 1939; as adviser, Ministry of Finance, Apr. 1939-Aug. 1940. Sept. 1940-March 1944: professor at department in Chengtu; editor of *Economic Facts*; student seminars and student summer projects. April 1944, on furlough and on leave.

PRIEST, ELSIE M. Mar. 1921-Dec. 1950. College secretary to Oct. 1922; University assistant treasurer until June 9, 1927; University treasurer to Dec. 28, 1950.

HWA, PEH-HSIUNG. Sept. 1921-Aug. 1926; Dec. 1934-Aug. 1936. B.S. Nanking, 1920. Associate, statistics; business manager. Resigned for rural work with American Presbyterian Mission, North, Nanking.

FAN, RUI-HSIEN. 1922-1937. Nanking resident, typist.

HSU, PAUL C. (HSU CH'EN). Feb. 1923-Sept. 1935. B.S. Nanking, 1918; M.S. Cornell, 1932. Associate, instruction: rural organization; extension: organizing rural credit cooperatives; acting head of department 1924-25 and Apr.-Oct. 1927. (Resigned for position with Bank of Communication.) During 1922-23, College Chinese secretary (half time). Spring semester 1923, half-time to the department.

SWEN, WEN-YEH. Mar. 1924-Dec. 1950. B.S. Nanking, 1924; M.S. Stanford, 1930. Farm management, agricultural economics; regional investigator, acting director of land utilization survey, July 1932-Oct. 1933 and Nov. 1934-May 1935. Director of the food consumption survey, 1931-1937. Co-author, chapter on nutrition in *Land Utilization in China*.

CHIAO, CHI-MING. July 1924-1940. B.S. Nanking, 1924; M.S. Cornell, 1933. Rural sociology and organization; regional investigator, director of population and vital statistics survey, head of department, June 1935-1940. Co-author of chapter on population in *Land Utilization in China*.

CHANG, SING-I (C. C. CHANG). Aug. 1927-summer 1930; 1931-Aug. 1932. B.S. Iowa; M.S. Cornell, 1926. Initiated crop reporting and agricultural statistics of China in cooperation with Bureau of Statistics, Legislative Yuan, Nanking; Regional investigator. (Resigned for position with Bureau of Statistics, Legislative Yuan, Nanking, in 1930 and 1932).

SHEN, HSIEN-YAO. Feb. 1928-Mar. 1934. B.S. Nanking, 1928; M.S. Cornell, 1938. Business manager. (Resigned to head Department of Agricultural Economics, National Agricultural Research Bureau).

CHANG, LU-LWAN. Feb. 1929-Dec. 1937. B. S. Nanking, 1929. Agricultural economics; prices and regional investigator.

TSUI, RUH-TSUIN. Feb. 1930-Dec. 1950. B.S. Nanking, 1925; M.S. Cornell, 1942. Farm management; regional investigator.

SHAO, TEH-TSING. Feb. 1930-Dec. 1937. B.S. Nanking, 1921. Farm management; soils and regional investigator.

WANG, LI-O. Feb. 1930- Dec. 1937. B.S. Nanking, 1928; M.S. Cornell, 1937. Agricultural economics.

MERTSKY, GRACE C. Mar.-Dec. 1930. B.A. Wisconsin; M.A. Chicago. Secretary; indexing Chinese farm economy.

SYDENSTRICKER, EDGAR. Apr. 1930 (2 weeks). Director, research division of Milbank Memorial Fund (USA). Lectured on statistical methods, advised on population and vital statistics problems, arranged for machine tabulation of the population data by the Milbank Memorial Fund, also granted funds for population and vital statistics survey (services gratis).

YANG, WEI (YANG, W. Y.). July 1930?-May 1940. B.S. Nanking, 1927; Ph.D. Cornell, 1935. Instructor in prices and statistics, corporation finance, and business management. Research in prices, cost of production, and marketing. Regional investigator. Part time with Foreign Trade Commission, 1938-April 1940. (Resigned to Economics Research Department of the Central Bank of China.)

WILLCOX, WALTER F. Sept. 1930. Professor, sociology and statistics, Cornell University. Two weeks of lectures on population and statistics (services gratis).

YIEH, MEO. July 1930-Mar. 1934. B.S. Nanking, 1930. Regional investigator and assistant statistician.

