Report

of the

China Famine Relief

American Red Cross

October, 1920—September, 1921

Illustrated from Photographs

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LETTER OF TRANSMITTAL

DIRECTOR, FOREIGN OPERATION,
AMERICAN NATIONAL RED CROSS,
WASHINGTON, D. C.

SIR:

I have the honor to transmit herewith a report of the Operations of the American Red Cross, China Famine Relief, from their inception in October, 1920 to the closing of the offices in China, September, 1921. In making out this report, I have had in mind two classes of readers—(1), an American public to whose munificence this work of relief is due, and (2), those who may be charged with similar tasks in China in the future.

It is a pleasure to report that while there has been considerable suffering from hunger in the areas allotted to the American Red Cross, there has been no large loss of life, from either starvation or disease. With the sum of $1,000,000 U. S. Gold put at our disposal, supplemented by miscellaneous gifts, (the whole amounting to $2,400,000 Chinese currency), we have been able to reach directly approximately 900,000 people. Some 160,000 laborers have been employed upon our projects, the largest number at any one time being 95,000. These laborers have constructed 850 miles of highway, dug and lined 3,650 wells, and planted over 40,000 trees. The highways include nearly a hundred minor bridges, several hundred culverts, nearly a mile of concrete paving, over a hundred concrete road crossings, thirty-one miles of heavy macadam, and nearly two hundred miles of heavy mountain construction where the highway is surfaced with gravel, cinders, or disintegrated rock.

Nearly fifteen thousand tons of grain have been purchased in distant markets, transported to the scene of operations, carried into the interior, and there paid out in small quantities to the workmen and their families.

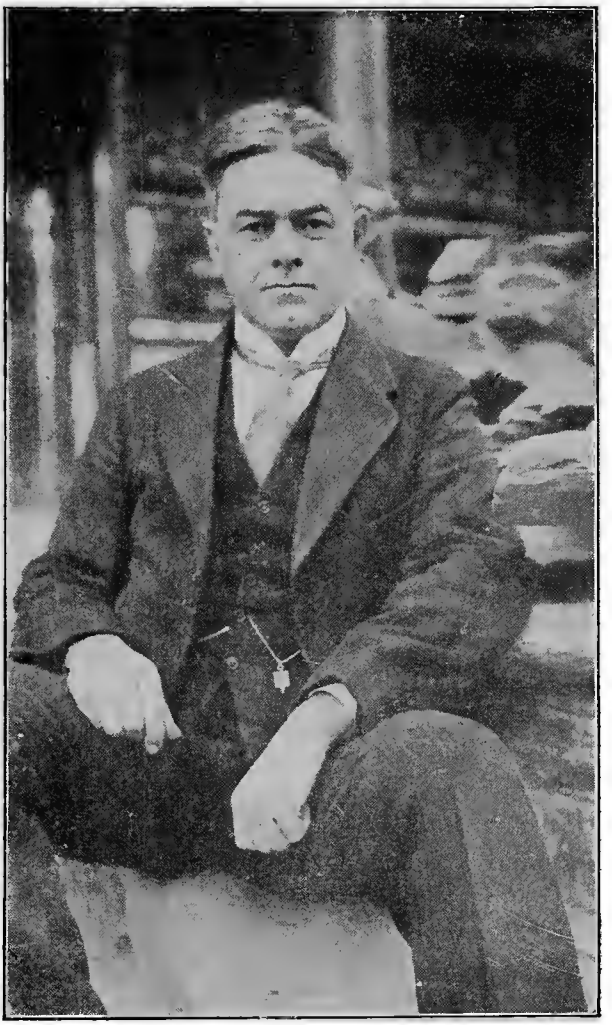
The conception, organization, survey, execution and disbandment of such an operation within the space of eleven months could not have been accomplished without the single-minded co-operation of large numbers of able assistants. From first to last, nearly three hundred persons were engaged in the work of supervision, and to nearly all of these my personal thanks are due for the energy, loyalty, and initiative displayed in this humanitarian task. Because of the large number, it is possible to make only this general acknowledgment. But I wish particularly to mention the assistance rendered by the Director of Accounts in shouldering the responsibility for financial matters, in calling my attention to needs for safeguarding the avenues of expenditure, and in counselling me on matters of policy. Especial mention should be made also of the valuable aid rendered by the Ministry of Communications, in furnishing free transportation of grain and of personnel, whenever our needs could be forecasted sufficiently in advance to make the required requests; in transmitting telegrams free for almost the entire period, and in donating my services. To the Chinese Maritime Customs, to the China Expeditionary Forces, U. S. A., and to the American Marine Corps, are due our thanks for

many courtesies and assistance. There must also be acknowledged the rapid and effective co-operation on the part of many officials of the Chinese Government, particularly of His Excellency Tien Chung Yu, Governor of Shantung; of His Excellency Yen Hsi Shan, Governor of Shansi; of Mr. S. W. Lao, who had charge of right-of-way matters in Shantung; of Col. Y. C. Chao, who not only attended to right-of-way in Shansi, but also secured for us a considerable portion of the engineers, instruments and construction organization of the Shansi Highway Bureau.

I must also express my appreciation for the confidence and support which the National Headquarters has invariably accorded to this Operation.

Yours very respectfully,

J. E. BAKER, Director,
American Red Cross,
China Famine Relief.



John Earl Baker, Director of Operations

CHAPTER I

BACKGROUND OF THE FAMINE

BETWEEN the 33rd and 41st parallels, China depends for moisture principally upon the summer monsoon. In other words, the belt laying between fifty miles north of Nanking and one hundred and fifty miles north of Peking, receives most of its rainfall during June, July and August. The belt extends from the coast to the continental plateau.

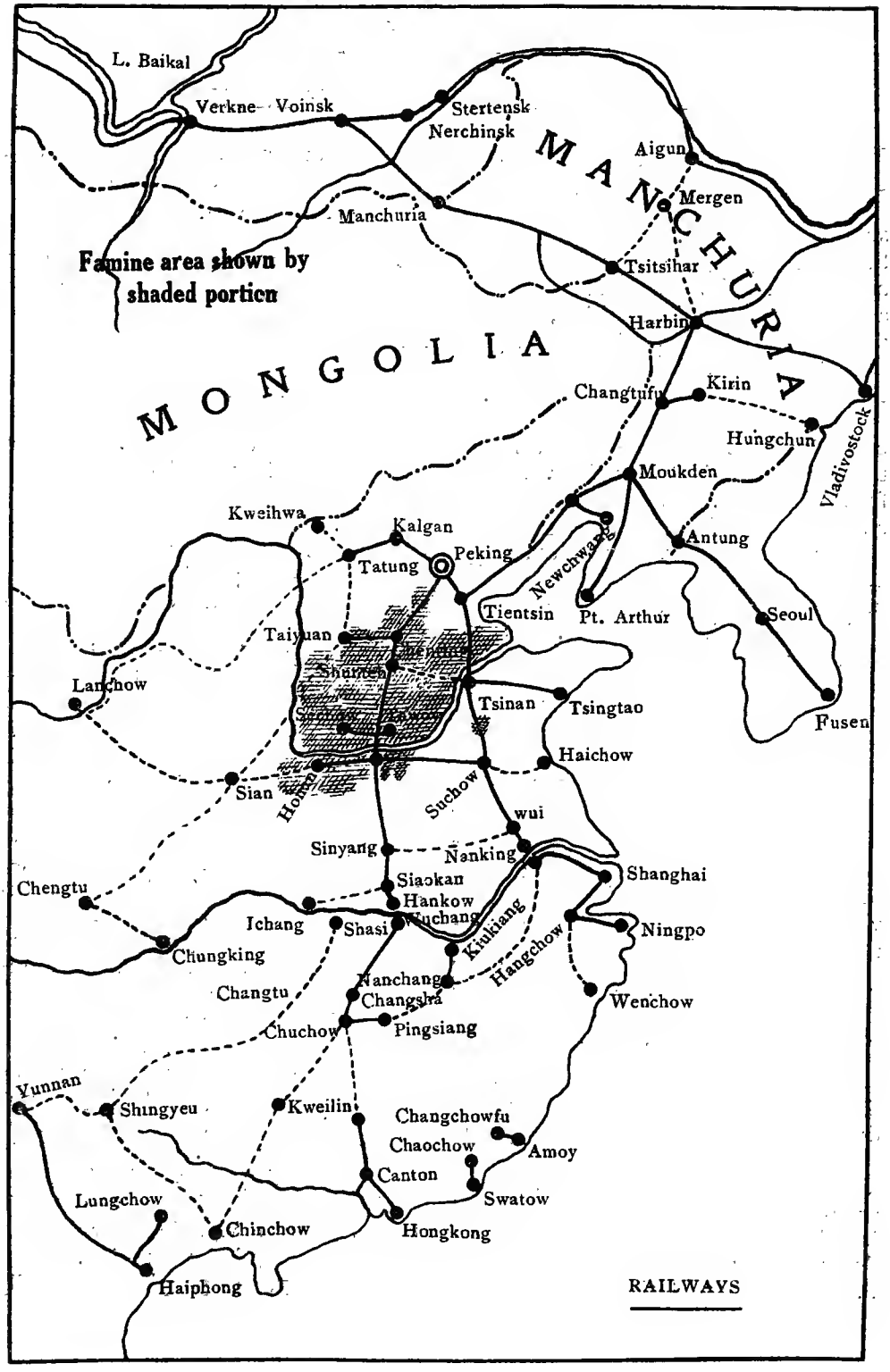
An occasional snow in winter, an early beginning or a late ending of the monsoon, is the only variation from this rule. If there is a good snowfall or two in the winter, one good shower during April and May, each, North China has a big year,—a crop of wheat in June and a crop of millet and kaoliang in September. If the snows or the showers fail, there is only one crop,—the fall crop. Frequently, it happens that the year's precipitation is nearly all crowded into the last two weeks of July and the first two weeks of August. Then rivers burst their banks and, as most of them have beds higher than the surrounding country, devastating floods result. Once every forty or fifty years, nature in her infinite variety, withholds the midsummer rains, and there is no crop whatever.

A population with accumulated property can withstand an occasional flood or drought, provided it has access to sources of food supply on the outside. But Chinese farmers have little accumulated property and a very deficient access to outside sources of supply. Up to fifteen years ago, there was no railway system in China. There are only six thousand miles of railway in China now. Whole provinces are dependent upon rivers and pack animals for transportation. And whole counties are so far from rivers that pack animals consume almost all the food they can carry in making the round trip.

Lack of transportation not only makes difficult the provisioning of the country in time of famine but it has retarded the development of industry so that to-day China is still an agricultural country, typically. Hence, when a crop failure or flood occurs, practically all the people are affected. There is no well-to-do industrial class which is in a position to assist the country districts. There are no large centers of storage from which distribution can be made,—no packing houses, no elevators housing the crop of a previous year.

Deficiency of transportation and industry is also typical of the deficiency in credit arrangements. Indeed the one is partly the cause of the other. A loan from one province to another is unthinkable. There is no machinery for collection. Outside of the treaty-ports, banking is essentially pawnbrokering. Interest rates are ruinous,—24 to 30 per cent. To become a borrower is to become a slave. A farmer inclined to be thrifty has no opportunity to accumulate savings accounts or other productive capital which during the hard year can be turned into funds with which to relieve his hunger. His sole opportunity of providing against the evil day is to buy a rare vase, a piece of jade, or gold ornaments for his women folk. Before the railroads came, they starved in the midst of these riches, if they were not able to get to a navigable river leading from some crop-blessed region. Needless to say, a people principally

THE FAMINE AREA



agricultural, with no manufacturers, no banking arrangements by which the distress of one year can be spread over the prosperity of others, no easy modes of exchanging the surplus of one district for that of another,—needless to say, such a people is poor,—very poor. And then in addition there is the tremendous pressure of population upon usual food resources. Hence, a famine year finds the Chinese with no reserve power.

It is a rare decade which does not record some widespread disaster in North China, either flood, or drought. Mere county or village disasters may be ignored. Every four or five years at least millions are involved. This year forty million people have been touched, of whom over half have been seriously affected. Three years ago the northern half of Chihli province was flooded and over five million people were made homeless,—their accumulations of food and household goods washed away. In 1912 a similar flood occurred further south. The same year a famine occurred on the Shensi plain. Because of its frequent ravages, the Yellow River is known as "China's Sorrow."

And so it goes by intervals more or less regular, back to the great Famine of 1878, when the greater part of the four northern provinces, Chihli, Shansi, Shensi, and Honan, with a portion of Shantung, were stricken with a terrible drought. Those who are familiar with Chinese history from native sources undoubtedly can take the record much further back. Speaking of the famine of 1878, an old report reads as follows :—

"It was estimated that during the continuance of the famine, from nine to thirteen millions of human beings must have perished from hunger, disease or violence. In the parts most severely affected it was generally reported that about seven-tenths of the inhabitants disappeared. A vast number of these migrated; but of the few who managed to reach a haven of safety, hardly any can have returned to their desolated homes. The condition of the roads, strewn with human remains, sufficiently testified to the usual fate of those who attempted to escape. A large number, however, reached Tientsin from the neighbouring districts, and efforts were made by the Government, as well as by the Famine Relief Committee, to succour these poor people.

"Tientsin was inundated with supplies from every available port. The Bund was piled mountain-high with grain, the Government storehouses were full, all the boats were impressed for the conveyance of supplies towards Shansi and the Ho-chien districts of Chihli. Carts and waggons were all taken up and the cumbersome machinery of the Chinese Government was strained to the utmost to meet the enormous peril which stared it in the face. The main road in the province of Shansi is over the Kukwan pass, a distance of about 130 English miles. During the winter and spring of 1877–78 the most frightful disorder reigned supreme along this route. Hwailuhsien, the starting point, was filled with officials and traders all intent on getting their convoys over the pass. Fugitives, beggars and thieves absolutely swarmed. The officials were powerless to create any sort of order among the mountains. The track was frequently worn out and until a new one was made a dead block ensued. Camels, oxen, mules and donkeys were hurried along in the wildest confusion and so many perished or were killed by the desperate people in the hills for the sake of their flesh, that the transit could only be carried on by the banded vigilance of the interested owners of grain, assisted by the train-bands or militia which had been hastily got together, but some of whom were armed with breech-loaders.

"The carriage of salt to Shansi was prohibited by the Governor owing to the scarcity of pack animals. Night travelling was out of the question. The way was marked by the carcasses or skeletons of men and beasts, and the wolves, dogs and foxes soon put an end to the sufferings of any wretch who lay down to recover from, or die of his sickness in these terrible defiles. Murder was very common, and if the officials could not prevent it, they could warn the wayfarers that the Imperial authority was still potent enough to exert itself on such culprits as came within its grasp, for human heads formed a constant decoration in conspicuous places along the route. Broken carts, scattered grain bags, dying men and animals so frequently stopped the way, that it was often necessary to prevent for days together the entry of convoys on the one side, in order to let the trains from the other come over.

"No idea of employing the starving people making a new, or improving the old road, ever presented itself to the authorities; and passengers, thankful for their escape from dangers of the journey, were lost in wonder that the enormous traffic was possible. At Szu-tieh, the path ceases, and the traveller towards Tai-Yuen-Fu, already impressed with the magnitude of the famine, would begin to realize in their fulness the horrors of the disaster. Industry had stopped; no sound of welcome or reprobation reached him from the villages as he passed along, only everywhere the silence of stupefied misery to

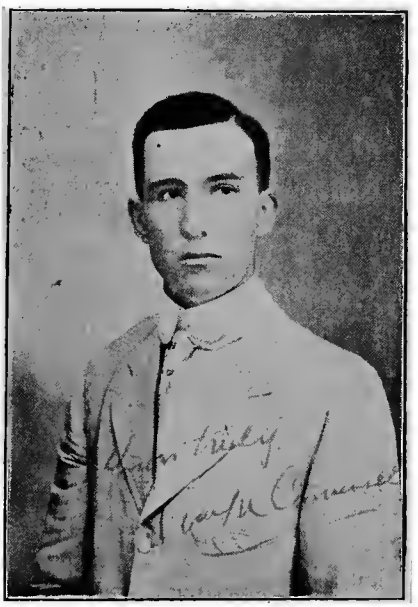
which no alleviation could come. Starved men crawling along and seeking for assistance which they did not expect, died on the roadside in the bitter cold. Women barely able to support the burden, were seen carrying their dead children for burial where the dust and snow was thick enough to conceal them. Magpies, crows, hawks and dogs were feasting undisturbed on corpses which no one cared to bury, and gangs of desperadoes, living in the security of the hills, rendered the passage of the roads a terror to those who tried them unarmed, or in no considerable numbers.

"A famine village could be detected at once by the absence of bark on the few trees which generally surrounded them, or of wood-work in most of the houses. Children lying about in sheltered corners, conspicuous for their enormously distended stomachs, the result of existing on the roots of rushes or poisonous barks or leaves, and fat clay, were awaiting the inevitable end; while in the ruined houses the dead, the dying and the living were found huddled together on the same stone bed.

"During the four bad years everything saleable had been disposed of, the beasts of burden had been killed and eaten, and the domestic dogs, driven by hunger to feast on the corpses—everywhere to be found, were eagerly caught and devoured, when the chance occurred, by the starving people. Women and girls were sold in troops and suicide was so common as hardly to excite attention. The mass of correspondence sent by foreigners and natives who became engaged in the work of relief, contains descriptions so revolting that they had better remain buried where they are. One feature, however, that of cannibalism,—deserves a passing notice. Residents in China from their knowledge of the sublime contempt which the Chinese usually show for death, are loth to believe that any extremity would induce them to partake of human flesh, but with every desire to disbelieve in the hideous statements of late so common, the impartial enquirer must confess to their truth."

Early in August, 1920, reports began to be received from points in Shantung, Chihli, and Honan concerning lack of rainfall, and consequent failure of crops. As the month wore on and no more rains occurred, these reports multiplied. A considerable movement of farmers from the worst affected districts to cities set in, and by September first, it was well understood that instead of a considerable number of isolated spots upon which the crop had failed, there was a general crop failure with only the exception of a few isolated spots where an occasional shower had produced something. The foothill districts, old river beds and alkali patches were the worst off. In the better regions, most of the farmers sowed buckwheat, in the despairing hope that fall showers might mature something of a crop. In most cases, however, the light showers received merely germinated the seed, produced a growth of four or five inches which flowered or went to seed, but never filled. A dread of something like the scenes of '78 began to be expressed and Chinese philanthropists and other men of public note began to exert themselves toward determining the extent of the disaster and possible means of meeting it.

E. ALFRED DAVIES, *Director of Accounts*



WILLIAM MEAD CORNWELL, *Assistant Director of Operations*

CHAPTER II

PRELIMINARIES TO RED CROSS OPERATIONS

THE first foreign action towards Famine Relief was taken by the Peking Chapter of the American Red Cross, which on September 7th, called a meeting of the Chapter for September 14th, to consider ways and means for preparing against the necessities now clearly foreseen. In advance of this meeting, however, the American Minister, Charles R. Crane, called together a special group of Americans and laid before them the possibility of working out an International organization for a united effort under a centralized management for all Famine Relief work. As a result of this conference, the Peking Chapter of the American Red Cross pledged any funds which it might be able to raise to such an International organization "if and when formed." It inaugurated a campaign for subscriptions from all Americans in Peking and vicinity, which netted about ten thousand dollars.

Mr. Crane's idea for an International organization was accepted by the other Legations and an International Foreign Committee was formed. By this time various Chinese organizations, of which at least twenty were known in northern China, began to consider the possibility either of combination, or of coöperation. Because of the fact that most of the prominent figures in public life in China owe their leadership to political forces, naturally every leader has a large number of active enemies, and this fact made it very difficult for any form of combination to take place. It is quite apparent now that much of the opposition to combination, on the part of the various Chinese leaders, was not so much opposition, as it was despair at the idea of *combination*, with the result that a form of *coöperation* was favored by such.

The late days of September and the early days of October were consumed in making small advances to the farmers in districts which had been organized by local missionaries, such advances to be used for the purchase of seed wheat. At the same time discussions and plans were proceeding towards securing a more effective centralization of the powerful forces which it could be seen were working towards Famine Relief. By the first week of October the Chinese Societies in Peking, together with the foreign international group, had effected a union. In Shanghai and Tientsin and Kaifeng, similar combinations had been effected, and the next step was, if possible, to bring about a coalition of these International societies located at these principal points. Peking being the capital, the location of all of the various Government Bureaus, whose assistance would be needed in the work, was looked upon by the International group at that point as the logical headquarters. Political opposition in Shanghai and Tientsin, however, was so great that after several attempts, all combination between the cities was abandoned. While the negotiations just described were in progress, news was received of the grant by the American Red Cross of five hundred thousand gold dollars for Famine relief in China, and coincident with the receipt of the news came a visit from the Manager of the Foreign and Insular Division of the

American Red Cross, Mr. Emmet W. White. Mr. White was on his way to the Far East on an inspection tour of the many Red Cross Chapters, and learned of the Famine only when he received a cable from Washington ordering him to China for investigation purposes. This cable and gift of five hundred thousand dollars were the result of representations made to Washington by the American Minister.

Mr. White spent his first days in Peking in calling upon the various individuals known to be prominent in Relief efforts and in gaining from them an idea as to the prospects for the formation of a centralized organization covering the entire field. Within a few days, Mr. White came to the opinion that whatever the prospects for such an organization were, the Red Cross should take the responsibility for the application of its own funds, rather than merely turn them over to a larger organization, which would disburse them according to its own ideas. But in order to give the movement toward centralization all of the impetus possible, in concurrence with the American Minister, he decided that the Red Cross should apply to the International Famine Relief Committee in Peking for assignment to a definite area within which the Red Cross would undertake to expend its funds.

At the same time a decision was made as to the method by which the Red Cross would distribute its relief, —a decision which was fundamental and which will probably have a marked effect upon all forms of disaster relief in China for years to come.

In the minds of almost every person who gave thought to the subject, there was a feeling of certainty that the calamity in view was far beyond domestic resources to avert and that foreign aid would be forthcoming in only small quantities. Hence the main problem was how to spread the means at hand over the greatest number of sufferers. The natural thing to do, therefore, seemed to be to dole out food or money in the smallest quantities possible to maintain life to as many of the worst sufferers as possible. But a considerable group took the view that those receiving aid should earn it in some fashion. The number of permanent paupers growing out of refugee camps is a constant reminder of the necessity of maintaining the self respect and self reliance of calamity victims. On the other hand, the "free relief" partisans pointed out that a working man must eat twice as much as a non-working man. Then, in addition to the cost of the extra food, there is the cost of surveys, of foremen, and of tools to be met; and on top of that is all the complications of foreign concessions, "spheres of influence," property rights, vested interests, and all the red tape of official action to discourage any form of construction. Hence, a series of concrete proposals by a group of foreign and foreign-educated engineers was definitely rejected by all of the other relief organizations.

Those in charge of the Red Cross negotiations, however, believed that the cost entailed by the construction features of relief need not cost more than would be lost by the "free relief" plan in feeding unworthy or unnecessary supplicants for aid, which class would be eliminated automatically by the "work" plan. The value of the work to the health and to the morals of the farmers who were to be helped was also emphasized. But probably most important of all was the hope that the organization of large numbers of men in this fashion upon extensive works of public improvement, would bring back to the Chinese people that ability to organize and that pride in achievement which in past ages made them the peers of any people of any time, and which might again lift them out of the category of an international

"poor relation" to the status of a self-reliant, progressive power.

