

Silk in the Life of South China

The Parasite, the Worm, and the Man.

A parasite attacking a certain caterpillar in South China means dire poverty for millions of men, women, and children. The parasite which attacks the silk worm rejoices in the scientific name *Nosema bombycis*. The worm does not know the learned name of its enemy, but the farmer realizes painfully the results of this and other ailments of the diligent worm whose good health is essential to the livelihood of nearly three million men, women, and children in two provinces, besides other millions indirectly dependent upon the product of this little silk-spinning caterpillar.

In these provinces 492 square miles of soil are devoted to the cultivation of the mulberry tree for feeding the billions of worms by means of which 2,275,000 human beings obtain work and earn their daily bread.

If We Conquer the Parasite. If the dis-



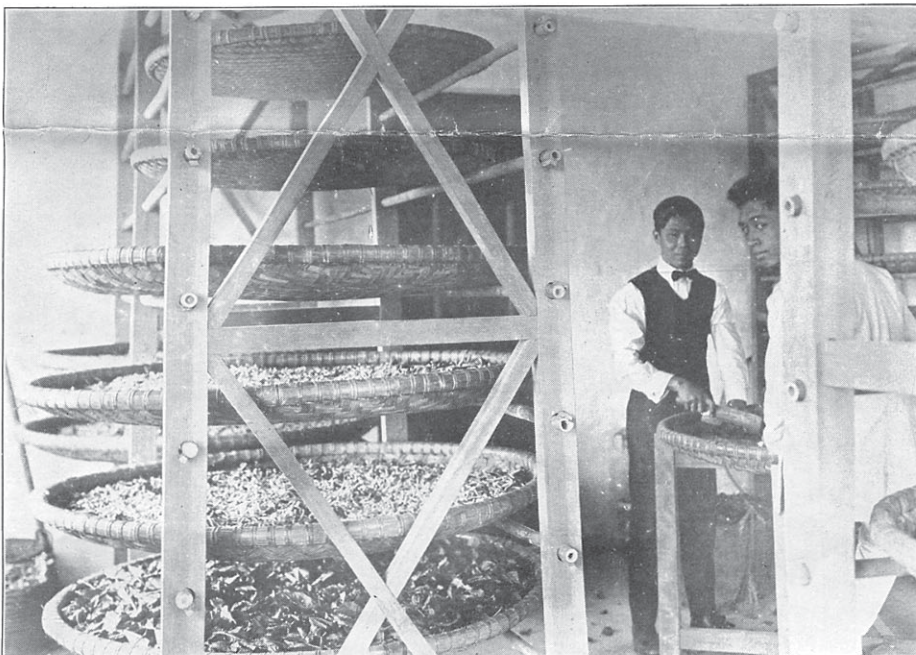
Improvement in the quality of the Lingnan University mulberry field might gradually improve the 492 square miles of silk-worm mulberries in South China.

eases of the silk worm could be eliminated, the increased silk produced would sell for \$78,480,000, gold. This vastly in-

creased income would show itself in reduced unemployment, better wages, a higher standard of living, good roads, labor-saving machinery, numerous modern schools, and widespread enlightenment and happiness among the densely crowded millions of South China. South China now produces about one-seventh of the raw silk of the world. Doubling that production would mean prosperity.

A striking book published a year ago bore the title "China, the Land of Famine". All those who are deeply interested in the spiritual well-being of the Chinese people have sooner or later realized the primary need to improve the economic basis of human life in China. Such is the origin of the College of Agriculture of Lingnan University and the Department of Sericulture as one of the divisions of this College. They constitute an effort to lift the whole plane of human life for millions of persons.