CHAPMAN, B. BURGOYNE. Aug. 1930-Dec. 1935. B.A., M.A., Sidney and Cambridge, Australia. Research in climatology of China, author of chapter on climate in *Land Utilization in China* (services gratis beginning Jan. 1932, after resigning from other university assignments).

LI, MING-LIANG. July 1930-1933?. B.S. Nanking, 1930. Regional investigator.

YIN, LIEN-KEN. July 1930-1946. B.S. Nanking, 1929; M.S. Cornell, 1938. Land economics; regional investigator, head of department 1940-1946. (Resigned to head, Department of Agricultural Economics, College of Agriculture, Peking University.)

LIU, RWEN-TAO. July 1930-1946. B.S. Nanking, 1925; M.S. Cornell, 1937. Marketing; regional investigator. (Resigned for position with Ministry of Agriculture and Forestry).

PAN, HONG SHEN. July 1930-1947. B.S. Nanking, 1930; M.A. Washington State, 1949. Farm management and economics of farm implements; regional investigator; Author of *Farm Implements in North China*, also a thesis at Washington State, "Economic Feasibility of Mechanization of Chinese Agriculture".

TAWNEY, R. H. 1930-1931. London School of Economics. Lectures on agrarian history in Europe and England (services gratis).

LI, HSUEN-CHIU (HOON K. LEE). Sept. 1930-Jan. 1931. Korea, Ph.D. Wisconsin, professor in agricultural economics.

SHAW, CHARLES E. Feb.-June 1930. Ph.D. On leave of absence, University of California cooperating. Training regional investigators on identification of soils.

THOMPSON, WARREN S. Oct. 1930-Apr. 1931. Scripps Foundation for the Study of Population Problems (USA). Lectures; advising and financing a special study on vital statistics (services gratis).

WEI-CHI (YU CHI), SUI-TSAO. Oct. 1930-1932. B.S. Nanking, 1930. Regional investigator.

PENDLETON, ROBERT. 1931. Ph.D. Former experience in India and the Philippines in soil surveys, in cooperation with the National Geological Survey, Peking. Training regional investigators in soils (services gratis).

HU, PANG-HSIEN. July 1931-Sept. 1932. B.S. Nanking, 1931. Associate.

CHEN, TSAI-CHANG. 1931-1943. B.S. Shanghai. Associate.

ANDERSON, HILDA. 1931-Dec. 1937. Secretary to the College, with assistance to departments.

YANG, MING-TSONG. 1931-1936. B.S. Nanking, 1928. Associate, agricultural economics; assistant statistician.

WARREN, STANLEY W. Sept. 1931-Aug. 1932. B.S. 1927 and Ph.D. 1931, Cornell. Agricultural economist; training staff in land utilization and statistical analysis.

WAN, KWOH-TING. Sept. 1932-Dec. 1933?. B.S. Nanking, 1920. Research in Chinese agricultural history (transferred from University of Nanking Library where he began research in agricultural history in 1923-1924). Resigned for a government position.

CHEN, TSU-KWEI. Aug. 1932-1950. B.S. Nanking, 1924. Associate, research in Chinese agricultural history. (Transferred from University of Nanking Library.)

WEEKS, DAVID. Spring 1932. M.S. Iowa State; Ph.D. University of California, 1928. Land utilization adviser and lecturer on land use and irrigation.

DRAKE, DORIS. 1932-1934. U.S.A. Secretary.

CHU, SHUI-TANG. Sept. 1932-?. B.S. Nanking. Research in agricultural history.

HU, SHIH-WEN. Sept. 1932?. B.A. Nanking. Research in agricultural history.

HWANG, WEI. Sept. 1932?. B.S. Nanking. Research in agricultural history.

EO-YANG, PING. Feb. 1933-1941. B.S. Nanking. Associate; instruction and extension in rural credit.

LEWIS, ARDRON B. Oct. 1933-June 1936. B.S. University of Maine, 1928; Ph.D. Cornell, 1933. Agricultural economist; assisted in analysis of land utilization data; author of chapter on prices and taxation, research on silver and the Chinese price level. Taught elementary statistics and prices.

LOW, BRIAN. Oct. 1933-Dec. 1937. M.A. Canterbury College, New Zealand. Classification of data to determine agricultural regions and areas; atlas and proof reading. Author of chapter on standard of living in *Land Utilization in China*.