Hence on October 14, an application was made to the United International Famine Relief Committee at Peking for permission to devote the sum of $500,000. Gold, or so much of it as should prove necessary, to the relief of the region extending from Tehchow via Lintsingchow to Tungchangfu in the Province of Shantung, by means of employment upon works of public improvement, especially canals and highways.

The considerations which led to the selection of the particular territory requested were as follows:—

From Lintsing to Tungchangfu the Grand Canal is silted up. An American engineering firm has the contract for the rehabilitation of this canal. The surveys were practically complete. The construction work is simple, and so would require no special training of the laborers, or the purchase of special tools. The work can be measured easily and so can be paid for on a quantity basis. Large numbers of workmen could be concentrated at one point with the result that supervision could be reduced to a minimum. The Canal is open as far as Lintsing, hence the transportation of supplies in bulk to the vicinity of the work could be accomplished readily. The work when finished would be a very important public improvement, for it would form not only an artery of communications but would carry with it flood control and irrigation.

The American Red Cross had once before attempted constructive relief work by planning works to control the Huai River in Kiangsu. All in all, there was everything to recommend the building of the Canal. Tehchow and highway construction were mentioned in the same connection for the reason that Tehchow was the railway point where supplies would be transferred to the canal, and for the sake of rapid communication with the canal work, it was thought expedient to build a highway from Tehchow to Lintsing so that motor transportation might be used. Also, there was a canny suspicion that something might interfere with the canal program, in which case it would be well to have substitute work upon which to fall back.

The suspicion proved to be only too well founded. Mr. White and the Director were summoned to appear before the Administrative Council of the International Famine Relief Society at Peking, October 18th. Our request was granted, but one of the most influential of the Chinese members warned us away from canal construction at considerable length. It transpires, that the officials in charge of the Grand Canal improvement work, belong to an opposition political group, and he was apprehensive lest the work of the Red Cross make of the Canal rehabilitation a success. Later it appeared that the officials of the opposition rather feared a "loss of face" if their success were based upon famine labor rather than upon a foreign loan which is expected for this work. And the American financiers who are expected to make the loan disapproved of the Red Cross beginning the work, at the same time themselves failing to loan the funds which would have made this great work of employment possible. The result was that the construction of highways was the only remaining alternative if the Red Cross method of relief were to proceed.

In the meantime, feeling sure that something would be done, the formation of an organization was commenced. Mr. W. A. B. Nichols, Chairman of the China Central Committee, American Red Cross, and President of the firm of Fearon, Daniel and Company, put at our disposal the residence flat belonging to that firm in Peking. The use of these comfortable and commodious quarters during the entire period of the operation, has been

donated to us. The firm of E. W. Frazar donated the services of its engineer, Mr. K. C. Weedin. Mr. William M. Cornwell, principal of the Peking School of Commerce (Y. M. C. A.), was induced to accept the responsibilities of Chief Accountant on a voluntary basis. Dr. F. F. Tucker, senior member of the American Board Mission at Tehchow and well known throughout northern Shantung, cheerfully accepted the task of organizing the work in the field, under the title of Superintendent of Relief. For such a field position it was absolutely indispensable to have a man who could speak the local dialect, and who was known and trusted by the countryside in which the work was to be carried on. In dealing with officials, the age and seniority of such representatives, is a factor of considerable importance.

A conference of Department Heads called by the Director in Peking on October 22, made another decision as to policy which was fundamental to the Shantung plan of work and several of the later operations. This decision was that payment to the workmen would be in food rather than in money. We had ascertained upon inquiry, that food could be purchased in distant markets much more cheaply than in local markets. To pay the men in money and leave it to them to buy their own food appeared likely to make the famine a very profitable thing for local grain dealers, who already were being referred to as profiteers. The decision at this time by the Ministry of Communications to grant free carriage by rail to all Famine Relief Societies made any other plan out of the question. However, there was still another thought in our minds, namely: that if we paid in cash many idle men might be applying for work who did not need it, and who would not be so eager if we paid in food. Because of the ready marketability of grain, this did not have so valid a basis at the time, but whenever grain is plentiful on the market the food payment plan does have a deterrent effect upon people who are merely applying for a job, instead of being in danger of starvation. The arrival of our train loads of grain in the field had an immediate effect on prices. This was valuable to the entire community and had an important effect in extending the purchasing power of people with a little means, which undoubtedly kept thousands from the necessity of coming to us for help.

Those who have lived in China longest know that as a rule in order to make haste, one must take the leisure to proceed though the recognized regular channels. Hence, after the United International Famine Relief Committee had allocated the territory within which the Red Cross was to work, the routine of official introduction was entered upon. The American Minister was requested to address the proper department of the Chinese Government and request its assistance in the prosecution of the work. In due course we were advised to call upon the Ministry of the Interior and explain our plans, and that the latter would instruct the Civil Governor of Shantung to lend us such assistance as appeared consistent. On October 29th, as per arrangement, Mr. White and the Director called upon the Minister of the Interior, His Excellency Chang Chih-tan. His Excellency thanked the Red Cross for its gift and gave personal assurances of desire to be of assistance, at the same time notifying us that all arrangements would have to be made with the Governor of Shantung. His Excellency was politely apprehensive about difficulties to be encountered in securing right-of-way for construction purposes, about the suspicions of the Shantungese concerning our ultimate intentions, and about the likelihood of encountering a paralyzing amount of knavery.

His Excellency TIEN CHUNG YU,
Military and Civil Governor of Shantung.

Through the Legation, next, we arranged for the American Consul at Tsinan, the capital of Shantung, to accompany us on a call upon the Military and Civil Governor (one person) of Shantung. The result was that his Excellency the Governor, Tien Chung Yu, invited us to tiffin on November 1st. Acquainted in advance with the amount of the Red Cross gift, the Governor asked how we proposed to make the distribution. The gist of the "work" plan was explained, and he inquired how we expected to get the land for the highways. "By your Excellency's assistance," we answered.

"Does the Red Cross think that land might be confiscated for this purpose?"

"No, that would work a hardship upon small landowners, who might lose practically their entire property."

"But if the Red Cross begins to buy land, it will meet many difficulties. Not only will most of its money be used up, but the time consumed will be excessive, and besides many of our people might think that some other motive was behind your action."

"Does your Excellency favor having a foreign institution owning a road in your Province? For, of course, if the Red Cross bought the land it would belong to the Red Cross."

"No, that would be sure to make trouble."

"Of course, we might be able to arrange that the profits on all tolls which we collected might be turned toward the construction of more roads."

"I am sure that this would lead to difficulty."

"Or the Red Cross could present this road to the Mission Stations in Shantung, who would maintain it out of the tolls collected and turn the balance over to the Province for other purposes."

"This also would be misunderstood."

"Then, the only alternative is to have the Chinese authorities purchase the land."

"But the Province has no funds."

"Could not the Province pay for the land in bonds of small denomination which could be made receivable in payment of taxes?"

"I am afraid the people would not understand."

"Now, undoubtedly a large number of well-to-do Chinese people are prepared to do something toward relieving the distress of their countrymen. Could not these men of means arrange to buy the land? They know how to negotiate better than we, and know what prices ought to be paid."

"Let me have a few days in which to work out a plan. I think something can be done."

"Very well, your Excellency, may we ask as a favor that you will let us have your reply soon, for if our plan is not acceptable to you, we have an opportunity in another quarter, to which we must give an answer within a few days."

Ten days later, a telegram was received announcing that a plan had been worked out by which the Red Cross offer could be accepted as made.

In a conference with Dr. Tucker, Superintendent of Relief, the Shantung Famine Relief Society, composed of the officials and substantial people of the Province, agreed to purchase the land, see to the removal of graves, take care of damages to buildings, wells, growing crops, and everything of a property nature. Furthermore, it was arranged that construction work should begin at once, leaving the bargaining with property owners to be carried on at leisure. While the Red Cross was requested to use the old official roads as much as possible, yet the marking out of the route was finally left to our discretion. Our engineers were to stake out the center line. A few days would then be

required for the land-buyers representing the Famine Relief Society to settle questions of ownership, and then the workmen could be turned on to the job. To take charge of this difficult task of acquiring the right-of-way, the Governor appointed Mr. S. W. Lao, a man of unusual directness, familiar with matters of this kind, having been Associate Director of one of the principal railways, at present Director of the Yellow River Conservancy, and possessing a fluent command of English speech. The extent of the Red Cross operations in Shantung would have been seriously restricted had it not been for these qualities possessed by the Governor's principal representative.

With the Assistance of the American Commercial Attaché, Mr. Julean Arnold, a member of the China Central Committee of the American Red Cross, connections were formed through an American returned student, with an old established firm of grain brokers. On November 16th, the day on which Dr. Tucker telegraphed the terms of the Governor's plan for land-buying, a telegram was also received stating that the first cargo of food, consisting of 1,320 tons of soya beans, had been purchased on the Red Cross account.

CHAPTER III

SIZE OF THE JOB AND GENERAL PLAN

THE provinces affected by the famine were Chihli, Shansi, Honan and Shantung. Of Shantung only that portion north of the Yellow River was considered to be in dire distress. The entire area of the province is about 56,000 square miles and the population is somewhere between thirty and forty millions,—an area like that of Iowa with a population as great as that west of the Mississippi River. The portion north of the Yellow River is probably not more than a sixth of the area of the province, and the Red Cross sector at first constituted less than a fourth of this section north of the Yellow River. (Later the whole section was occupied in part). Six entire hsiens (counties) and thirteen hsiens in part were included in the first Red Cross area. The population of the entire section is estimated at 9,488,000, and that of the first Red Cross sector at about 2,000,000. Investigations which had been made by mission stations and government authority settled upon about two-fifths of this number as requiring relief. The problem was how to spread out $500,000 over 800,000 people in such a way as to keep them alive until the first harvest,—about June 15.

We had the area to ourselves exclusively. If the estimates furnished us were correct, the task before us was impossible. The policy was then adopted of attempting to carry no more people than could be carried through to the end in good condition. It would be of no use to feed the entire 800,000 for a month, and then let them starve for the next six months. At rates of exchange then current, $500,000 gold would yield about $750,000 Mex. Miscellaneous gifts of another $100,000 Mex. were counted on. At prices of grain then current, it was estimated that $10. Mex. would "feed a mouth" till harvest. That meant that 85,000 people could be carried,—and at four dependents per man, 17,000 laborers could be employed. It was manifest that the longer large numbers could be made to depend upon their own resources, the greater number could be reached finally. Investigators reported that while a large number were already without visible means of support, a much larger number would need to be helped in the late winter and early spring months. Hence, although the operation was begun immediately, it was thought that no haste should be made to bring the full force on to the work until reports indicated the beginning of an increase in the death rate.

Those familiar with the after-effects of other famines and floods, at this time, raised a very considerable voice concerning the probabilities of typhus epidemics. Certainly it would be futile to save a hundred thousand people during the winter only to have them fall before such a pest in the spring. The experience of "old China hands" and of physicians returned from the Great War, influenced us to believe that by adopting a vigorous de-lousing program together with other sanitary rules, considerable immunity from typhus could be insured, —especially among our well-fed workmen. Hence the appropriation of $500,000 was roughly apportioned as follows:

Relief food -	$360,000	72 per cent
Commissary -	30,000	6 ,, ,,
Engineering -	41,250	8¼ ,, ,,
Health - -	27,500	5½ ,, ,,
General -	41,250	8¼ ,, ,,
	$500,000	100 per cent

Believing that at the best, we should fall far short of preventing an appalling loss of life, it became necessary to consider whom—what classes—should be saved. The classes most useful to the province obviously would be the choice of any sociologist. This meant cutting off from our lists, the maimed, the halt and the blind, the diseased, paupers, and the aged without support. Vigorous men of family were to be the natural choice for laborers. But knowing the revulsion of feeling which Chinese would experience upon the bald announcement of such a policy, the Director sought to have influential Chinese choose this policy of their own free will.

A thoughtful group of Chinese living in the sector, but themselves not in need, was sought in counsel. The data given above was submitted to them. Concerning the pauper class there was no hesitation on the part of this group. But the aged? Ah, who could bear to see them suffer? Well, then, should the Red Cross feed workmen on the works, and separately organize soup kitchens in villages for all the hungry?

"No, everybody would live on the kitchens, and there would not be enough to go around. Besides, under these conditions no one would want to work."

"Suppose the Red Cross should secretly finance a subsidiary society which would take care of the aged?"

"This would certainly be found out. Besides, many of the aged who had sons would claim aid, and so be helped both by the son and by the society. Better let the few aged depend upon the charity of the local people of means."

"How should workmen be paid—all alike or according to the number of persons in their families?"

"A difficult problem. Surely a man with many children, his parents and perhaps grandparents, needs more than one with only a child or so. Yet if you give him more, people will scrape together all the relatives they can find, so as to get more pay. Then, too, if a man has been blessed with a large family, should he be blessed again by giving him bigger pay? Really, there is no plan which is perfect. But some plans are better than others. The Red Cross has chosen the plan of giving employment. Let it stick to that plan."

In other words, all workmen should be paid alike. And it was so ordered.

We were now in a position to make definite offers to the workmen whom we wished to select for employment. The recruiting forces then started out for the worst affected districts. They had instructions to select men in groups of thirty, each group to select its head man, or business representative, and its cook for itself, and to wait for further word as to where and when to report for work. In the meantime the engineers had selected the route to be built over. Next, they notified the Government landbuyers (through the Superintendent of Relief) that center lines would be staked by a certain day. While the landbuyers settled the facts of ownership on a certain section, the engineers located gang, section and division headquarters, and notified the Commissary Department. The Commissary Department then arranged billeting for the laborers, and headquarters for the foreign personnel. The landbuyers, as soon as their work on a division was finished, were expected to notify the Superintendent of Relief, who after ascertaining that both Commissary and Engineering departments would be ready, instructed the Recruiting department to produce

Field Manager,

O. J. TODD

(March 8 to conclusion)

S. W. LAO,

Representative of Shantung Relief Society

In charge of Land Purchases

their gangs on the date and at the place arranged.

When a gang appeared, each member was given a tin tag with a consecutive number impressed upon it, and this number was recorded in the recruiting form. This tin tag constituted the wearer's evidence of a right to work. Each gang was immediately given an issue of rations by the Storekeeper, and was assigned to its section by the Engineer. Henceforward, it was under the direction of the Engineer. A Division Engineer was quartered with each Division Storekeeper, and certified to the Storekeeper the number of gangs and the number of men in each gang which were entitled to draw rations.

The organization soon took shape with a sharp distinction between Headquarters and Field. It was the duty of Headquarters to furnish policy, personnel, food, and funds to the Field. It was the duty of the Field to apply food and funds to the work of relief.

Headquarters consisted of the Director of Operations and Chief Accountant, located in Peking, together with office forces. A shipping agent was soon employed in Tientsin. For some little time the Grimes Forwarding Agency performed this service gratuitously. Later there were added a Transport Officer, who gave particular attention to grain shipments, and a Purchasing Agent who attended to the purchase of engineering tools and supplies, food supplies for the foreign mess, and miscellaneous articles needed in the work.

After January 1, the accounting work was taken over by the Director of Accounts who was a direct representative of National Headquarters, in which capacity he was independent of the Director of Operations. Representing the Director of Accounts in the field was a Field Accountant, who similarly was independent of any other authority in the field. The Operating Organization, after some early changes, observed the following form:

Field Manager (after March 8, 1921)
- Superintendent of Relief
  - Recruiting Manager
    - Recruiting agents
  - Chief Health Division
    - District officers
      - Sanitary patrols
- Chief of Commissary
  - Manager Stores Division
    - Division Storekeepers
  - Manager Foreign and Engineering Supplies
  - Transportation Manager
  - Manager of Billeting Division
    - Carpenters, Masons, etc.
- Chief Engineer
  - District Engineer
    - Division Engineer
      - Section foreman
        - Head men of gangs

During the early part of the work, not only in the Shantung field, but on other operations, it was helpful to have frequent meetings of department heads. No one was "cock-sure" as to what plans would work and what would not. In addition, missionaries composed the majority of the departmental chiefs, and missionary stations are accustomed to work on the committee plan. But after the work was well along and questions of policy and methods were well established, these staff meetings were discontinued. In fact, instead of a help they became a hindrance, for they involved bringing in busy men long distances from their work, and they served to promote the personal differences which inevitably crop up in any organization. These differences are likely to be accentuated in work of this kind for the reason that personnel are drawn from walks of life holding such different ideals, and that the work is done under such pressure that very few men are able to

retain their usual composure or self control under misunderstanding and even positive antagonism.

During the early months of the operation, the supervisory force consisted of volunteers, solely. But later, as the scope of the work became enlarged and as greater details of accountability became required, it was impossible to obtain sufficient volunteers. Besides, other organizations working on the "free" basis were able to secure much larger funds than at first, and so commandeered larger and larger numbers of missionaries, which it had been expected might be available for the Red Cross. Later, when the additional appropriation of $500,000 was received, and more extended operations were opened, it manifestly became impossible to secure sufficient help except by paying salaries. From that time, practically all new personnel were hired, and those already in the field were gradually put on a salary basis. The soldiers, marines, and missionaries, however, were given no salaries, as these classes were already receiving support from other organizations.

It soon became necessary to advertise for help in the Engineering and Commissary Departments. Fortunately for our work, a serious business depression was under way, and a considerable number of high grade men were thus acquired at relatively low rates of pay. On the other hand, we also acquired a goodly portion of the "flotsam and jetsam" stranded in these eastern ports. Some of this class rendered good service, but several were absolutely unemployable and their expenses to and from the field was a dead loss. The moral behavior of some of these men in the field raised disturbing questions as to the effect on American prestige. Altogether, twelve nationalities were employed among our foreign supervisory forces. Their distribution was as follows:

Nationality	*Full Volunteers No salary, and supplying own maintenance*	*Volunteers No salary, but ARC supplying maintenance*	*Salaried*	*Total*
Americans	47	80	57	184
British	10	6	27	43
Serbs	..	..	1	1
Russians	..	..	13	13
Italians	..	..	1	1
Czechs	..	..	2	2
Germans	..	..	2	2
Norwegians and Swedes	3	..	1	4
Danes	..	1	1	2
Poles	..	..	1	1
Finns	..	1	..	1
Filipinos	..	..	2	2
Unknown	..	21	4	25
TOTALS	60	109	112	281

With the large influx from the "treaty ports," the problem of interpreters became acute. The colleges and academies where English is taught were appealed to. It is a pleasure particularly to record the excellent work done by students from Tsing Hua College in this capacity. This college kept Shantung supplied with ten interpreters practically the entire season, by means of relays. These young men were not afraid of work, displayed unexpected initiative, and had a superior command of American English. Many of our engineers and commissary men were inclined to look upon the interpreter as a servant—something very galling to the scholar class of China. The Tsing Hua students appeared quite able to maintain their position without causing friction.

With limited means at our disposal and an unlimited demand for food, there was every reason for finding the most economical ration possible. The southern Chinese depends upon rice as a staple. The northern Chinese of the better class depends upon wheat rather than rice and consumes considerable meat. The poorer classes

eat kaoliang (Kaffir corn) with a very little meat. Wheat and meat were entirely out of the question on account of their cost. The Peking Union Medical College (Rockefeller Foundation) was approached for assistance, and the following report was received.

The following foods were obtainable in quantity on the market at a low price. Average cost per catty (1.33 pounds) was as follows:

Beans	4.3	cents per catty
Peanut cake	3.0	,, ,, ,,
Bean cake	3.5	,, ,, ,,
Corn	4.2	,, ,, ,,
Ground rice with chaff	1.9	,, ,, ,,
Kaoliang (Kaffir corn)	4.4	,, ,, ,,
Millet	5.0	,, ,, ,,

According to investigations made by Dr. B. E. Read of the Union Medical College, Peking, the food value of these various articles is as follows:

	Proteins	*Carbo-hydrates*	*Fat*	*Calories per catty*
Kaoliang	7.90	67.26	2.77	2020
Millet	8.72	73.10	4.75	2304
Peanuts	25.80	24.40	38.60	3413
Soya Beans	39.87	8.95	..	2285

Miss Embrey, Food Chemist of the China Medical Board, recommended to us the following as a balanced and sufficient ration:

STANDARD RATIONS

Bread made of	*Working Men*	*Idle Men, Women Working and Nursing*	*Children 10–17, Idle Women*	*Children 1–10*
Wheat or Corn or Kaoliang 70%	.70	.46	.35	.23
Yellow soya bean or Peanut 30%	.30	.20	.15	.10
Together with Soup containing solids as follows:				
Yellow soya bean 30%	.056	.037	.028	.019
Millet 30%	.056	.037	.028	.019
Corn 40%	.075	.050	.037	.025
Vegetables	.019	.126	.095	.063
CATTIES	1.206	.910	.688	.456

Above to be divided into two meals for each day.

Upon the above data, a practical diet scheme for a gang of thirty men was worked out. It furnishes about 3,500 calories of heat energy, about 100 grams of protein and the necessary vitamines and mineral matter.

The rations for 30 men for 1 day consisted of:

1. Bread, 40 catties, or 1-1.3 catties per man.
   The composition of the bread may be as follows:
   40% ground soya bean "press cake," or peanut cake - - - - - - - - 16 catties
   and 60% millet flour, or ground cotton seed meal, or wheat flour, or maize flour, or Kaoliang - - 24 catties
2. With the bread is given a soup. The ingredients for 30 men for one day consist of
   12 catties of meal, of which at least 3 should be soya bean meal or peanut meal. The other 9 catties may be any convenient cereal, such as millet, corn, wheat, etc. - - - 12 catties
   52 catties

NOTE: The peanut meal and soya bean meal may be used interchangeably, viz: 20% of each or 10% of one and 30% of the other. There must be 16 catties. The millet, maize, cotton seed meal, wheat, kaoliang, or rice may be used in any convenient proportion to make up 60% or 25 catties. This mixture of flour may be made into Chinese steamed bread.

15 gallons water
30 catties fresh vegetables
3/5 catty salt
3/5 catty powdered limestone, chalk, or lime (omitted)
3 catties pork, or bean oil, or any other cheap edible oil (not used)

The meal is cooked in 15 gallons of boiling water for 5 minutes. To this stock is added the vegetables, salt, and the whole is boiled not longer than 30 minutes.

The family of each workman received double the standard individual ration, —except that the family received no salt or vegetables. These family rations were issued fortnightly. As near as could be arranged, every fourteen days, the gangs were lined up in the Division Store compound and each man given a sack of food containing about 52 catties which he took home to his family, where it was used as the family saw fit. This fifty-two catties is arrived at as follows,—2 rations for 14 days equals 28 rations; plus 2 rations for the workman going home and coming back equals 30 rations, or the same as a 30-man ration for one day.

Due to scarcity and high prices other commodities were tried in lesser quantities. Among these were buckwheat, cotton seed, barley, oats, rye and rice bran.

At first, workmen hesitated about all of these strange substances. Bean cake and peanut cake are commonly used for fertilizer in China. There was a natural revulsion on this account. But on all of the jobs where the men were needy they soon learned that these substances were meat, and in one case, men who had formed a grievance committee re-appeared two weeks later asking for an additional quantity of the "cake" in place of kaoliang. Cotton seed took so long to prepare for eating that after a few trials, this was used for family rations only.

The rice bran was the big disappointment of the job. Purchased at a low price, it was expected that this would mix with the heavy bean rations as a lightener. But when delivered, it was found so mixed with rice scourings, including marble dust, or other mineral substance, that men would not eat it, except in extreme cases. Three-fourths of the purchase was given away either by our own organizations or through the organizations giving free relief. The purchase having been made from an irresponsible broker of a nearby nation, there was no practicable recourse.