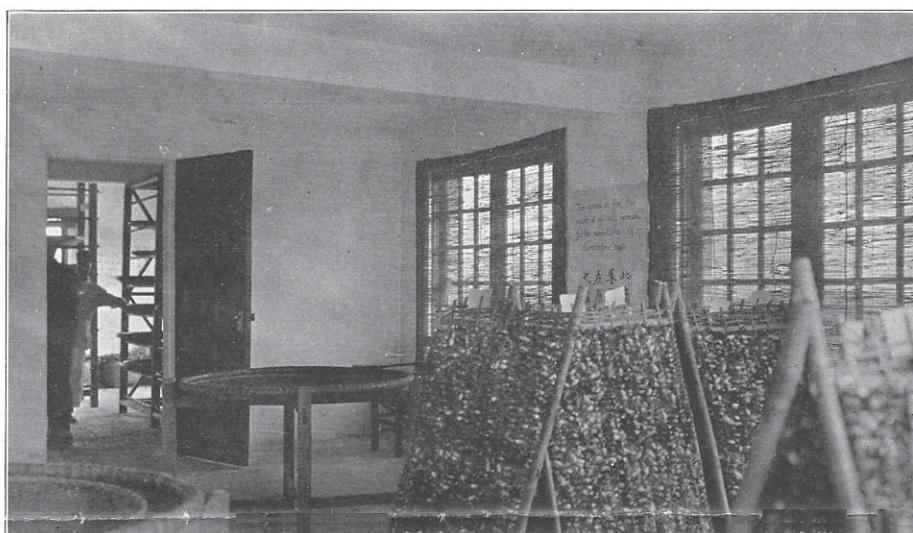
The Parasite of Ancient Custom. But there are other things besides diseases of the caterpillar that hamper the silk busi-



Fresh, but not damp, leaves must be chopped fine and strewn over the trays to be devoured by the myriad growing caterpillars. Wrong feeding means diseased worms.

ness in South China and make themselves felt as distressing poverty. All processes in China are old. They have become stereotyped. It has been difficult to introduce change and improvement. More than a quarter of a century ago the Silk Association of America appealed to all countries producing raw silk to adopt a uniform method of reeling and a uniform size and length of skein, in order to reduce the cost of throwing and spinning in America. The adoption of these changes by the Japanese alone resulted in an annual saving of \$6,500,000 in the cost of manufacturing silk in America. But South China has been slow to change. Certain improvements were introduced a decade ago but very much remains to be done before the silk business of the South can be put on a proper basis.

Lingnan, the Silk Association of America, and the Canton Government. Since 1919, the Agricultural College of Lingnan University has been engaged in the study of the problem and in active effort to improve the conditions of the whole silk industry in South China. Successful handling of the problem is even more difficult in South than in Central China because of the tropical climate and great humidity. Greatly increased progress is to be ex-



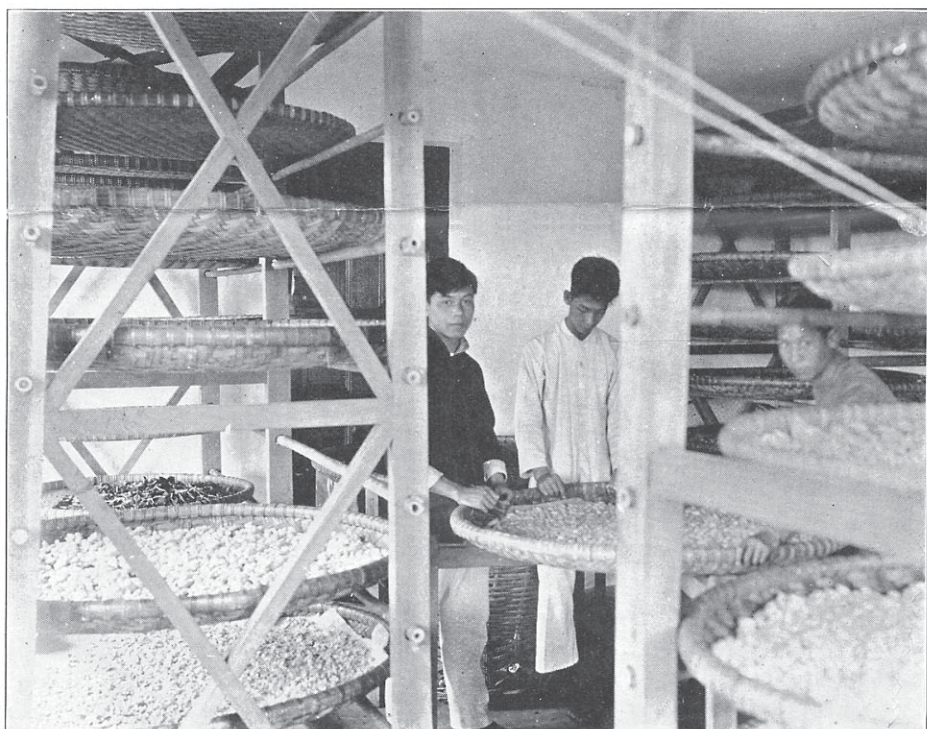
The grown caterpillars find anchorage on these frames for spinning their cocoons. The room must be sanitary to insure fine cocoons.

pected because of developments in recent years.