YANG, WEN-CHAO. Dec. 1933-1935. B.S. Peiping. Associate.

ZORNER, H. 1936. Germany. Agricultural economist; lectures and seminars on Russian agricultural collectives which created great interest.

HSU, TSUI-CHING. Jan. 1934-?. B.A. Central. Research in agricultural history.

YAO, YONG. Feb. 1934-1936?. Associate

MAYNARD, LEONARD A. Apr. 1934. Ph.D. Nutrition; on leave in cooperation with Cornell University; assisted in analysis of food data. Instruction in nutrition and co-author of chapter on nutrition in *Land Utilization in China*.

NAN, PING-FANG. Feb. 1934-Jan. 1935. B.A. Park College, M.A. Chicago. Instructor, agricultural economics. Formerly, head, Economics Department of Min-Kow College, Peiping.

LI, HWEI-CHIEN. Feb. 2, 1934-Dec. 1950. B.S. Nanking, 1932. Organization of rural credit cooperatives and farmers' associations.

THORP, JAMES. Spring 1934-Spring 1936. In cooperation with National Geological Survey, Peking. Field trips on soils with staff members and author of chapter on soils (services gratis).

NOTESTEIN, FRANK A. 1934-1936. Ph.D. Director, Milbank Memorial Fund (USA). Machine tabulation of population data in U.S.A. Coauthor of chapter on population (services gratis).

STRICKLAND, C. F. Sept. 1934-May 1935. (England.) Instruction and extension in rural cooperatives, based on extensive experience in India.

STEVENS, WAYNE M. Sept. 1934-June 1936. B.S. Illinois, 1917; M.B.A. Northwestern University, 1924; Ph.D. American University, 1926. Instructor in cooperatives; instruction material on cooperatives and research on seasonal prices.

SAUNDERS, ENID. Oct. 1935-July 1938. (England.) Secretary to Buck, U. S. Treasury representative in China. Edited *Land Utilization in China* manuscript, in Hongkong.

KING, OGDEN T. 1935-1936. B.S. Texas Tech., 1929; M.S. University of California, 1932; Ph.D. Cornell, 1937. Survey of farm implements in east central China for Ph.D. thesis at Cornell. Residence and work in Nanking with assistance of the department.

KING, MRS. OGDEN T. 1935-1936. Secretary, part-time.

CHEN, HONG KEN. 1935-1942. B.S. Nanking, 1935. Agricultural economics.

HU, KWOH-HWA. July 1935-Dec. 1950. B.S. Nanking, 1936. Associate, prices.

RAEBURN, JOHN R. Sept. 1936-Dec. 1937. B.S. College of Agriculture, Edinburgh; M.S. Cornell, 1934; Ph.D. Cornell, 1936. Agricultural economist, instructor in prices, statistics, and advanced statistics. Research in prices with many papers in *Economic Facts*.

HEDLUND, GLENN W. Sept. 1936-June 1937. B.S. University of Nebraska, 1930; Ph.D., Cornell, 1936. Agricultural economist; advisor and instructor in cooperatives, farm management, and economics.

KO, FUH-TING. July 1936-Dec. 1950. B.S. Nanking, 1936. Research and instruction in prices and statistics.

LU, SHENG-HWAI. July 1936-Aug. 1938. B.S. Nanking, 1936. Teaching assistant, prices.

TURNER, MARGARET. Sept. 1936-Mar. 1947. (England) Secretary, proof reading of *Land Utilization in China* in 1937; otherwise with University administration office.

CURTISS, W. MARSHALL. Sept. 1937-July 1938. B.S. University of Illinois, 1927; Ph.D. Cornell, 1936. Agricultural economist. With J. L. Buck, prepared farm management textbook for Chinese students.

WANG, YIN YUEN. Sept. 1937-Apr. 1950. B.S. Nanking, 1937?. Research and instruction in prices.

Note: This list includes neither technical assistants, nor clerical assistants engaged in tabulation of data. The chief technical assistants are listed with the "Personnel Organization of the Land Utilization Project", page 33. In the *Annual Report of the College for 1927-1931* there are 62 assistants listed, including the technical assistants for the year 1930-1931. A year later there were over 100 statistical clerks tabulating land utilization data, chiefly with the abacus.