At the very beginning of our operations the Ministry of Communications provided free railway transportation on specified kinds of grain for famine relief purposes. The Army Headquarters at Manila offered the use of the transport service wherever convenient. Beans being so large a factor in our diet, it was fortunate that the principal bean market was Dairen. This port is only a little out of the route of the transports plying between Manila and Chingwantao. Chingwantao was also a most favorable port of entry, for the reason that the coal export from that port always makes available a large supply of freight cars. In China this is a matter of prime importance, for there is always a car shortage. Last year the shortage was especially acute for the reason that the grain supply of the whole famine area had to be brought in distances ranging from three hundred to seven hundred miles. The Peking-Mukden Line which brought in about half of the total tonnage, hauled nearly ten times as much grain last year as during the year before.

Cargoes ranging from 1,000 to 1,600 tons were carried from Dairen to Chingwantao by nearly every transport available between December 1 to March 15. Special trains were thus loaded to capacity and run direct to the Head Stores. It is always necessary to place watchmen on such trains to prevent thievery. These watchmen were provided by our shipping agents in Tientsin.

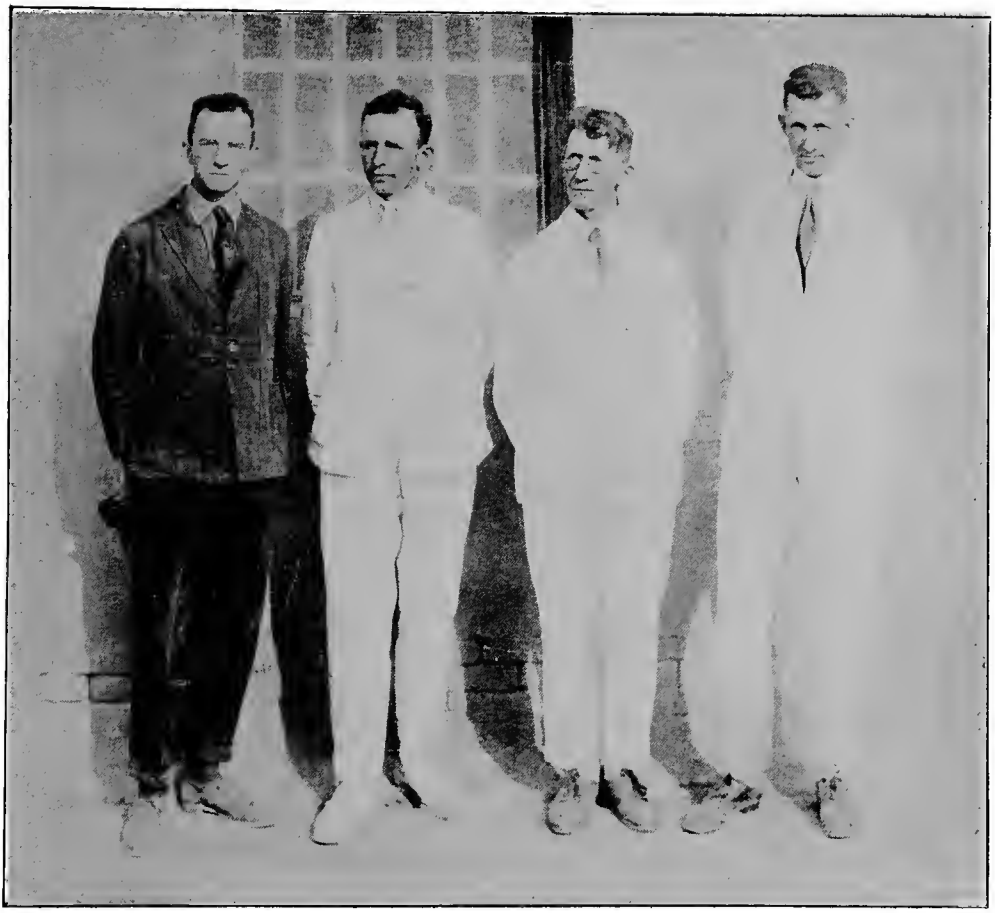
Dairen was finally given up as a market partly because of high prices, and partly because of insufferable annoyances in doing business there. The strike incident to the introduction of gold yen as standard currency followed hard after. A market about 300 miles south of Hsuchow was then used considerably. On the whole it was a cheaper market than Dairen, but it was not well organized, and purchases in

train load lots were impossible except over long periods of time. Grades of grain are not standardized. Also train service was limited. However, with the assistance of the Governor of Shantung, we were able to obtain the services of a commandeered train from time to time as needed. For the jobs in Shansi several thousand tons of odd grain, like barley, rye, and oats, were purchased on the Peking-Suiyuan Line toward the Mongolian border.

In order to obtain free transportation privileges it was necessary to apply to the Famine Relief Bureau of the Ministry of Communications, stating the kind and approximate tonnage of grain to be moved, the points of origin and the points of destination. A "chichao" was then issued, which on presentation to the station master at point of origin secured preferred attention in obtaining cars, together with free freight.

Dairen, being a port in leased territory, is treated as a foreign port by the Customs authorities. However, we were given exemption privileges similar to those on the railways, upon request and presentation of a "huchao" issued by the Inspectorate General of Customs. Each province has its own local customs taxes, "likin." On imports from Dairen, the "huchao" secured for us exemptions, but on purchases in one province moving to another we could secure exemption only by securing a special "huchao" from the Civil Governor, or the Ministry of Finance. Sometimes we did both, in order to be safe.

Our first purchases were all made by direct representatives, Chinese, to whom expenses and salaries were paid. Later a commission of two per cent was paid in lieu of salaries and expenses. And still later, perhaps three thousand tons were purchased at a flat rate delivered. The last-named plan is much the simplest to the accounting department, but on the whole it appears to be somewhat more expensive than the other plans. The first plan secured for us the best quality at the cheapest price, but no one can prove that it would have done so all the time. Prices dropped steadily up to the Chinese New Year in February, and then rose slowly until harvest.



Heads of Departments, Shantung Operation.

W. I. LACY	O. J. TODD	Dr. F. F. TUCKER	PAUL MACEACHRON
Field Accountant	*Field Manager*	*Sup. of Relief*	*Chief of Commissary*

CHAPTER IV

RECRUITING

(Shantung)

DR. F. F. TUCKER,

Superintendent of Relief

C. E. EWING,

Chief of Recruiting Division

DR. F. F. TUCKER

THE Recruiting Division was one of the principal branches of the Relief Department. Its duties were to sift the thousands applying for work in such a way as to save our relief for the most needy and worthy, and to put the laborers selected at the disposal of the Engineering Department when needed. The Recruiting Division was also expected to follow up its men, so as to see that the promises made were being carried out, and to smooth out misunderstandings as far as possible. Of the latter there were unavoidably a good many. No place on earth will rumor travel faster than in China, the land of few communications. The difficulties of language are many. And there was ever and anon the agitator who would address the workmen thusly: "Why do you work so hard? Is not the Red Cross here to help you? Have they not loads and loads of food which they must feed you whether you work or not? Over in Chihli, the —— missionaries are feeding people without requiring any work of them. Why should work be required here? Undoubtedly these Americans expect some day to make this a railway. Then you know what will happen." The "follow up" part of the Recruiting Division's labors was as important as any.

It so happened that the routes selected by the engineers did not traverse the worst affected districts. So the Recruiters went into the districts where help was needed rather than along the route of the road. Usually word was sent to the village elders ahead, stating that the Recruiting Committee was arriving in two or three days, and asking that the village head man list his needy neighbors in three categories: (1) those who must have help very soon, (2) those who would need help in March or April, (3) those who would probably be able to get through without help. In effect this meant (1) families with no personal property and almost no food, (2) families with two or three months' supply of food, or personal property which might be sold for that much food, and (3) persons with a half acre or so of land,

Gathering leaves for food.

Not a famine victim, merely enjoying a "pill." Many opium smokers had a good winter on "free" relief

Getting out the roof timbers for sale.

a donkey, or similar property. Blanks were supplied these head men upon which to list the families together with information pertinent thereto. (See Form R, 1, P. 25). When the recruiting agent reached the village, a few of the families listed were investigated to determine if the head man had been fair in his listing and if the village needed help as much as neighboring villages. If the inspection gave evidence that the head man's statement had been made out in good faith and that his village was needy, the remainder of his list was accepted as correct,—with one precaution. The lists were pasted up publicly where the whole village could see. Although only a small proportion can read, there are always a few who can, and who will read such public proclamations to those who gather round. The Chinese village is probably the most democratic, the most self-governing political unit on earth. If there is any human power which could keep favoritism out of such lists, it is this exposure to public knowledge. Very few complaints came to us of mistakes or wrongs committed within a village. The complaints generally came from neighboring villages, charging that in the selection, our Recruiting Agents had favored one village above another.

In the work of recruiting, the best known missionaries in the districts being examined were put in charge. The standing of such men in the community was such that no appeals were ever taken from them to the Field Manager or to the Director. Complaints that arose invariably were founded on some allegation of relationship between some of the Chinese personnel and families in the villages inspected. However, as inspectors were never sent to their home villages, if it were known, such complaints were rare. An expected form of complaint, conspicuous by its rarity, was of favoritism shown Christians compared with non-Christians. This complaint was spared us not only because of instructions that no discrimination would be tolerated, but also because in the interior villages, Christians are relatively few and in addition are comparatively well-to-do. There was a tendency, of course, for the families inspected to show as much poverty as possible in the hope of a more liberal relief. Investigators for societies which issued free relief in proportion to the number of "mouths" in a family, complain bitterly of the tricks by which parents and children were multiplied, how animals owned were hidden away, and food stowed in the most unlikely—even filthy—places so as to escape the eye of the searcher. We were spared much of this for the reason that the number of mouths made no difference to the amount of relief which we gave, and the work which we required made relief unattractive to those who had other means of a livelihood. Our problem narrowed down pretty much to that of just allotment between villages.

村 長 調 查 表

FORM ISSUED TO VILLAGE ELDERS R-1.

ARC 美國紅十字會 Class 1.

Name of Village 村名 ..... Name of Village Elder 村正姓名

Name of County 縣名 .....

姓名 Name of Family	家人類別年歲 Members Classified by Sex and Age							
	男 Male				女 Female			
	0–12	12–20	20–50	50–	0–12	12–20	20–50	50–

From lists like those above the Recruiting Agents with the assistance of the village elders made up a list of workmen who would be accepted (See Form R. 2.)

工 人 每 班 記 錄

GANG REGISTER

ARC 美國紅十字會 R-2.

Gang No. 班號 ..... Headman 工頭 .....

County 縣名 ..... Village 村名 .....

號數 Number	姓名 Name	年歲 Age	家人人數 No. of dependents	

The men chosen were those between the ages of twenty and fifty. (Numbers under seventeen, however, got on the lists.) They were listed in groups of thirty, each thirty constituting a gang. The gang elected its own leader, or head man, and its own cook. They were required to bring their own cooking utensils, mills, (small hand mills to grind the grain), bedding and all other furnishings, which they expected to use in camp. The camps, consisting of temples or other buildings, were furnished them by the billeting

division, together with mats for the floors. Workmen were also required to bring shovels, picks, mattocks, carrying poles, and similar tools. They were promised their rations daily and a two days' vacation fortnightly for the purpose of taking their "family rations" home. A half day's rest was to be given on Sunday. All of these details were explained by the Recruiters as the list was made out, and the gang was then instructed to await further orders as to the date and place for reporting for work.

These gang lists were made out in triplicate,—one copy being left with the village elder to be posted in a public place in the village, another copy being sent to the Engineering Department, and the third being retained by the Recruiting Division and filed in Gang Number order. This file was very useful in running down substitutions of old men or boys for the vigorous adults who had been placed on the list. When the gangs reported to the engineers, each man was furnished a tin tag bearing a consecutive number, which became his identification tag, and without which he was denied the right to work, and what was more important, the right to rations. (In later operations, the consecutive number was changed to a double number system,—gang number, and individual number within the gang being stamped on the tag, the gang number being at the top, thus:—

$\frac{242}{26}$ The gang number is 242 and the individual's number is 26.

(In case of any question, reference was made to Gang Register 242 and particulars of workman 26 ascertained).

The progress of the Recruiting Division was governed to a considerable extent by the requirements of the Engineering Department, which in turn depended considerably upon the activity of the landbuyers representing the Provincial Relief Society. The numbers reported are as follows:

November 30	180
December 31	3,700
January 31	11,000
February 28	15,000
March 31	21,800
April 30	33,560
May 31	50,060
June 30	61,000

During the spring months the work of the Recruiting Division could be done with much less attention to the need of the applicants for work. Cultivation of the land was much more important to all who had land upon which to work than employment upon the Red Cross project. Then, too, the plan of payment by the day had been changed to payment by quantity of work completed, so little attention needed to be paid to the age or physical condition of the applicant. With all of these changes in conditions, the clerical work on registers could be slighted also. Hence during the last two months, about all the recruiting required was to notify local officials that a given number of men could be employed at a certain place on a certain date.

It was Dr. Tucker's opinion toward the end, that each workman on the road on the average represented six dependents. This is somewhat larger than the estimate in other provinces. But Shantung is thickly populated, and Dr. Tucker has unusual opportunities for knowing the situation. Accepting his estimate, a total of 427,000 people, sooner or later, enjoyed relief in some measure from the Red Cross. Two-fifths of these, however, were reached only during the last two months of the operation. Many of these had been the recipients of free relief before the Red Cross reached their vicinities, but had not received sufficient to make them unappreciative of Red Cross efforts in their behalf.

Our organization failed to co-operate as well as it might have in one important respect. Engineers did not always call upon the Recruiting

A study in contrasts. Type of man who will work and type of man who will not.

A "professional."

Kind of man it pays to help. Only a few leaves and thistles between this family and the end, but neither courage nor pride has failed.

Department to assist in making clear to the workmen our regulations, and to impress upon them the serious consequences which would result from breaking or ignoring our rules. Having discharged workmen, the Engineers did not always notify the Recruiting Division, giving reasons for the action and the gang numbers of the men. It sometimes happened, as a result, that the Recruiting Division considered that these men should be given another chance, rather than to be condemned to death, as it seemed, outright. Such gangs were accordingly recruited again under different numbers, and sometimes reported to the same Engineer who had discharged them, with results fatal to discipline. In other cases the Recruiting Division was not at fault for the re-recruiting of discharged men, but were the victims of clever practice on the part of the village elders. The closest harmony possible between the Recruiting Division and the Engineering Department is essential. In our case ideal conditions could not be hoped for, due to the scarcity of Chinese-speaking foreigners.

INSTRUCTIONS TO RECRUITING AGENTS.

(Translation)

1. Recruiting Agents are known in the community as representatives of the Missions. Hence conduct your investigation so that when people see your work, they will form a good opinion of you.

2. The most difficult task in famine relief is investigation. Investigations must be fair and above board. There must be no spite work or favoritism.

3. Make out the counterfoils of your investigation rolls clearly. Otherwise the work may have to be done over.

4. Investigators must be careful to state nothing contrary to the instructions.

5. Investigators should not only ask the number of members of the family, but should also see them personally.

6. Investigators, serving in pairs, shall classify each family as follows:—

a. Abnormal:— Those who have neither shelter, furniture nor land for the support of their families.

b. Normal:— Those who can exist up to the end of the Chinese New year.

c. Slight:— Those who are in better condition than the "normal" class.

7. The power of issuing certificates to the workmen is vested in the group leader.

LETTER TO VILLAGE ELDERS.

(Translation)

Sirs:

We deeply commiserate those people whose misfortune has brought them such poverty, during this year. So we are planning to investigate the condition of those people who have nothing to eat nor clothes to wear and are exposed to the danger of death.

We send this letter to you with the special desire to get true information about famine conditions of your district. In case anything false is found in the information you give us, then all of the people of your village will be refused all relief whatsoever.

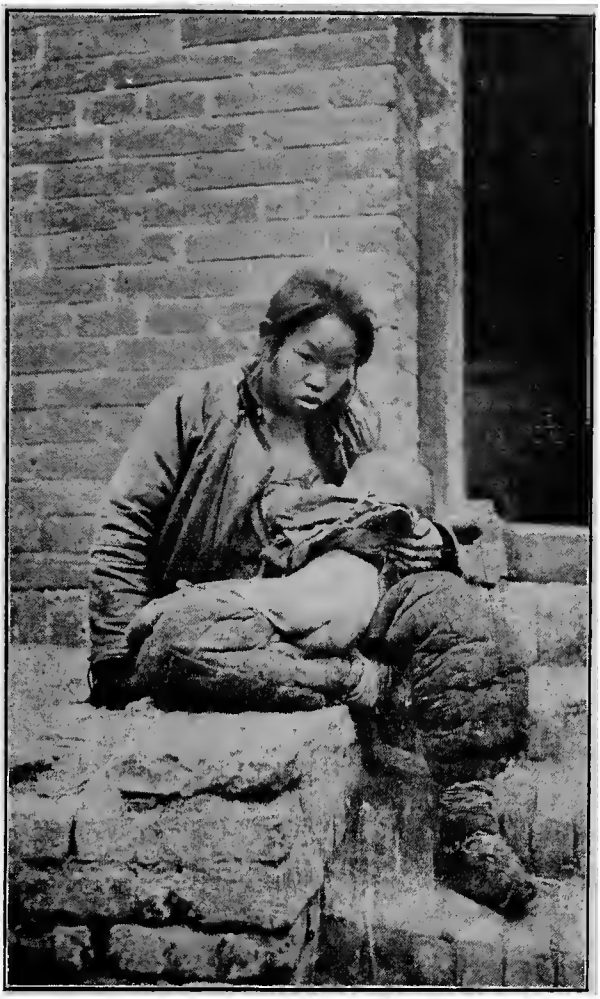
Please send a true report as soon as possible.

Yours truly,

.....

INSTRUCTIONS TO GANGS.

This year in North China not even five grains have been reaped. The common people are in fear of death. The American Red Cross pities them and out of its generosity has started to build a road from Tehchow to Lintsing for famine relief. In order to avoid trouble caused by misunderstandings, we issue a few instructions, as below.



Famine Types. Note shrunken thigh of the baby.

Famine Types. Note distended stomach caused by eating leaves, chaff, etc.

If anything unsatisfactory is found in the following regulations, we reserve the right to revise them from time to time.

1. The age of workmen shall be between twenty and fifty.

2. Thirty men form one gang and from each gang a gang leader and a cook shall be chosen. Mills and stone rollers must be furnished by the gang.

3. Employees from each village will report at the work headquarters on the exact date appointed.

4. All workmen must obey the orders given by the Chief Engineer, or his subordinates.

5. Workmen must always wear their tin tags. No substitutes will be allowed nor will tin tags lost be replaced.

6. Workmen's families will draw their rations twice a month.

7. Half a day's rest will be given every Sunday.

8. Doctors will be provided to attend workmen when sick.

9. All workmen must provide their own shovels, picks, carrying poles, kettles, spoons, clothes, quilts and other furnishings.

敬啓者村正首事地保鈞鑒本會以年遇荒旱五穀不收民不聊生殊堪憐憫現擬調查極苦無食之戶口特請諸位費神據實詳開以備查驗如不據實開單以經查出全村人民不得領賑見信以後急速備妥勿延爲要爲此佈達順詢

近安

美國紅十字會發

調查人員須知

〔1〕調查人代表教會外人視我等如何待人卽如何視教會

〔2〕賑濟之爲難全在乎調查果然調查清楚卽可免去怨言

〔3〕調查存根務要記錄明白如有含糊不清難免再查

〔4〕調查人員與人言談決不可說章程以外之言語

〔5〕調查不但問及某家有人幾口應當親見其人

〔6〕二位調查人員須商議定准某家等次

等次有三〔1〕爲極苦〔2〕爲次苦〔3〕爲苦者　極苦者爲房屋已把去的傢俱未有的人多地少的　次苦者有粮米傢俱牲畜能糊口至年終者　苦者比次苦強的明年無食物的

〔7〕發給工人執照當歸於團長專任

今年中國北方一帶五穀未收小民嗷嗷待斃本會目視心痛議定修築德臨土道以工代賑略盡本會救世之責惟恐工作無序諸多隕礙謹訂工人簡章數條後遇不妥本會臨時再行酌定

一工人自二十歲至五十歲爲合格

二每三十人爲一排每村須在一排作工內選排頭一位火夫一位各排須於飯廠內自備碾礪

三每村所招工人須按所定日期齊到路工工廠

四所招工人作工須聽工程師及監工人指揮

五工人須時常帶號牌不許找人頂替遺失如經查出當均革除

六工人之家每月領粮兩次

七每至星期歇工半天

八工人有病本會請有醫生調治

九工人須自帶鐵鍬鐵鏟扁担衣被並鍋碗瓢勺及一切零星物件

CHAPTER V

ENGINEERING

(Shantung)

Chief Engineer { K. C. WEEDIN, October 21—December 23
CAPT. L. IMPEY, December 23—May 7

Field Manager O. J. TODD, May 7—June 30

1. *Location of roads:*

IT was first necessary to agree on the location of the roads. In this matter our engineers were aided by suggestions from resident missionaries, local Magistrates, a representative of the Shantung Relief Society and the head of the Shantung Highway Bureau. In fact, throughout the period of the American Red Cross operations the Director and afterwards the Field Manager, continually consulted with Mr. S. W. Lao, who represented the Shantung Relief Society, and the Governor, and also with Mr. Tang of the Highway Bureau.

In the early stages of the work, the engineers were chiefly interested in getting the proposed roads staked out and getting the land buyers in to purchase right of way. In locating the roads, the engineers made a reconnaissance and endeavored to avoid old stream beds wherever possible, for these consisted of a very light sand. Wherever sand beds of great extent were found, proposed roads were either abandoned or located to one side.

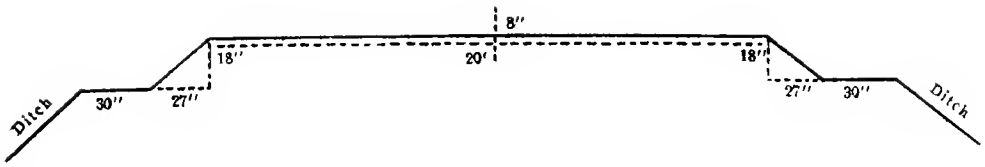
2. *Problem of Right of Way:*

For the most part, the route outlined followed old official roads. The Government legally owned an average of 75 to 100 feet of width for these roads. Originally this width represented mere seizure, but gradually year by year the adjoining property owners have encroached upon the road until at present the typical Chinese road is either a meandering path which changes by many rods each year, or else settles down into a deep trench. To proceed without some effort to pay the farmers for their land would result in endless difficulties being put in the way of construction, and in encroachments on the new roads as soon as supervision became lax.

From the beginning, it was understood that no Red Cross money would go for land, grave moving or growing crops. The Governor's representative undertook to handle this part of the work and money was voted for those purposes from the funds of the Shantung Relief Society, composed of Chinese gentry. The shortage of these funds made it seem at first necessary to follow old roads wherever possible, to avoid delays, and it was realized that the work of measuring and acquiring would be necessarily slow. As it was of prime importance to have this question of right of way settled promptly in order to make a place for workmen, it became at once one of the most pressing questions of our whole work.

3. *Schemes for Land Purchase:*

The most practicable scheme for land purchase seemed to be by a single cash payment made by agents of the Shantung Relief Society to bona fide landowners holding certificates of purchase from the land buyers. It became apparent, however, early in April that



Standard Section

Appearance of finished road.