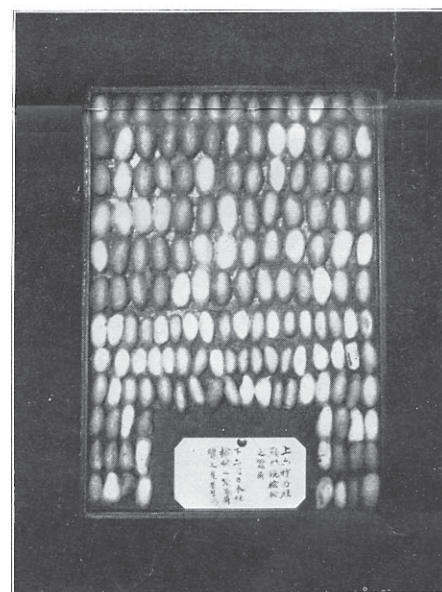
For the progress made, earnest thanks are due to the Silk Association of America. Since 1919, this organization or individual members have given generously to the development of this work at Lingnan University. In 1919, the College of Agriculture was given a building for the production of disease-free silk worm eggs and for sericultural experimentation. A second building was given by a member of the

Silk Association to be used as a dormitory for students of sericulture. Other buildings have since been added through the generosity of members of the Association as well as valuable machinery and instruments essential to scientific experimental study of various aspects of the production of silk.

Another strong factor has now united in the attack on the parasite and ancient customs. In 1923, the Kwongtung government organized a special Provincial Bureau for the improvement of sericulture, establishing its office at the Lingnan Agricultural College and appointing Pro-



At present 75% of all Chinese silk worms are diseased. By scientific selection and breeding Lingnan hopes eventually to reach Japan's standard, where 86% produce fine large cocoons.



Note the varieties of cocoons. Experimentation will improve the standard, which means more income and a better life for the Chinese farmer.

fessor C. W. Howard of the Department of Sericulture as the Director of the Bureau. The government placed large responsibilities and authority in this Bureau, empowering it to carry out any measures necessary for the improvement of methods of rearing silk worms and reeling raw silk. Unfortunately, we need scarcely add that military conditions in China since the establishment of the Bureau have greatly hampered its efforts. But the final establishment of the Nationalist Government in Canton brought about a great change. For the fiscal year 1926-27, the Canton Government appropriated approximately \$70,000, gold, to the Department of Agriculture of Lingnan University. For the present fiscal year this appropriation has been generously increased. There are also at present several associations in the province seriously interested in the improvement of sericulture. Foremost among these is the Kwongtung Silk Improvement Association composed of Chinese silk merchants and owners of filatures.

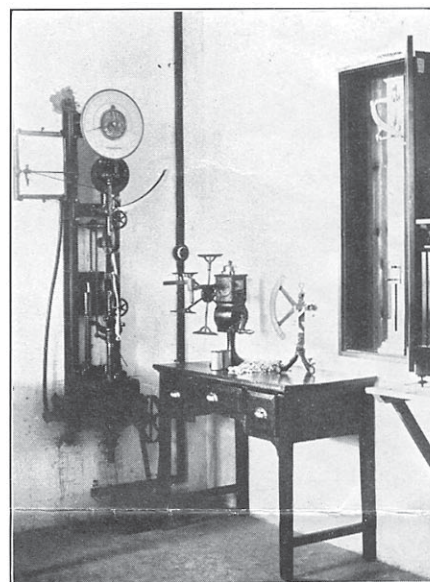
This united effort by American business men, university teachers and scientists, and the Canton Government must eventually result in success.