Inspection by officials of Shantung and of the Red Cross on the opening day.

the extent of new roads would far exceed original estimates. At first the line from Tehchow to Lintsing and on to Tungchangfu, with perhaps a few branches, were all that any one had in mind—perhaps 200 miles. But on the piece work basis of pay, construction began to go faster. The funds at hand, therefore, were manifestly inadequate to pay for all land needed, so the Governor decided that an annual rental be paid until sufficient funds could be raised for full purchase.

This change in plan of payment, together with the time required to make out property diagrams as a preliminary to proper accounting for purchase funds, gave rise to the rumor that lands would perhaps never be paid for. Unfortunately, some of our inexperienced personnel lent ear and voice to such rumors and considerable friction resulted in our own ranks as well as with landowners. (See appendix for Rules governing Land Purchase.)

4. *Line and Grade:*

As a rule the alignment was not as accurate as is customary in American road building, though all the road east of the railway from Yucheng to Wuting and thence northward was laid out with transit and proper railway curves put in. This practice was not followed in the earlier stages of the work. Transit line was also run from Yucheng to Kao Tang and then through Poping to Tungchangfu. The grades were put in by eye as the country was so flat that there was no necessity for any instrument work. As is known to those who have studied the topography of northern Shantung, this country is almost flat, being built up by centuries of river deposits and having a slope from west to east of about 1-10,000.

5. *Type of Road:*

In the early stages of the work it was decided that the road would be uniformly 20 feet across with crown of 8 inches, having slope from the shoulder of 1 on 1½ and below these shoulders a berm between 2½ and 3 feet wide. The sides of the ditches which were used as borrow pits for the roads were to have slopes of 1 on 1½. The shoulders of the roadway were to be 18 inches high on an average. This height of road was not uniformly maintained. There were places where the road had to be built up several feet across gulleys and low depressions in the country. In other places the road was less than one foot high at the shoulder. The crowning was practically uniform throughout.

6. *Method of Construction:*

The first thirty miles of road, Tehchow to Lintsing, was constructed under traffic; hence there was nothing more to do than to throw up the dirt according to the standard cross section. During the winter months when the ground was frozen, the earth was thrown up loosely and rolled on top. This method of construction persisted until after the middle of March, when it was decided that tampers should be used. A test made by an auto truck showed that without tamping, the roads would not sustain transportation the first year. If our period of operation were indefinite, we could have saved the expense of tamping, by waiting for the rains to pack the embankment, after putting on finishing gangs to make repairs and bring the line up to grade. But our time was limited and demonstration of the value of the roads before we left them seemed necessary.

Tampers were of many types. Railroad ties were cut in two or three parts and fitted with handles to be used by one or two persons in tamping down the earth.

In April it was decided to try stone tampers and iron flappers, both of which were brought on the job and used to a certain extent. The stone tampers, weighing about eighty pounds, were quite successful, but the flappers were not considered efficient due to the fact that they took too much labor

Packing the dirt. This type of roller is too light for satisfactory results.

Packing the dirt. This type of roller is too heavy for man power.

Packing the dirt. Hand tamping was found to be most satisfactory under our conditions.

When there was a shortage of tampers, mass treading was found to be fairly efficacious in firming the roadbed.

to handle. Where the ordinary stone tamper was not available and railroad ties were hard to get, small stone rollers such as were used by the farmers in rolling the wheat immediately after planting, were fitted with handles and used as one-man tampers. These are disks of stone about five inches thick and about sixteen inches in diameter, with a hole in the middle where it fits on the axle. Through this hole in the middle a wooden handle was placed and wedged so that the disk could be used as a tamper. Various other devices were used and tamping was even done by men tramping close together in unison, using at the same time the ends of their shovel handles. The rule was to tamp every six inches of dirt as it was placed.

Along with the tamping, stone rollers weighing about 500 pounds were used. These are the rollers the natives habitually use on their threshing floors and were easily obtained throughout the area in which roads were being built. Heavier rollers were also used in places. These weighed about two tons apiece and were drawn by a team of oxen. They were made by taking a set of wagon wheels with tire removed and spiking on planks 2" x 6". Inside of this drum were placed sacks of sand tightly packed. This type of roller was very satisfactory, especially where the ground was fairly damp. A still heavier roller made of iron filled with concrete was imported from Tsinanfu and tried on the road near Yucheng. This roller weighed about four tons and was found too heavy for the roads after a storm. Fifty men were unable to handle so heavy a roller on the roads under the conditions stated of the earth being soft and giving way perhaps two inches under the impact of these implements. The oxen obtainable in the harvest season were not the best and this roller proved rather a disappointment. However, it could be used towed behind a light caterpillar or by eight good oxen. Apparently a three-ton roller is the best thing to use on these roads after dragging has been done in wet seasons. Test of the adequacy of tamping was made by running automobiles over a completed road under high speed. If the machine sank in so that it would no longer run on high gear, the road was condemned and the men were required to re-tamp it at their own expense. This at first discouraged some of those laborers who had been having a rather easy time working by the day, but in the new region east of the railroad, especially in the Wuting district, we had no such difficulty. Wells were dug every half *li* along the roadside and special well-digging and bucket gangs were organized and paid by the day to carry water and sprinkle it on the roads so that the workmen could get compact roads by tamping. Wherever this work was done, automobiles could run without any difficulty at high speed immediately on the completion of the work. This particular part of the work, which was handled under the supervision of Prof. Bailie, showed the value of using water in the construction of dirt roads whenever the earth becomes too dry to pack well.

At the beginning and throughout the winter, payment was made by the day, the workmen being required to supply their own tools, bedding, and cooking utensils. Payment by the day was chosen instead of quantity for the reason that quantitative surveys would have delayed beginning operation and would have required the employment of a considerable number of engineers, which expense we were anxious to save for relief purposes. Besides, as most of us were without experience of this sort in China, we did not know how much to pay by quantity, how much a workman could do, and freezing weather was coming on for which any rate arrived at earlier would be inadequate. But once put up the rate for the frozen period and we should have all manner of trouble in putting it down when the

frost was out of the ground. Then, too, we doubted if famine labor was in a condition to do a full day's work and we felt that by discipline we could scare each laborer into putting forth an honest effort. A dismissal appeared to be equivalent to capital punishment. For some time these assumptions were correct. But our experience now leads to this advice: Begin with "piece work" and keep to it. Those who do not accept what is offered, are not in need of relief. If necessary, feed the laborers a few days before they begin work, so as to get them into condition.

7. *Organization:*

Under the Chief Engineer, whose duties were afterwards taken over by the Field Manager, there were several district engineers, each reporting in to the head office at Tehchow or Yucheng, giving the quantity of work done during the previous week and reporting any difficulties. Under them were the division engineers who were in immediate charge ofthe men. Finally there were five district and twenty division engineers. In gathering up the personnel for handling this road work it was not possible to get experienced road builders. A call was made upon the Legation Guard in Peking and this organization furnished twelve of its men, with an officer, to come on the work and act as division engineers. Other men for this work were volunteers from the Philippine Islands and elsewhere. Later it became necessary to employ ex-Army sergeants and other men with some construction experience to come from Shanghai and assist in this work. A few of our best men in this linewere furnished by the Fifteenth Infantry, U. S. Army.

The district engineers were missionaries who had some experience in handling men, and young engineers with varied experience, employed in Shanghai and Tientsin.

The office of Chief Engineer was filled by several men, one of whom was obliged to leave for America; another was ordered back to Manila for military service; another was taken sick on the work and at last transferred to another field when the Field Manager took over his work.

The laborers worked in gangs of thirty, each under its own headman. Foremen were furnished as the district engineers found need for them. As a rule, however, one salaried foreman was furnished for every ten gangs of workmen. The most of these men were employed locally at a salary of from $8 to $10 per month and were of only mediocre ability.

One of the most difficult problems was that of sufficient capable foremen. Coolies returned from the Labor Battalions in France were at hand in considerable numbers. A considerable number were selected from the experienced gangs, but these as a rule lacked initiative and had no prestige with the workmen. Better men were brought in from Tientsin at salaries ranging from $15 to $30 per month. These latter had had previous training on railroads and on surveys and took considerable interest in the program, but they were not particularly liked by the natives, due to the fact that they insisted on greater accomplishments than the Shantung foremen, who were known in the communities.

It was the duty of the division engineers not only to supervise the laborers, report absences and see that their foremen kept the road alignment correct and took care of the tamping and rolling properly, but also to measure the quantity of work done. Their territory extended some six or seven miles. Some engineers had as high as 2,000 men in their charge, though as a rule the attempt was made to keep the numbeunder 1,000.

While payment to laborers was on a day basis, the principal task was to keep the men at work and effectively so. After the middle of April, when payment was made on a piece work

In many places the soil was too dry to pack well. It then became necessary to water the dirt, especially when finishing the surface. Hence many wells were dug, in cases where private wells were too far away from the road.

After the surface is trowelled with wet clay it bakes hard in the sun and will turn water for a considerable time if the surface is not broken.

basis, the principal task was to secure good quality of work. After going on the piece work basis, of course the laborers were not anxious to do tamping, and the supervision lay mainly in seeing that the work was complete in this respect. By systems of "stints" and of fines for non-performance, a few division engineers were able to secure a reasonable day's work on the daily pay basis. But most were not, and a great deal of friction resulted from their attempts. By March 1, it was decided at headquarters, that the majority of the workmen were being pauperized about as much by the day's work which was being accepted as if rations were given free. Hence, instructions were issued to instal the piece work system as soon as the frost was out of the ground. Several officers in the field felt that this order was emphasizing the construction feature above that of relief and for some time ignored the instructions. Discipline can not be enforced on a raw organization, in which volunteers hold important positions, to the extent possible in older, seasoned organizations, and it was May before the system was entirely changed.

8. *Rate of Pay:*

During the period of payment by the day, each laborer received three standard rations per day—one for himself, paid every day, and the other two for his family, paid every two weeks. This amounted to some five catties (a catty equals one and one-third pounds) of mixed grain per day. No distinction was made as to the kind of grain paid. When the piece-work basis was introduced, it was believed that one fong of tamped earth (100 cubic feet) constituted a fair day's work. Hence the pay allowed was five catties per tamped fong. In some places remote from our stores and close to other sources of supply, men were paid in cash and the amount was based primarily upon the price of grain in the market. Thus the rate of pay in some districts was 25 cents per tamped fong, and in other districts 20 cents.

9. *Methods of Laying Out Work:*

(a) Allot each gang a certain section of road to complete to specification of the Engineer in charge, as and how they please. The work is measured up periodically by the Engineer, who gives the gang leader a certificate for presentation to the paymaster or storekeeper for payment. Drawbacks of this plan are:

1.—An accurate survey of the ground previously is necessary, if payment is on piece basis.

2.—An Engineer in charge of about thirty-five gangs would have to travel over twenty or thirty *li* of road—rather too long for efficient supervision.

The principal advantage is that billets for workmen do not need frequent changing. If men are recruited along the road, they can live at home.

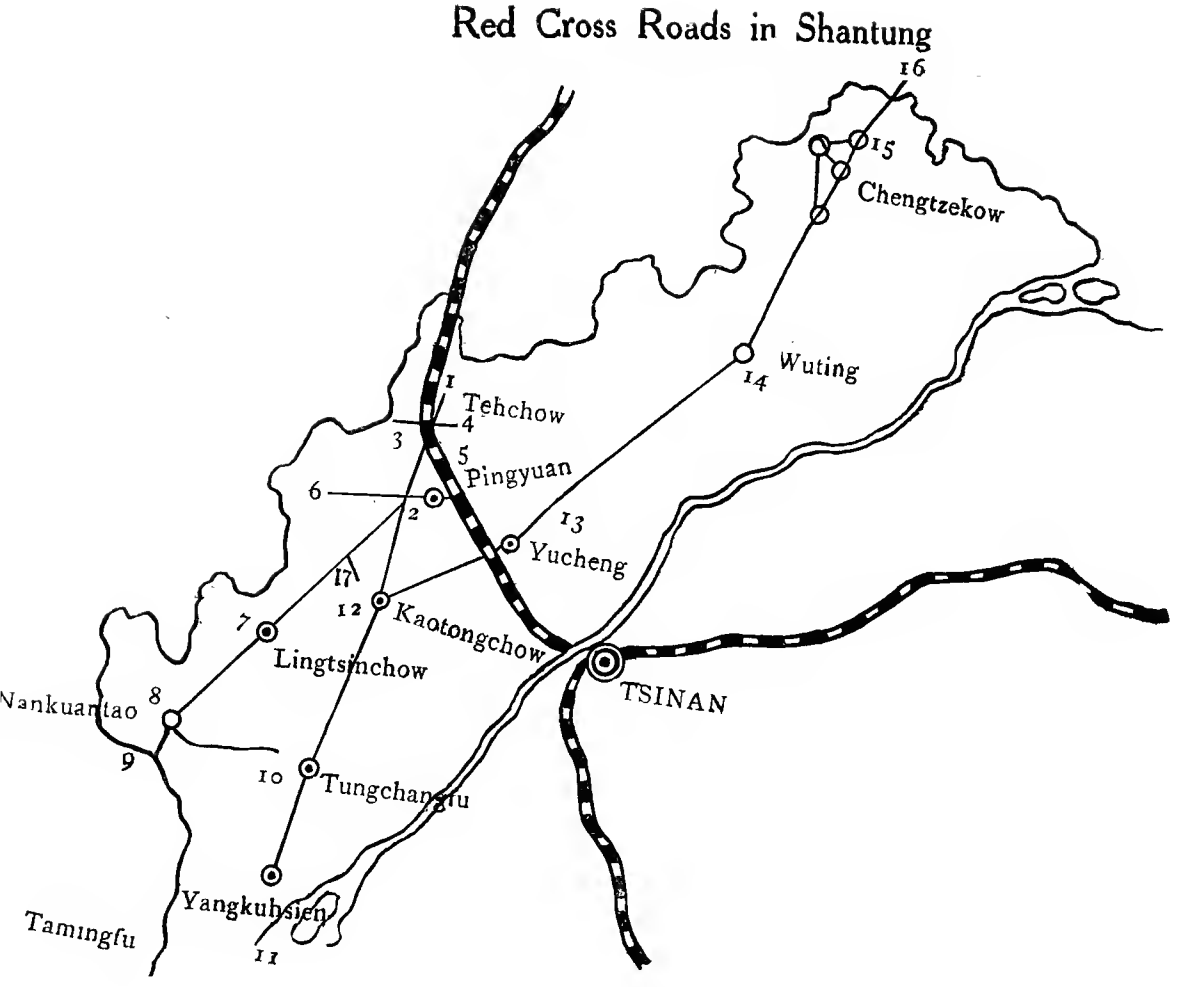
(b) It is a fair day's work to produce one fong of tamped earth per man, or thirty fongs per gang. (A fong consists of 100 cubic Chinese feet. A Chinese foot is slightly longer than an English foot.)

After estimating the depth of fill required, drive stakes at the sides of the road, till a mark on the base is flush with the ground and the tops stand at the required level.

Allot the required number of lineal feet to give the required fongage per gang, and mark out the road thus for a daily task for thirty gangs working consecutively.

This will enable the engineer to watch the work more closely and save useless expenditure on foremen, who also have to be closely watched to prevent "squeeze."

The disadvantage is to be found in the long walks necessary from billets,


Red Cross Roads in Shantung
16
15
Chengtzekow
14
Wuting
1
Tehchow
4
3
5
Pingyuan
6
2
13
Yucheng
17
12
Kaotongchow
7
Lingtsinchow
TSINAN
Nankuantao
8
9
10
Tungchangfu
Yangkuhsien
Tamingfu
11

or the more frequent relocation of billets. Greater congestion of men also exposes the job to greater danger from epidemics.

10. *Results:*

Results of the efforts of the Red Cross in road construction were 1,356 *li* or 485 miles of standard highway completed. Besides this, 50,000 trees were planted along the roadway, making an avenue from Pingyuan to Lintsing. There were over one hundred wells dug, but not curbed, in the Wuting District. Two bridges were built over old courses of the Yellow River. These of course were small structures, one of them being an old bridge repaired and costing about $200, and the other being placed near an old bridge that had been destroyed, and costing about $1,000. Two other bridges were used by simply repairing the floors. These were old Chinese stone bridges that promised to be serviceable for several years.

ROUTES

Section	*From*	*To*	*Distance (Li)*
1– 2	Techow	En Hsien	70
3– 4	Ssu-nu-ssu	Huang Ho Ya	25
2– 5	En Hsien	Pingyuan	25
2– 6	En Hsien	Wu Cheng	75
2– 7	En Hsien	Lintsing	132
7– 8	Lintsing	Nan Kuan Tao	115
8– 9	Nan Kuan Tao	Chihli border	27
8– 10	Nan Kuan Tao	Tung Chang fu	130
	Belt line around	Tung Chang fu	10
10–11	Tung Ch'ang fu	Yang Ku	90
10–12	Tung Ch'ang fu	Kaotang	110
12– 2	Kaotang	En Hsien	70
12–13	Kaotang	Yu Cheng	90
13–14	Yu Cheng	Wu Ting fu	210
14–15	Wu Ting fu	Cheng Tze Kou	150
15–16	Cheng Tze Kou northeasterly		15
17–	Hsia Chin southerly		12
		Total	1,356

1 Li equals 3.579 miles.
1,356 Li equal 485 miles.

11. *Cost:*

The cost of this road work, including the money spent for rice bran which was given away, office overhead in Peking and Tientsin, and various other expenses before the road program was well started, bring the average cost up to nearly $1,850 per mile. But in the month of May when the work was running at greatest efficiency the cost of road building was less than half this. The expense for trees and wells was so small that it has been lumped in with the general road cost.

These costs include supervision, engineering and medical services as well as actual payments to laborers. The most economically constructed railroad in China, the Taokow—Chinghua, shows a cost of $1,333 per mile

Ancient bridge near Er-Shih-li-pu re-built by the Red Cross. Old railway sleepers were used for the floor and railing.

New culvert near Kaotang built by the Red Cross.

of line for earthwork alone. It runs over very similar territory, and the grading is very light. This was constructed some fifteen years ago when the cost of labor and of food was less than half the cost during the past winter. In addition, it will be remembered that we deliberately carried on work during the winter months, when frost made efficiency impossible, in order to keep up the relief phases of the work, and that we did not give the laborers as small a wage as possible, but rather sufficient to keep them and their families in good health.

12. *Quality of the Finished Road:*

When the roads were turned over to the authorities of Shantung, practically every section would permit of a speed of thirty miles per hour in a Ford, Dodge, Buick or similar type of car. There were four or five patches of sand which would quickly deteriorate if not given constant attention. These were not more than a half mile each. The numerous crossings would also soon cut deeply unless frequently repaired. During July and August floods came and broke through in places, while the farmers cut through in other places in order to let out the damned waters. But otherwise, according to independent reports, the roads are standing well. The loess soil contains a small percent of lime, which causes an exposed surface to bake like brick after being wet. A very limited maintenance should retain an excellent road.

Toward the end of the work two road drags and Buck scrapers were constructed at Pingyuan, and used successfully for a short time immediately after a storm. These were shod with a strip of steel 5/8" × 4" and were so drawn that ruts were filled and the dirt thrown toward the center of the road. An imitation of the old split-log drag was also put on the road and tried successfully, but that was towards the end of the job and the experiment was rather a short one. It seems probable that the split-log should be used immediately after summer storms and that it should be followed by the three ton roller, thus packing down the roads and filling the ruts. In two years' time with prudent use of these implements, the roads should be a great improvement over anything that has existed in northern Shantung heretofore.

13. *Recommendations for Upkeep of Roads:*

As the highways have been turned over to the Shantung Highway Bureau, the duty of upkeep falls on that body and the Red Cross has no further responsibility, but in leaving the field, the following recommendations have been made:—

1. To the greatest possible extent narrow tired carts should be kept off the new roads and carts with tires three inches or more wide should be encouraged to be used in their stead. Probably some form of taxation on the narrow tired, or bonus for using broad tired, carts will gradually bring about this change.

2. It has been recommended that drags similar to the split-log drag of America be employed in the rainy season soon after storms, so that the ruts may be filled and roads slightly re-crowned. Rollers weighing one to three tons should then be put on the roads, bringing the surface down smooth.

3. Small equipment for repairs to fill washouts and deep ruts made by crossing of narrow tired carts should be kept in the various hsien cities. These will consist of picks, shovels and railroad tie tampers. It is not considered necessary to use brick, wood or stone on the crossings of the country roads. Probably regular upkeep by putting in dirt, mixing it with lime one part in five, and thoroughly tamping it would be more practicable, due to the scarcity of rock and bricks.

4. The sand stretches where there is little or no binding material in the earth will cause the greatest trouble and it is recommended that rock or brick be placed on these stretches and a macadam surface be made, after first rolling the sub-grade thoroughly. Probably this macadam surface should be 10 or 12 inches thick and 14 feet wide. This will be expensive in many instances, due to the long cart or wheelbarrow hauls from the railroad. All rock must necessarily come in by train or canal. When leaving the work, the Red Cross turned over eighty carloads or 320 fang of good No. 2 limestone rock at Pingyuan station. This should be used by the Shantung Highway Bureau on the stretches between Pingyuan and En Hsien, En Hsien and Tehchow, and En Hsien and Hsia Chen. More rock should be shipped in as funds are available, for placing on the road.

5. An estimate has been made for annual upkeep of this 1,400 li that amounts to nearly $100,000 per year, or roughly $200 per mile. It is suggested that this fund be raised by a tax on narrow tired carts and also a labor road tax levied against all villages and cities benefiting from these highways. The Governor has already stated that prisoners in jails in northern Shantung will be available to work in repair gangs for the Shantung Highway Bureau, without cost. It is doubtful if there will be enough of these prisoners to do all the work, but it will cut down the annual appropriation of $100,000 otherwise necessary.

6. It has been suggested that the missionaries living in the immediate vicinity of these new roads be used as road supervisors, advising the Shantung Highway Bureau after heavy storms of any damages that have occurred and recommending where emergency work should be done. This seems a natural piece of coöperation, because the missionaries as well as the officials of Shantung are interested in the upkeep of these highways. Thus far there has been no definite arrangement made in this respect.

The whole matter of upkeep is in the hands of the new Shantung Highway Bureau, headed by an American educated engineer, Mr. E. L. T'ang, with four Tao T'ai as the other members of the Board. The Governor of Shantung has expressed a great interest in this movement for better highways and it is expected that he will give every encouragement to the work of the Bureau that has just been established.

13. *Macadamized Surface:*

We have been asked frequently why we did not "metal" the Shantung roads.

Any considerable macadamizing of roads in Shantung is out of the question. Some 487 miles of line have been completed there. Consider what it would mean to macadamize this extent of road. The standard width of these highways is 20 feet. If a center crown 14 feet wide were made of macadam 8 inches thick before rolling (which would mean about 6 inches thick after rolling), each lineal foot of highway would contain 9-1/3 cubic feet and a mile would require 49,280 cubic feet. At 100 pounds per cubic foot, each mile of macadam would amount to roughly 2,500 tons or five trainloads. Five hundred miles (to use round numbers), therefore, would require 2,500 trainloads or at the rate of seven trains per day for a year. In other words, the entire freight service of the Tientsin-Pukow Line over the section in Shantung would be required for one year, in order to macadamize the Red Cross Roads. We needed those trains for food.