An Egg Puzzle Columbus Did Not Solve. The first step to be taken in improving the silk industry in South China is the production of silk worm eggs free from inherited diseases. This problem has been taken in hand by Lingnan University and a high measure of success already attained on a limited scale. So superior are

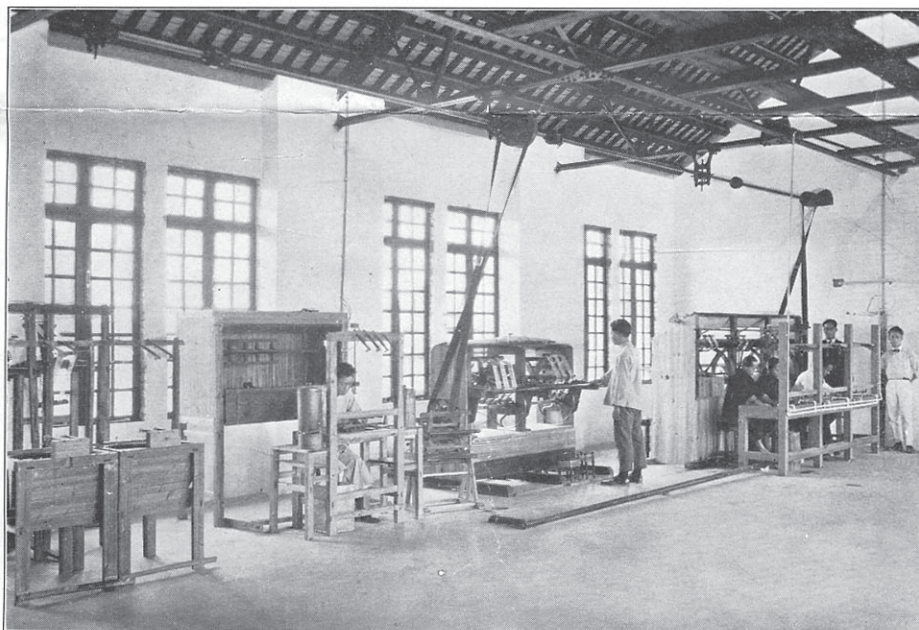


When the Lingnan moth has laid her eggs, the microscope determines whether she was diseased. Only eggs from sound moths are sold to the farmers.

the eggs produced under scientific control that they have been readily sold to the farmers at prices ranging from 20% to 100% above the normal. The farmers find that from these eggs the increased proportion of silk worms hatched and thriving was so great and the improved character of the cocoon produced by the moths was so marked that there was a much higher profit for the farmer even when he paid twice as much for the eggs. The records have shown that 75% of the farmers who



Before an American friend gave these silk testing instruments to the University, Chinese merchants never saw their product tested. Now they see what American requirements are and can learn to meet them.



Model experimental reeling laboratory given to the University by the late Mr. Eugene Atwood. Here students learn the art of reeling silk for uniformity and high quality.

use these eggs have been able to sell their cocoons at a high price to egg merchants to be used for hatching purposes instead of production of silk.

But the problem of providing disease-free eggs for South China is enormously difficult. If it is to be solved by the present method of inspection, more than 60,000 men with microscopes would be needed to inspect eggs during four laying periods in the year. Instead, therefore, of seeking for the absolute elimination of diseased eggs

a method must be adopted whereby the best practicable quality of eggs will be provided in ample quantity to the farmers throughout the whole silk-producing area. It is considered entirely practicable by such a method to increase the production of silk at least 50%, a gain of nearly \$40,000,000, gold, for the people of two provinces.



There is much "waste" in the reeling of silk. Here is a machine made at the University to improve the quality and thus the price of this "waste."

More and Better Caterpillars. The next step in the improvement of the industry follows directly on that of improved eggs. The improved eggs hatch out stronger silk worms. But under present conditions of feeding a great percentage of the worms would still become diseased. Scientifically prepared feeding houses must then be provided, built to reduce the excessive humidity, scientifically heated, ventilated, and screened against a certain fly which lays its eggs in the silk worm's body and causes disease. The result of this scientific treatment is a greatly improved type of cocoon which yields a greater quantity of raw silk much more easily reeled from the cocoon into skeins for the market, and therefore giving a greatly increased price for the farmer's cocoons and for the silk merchant's raw silk.