Calculate the problem in a slightly different way, The rail haul upon this rock from the nearest sources of supply to the railway stations from which it

could be distributed, would average 150 kilometers, and at the extremely low rate of 4 mills per ton kilometer, the freight would amount to 60 percent per ton, or $1,500 per mile. The mere railroad freight upon this rock would amount to $750,000, or not far short of the entire amount spent by the Red Cross on highway construction. But remember that this rock would then only be at the railroad, and it would have to be carted an average distance of 100 li on either side of the railway. Assuming an average rate of 6 cents per ton per li for carting the rock from the railroad to the point where it is needed, and we arrive at the tremendous figure of $15,000 per mile for carting the rock to the point where it is to be put into place. There is no need of considering the cost of the rock or of putting it in place. Already the figure is over $8,250,000 for transporting the macadam for these 500 miles of highway. Possibly as the macadamizing progressed, unit costs could be reduced.

APPENDIX "A"

RULES FOR LAND PURCHASING ISSUED BY THE SHANTUNG RELIEF SOCIETY

CHINA FAMINE RELIEF, *Shantung, February 14, 1921*

I. Principles

1. Twenty-one articles on land purchasing are outlined by the Famine Relief Society. Some will probably be adopted by all philanthropic bodies, both Foreign and Chinese, who contribute money towards the purchase of land to construct roads for relief work.

2. With the exception that when new roads have to be opened because the public roads are not wide enough, or in order to avoid crookedness, roads should be constructed only along the existing public highways, and it is unnecessary to have new land bought from the land owners.

3. In case any portion of the public land is illegally occupied, person occupying said land shall be notified by the local officer in charge, to release the land encroached upon.

II. Measuring of Land

1. Land shall be measured as follows:

6,000 sq. ft... .. .. 1 mu.
240 kung .. .. .. 1 mu.

2. The land measured shall be marked with lime. The land measured shall then be reported to the officer in charge, said officer shall then notify the land owner to have his land measured, etc.

3. After measurement there shall be no planting, building, interment, etc., upon said land.

4. Work may be started within the boundary of said measured land by the purchaser of said land, before payment has been made therefor, if for some formal reason payment has been delayed; said land owner is not permitted to hinder or in any way or for any reason, the progress of work upon said measured land.

III. Purchase of Land

1. Where the land needed for the purpose of road construction belongs to the Government, there shall be no payment therefor; there shall be fixed prices for various kinds of lands, as follows:

Field—

Grade 1.
Vegetable gardens Burial grounds, etc. .. .. $50. per mu

Grade 2.
Cotton Fields, 1st class
Gardens, 2nd class .. 45. ,,

Grade 3.
Cotton Fields, 2nd class
Gardens, 3rd class .. 40. ,,

Grade 4.
Cotton Fields, 3rd class
Gardens, 4th class .. 35. ,,

Grade 5.
Cotton Fields, 4th class
Gardens, 5th class .. 30.

Grade 6.
Cotton Fields, 5th class
Gardens, 6th class .. $25. ,,

Grade 7.
Fairly good land .. $20. per mu
Grade 8.
Land half usable.. .. 15. ,,
Grade 9.
Land not good for cultivation .. .. .. 10. ,,
Grade 10.
Waste land.. .. .. 5. ,,

2. Where there are graveyards, buildings, temples or woods, existing upon land needed and detour is unadvisable, the owner shall be notified to remove said obstruction.

Compensation for such removal shall be as follows :

(*A*) *Graves.*

1.	Brick or stone graves	$12. each
2.	Dirt graves	6. ,,
3.	Small graves	3. ,,
4.	Receptacle holding skeleton	3. ,,
5.	Coffin above ground.	3. ,,

(*B*) *Buildings or Temples.*

1.	Brick house—new	$90. per room
2.	Brick house—old	45. ,,
3.	Lime house ..	30. ,,
4.	Adobe house—thatched roof .	22. ,,
5.	Camps made of mud	8. ,,
6.	Inclosure—Mud Walls	8. per 10 ft.
7.	Well—brick ..	15. each
8.	Well—dirt.. ..	8. ,,

(*C*) *Trees.*

1.	Large trees ..	1.50 each
2.	Small trees ..	.50 ,,
3.	Fruit trees—large	8.00 ,,
4.	Fruit trees—small	3.00 ,,
5.	Vegetable—water lotus, lily roots, etc...	3.00 per mu
6.	Miscellaneous plant and reeds	1.50 ,,

After removal the above-mentioned shall belong to the former land owner.

3. Where there has been false claim of ownership of graves, or when a dirt mound has been reported as a grave in order to obtain compensation therefor, person making such claim shall be punished.

4. The land owner shall in no case receive more money for his land than is due him according to the prices fixed by the Committee.

5. When there is a fraction of land left—over one fen—which is not usable for any other purpose, it will be advisable for the owner of said land to offer same for sale to the purchaser of land.

IV. Deeds

1. The owner selling land should guarantee that said land has never been mortgaged or sold to others. Said owner shall be responsible for any complications which may arise after said land has been sold to the Committee.

2. Where the deed to the property has not been recorded with the officials —private deed—or where there is no deed for the land, the owner offering land for sale shall produce his proof of ownership in the form of a receipt which has been issued him by the government, showing the amount of grain he has paid in the form of tax for grain raised upon said land. His neighbors shall witness that said receipt is genuine.

3. Where the land owner cannot produce a deed to land offered for sale, he shall be asked to fill in a blank prepared by the Committee, blank to read as follows :

Bill of Sale

I, ...do hereby, for the consideration of .....Dollars, transfer to the .....the following land:

Location .....
Number .....
Boundary .....
Number of mu .....
Signed..... Owner
..... Committee
..... Witness

In addition to his signature the owner shall also put his seal upon the Bill of Sale.

4. Before the land is sold the owner of said land shall also fill in the following form:

Offer of Sale

I, ...offer for sale to..... the following land:

Location.....Number of mu .....

.....(Signature of Owner).

5. For the land sold the owner shall receive a slip, showing the location, number, boundary and price of the land sold and the name and address of the aforesaid owner. This slip he will exchange for a certificate, which upon presentation upon a fixed date will enable him to secure payment for the aforesaid land.

V. Payment

1. Date of payment shall be proclaimed for ten days in advance. At the fixed date the owner can, upon presentation of the above-mentioned certificate, secure his money, provided there is found to be no error in the certificate when examined.

2. If the owner for any reason fails to appear upon fixed date to present his certificate for payment, the money shall be deposited to his credit with the local official court, to be drawn by the above-mentioned owner at his convenience.

VI. Appendixes

1. There shall be a clear statement made indicating the name and address of the owner, the location of the field, the number of mu sold, said statement to be sent to the local official court in order to secure exemption of payment of tax for the above-mentioned land.

2. Above rules and regulations are subject to revision as occasion may arise.

Above rules and regulations shall be put into effect after they have been sanctioned by the Provincial Civil Governor.

APPENDIX "B"

Tehchow, Shantung, *April 9th, 1921.*

MEMORANDUM

TO HEADS OF DEPARTMENTS OF SHANTUNG PROJECT—AMERICAN RED CROSS

ON all *new road extensions* the following method of relief will be adopted, commencing Monday, April 11, 1921.

1. Payment for work shall be in grain according to the amount of work done.

2. Each gang shall elect its own head man to represent it in business dealings and receive all payments for the work of the gang.

3. Each head man will be furnished a suitable number stamp by which to receipt for supplies.

4. Each man in a gang will be furnished with a tin tag showing number of the gang and number of the man. This is his evidence of right to work and right to share in provisions.

5. Provisions will be issued to gangs in bulk, leaving the gang to make its own distribution.

6. So far as possible gangs will be recruited close to the road in order that they may arrange their own housing.

7. No payment will be made for work not up to standard.

8. Engineers will compute in advance the total quantity of work to be put in place in each li and advise same to the Commissary, so that the total grain value of the completed job can be set up in the books. This is necessary in order to make sure of getting the proper quantity of supplies to headquarters, and to guard against mistakes in issues.

9. While each gang will be directed by its own head-man, the Division Engineers will furnish special General Foremen to direct the work and see that it is done to the satisfaction of the Engineer in Charge.

10. Workmen will furnish their own shovels and other tools. If requested to supply shovels, the American Red Cross will do so at a daily rental of three cents for each shovel, to be charged against the gang receiving same and paid for by deduction from total grain due at the end of a 12-day period. When the amount held back equals the cost paid by the American Red Cross for the shovel, this tool becomes the property of the gang that has paid such rental.

11. Each gang will be paid according to the quantity of work performed,—probably five catties of grain like kaoliang, beancake, rice bran, etc., per fong (100 English cubic feet) of dirt put in place and tamped so that when water is poured into holes punched for the purpose, it will not run away. The payment shall be slightly increased as may be decided upon by the District Engineers, due to special difficulties of the work or long distance of men from their homes. This adjustment will be made once in 12 days to balance all inequalities arising from unequal opportunities.

12. After two days' work each gang will be allowed to draw 300 catties. Following this first payment, nothing shall be paid until earned. Engineers

will certify to all claims for payment before same will be honored by Commissary. As a rule payments will be made every ( ) days on advance estimates of Division Engineers. This means all work thoroughly tamped to satisfaction of Engineers.

13. The earth should be put in place in layers not exceeding one foot in thickness, and each layer tamped or rolled solid, preferably have every 6th layer tamped well.

14. Division Engineers shall test the quality of the tamping by driving a rod into the surface. Then withdraw rod and pour water into the hole. If the water stands, i.e., does not soak away, the packing has been satisfactory. A substitute test in places will be the ability of the road to carry a one-ton loaded truck running on high gear without appreciable sinking. The tests shall be such as to satisfy the Chief Engineer that the roads will stand up under automobile traffic without undue settlement.

15. Food supplies shall be issued to Head Men of working gangs only upon the certificate of the Division Engineer to which such Head Men are subject.

16. Head Men will come in person, or send duly authorized representatives, to the store at for supplies earned. Gangs No. to shall receive no allowance for transportation. Gangs to inclusive, shall receive a five per cent increase to compensate for transportation, and gangs to inclusive, shall receive a ten per cent increase.

17. Head Men shall receipt for supplies drawn upon the form provided, by impressing a stamp provided for that purpose.

18. If deemed expedient, the Commissary may arrange with the Engineering Department for certificates from the Engineers calling for equal quantities, such as 300 catties, etc., so long as payment does not exceed work done, leaving the exact reckoning to the final payment.

(Signed) O. J. TODD,
Field Manager.

CHAPTER VI

COMMISSARY

Chief of Commissary	PAUL MACEACHRON
Manager Billeting Division	F. W. WANG
Manager Stores Division	LEROY HUSSELL
Manager Transportation Division	MICHAEL STEELE
Manager Foreign Supplies Division	SGT. E. F. MOTT, (Dec. 1—Apr. 1) I. DIAMOND, (Apr. 1—June 30)

PAUL MACEACHRON

THE Billeting Division for the first two months was under the direction of the Superintendent of Relief. This was because the manager, F. W. Wang, who was so eminently fitted for this work, was a subordinate of Dr. Tucker's in the Tehchow hospital. Personal relations determine many things in China. Later, because of the close coöperation necessary between the Billeting and the Stores Divisions, the former was transferred to the Commissary Department.

The work of the Billeting Division was two-fold; one, to secure quarters for the native workmen, and, two, to prepare quarters for foreign personnel.

Native workmen were quartered for the most part in temples, and small buildings close to the work on the road. Usually these could be obtained free, or for a nominal rental. In some cases, spaces between buildings were covered over with mats made of split bamboo, the ends closed in similarly, and thus a temporary building made to serve the purpose. Mats were usually furnished for the floor, and in some cases rushes or straw was placed underneath the mats. A floor space of about nine or ten square feet per man was provided, and within this his food was cooked and eaten and he slept. The men invariably slept on the floor. The repair or improvement of the quarters thus provided was left to the gangs, who also built their own stoves, or fireplaces. From the standpoint of a newcomer to China, such housing arrangements were simply impossible. But compared with what these men have at home, it was not so bad. At least, the shelter provided plenty of ventilation and the health record was good. During the spring months a very considerable proportion of the workmen were quartered in mat sheds. These are constructed on a light framework of bamboo and covered with the mats mentioned before. A camp of these looks something like a collection of tepees.

At Tehchow, Lintsing, Nankuantao, Tunchangfu and every other mission station in the field, foreign personnel were quartered at the homes of missionaries. Two dollars per day was paid as a recompense.

At division and district headquarters the Billeting Division provided office, residence, and storage accommodations for the Store and for the Engineers, together with their staff of interpreters and clerks. A temple or other commodious compound was rented. Such quarters must have space for storing

Dug out billets roofed with mats made of split bamboo, near Hsia Chin.

Red Cross laborers often enjoyed the hospitality of the gods, temples being the usual quarters during the winter months.

the grain and for weighing it out to the workmen on paydays. There must be a strong gate to keep out intruders. An Engineer and a Storekeeper were generally quartered together. Provision must be made for the accommodation of transient officers night bound. Each engineer and storekeeper had an interpreter. A cook, a coolie, and a watchman comprised the retinue of servants. Thus the rooms which had to be provided were as follows:

Office
Foreigners' room
Interpreters' room
Kitchen
Servants' sleeping room
Supply room (with lock)
Stable

After these premises were secured, it was next the work of the Billeting Department to clean the rooms to be occupied, white-wash the walls, fit one or more glass windows to the office and paper windows to the other rooms occupied, construct toilet facilities, install stoves, and provide the furniture which could be had locally.

Tables, stools, benches, and similar furniture were borrowed or purchased locally, for the most part. A considerable quantity was made by local carpenters out of odd railway sleepers, on our design. For beds, folding army cots with native made cotton mattresses were used considerably for the foreigners. These cots are not durable, however, and are relatively expensive. A cheaper and fully as comfortable bed is made in the form of a wooden frame for a bench, the top of which consists of stalks of kaoliang (kaffir corn), nailed crosswise. Another form was of the same design, except that instead of kaoliang, nailed across, rope was strung across. These frames were cheaper, with the same mattress, more durable, and fully as comfortable as the army cot—but they are awkward to transport. Where men are on the move frequently the army cot is worth what it costs. Otherwise, the Billeting Division supplies the bed frames.

As soon as the Billeting Division had secured quarters for the workmen, fitted up headquarters, and installed a watchman there, it reported to headquarters, so that the other divisions and departments could proceed with their arrangements.

Foreign Supplies Division: The Foreign Supplies Division sent out the remaining furnishings required by the foreign personnel, and the Stores Division began to stock the place with grain for the workmen.

A typical list for a two-man camp (two foreigners) follows:

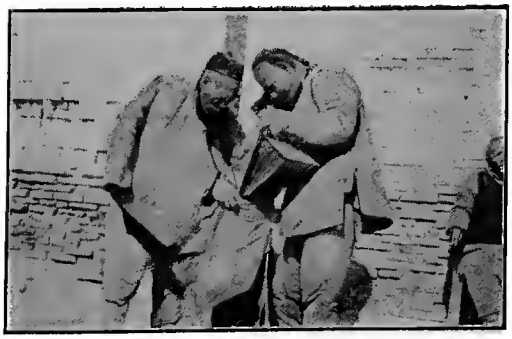
3 bed frames and mattresses.
1 wash basin.
1 tub.
1 small looking glass.
2 kerosene lamps.
2 lanterns.
1 frying pan.
1 boiler.
1 tea kettle.
1 coffee pot.
2 kitchen spoons.
1 kitchen knife.
4 table knifes and forks.
4 teaspoons.
2 table spoons.
2 candle sticks.
4 cups, saucers, plates, sauce dishes.
1 salt shake, pepper shake, sugar bowl, milk pitcher, water pitcher, syrup pitcher, vinegar cruet.

Most of these articles are not worn out after four or five months' use and should be turned back in fair condition for sale. We found, however, as every amateur organization will find, that our system of charging such equipment to distinct individuals was not sufficiently rigid, and much of our equipment "evaporated."

Chinese when traveling always carry their own bedding, wash basin, towels, chop sticks, etc., while other needs can almost always be supplied from local shops. Hence little special

Typical division headquarters, street entrance.
(Also typical crowd when the light truck was new)

Typical division headquarters, inside the compound. Note bean cake piled up on the left. Weighing up family rations on the right.



A beggar with one hand daily received the sweepings from the Hsia Chin yard.

轉交中國災民救濟會監督
北京美國紅十字會

甲頁
ORIGINAL

To

DIRECTOR CHINA FAMINE RELIEF
Care AMERICAN RED CROSS
PEKING, CHINA.

二式 Form 2

REQUISITION 徵發

Please furnish the following: 請供給下列各項物品　徵發單號數 Req. No.....

爲 For.....

..... 區所 Station.....

..... 日期 Date.....

Line No. 行數	Quantity Ordered 貨量	Articles and Description 物件及詳情	Quantity on Hand Now 現存量	Purchase Order Numbers 買貨單號碼
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				

Other Approvals: 允驗	Approved: 允驗	Respectfully Requested: 呈請
	DIRECTOR CHINA FAMINE RELIEF 中國災民救濟會監督	FIELD MANAGER 區長

Send Original with Duplicate to Director China Famine Relief　將甲乙二頁送交中國救災會監督

preparation is required for interpreters and clerks.

The feeding of the foreign personnel was a problem by itself. It was necessary to have canned and dried goods purchased in Tientsin and brought in to Tehchow or Pingyuan for distribution to the various stores where foreign personnel were located. The storekeepers gave the Manager weekly inventories of supplies on hand and a statement of needs.

These supplies furnished the basis of the food for the foreign personnel, local meats, vegetables, eggs, etc., being purchased in the villages where sub-stores were located.

The Manager replenished his supply by Requisition upon the Purchasing Agent in Tientsin. Such Requisitions were first approved by the Chief of Commissary, after the appointment of a Field Manager, by that officer also. Requisitions were made out in triplicate, one copy being retained by the Requisitioner, and two sent to the Purchasing Agent. One of these he retained in his files and the other he passed on to the supply houses, or used as memorandum in his shopping. Invoices were required from suppliers in triplicate, one for the use of the Purchasing Agent, one to accompany goods to destination, and the other to be sent by mail to the Requisitioner. One weakness in this system which was corrected in time was a lack of prompt notice to the Purchasing Agent that goods invoiced had been received in good order. In this land of strange customs and undeveloped communications, parcels go far astray unless promptly followed up.

It will be of interest to foreigners to know the approximate cost of feeding foreign personnel on road operations in Shantung. For the month of April the average cost of food, cook hire, house rental, etc., exclusive of fuel, was about $1.40 Mex. per person per day for all camps. Some of the individual camps had a record as low as $1.00 per person per day. The food was uniformly good and where properly safeguarded it was easily possible to keep below the $1.50 per day limit. Records were kept at each store of individual meals eaten by transients so the whole could be accurately figured out on a day basis. At the missionary compounds at Tehchow and Lintsing arrangements were made to board and lodge foreign personnel at the rate of $2.00 per day. This figure was considered fair because there was certain servant hire, wear and tear on furniture, washing, etc., that made the cost higher than in the field, and it was the intention to be sure that these missionaries who had opened their homes to the personnel of the Red Cross were not underpaid.

Engineering supplies such as picks, shovels, chains, etc., were also in charge of this Division until issued to the engineers.

The work of the Stores Division began with the delivery of carloads of grain by the railway at the station where the Head Store or principal District Store was located. The Head Store was first located at Tehchow, and later at a station further south and nearer to more of the work, Pingyuan. A District Store on the railway was opened early at Hwang Ho Ya and at the latter end of the operation at Yu-Chêng. Although a loading and an unloading charge is collected by the railway, the amount of grain which the Red Cross received was so far beyond the capacity of the railway forces to handle rapidly and satisfactorily, that the Stores Division was forced to organize its own unloading coolies. Simple as it may be to tell, it was always a difficult matter to get a correct tally of the number of sacks of each kind of grain brought in by any train, and still more difficult to keep the count by cars, as it was attempted to do. This came about because of the demurrage rules which require

cars to be unloaded within six hours of arrival. The result was that the sacks were simply heaved out of the cars onto the platforms, and the cars released. After the cars were hauled away, then the carrying of the grain to the stores began. The platforms as a rule were not wide enough to accommodate each carload in a separate pile. The presence of a swarm of beggars (in some cases the families of the railway coolies) before which the railway police were disinterestedly helpless, required the attention of the foreign officers with staves and canes as a special police force.

In the Store compounds, the grain was piled in the open, in pyramidal heaps. A floor of old railway sleepers (ties) or bamboo mats was generally supplied, and the heap was covered with mats to keep off rain and snow. A ditch with outlet was dug around the base for drainage when rains began to be expected. Each kind of grain was piled separately. Bean Cake and Peanut Cake was commonly shipped unsacked, and at the Store the cakes were piled in columns, only the broken pieces being sacked.

When a shipment had been finally stored, the Accounting Department was advised as to quantity and quality of the grain, so that deliveries could be compared with the terms of the order and the advices of the Purchasing Agent or the contracting firm. The grain was then ready for transfer to Division Stores on instructions from the Chief of Commissary. The actual transfer was accomplished by the Transportation Division, whose work will be described later.

At the Division Store the checking in of the grain was done very similarly to that at the Head Store. The issues from the Division Stores were to the workmen themselves. Grain was issued daily to the cooks of each gang and receipted for by means of a rubber stamp bearing their respective gang numbers. Engineers were expected to report daily to the Division Storekeeper whether any men were not appearing on the work, and if any were absent without justifiable excuse the gang ration was reduced accordingly. See Form E.–1. Issues were made to the workmen for their families every two weeks, and two days' vacation were given to the men for the purpose of taking these rations home. They were loaned sacks for the purpose, but were required to bring them back.

Bins about 4x8 feet by 3 feet deep, raised on legs so as to slope forward were built to facilitate handling of the grain when issued. Measures containing the proper weight of grain were also ready. In the beginning, efforts were made to measure out to each man the amount furnished his family. If the vacations were given regularly every fortnight, at the rate of two workmen's rations for each day, twenty-eight standard rations for the family would go into the sack, in addition to which there would be two days' rations for the workman himself. Thus, thirty standard rations would make up a package to take home,—the same size as the package issued daily to gang cooks. Hence an attempt was made to handle everything in standard packages which were measured out in advance. But irregularities in attendance and in the date of the vacations soon made the standard package a very inconvenient device, and at the same time the expedient was adopted of measuring out the total weight to be issued to an entire gang and let them divide it according to their own devices. It is quite possible that this gave rise to abuses later on. A foreman would find it more simple to force contributions from his gangs under this situation.

Fuel, salt, and vegetables were furnished the workmen but were not furnished to their families. Fuel, salt and vegetables were furnished through the Stores the same as grain. Towards spring this allowance was cut off on

Piles of grain covered with matting.

Workmen rejecting cotton seed for food. A "committee" beat every man who refused to pour out his portion when he got outside the Division Store compound. Later, they gladly took cotton seed for family rations, after being taught how to prepare it.