Still another step must be the general adoption of steam filatures in place of the ancient hand filatures now very widely used. Even the steam filatures now partly in use must be replaced with modern types.



Model reeling laboratory on a commercial scale, given by the late Mr. Eugene Atwood. Sure to be reproduced elsewhere in South China.

Marketing the Silk. But the sericulture industry in South China will also profit greatly from improved methods of marketing. The American market will pay better prices when the silk produced is uniform and has been thoroughly tested before shipment. This requires testing machinery.

Industry and Education. All this involves a process of education and also a certain degree of government pressure and supervision. Fortunately, an ideal working arrangement has already been brought about between the Canton government and Lingnan University. The govern-

ment is generously supporting the work in sericulture and the Sericultural Bureau is closely identified with the Department of Sericulture of the University. With the gradual dissemination of scientific information among the farmers and the gradual training of an adequate number of young men and young women in the University to take managerial responsibilities in all branches of the silk business, we may hope to see a vast improvement in this fundamental industry in South China, and through it in the life of the people. Those who are to take the leadership in this whole industry and bring about its re-



Clubs are organized by the Sericultural Department among the farmers. Here is the Club at Yung K'ei just after a contest for the best silk worms.

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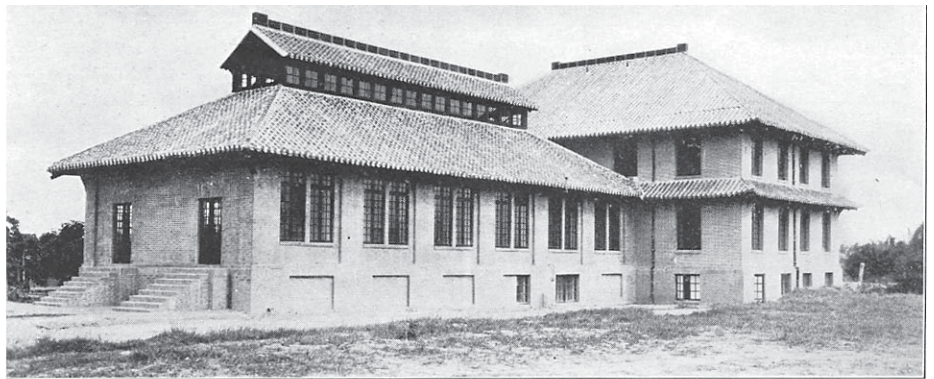
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Reeling laboratory given to the College of Agriculture by the late Mr. Eugene Atwood. Its influence will permeate all of South China, affecting the lives of millions of toilers and merchants.

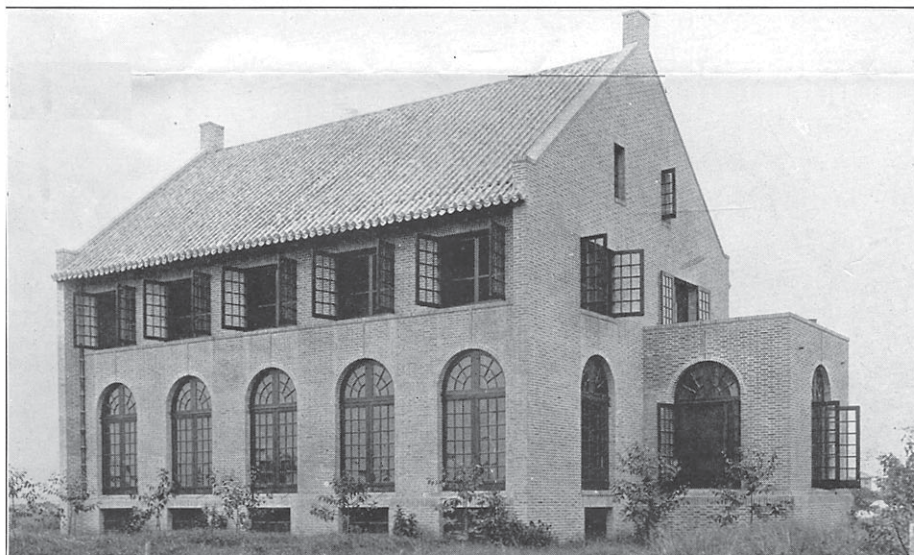


Prize winners in the contest at Yunk K'ei. Part of the Extension work of the College of Agriculture.