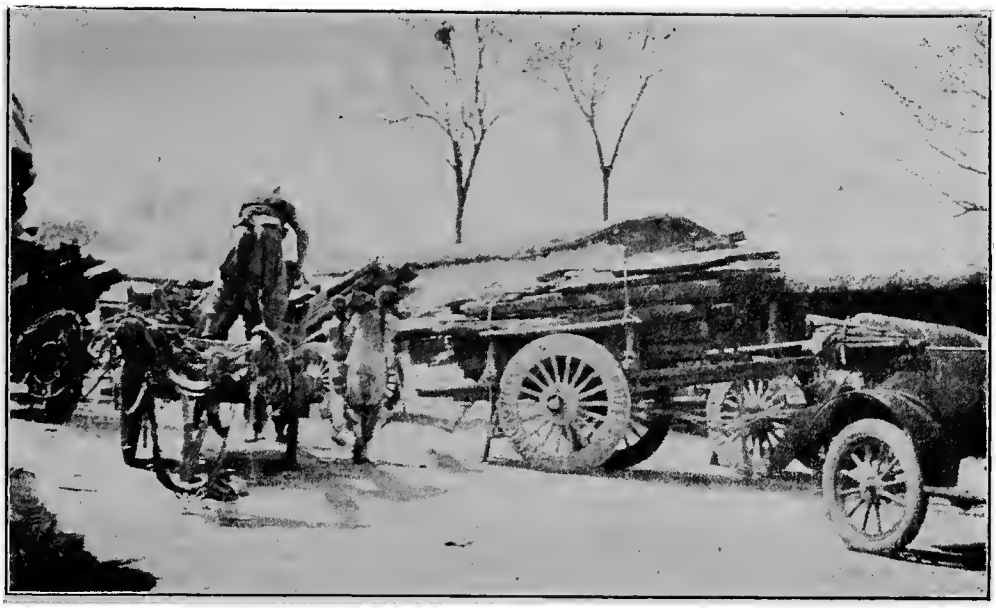
orders from the Director who believed that with the warmer weather the food allowance was ample for the gangs to secure their vegetable ration from sprouting a portion of their allowance of beans. Bean sprouts are a common article of diet to Chinese.

The accounting work of the Stores Division was simple, yet of basic importance. The supplies of grain were really the treasury of the operation. Unless the records could be traced from the bulk to the individual payment with its acknowledged receipt, there was a hiatus which might give rise to any amount of diversion of the working capital. Unfortunately, however, grain does not admit of standard treatment like money. Grain wastes enroute from holes in sacks, improper tying, etc. This may be compared to the cost of exchange, but whereas exchange costs can be recorded as a certain percent and be witnessed by both parties to the transaction, wastage varies according to the kind of grain, the kind of sack used, the number of times handled, weather conditions and many other factors, for none of which standard percentages have yet been fixed. There are also a dozen tricks by which actual pilfering may be concealed. Still more exasperating is the difference in units of measurement in points only a hundred miles apart, and the variations in scales at the same place. At the beginning of our operations we ordered eighteen steelyards, specifying that they must be standard. These were to be used in the Head and the Division Stores. It was found out later that twelve of these scales agreed with each other, and six also agreed with each other but that the twelve and the six differed by as much as three percent.

When grain was received in train load lots, it was impracticable to weigh every sack. But where the sacks were uniform, perhaps a hundred would be weighed and the average weight multiplied by the number of sacks would be taken as the weight of the cargo. This weight was entered on Form C–3: Report of Store Balance. As grain was transferred to Division Stores, Form C–1 Issue was used. This was made out in duplicate, one copy being retained for record, and the other being sent with the grain to the Division Store. The copy was signed by the Division Storekeeper and returned to the Head Store, when the grain had been received. The Head Storekeeper from the record copy listed the amount issued on Form 7: Report of Stores Issued. A different sheet of Form 7 was kept for each Division Store, and at the end of the week each of these was added up and the total listed on the "Issued" side of Form C–3. At the end of the week both sides of Form C–3 were totaled and the difference represented the balance in the Store. Inventories were supposedly taken once a month to verify these balances. But the rush of the work was such that this rule was probably honored in the breach more than in the observance.

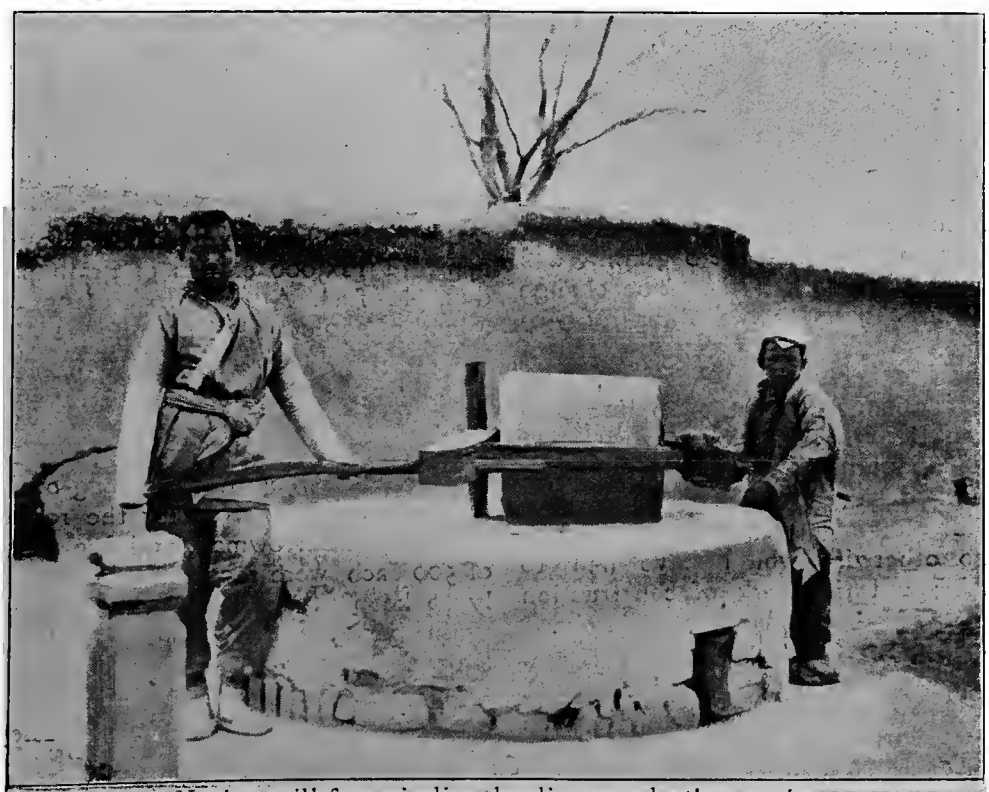
In the Division Stores the receipts were recorded the same as at the Head Store. For Issues, however, Division Stores used a different set of forms, for convenience. For the daily issues to the gang cooks, Form C–16 was used. As a rule, two kinds of grain were issued each day, beans or "cake" being one and the other a "flouring" grain like kaoliang, or buckwheat. The proportions were varied somewhat according to the stock on hand. The weight per gang was first entered in the appropriate column. Then as the gangs received their parcels, they receipted by using the rubber gang stamp on the space provided. The total weight represented by the sheet was thereupon a mere matter of multiplication.

Issues to the families (while payment was on day basis) were recorded on the same principle. See Form C–15.



Carting out old railway sleepers (ties) to division points where they will be used for fuel.

Type of native steelyard.



Native mill for grinding kaoliang and other grain.

By combining these two forms of Issue Receipts, a total could be obtained for insertion on the Issue side of Form C–3 and the weekly balance taken, the same as at the Head Store. However, the need of being eternally up to date at the Division Stores was greater than at the Head Store, for the latter was always stocked well ahead, and the end of the operations for the Head Store was practically fixed from the first. But in the Division Stores "peak" demand rose rapidly and diminished even faster. Hence a Daily Report was used. (See Form C–12). This report was useful to the Manager of the Stores Division principally, while Form C–3 by reducing the number of items, was more convenient to the Store Accountant.

To prevent gangs from appearing a second time for their "family rations" and securing more than their due, a list in numerical order was prepared on Form C–13 from information furnished by the Engineers, and this was checked up as the gangs appeared for payment. This form also served as a recapitulation sheet from which Form C–12, Daily Report, was posted.

When payment was changed to the piecework basis, a different set of forms was required. The forms so used will be described in Chapter XI dealing with the Hantan Operation, where the plan from the beginning was on the piecework basis. The change from one basis to the other in Shantung brought about a great deal of confusion in the Stores Division. But it was abundantly justified in its effects upon the workmen. Those who had been fed all winter and were loafing scandalously, quit immediately; thousands of new workmen were reached who otherwise would have had to suffer; and the work of construction proceeded to speed up immediately.

The District and Division Storekeepers also acted as paymasters to those native foremen, mechanics, etc. who were paid in cash. Form C–8 was used for this purpose.

Transportation Division:

The Transportation Division of the Commissary Department, functioned only in the field. Its responsibilities were to provide for the transfer of grain, salt, and fuel, foreign and engineering supplies from the Head Store to division points. A large proportion of the first cargo from Dairen was shipped immediately from Tehchow to Lintsing via canal before the ice stopped navigation. In the spring shipments were again sent that way on to Nan Kuan Tao. But for the remainder of the season everything went overland, either by mule cart or by wheelbarrow. It was our policy to use wheelbarrows in preference to carts in order to furnish employment to men rather than to animals. However, this policy had to give way to expediency due to weather and necessity for immediate service on some occasions. Carters are a bit more reliable than barrowmen, being men of some little substance, and the units being larger there was less bothersome detail with carts than with wheelbarrows.

At the peak of our operations some 25,000 workmen were employed at one time in Shantung. At 5 catties per man per day, this involved the movement of 125,000 catties of grain per day, plus fuel. A barrowman can push a load of 250 catties (more if he has a helper) about 50 li (18 miles) per day. Returning light he can go further. Our average distance was probably close to 150 li. Hence with three days out and two days coming back, five days were required for the round trip of each barrowman, and five shifts of 500 each, were required theoretically to keep this stream of 80 tons of grain per day arriving at Division Stores. As a matter of fact, the total number at any one time did not rise much above 1,800 barrowmen. They

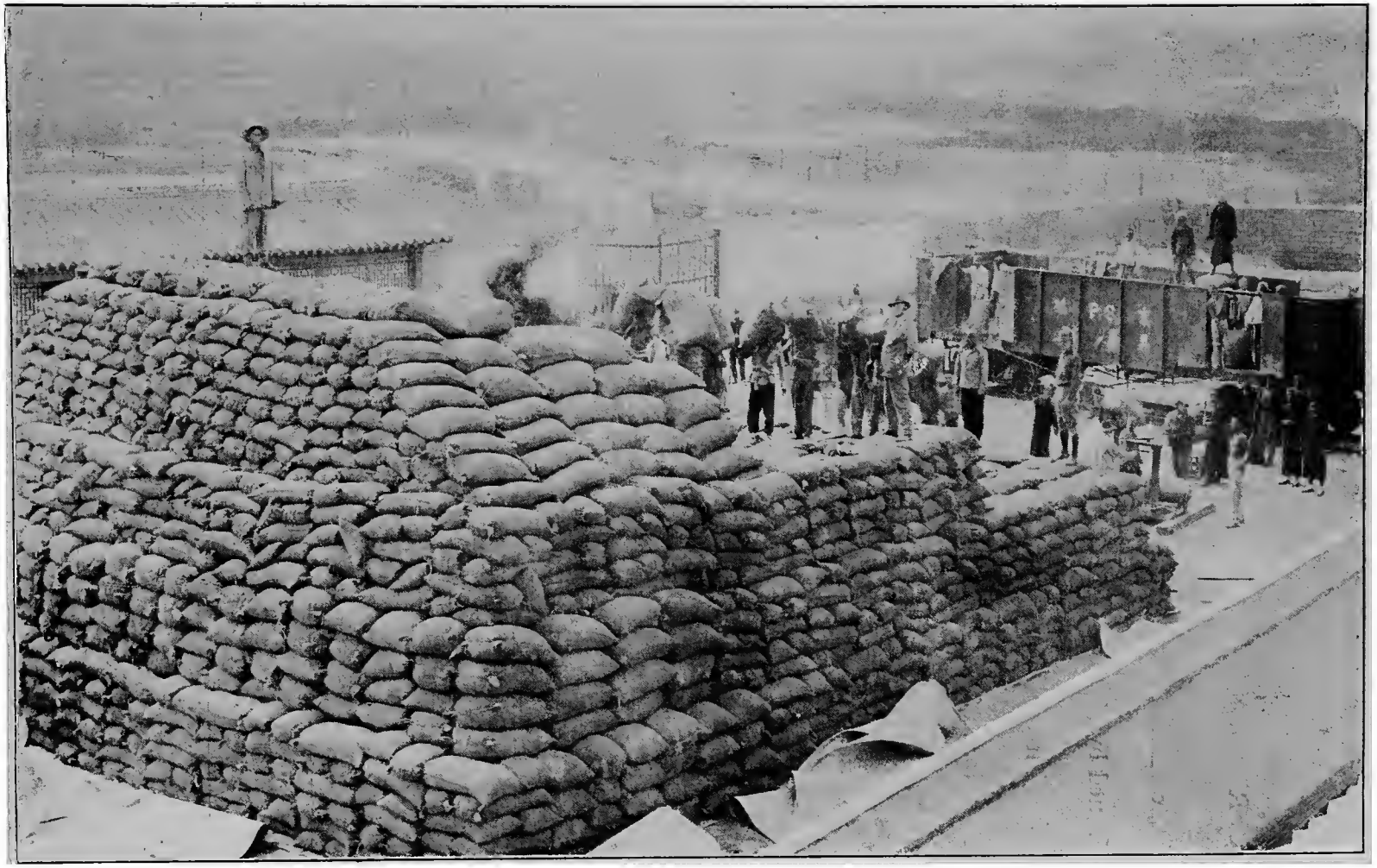
Gang cooks sifting flour.

were paid at the rate of 30 cents per 100 catties carried 100 li—no payment being made for the empty return. Most payments were made in grain equivalents. Until harvest time sufficient barrowmen or carts were available to handle our transportation needs. But at the very close of our operations, the assistance of Magistrates in requisitioning carts and barrows became necessary.

The organization of this large force at first seemed a big problem. Should the barrows be organized in zones so as to keep the men close to home, or should each squad make the complete round trip? If they were organized in zones, in each zone there would be necessary a separate Transportation Manager so as to keep the required numbers constantly recruited. Besides, such a zone sub-manager would always need to be closely informed as to the plans of the Headquarters. The inevitable and everlasting dickering and bargaining which even a starving Chinese will employ to secure what he considers better terms is also likely to break down one of the links in the chain. Hence, the plan of through routes was adopted. This enabled the Transportation Manager to "dicker" back and forth between barrow men and carters, and so by playing one against the other, keep himself from being the victim of a strike by one party or the other.

Barrow men were organized into groups of fifteen or twenty under a captain. The captain carried the shipping documents and was responsible to the Transportation Manager for the delivery of the correct weight of grain in proper condition. Each sack, as loaded on to a wheelbarrow, was numbered and weighed in the presence of this captain. The number and weight was recorded on a list (See Form C-20). At destination, each sack was weighed similarly and the weight recorded in a parallel column. Captains were held responsible for discrepancies beyond one percent.

A favorite method of stealing grain enroute is to insert a pointed bamboo stick, hollowed out, and take out a few catties from each sack. No mark is left on the sack by this method. The weight is restored by pouring back sand or other fine dirt in equal amount. Water sprinkled over the entire sack also accomplishes the same purpose. The successful transportation of such supplies into the interior depends much upon the fine art of detecting such practices.



Storing grain in the open at Commissary headquarters.

CFR

Form 1

Date ..... 192 ..... **ISSUE** No. .....

Issued by ....

Issued to ....

Div. No. ..... Sect. No. ..... Gang No. .....

Articles	QUANTITY	
	No.	Unit

Above articles received on ..... 192 .....

Receiver ..... Receipt No. .....

Approved ....

每 天 報 告 單

E.-1

DAILY REPORT SHEET

區 Division.....　段 Section.....　日期 Date.....

工頭 Foreman.....　住所 Camp.....

雇定的人數
No. of Men employed.. .....

做工的人數
No. on work..... .....

疾病的人數
No. sick..... ....

不到的人數
No. absent.... .. ..

註明
Remarks.... ....

工作
Work... . .. .

材料
Materials..... . . . .

損失及修理的工具
Tools missing or repair..... .....

註明
Remark.....

住所的景況
Camp arrangements.....

遷移
Movements.....

總註
General Remarks.....

簽押
Signature.....

CFR

Form 7

REPORT OF STORES ISSUED

No. ....

To..... *By*.....

Period ending ..... *192*.....

Date	Issue No.	Beans	Bean Cake	Pea-nut Cake	Kao-liang	Corn	Millet				Remarks
TOTAL.....											

Correct: Signed

.....

Issuing Storekeeper

.....

AMERICAN RED CROSS
C. F. R.

Form C-3

REPORT OF STORE BALANCE

No. ....

Dr. *Store* .... *Period ending* .... *1921* **Cr.**

RECEIPTS

Date	Received from	Quantity							
		Beans	Bean cake	Pea-nut cake	Kao-liang	Corn	Millet	Rice Flour	
	Balance last report								
	TOTAL								

ISSUES

Issued to	Quantity							
	Beans	Bean cake	Pea-nut cake	Kao-liang	Corn	Millet	Rice Flour	
Balance on hand								
TOTAL								

Accepted ....
Chief of Commissary

Signed ....
Storekeeper

Form C-46

AMERICAN RED CROSS — CHINA FAMINE RELIEF

SHANTUNG

ISSUE RECEIPT.

IN CATTIES

Gangs of more or less than thirty must be reported on separate sheets—scratch out the word Thirty and insert actual number in gang.

Received from Store No. ..... *Date* ..... *1921.*

One Thirty-man Gang Daily Ration—Containing :

ARTICLES	Weight Per Gang	Total number of Gangs	Total Weight This Sheet	
VEGETABLES				
COAL				
WOOD				
SALT				

GANG "STAMP" BELOW.

This report to be made out in Duplicate. One copy kept in issuing store and Original sent with Daily Report to Head Store at Pingyuan.

Signed .....

Storekeeper.

Form C-15

AMERICAN RED CROSS — CHINA FAMINE RELIEF

FAMILY ISSUE RECEIPT.

IN CATTIES

Gangs of more or less than thirty must be reported on separate sheets—scratch out the word Thirty and insert actual number in gang.

Received from Store No. ..... *Date* ..... *1921.*

One Thirty-man Gang Family Rations for two weeks from ..... *1921 to* ..... *1921 containing:*

ARTICLES	Quantity Per Man	Quantity Per Gang	Total Number of Gangs	Total on This Sheet	

GANG "STAMP" BELOW.

This Report to be made out in Duplicate. One copy kept in issuing store, and Original sent to Head Store at Pingyuan.

Signed .....

Storekeeper.

AMERICAN RED CROSS
C. F. R.

Form C-7

DAILY REPORT OF TRANSPORTATION DEPARTMENT

Agency ..... *Date* *1921*

Shipped to	Quantity	Goods	Permanent Carts	Temporary Conveyances			Estimated Am't still in Transit	No. of per. carts ready for work	No. of barrows etc. ready for work	Remarks
				No.	Name	Price				

Received from	Quantity	Goods	Permanent Carts	Temporary Conveyances			Condition of Goods on arrival	No. of per. carts ready for work	No. of barrows etc. ready for work	Remarks
				No.	Name	Price				

Form C–13

AMERICAN RED CROSS

GANG ISSUE

CHINA FAMINE RELIEF

IN CATTIES

Store No. ..... *Date* *1921*

Gang No.	Number in Gang	Beans	Bean Cake	Peanut Cake	Kaoliang	Millet	Vegetables	Salt	Coal	Wood	Remarks
Total											

(DAILY TION SHEET OF ISSUES SHOWN ON FORMS C-15 AND C-16)

These Amounts Transferred to Daily Report

Signed .....
Storekeeper

Form C-1[2]

AMERICAN RED CROSS **CHINA FAMINE RELIEF**

DAILY REPORT

IN CATTIES

Store No...... *Date*.....*1921*

ARTICLES	Balance on Hand From Date.....	RECEIVED	ISSUED	BALANCE	REMARKS
STANDARD DAILY GANG RATION					
STANDARD FAMILY RATION					
BEANS					
BEAN CAKE					
PEANUT CAKE					
KAOLIANG					
CORN					
COTTON SEED					
VEGETABLES					
SALT					
COAL					
WOOD					

This Report to be made out in Duplicate, One copy kept in issuing store, and Original sent with all receipts to Head Store at Pingyuan.

Signed.....

Storekeeper

AMERICAN RED CROSS, CHINA FAMINE RELIEF

Form C-8

CASH PAY ROLL

Statement of Pay and Allowances Claimed for Civilians Employed with *The American Red Cross, China Famine Relief*, for the month of ..... 1921, at District....., Division ....., Camp.....

Zinc Tag No.	Name in Chinese	Occupation	PERIOD		AMOUNT				PAYMENTS		SIGNATURE or MARK, WITNESSED
			From	To	Days Absent	Days Worked	Rate per Month or Day	Total Amount Due	Mid Month	End of Month	

I certify that the number of ..... for whom pay is claimed were employed during the period stated.

Approved:

.....

Supt. ..... Dept.

.....

Form C-20

No. .....

INVOICE

To .....

.....

.....

.....*19* .

Dear Sir,

Please received:

Sack No.	Description	Differences + or —	Quantity: No.	Quantity: Unit

Yours faithfully

.....*Receiver*

.....

To be receipted and returned

CHAPTER VII

HEALTH DIVISION

(Shantung)

DR. F. F. TUCKER,
Superintendent of Relief

DR. D. E. FORD,
Chief of Health Division

(Written by Dr. Ford)

DR. D. E. FORD

Malig[illegible] tumor, Workman
on [illegible] near Hsiachin.

THE work of the Medical Department was to care for the health of the ever-changing army of famine sufferers recruited to build roads. Though there are no sanitary laws or regulations, the living conditions among the farmers are more healthful than in the citles, in that the former are less crowded and are out of doors nearly all the time. Village sanitation is purely an economic question, not for health or for cleanliness. Dirt is expensive. Nothing is wasted. Any vegetable or animal waste that cannot be used as fuel or food is carefully preserved, mixed with earth, in brick-lined pits for use on the fields. Latrines are small, usually bricked-up pits, open to the air, sun and flies, but cleaned at very short intervals. Public latrines are built on the main streets, each owned or rented for profit by a private individual. The roads between towns are closely patrolled by professional manure gatherers, and every pack animal and cart carefully trailed.

The adobe houses are dark and dirty, without floors and unheated. There is no wood, the fuel being kaoliang (kaffir corn) stalks and straw, and the cooking stoves discharge their smoke directly into the rooms. Water is limited, and this with the lack of fuel, has made winter bathing merely a tradition. With the onset of cold weather every one fastens his padded garments, adds his extra suits and is dressed till spring. I have counted seven fur lined coats on one "famine sufferer." Lice are accepted by all, along with the smoke and raw cold, as normal living conditions and no attempt is made to combat them, be[illegible]use no one can see any cash rew[illegible] for the struggle.

Early in the wint[illegible]cians long resident in China [illegible]er, p[illegible]ed a typhus epidemic as sure [illegible] pred[illegible]ow up on the heels of the fa[illegible] to follo certain was this epidemic, [illegible] mine. [illegible]ial board was created, wholly distin[illegible]rom the Red Cross, and a fund of $150,000. Mex. raised to prevent or handle it. Everything was ripe for it. Millions of people weakened by poor food, many concentration camps, filthy personal habits and 100 per cent lice infested, certainly made ideal epidemic conditions.

This was the situation that the Red Cross had to meet in Shantung. The job there was definitely outlined, and from a point of view of the Medical Department had its own special conditions. Some of these special conditions included the policy of the Red Cross to put as small a percentage of its funds into equipment as possible and as much as possible into food; twenty-five thousand undisciplined men on piece work over 200 miles of road; and men suspicious and, on occasion, justly hostile to foreigners, full of strange and incomprehensible ideas, and whose family and personal history had always included lice. It looked more formidable than it actually turned out to be.

It was handled in three ways: First by furnishing a balanced ration. The laborers wanted kaoliang alone because they were accustomed to it and because it represented a stable local market value. There was strong opposition to receiving pay in any other kind of food—an opposition on several occasions backed up by mob fights with clubs and bricks. But on the whole there was little trouble and the other rations accepted. Beans, beancake, peanutcake and cottonseed were given together with salt and fuel for cooking. Thus the nutritional disturbances, due to a one-sided, strictly carbohydrate, diet were prevented and bodily resistance, the best preventive of epidemic diseases, kept up to normal. There was no beriberi on the Shantung division, and little scurvy; in fact, practically no famine effects of any kind were seen among the laborers or their families after the first months.

Red Cross native physician and delousing squad, which consisted of foreman, two pressers, and two swabbers.

Then by a system of dispensaries and inspection, epidemic diseases which broke out on several occasions, were controlled and successfully isolated. When I came into the work in January, Dr. Struthers and Dr. Brafladt of Tsinanfu, whom I succeeded, had already started this system which, enlarged and modified, was used throughout the work. At that time there were about fifty miles of road under construction and five thousand laborers on the work. There were two dispensaries under Chinese foreign-trained physicians, located on the road, and the excellent hospital of the American Board Mission at Tehchow, available for serious cases.

The laborers were recruited in the regulation gangs of thirty, each gang with a permanent number, and billeted in temples and houses in the village nearest their work. At each billet one or two men were appointed by the gang headman, as sanitars, whose duties were to clean the rooms and latrines daily and to hang out all the bedding for at least eight hours. All gang numbers and names of villages, where they were billeted, were kept on record at the dispensary covering the division. The physician at each dispensary had two or more inspectors who travelled continually from village to village recording the conditions of the billets, reporting any serious illness among the laborers or villagers, and keeping the local sanitary men up to their work. Upon inspection reports, checked by local physician, sanitary men were praised or discharged. This system was enlarged with the extension of the construction work, until in May it was covering over two hundred miles of road and 25,000 laborers at one time. It proved very effective. Several epidemics threatened but on each occasion the gangs affected were seen by the district physician within twenty-four hours, moved to isolation temples and put under special quarantine guards and medical treatment. The weekly reports show that from January 20th to June 30th, 4,348 billet inspections were made.

The dispensaries were established near centrally located grain distribution stores and moved from time to time with the extension of the work. Their equipment was small but replenished as required, the aim being to adapt it to the work of keeping the laborers in shape, rather than constructing model hospitals. Daily reports were kept and weekly summaries sent to the Medical Director. From January 30th to June 30th, 4,205 cases were treated, a total not including the return cases of the two largest dispensaries. In May there were eight dispensaries under six Chinese and two foreign physicians.

And third, a delousing and disinfecting system which would meet the special working conditions, was put into operation. The central bath and delousing stations which were being constructed when I went on the work did not prove a success, and it could be seen at once that they would not do for Shantung. The men were too busy with their piece work (each gang was paid in proportion to the amount of work done) and being moved to new work too often to be in touch with central baths, though at Hsia Chin, which was a big center for quite a time, 8,072 baths were given. Here the city bath was leased for a small sum and the men and clothing deloused by the kerosene and charcoal method detailed below. And 2,573 were deloused at a small bath built at En Hsien. For this latter work it took almost three tons of wood, hauled ten miles—sixty-five pounds for each gang of thirty men—to heat the water.

If delousing was to be done in any effective way the apparatus would have to be taken to the men as they worked, and their billets would have to be disinfected at the same time. So in March a system was put into operation which overcame rather successfully

Delousing squad on the move.

Lighting up the charcoal irons.

the failure of the stationary delousing plants. It was an adaptation of the kerosene bath and hot pressing iron method used in Serbia and Mesopotamia and in Siberia.

The dispensaries were made the centers for delousing as well as for treatment and inspection. Each physician had a delousing foreman who was in charge of from two to eight squads, depending upon the number of laborers in the division and the mileage of road to be covered. A delousing squad was composed of six men and a billet disinfecting squad of four. The more intelligent laborers were selected for this work, their pay increased. They were given two white cotton suits and allowed to wear an armband with a red cross on yellow, but had to consent to their cues being cut. One man of each squad had to be able to write. He was appointed No. 1 man and had to report daily the numbers of the gangs deloused and billets disinfected; or if distance was too great, a report was made every two days.

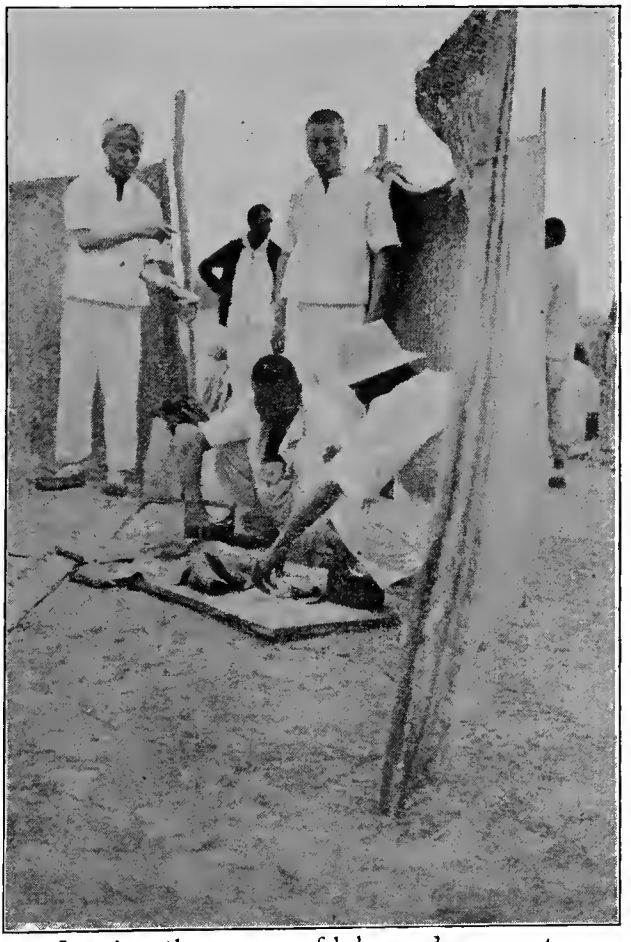
The apparatus and operation of these mobile delousing plants was as follows: Each squad had five straw mats, about 5x11 feet, which had been strengthened by cross pieces of split bamboo and fitted with tie ropes at the ends. Four of these were used as a screen, tied to nine six foot stakes. The sixth was to be laid on the ground as a carpet. There was a wooden box containing thirty pairs of cotton trousers, Chinese style, and fitted with rope handles. Another box carried charcoal and two large charcoal heated pressing irons. An open kerosene tin with wooden handles containing two gallons of kerosene and a small spray pump—enough for a day's work. And for the pressing of clothes there were two heavy boards, two by four feet. It was intended that six men should carry this apparatus to the work on poles, for it was not too heavy, but in a few days each squad found a wheel-barrow.

The foreman and physician gave the squads orders each morning as to what sections or gangs should be covered. Arriving at the road, where the laborers were at work, stakes were driven and the screen mats attached. Inside one entrance a man was stationed with the can of kerosene, spray pump and a number of twelve inch squares of cotton cloth. Two men heated up the charcoal irons and placed the boards within the side entrance. Another in charge of the cotton trousers was stationed at the exit. No. 1 man with the help of the headman lined up one gang and five or six men entered the enclosure at a time, stripped and rubbed themselves all over with kerosene, while the man with the sprayer assisted. Then each put on a pair of the trousers and went back to work. The clothing was turned by a sixth man and handed to the pressors, who passed the hot irons over all the seams and threw it outside the enclosure. In the meanwhile another batch of men were being kerosened. Before the gang was finished the first batches were returning for their clothing and handing in the trousers. No. 1 man was responsible for all property.

From late in March to June 1, 50,238 men were deloused by these mobile squads and 10,695 by the kerosene and charcoal irons used with bathing at the En Hsien bath and the city bath at Hsia Chin. Late in May there was so much friction between the management and the men over land buying and the coming harvest, that delousing was discontinued west of the railway. The danger of typhus was practically over. To the east only 5,788 were done in June. This brings the total number deloused to 66,621. While this method did not eradicate all lice, inspection showed that the number of infested men was reduced from nearly one hundred per cent to ten or fifteen.

While the men were being deloused along the road, the squads of four men armed with large spray pumps and

Laborers swabbing themselves with kerosene.



Ironing the seams of laborers' garments.

Bathhouse at En Hsien, under construction.

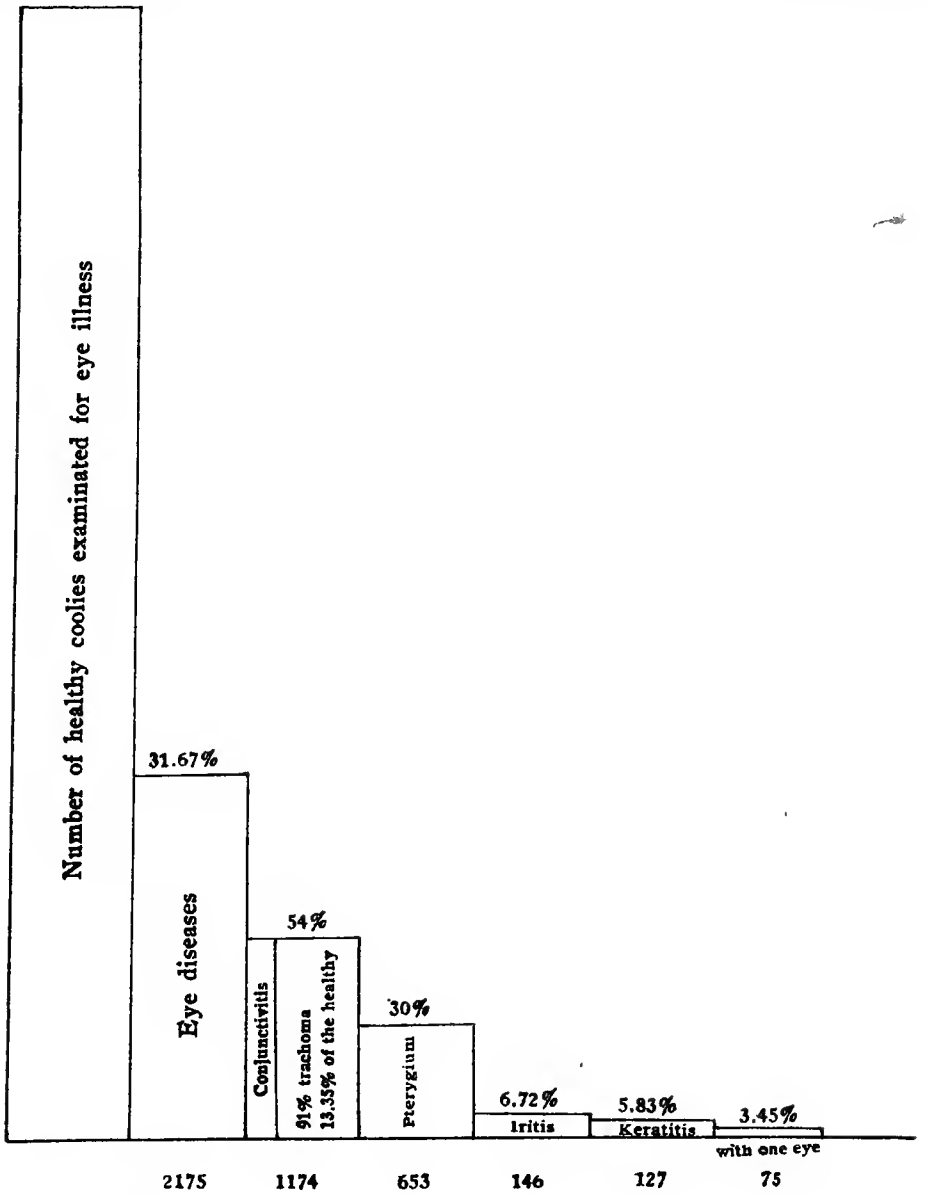
Williams-Porter Hospital, Tehchow.

Diagramma Morbium Oculis

June 10, 1921

American Red Cross

China Famine Relief



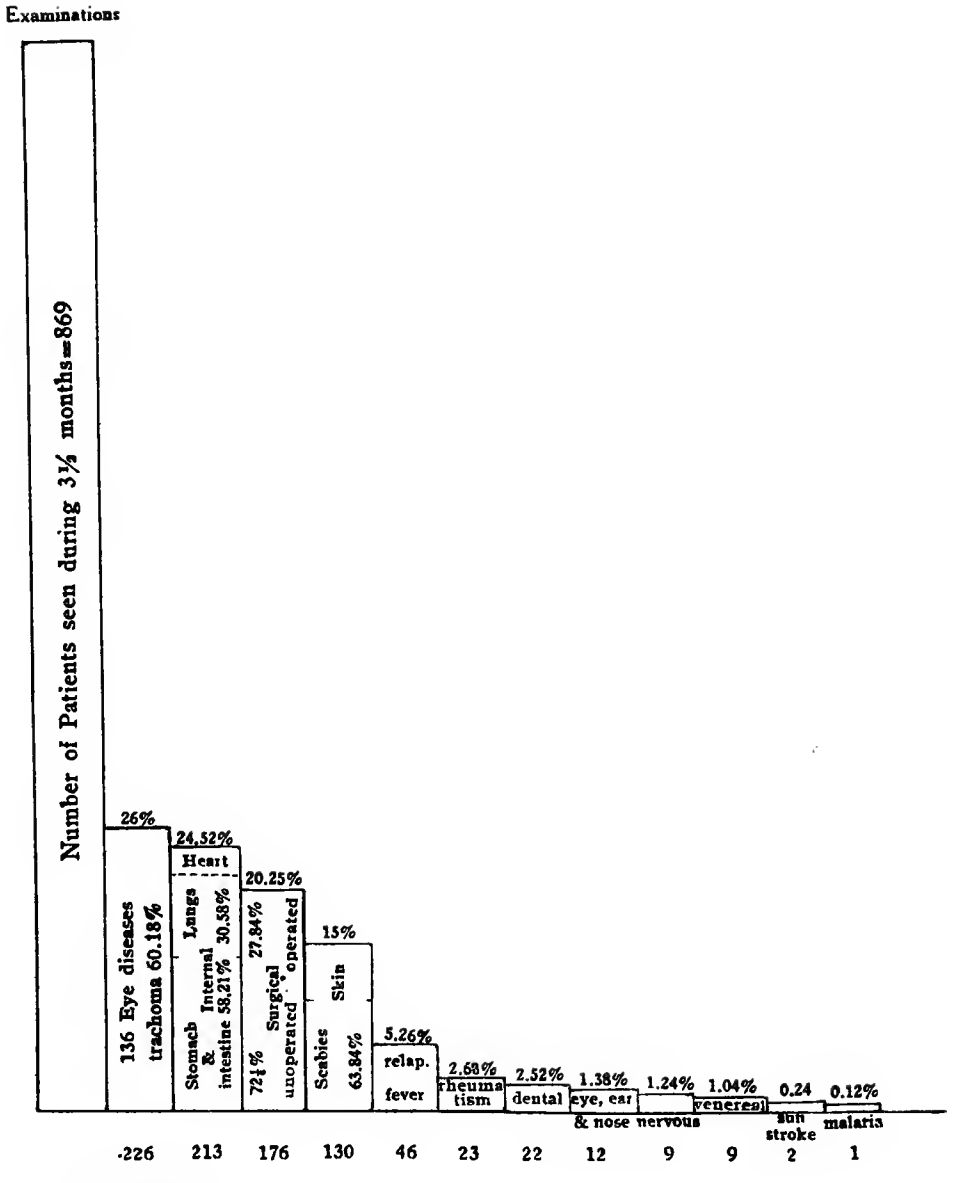
Shantung. China.

Dr. S. D. Joffick

Diagramma Morbium

June 14, 1921

China Famine Relief



Shantung, China.

T = Cotton Trousers
K = Kerosene.
B B = Ironing Boards.

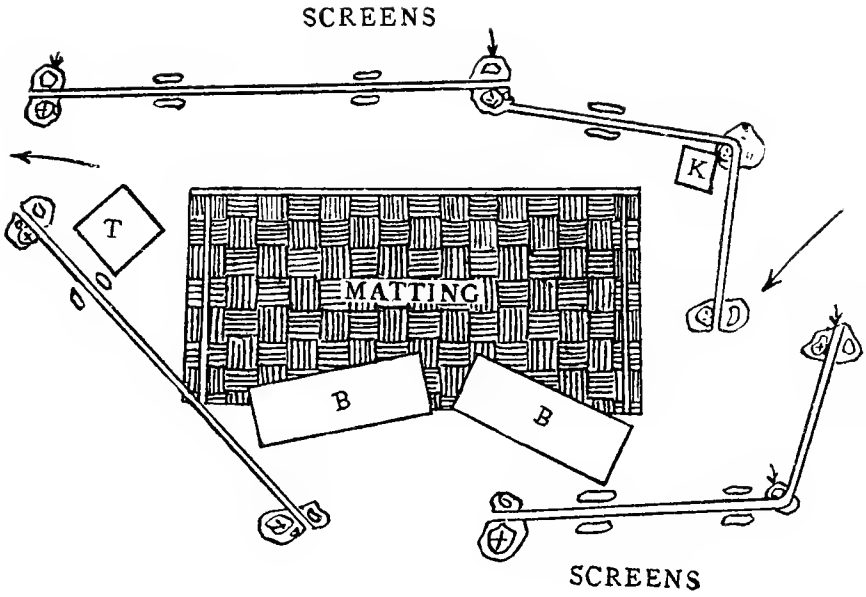


Diagram of de-lousing enclosure

lysol and beating sticks, visited their billets, sprayed and beat the bed coverings and mats. There were 2,444 billet disinfections by this method.

The fact that typhus did not break out among the laborers in Shantung was largely a matter of good fortune, for not all the lice were killed by any means and the laborers were constantly in contact with the villagers. But the machine of inspection and disinfection was there and operating, and would have detected and handled any infected gangs within twenty-four hours. And it shows what can be done with an untrained staff in the way of handling large numbers of undisciplined laborers.

As an experiment in working with people not in Red Cross employ, the streets and forty-two court-yards in the village at Yu Cheng station were cleaned. And at Yu Cheng Hsien the prison and prisoners were deloused. This was repeated later upon request from the police.

At the dispensaries 4,205 cases were treated (at least 5,000 visits) with five deaths. Each dispensary had a room where five or six patients could be kept for treatment if necessary, and these small hospitals were very effective in keeping down the number of men to be sent to the large hospitals at Tehchow and Lintsing. Transportation was difficult and slow. Fifty to seventy miles by Peking cart, wheelbarrow or carrying poles would have been necessary in several instances but for these dispensary accommodations.

An analysis of 3,528 of these cases will give a fairly accurate idea of the diseases prevailing among the adult male population of Shantung. Some women and children were treated but the number was small and may be disregarded.

		per cent
Eye Diseases	904	or 25.62
(Of these 10.8% were Trachoma)		
Gastro Intestinal	745	or 21.12
Respiratory	294	,, 8.33
Cardiac and Circulatory	45	,, 1.27
Nervous and Mental	54	,, 1.52
Venereal	54	,, 1.52
Skin Diseases	381	,, 10.79
Contusions, Sprains and Lacerations	327	,, 9.26
Abscesses and Local Infections	555	,, 15.72
Infectious Diseases	169	,, 4.77

Rheumatism (acute and chronic articular)	57
Influenza	68
Leprosy	2
Cholera	6
Cerebrospinal Meningitis	1
Malaria	8
Smallpox	14
Mumps	3
Whooping Cough	2
Paratyphoid	5
Relapsing Fever	3
	169

There were five deaths:

Pulmonary Tuberculosis	1
Acute Gastritis	1
Cerebrospinal Meningitis	1
Influenza	1
Cholera	1

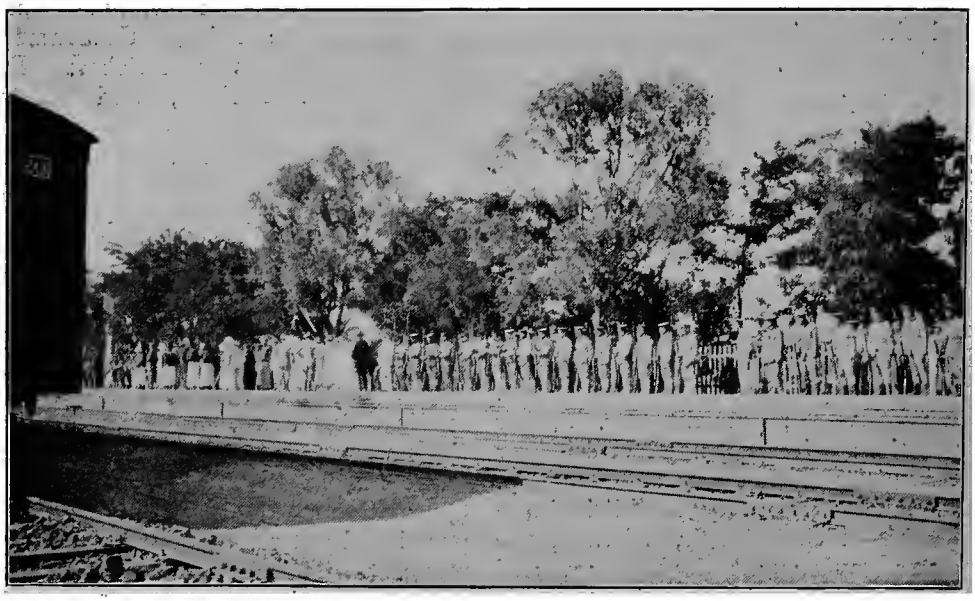
While all of these patients were recruited from the most needy of the famine sufferers, the proportion of epidemic diseases among them was remarkably low. The only place where the effects of famine show in the statistics is in the high percentage of gastro-intestinal complaints. One of the first effects of famine conditions is not a reduction in the amount of food eaten, but a substitution of less nourishing and usually unused articles, to increase the bulk ingested in an attempt to relieve the feeling of hunger. These substitutes are of many kinds and are ground up with kaoliang or millet for the steamed cakes. Even in normal times the poor eat little wheat.

Corncobs, chaff, dried elm leaves, and bark are the commonest substitutes. The result is much chronic gastritis and chronic diarrhea from irritation of the lower colon.

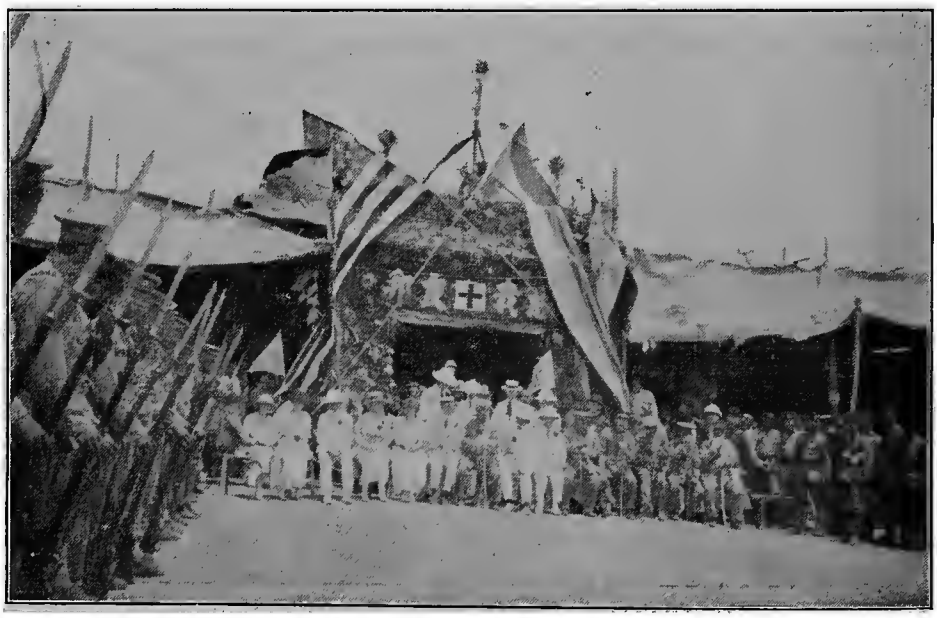
As famine statistics, these records would have been of more value if made before, instead of being begun six weeks after, relief was started. As it is they show the effects of famine relief work rather than of famine.