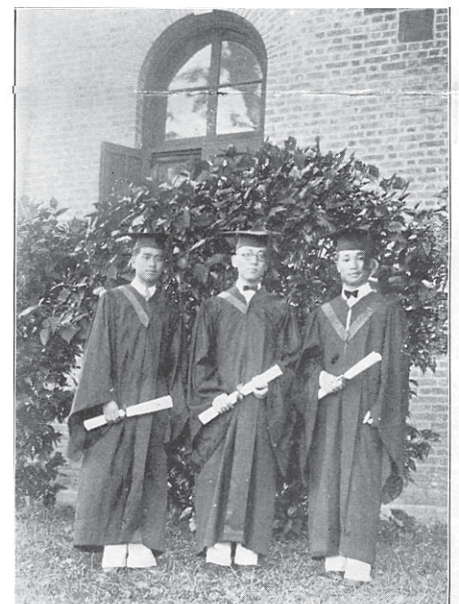
organization should be men thoroughly educated and with a broad knowledge of international trade, as well as of their own special industry. Such men will find positions in commission and export houses, as managers of filatures, and also in the management of large farms devoted to the production of cocoons. Others can render

great service in Extension Educational work in all branches of the industry. But there is still a greater need for men and women with only Middle School or even Primary School education to become foremen and extension workers in the filatures and among the farmers. Japan has placed sericulture in her educational system and

developed several sericultural schools of middle grade. Even ten years ago, the graduates of the school of Tokio alone already numbered 3,400, and all these men have become leaders in the sericultural business. There is need for extension lecturing and demonstration among the farmers in every possible aspect of the work from which they make their living. At the great central experimental station for sericulture, Japan has more than one hundred scientists, each an expert in his own subject and all working in the various phases of the improvement of the silk industry. Within the period of eight years this scientific work had been so effective that the same number of silk worm eggs previously required to produce one hundred pounds of raw silk now produce two hundred pounds.



In this laboratory given by the American Silk Association, silk worms are reared, cocoons are studied, eggs are tested. Sheets of disease-free eggs are sold to the farms. Two American scientists are needed to study the diseases of the silk worm and to experiment in the breeding of more profitable varieties.



The type of young men graduated from the College of Agriculture to become the leaders in a new rural economy and life.

What the School of Sericulture Needs

The Canton Government shows commendable zeal and energy in its effort to improve sericulture. Its task, however, is enormous. The wide-spread poverty in South China, all the greater because a number of years of disorder, faces the government with a vastly complex problem. The assistance of American friends is not only welcomed but is greatly needed. What would conduce most directly to increasing the effectiveness of what has already been done would be the addition of two American scientists to our Sericultural staff. **Note from the picture below that, with the death of Professor Howard, we have lost the only American member in that staff.** There is an urgent request from Canton that we provide a

pathologist and a geneticist for the School of Sericulture.

From what has been said in these scattering paragraphs, it will be clear why these two scientists are needed. Only the most thoroughly competent scientific student of the diseases of the silk worm and of process for checking and overcoming these diseases or removing the conditions which cause them can possibly bring about any marked improvement in sericulture in South China. But while the pathologist and his staff are studying present diseases and battling with them, his colleague the geneticist must be studying methods of selection of silk worm eggs for breeding purposes and the production of new types of silk worms with the ultimate objective of securing types immune from these diseases and capable of producing larger and finer cocoons of silk.

Collaborating with these scientists, will be the whole staff of the Bureau of Sericulture and the Sericulture Departments of the University, working toward the improvement of the industry in all its stages from egg to Canton brocade silk, and the elevation of the lives of all who live by silk.

He helps most who helps others to help themselves. There are no more patient and laborious people in the world than the Chinese nor are there any more intelligent. But the Chinese farmer needs information and scientific training. Neither the government nor the educated leaders alone can possibly cope with the enormous problem involved. They urgently ask American help, in their effort to help the farmers of South China to help themselves.



Staff of the Sericultural Department. In the front center is Mr. Fu Po Wong, successor to Mr. C. W. Howard, who died in a railway accident in America last spring. We need to add two American scientists to this staff.