Mention should be made of the work of Dr. Tucker, Superintendent of Relief, in confining the outbreak of pneumonic plague to its original area. Suspects were reported to Dr. Tucker from the station just north of Tehchow during the last days of February. Dr. Tucker promptly established the identity of the disease, informed the proper government department, and effected a quarantine. Railway traffic was put under rigid restrictions, and within two weeks it appears that the epidemic had run its course. The order had been given out for the removal of travel restrictions when Dr. Yu of the Chinese Government medical forces was stricken. Dr. Tucker, Dr. Perkins, and several others of the Red Cross forces had been contacts with Dr. Yu when his symptoms began to manifest themselves. It was necessary to isolate them all for five days. During these trying days several developed symptoms similar to those of "plague" but in every case except Dr. Yu, the symptoms passed. The death of Dr. Yu was a profound loss to the Chinese medical fraternity. Railway restrictions were resumed and remained in effect almost to the end of April. Quarantine regulations were again imposed and not relaxed until all danger was past. That "plague" was prevented from entering the Red Cross area was largely due to Dr. Tucker's promptness and experience.

Drs. Tucker and Perkins in "plague" uniform.



Opening Ceremonies at Yu Cheng, June 10—The Governor's Special is due.

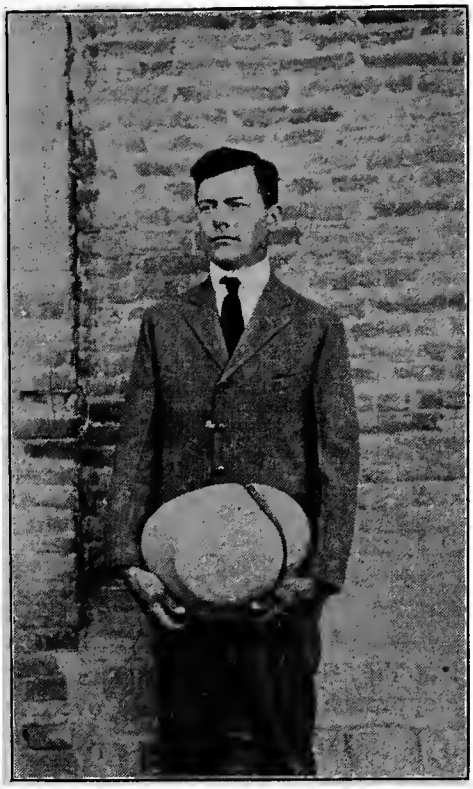


The Reception Pavilion, Yu Cheng, June 10.

Opening ceremonies at Yu Cheng, June 10. The formal barrier ready to be removed on the approach of the car with Governor Tien Cheng Yu.

The barrier removed. The job finished.

Mr. L. Kolesnikoff,
Chief Engineer.



Dr. F. J. Wampler, Field Manager, P'ingtingchow.

Dr. F. H. Crumpacker,
Assistant Field Manager
and Chief of Commissary

Typical country around P'ingtingchow.

CHAPTER VIII

P'INGTINGCHOW OPERATION

(Shansi)

Field Manager	DR. FRED J. WAMPLER
Assistant Field Manager / *Chief of Commissary* ..	DR. F. H. CRUMPACKER
Chief Engineer	L. KOLESNIKOFF
Chief Health Officer .. .	DR. D. L. HORNING

THIS operation was located just inside and parallel to the eastern boundary of Shansi. Its northern end was at Yangchuan, on the Cheng Tai railway, and its southern extremity was at Liaochow, eighty miles distant.

The northern half of this operation traversed a territory rich in coal, iron, fire clay and limestone. A coal seam near the road measures nineteen feet thick, and others in the same county are said to be forty feet thick. Small potteries, coal mining by native and foreign methods, iron smelting by hand methods, and a few trades which grow out of it, constitute the industries. Agriculture is carried on in all spaces where there is dirt enough to raise crops, but in normal years this northern portion does not raise grain enough to support half its population.

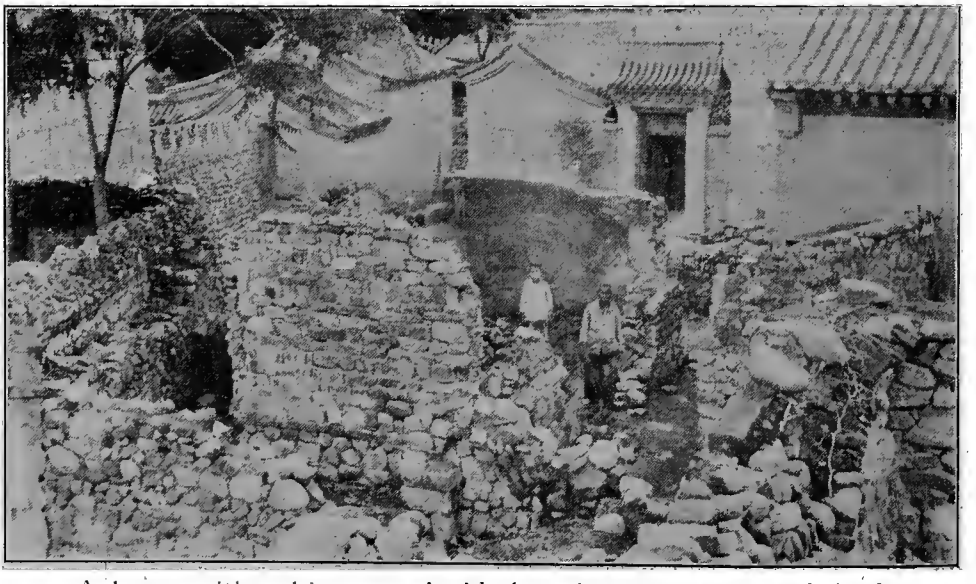
The southern half of the operation traversed an agricultural territory, principally, which in normal years can export considerable grain.

During the season of 1920, in the northern half, the principal crop—millet—did not yield enough to replace the seed, and corn and kaoliang did little better. The year before, 1919, saw a severe drought, and 1918 saw a pest of locusts and severe losses by hail. The population, therefore, had no reserve resource. Even in July and August they were eating leaves from trees, tree bark, and chaff. By October suicides and deaths from starvation were of frequent report. The industrial portion of the population was as bad off as the farming portion, for their business had fallen off to the vanishing point, because the farmers were not buying.

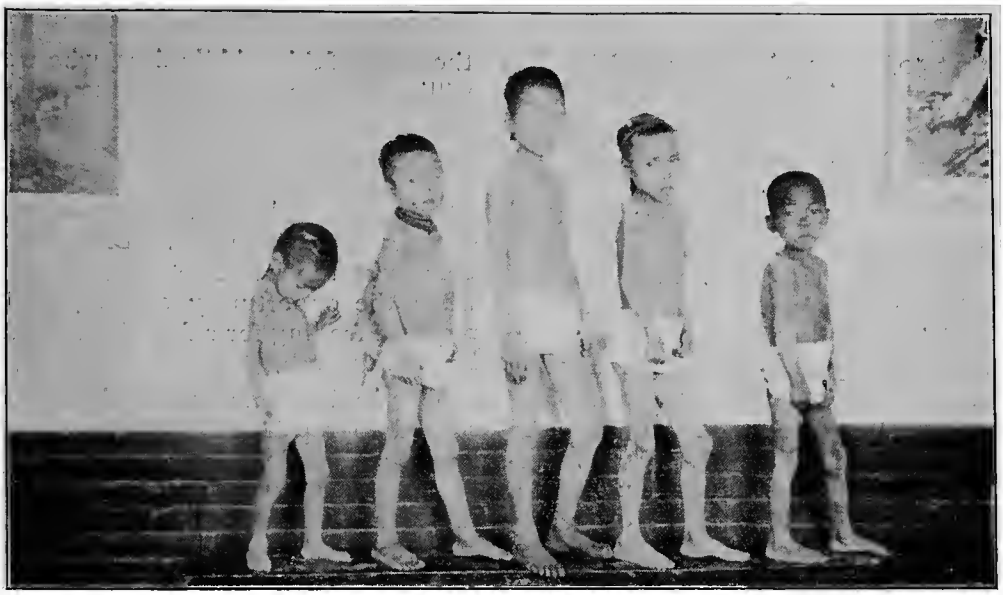
Refugees from other provinces added to the difficulties of the situation. Because Shansi has no heavy floods, like Chihli, flood victims have acquired the habit from generations of experience of taking refuge in Shansi whenever disaster overtakes them. Thinking of Shansi only as a land of continual plenty, this year they trooped in as usual, only to find conditions fully as bad as those left behind. Most of these refugees passed on through, but the problem of feeding them while they were passing was one of serious moment.

Methods of relief were undertaken early. Even in August a Price Stabilizing Bureau was established in the county of P'ingting, which purchased grain, brought it into the county and sold it below market rates. Local and provincial officials made gifts of grain and of funds. Business men combined to purchase the products of the iron foundries so as to keep alive these families of craftsmen. It is estimated

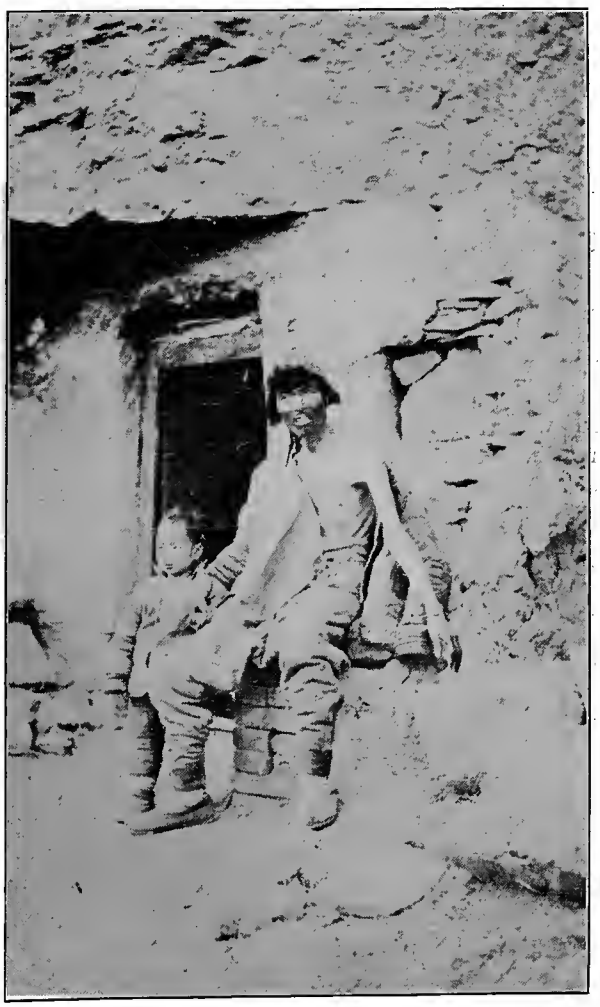
Chihli Refugees migrating to Shansi.



A house with a history. Amid the ruins are the son and the father of the owner, who sold first a small daughter, next a baby boy, then his wife (who killed herself three days later) and lastly the roof of the house.



Famine types : Girls in the refuge at P'ingtingchow.



Famine types : Too weak to walk unassisted to the job.

that 50,000 people were saved by this expedient. The Church of the Brethren Mission secured considerable funds in America, which were also immediately applied.

But all of the native organizations for relief confined their aid to the aged, widows, orphans, and those without saleable property. There were not sufficient funds to extend help to any who by any shift could get through alive on their own devices.

Thus it was that the people who owned any land or who owned buildings were unable to get relief from these organizations. This, of course, meant that the organizations were feeding the people who are always more or less a burden to society and often those who were really not very worthy of help, while the great middle class of thrifty farmers had to sell their farms to rich people at a very much depreciated value, or starve.

There was one provision, however, for these people. The Provincial Assembly also arranged for a loan fund. Thus, the local governments in the worst sections established a Loan Bureau which would loan money to land owners on their deeds. At the very most they would loan only 30% of the value of the deed and would take up the deed when making the loan. The interest was to begin with 1% per month and increase every six months until the end of three years, when the loan was to be paid back or the property sold. Many people made use of this opportunity, but none of them were enthusiastic about it because it was too big an opportunity for them to lose their hard-earned homes to somebody else for only a small fraction of what the property was really worth.

It was largely to relieve this situation that representations were made to the American Red Cross, China Famine Relief, to make an appropriation for this section which could be used in building a road. This would allow those out of this middle class, who were willing to work, the opportunity to earn for themselves and their families enough grain to keep them in working condition and able to go on with their farming and industrial work when the proper time came again. Large numbers were too weak to walk to work when the opportunity came, and all required feeding for a few days before beginning work.

This application was made before the second appropriation of $500,000 gold had been made. But several large gifts had been received, notably from the Manila Chapter of the Red Cross, and from the Standard Oil Company, and out of these funds, a grant of $20,000 Mex. was made for the purpose of building a road from Yang Ch'uan, on the Cheng Tai railway, to P'ingtingchow, some six miles. Shortly afterward, word of further gift from National Headquarters was received, and the appropriation was raised to $200,000. This has been augmented from time to time as the work required, until nearly $600,000 Mex. has been allotted to the entire route, Yang Ch'uan to Liaochow.

The need for a road in this section was very great. Roughly speaking, the population to be served by this road is more than one million people. Up to the present the only means of transportation for freight and passengers are pack animals. Since the northern part of the territory is largely industrial and has to have grain stuffs brought in from the outside, most of this grain in ordinary years comes from the southern end of this area. Manufactured products from the northern end, together with government salt, coal, oil, and all kinds of imported goods, have to be carried south from the railroad. In addition to this, the hauling of the coal and iron to the railroad stations was also an important consideration for a road. A mule can carry on a pack only about two piculs. Hitch him to a cart on a road that has a

Types of Shansi's "bold peasantry"
which the Red Cross helped.

Waiting to be registered and assigned to work.

good grade and he will pull five times as much. The number of mules and donkeys that travel over the section of this road on an average day near Yang Ch'uan station would be about five thousand.

The old Peking-Taiyuanfu-Hsianfu trail, which has been used by China's emperors and millions for hundreds of years, makes up the first eight miles of road from Yang Ch'uan station south, and the first twenty-four miles runs along the trail from Shuntefu to Taiyuanfu.

RIGHT OF WAY FOR THE ROAD

The provincial government made itself responsible for the right of way, not only for the purchasing of the land but also for the expenses in connection with the removal of graves, temples, houses and trees. As soon as the line was surveyed, the route was gone over by representatives from the provincial Highway Bureau and satisfactory adjustment made with the local people.

The co-operation of the local officials and people was generally very hearty. In only a few cases was there any objection to the work and this always on the part of people who preferred to have somebody else's land occupied. Magistrate Liang, of Hsi Yang county, should be mentioned especially for his hearty assistance and valuable aid.

RECRUITING

ANNA V. BLOUGH, *Chief of Division*

The plan of organization followed was the same as that followed in Shantung. The instructions issued for recruiting, for co-operation of departments, and the organization itself was patterned after those in Shantung. Due to a scarcity of men, and the need for them in other departments, women featured in the personnel of the organization in both the Recruiting and the Commissary Departments.

ANNA V. BLOUGH

These women of the Church of the Brethren Mission, out upon their journeys in those desolate mountain villages, or alone managing the payment of rations from an interior Division Store, offer examples of quiet heroism which should not go unnoticed. The rapidity with which workmen could be placed on the rolls depended principally upon how fast the surveyors could get the line staked out ahead. The Recruiting Department was, until the last, ahead of its requirements, and the workmen were always on the very heels of the surveyors.

All told, the Recruiting Department furnished 21,300 men to the work. In addition, considerable numbers were used in stores, on transportation, and various small jobs, so that the total number of employees in manual work was approximately 25,000.

COMMISSARY

DR. F. H. CRUMPACKER, *Chief.*

1. *Billeting.*

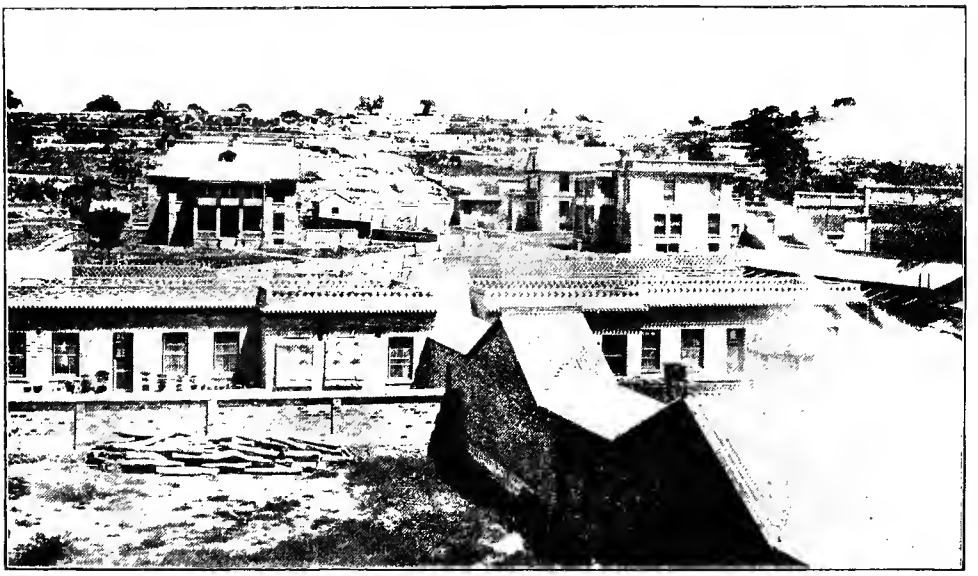
This division dealt with billets for workmen especially. Quarters for foreign personnel on the line were provided in temples and inns, principally. At P'ingtingchow and Liaochow the Mission homes were opened, the Red Cross paying the estimated cost of food, service, and wear of linen. At first their rate was fixed at $2.00 per day but later was raised to $2.25.

In the most of our territory we were fortunate to have an abundance of temples, empty caves, farm houses, and mining camps that were available for the housing of our laborers. The men slept on the ground where brick beds were not available. When this was necessary an allowance of ordinary millet fodder was made that they could use as mats. After the weather became warm the use of fodder was discontinued.

In the beginning the billeting was in charge of a foreigner but later, as the

Grain supplies at Yang Ch'üan—rail head

Pack animals waiting to take out "family" rations.
The disks are beancake.



Church of the Brethren Mission, P'ingtingchow Red Cross Headquarters.

weather grew warmer, the work was given into the hands of a few capable Chinese, the Chief of Commissary supervising. This work was done in connection with the local officials in every event, and in practically every place the support was hearty.

In the mountains where the villages and other buildings were sparse, we were compelled to build a few temporary mat sheds, but on the advice of the field manager this method was not generally used because of the cold, and at times, local rains which made it unhealthy for the laborers.

The billeting continued to the very end of the operation because there were either new gangs being added or old gangs were being transferred and re-located.

2. *Food Allowance.*

Following the experience in Shantung it had been suggested that the laborers should have one and one-half catties of grain per day, and the families to draw at the rate of three catties per day, and each gang to have a daily allowance of ten oz. of salt. The allowance of grain was later increased to two catties per man per day, the additional half catty being donated by the Church of the Brethren Famine Relief Committee. This change was recommended on the field and sanctioned by the Director.

We had during the operations at various times and places the following grains for the laborers and their families: millet, rye, kaoliang (cane seed), buckwheat, oats, corn, wheat, beans, beancake, and rice flour. At no time did we issue more than three kinds of grain at one time. All of the above grain was received and used gladly by the laborers and their families except the rice flour. This came to us in a damaged condition and caused a lot of dissatisfaction and probably some sickness, so that its use was discontinued before its supply was exhausted. Later the few remaining bags were given out to the beggars.

The largest number of laborers fed at any one time was about 19,000. The laborers, including their families, would total more than 100,000. To feed the laborers and their families during the operations we received 7,154,122 catties of grain, and this was all distributed. In addition, a

considerable amount of money was expended in lieu of grain.

It was certainly fortunate for the people of our district that we could get our grain from the outside, for we could thus keep the local prices of grain down, and by so doing we were able to help thousands who had no connection with our relief work.

One difference in conditions that brought about a difference in practice, was in connection with the issue of family rations. At P'ingtingchow most of the workmen came from a region considerably north of the No. 1 Store at Yang Chuan, while the work was all to the south. Hence, instead of allowing the men to go home fortnightly, as in Shantung, they were given a family ration ticket good for 45 catties per man each half month. This could be presented by anyone the gang chose to send, on the date registered on the ticket. Two or three men could thus take the entire gang's allowance to the home village and make the distribution to the families. This cut down a good deal of work and reduced confusion.

At times, due to shortage of grain, family allowance was paid in cash instead of grain. This was the plan in force from the beginning at the southern extremity of the job. In fact there was a small surplus of grain in this section at one time, and an attempt was made to buy locally for our three southern stores, rather than to buy in Kalgan or Dairen and transport by pack animal from the railway to this section. We were hastened to this attempt by a shortage of pack animals. But prices began to soar, and to protect the general public as well as our own laborers, the experiment was abandoned as soon as possible.

3. *Transportation.*

This was one of the most troublesome portions of the job. There was difficulty in getting grain transferred at Shih Chia Chuang from one railway to the other on account of the rabble of beggars. The Standard Oil management rendered us no small service on several occasions by allowing this transfer to be made in their yards. After the grain reached our Store No. 1 at Yang Ch'uan, the troubles were not at an end, for often just at the time when we were wanting to make a rush to fill up a gap, the haulers would suddenly want an increase for hauling. At the beginning we tried to make a contract that would hold all the way through, but this was practically impossible. However, by careful dealing with a local hauler as our transportation man, we were able to get through with but few, if any, excessive charges.

Another hard nut was the leakage of grain. This, too, we could not control absolutely, but when we consider the amount of grain hauled and handled and the tricks that the haulers know, we should count ourselves lucky to come through as well as we did. At times we would find coal, gravel, stone and dirt in the bags, and sometimes the grain was soaked in the sacks to make the weights stay up to normal, for each lot of grain was weighed to and from the hauler. He had to account for the weights and if he took out, of course he had to put in something else. When the leakage did occur, we could not locate it, for you will remember that the grain had likely been sacked by some farmer in Manchuria and then it came through the hands of the railway people, the police on the road, the local police, the local transportation men and finally our coolies in the stores. Eternal vigilance itself could not absolutely prevent leakage. We must have come through rather well, though, for we had but few complaints from the people who used the grain, and this was a testimony that there was not a great deal of damaged grain to get through to them. So far as the weights were concerned, as our reports show, practically

Grain going out to a division store.
Note workmen on the right, starting the line over a rocky ledge.

Gang rations weighed out and ready to issue.

all the grain was accounted for. There were necessarily some differences caused by the different men as weighers and the different scales, but this had to be allowed for, as well as some other losses that came while the grain was being hauled in bad sacks.

4. *Fuel Allowance.*

Besides the grain allowance, each gang in the P'ing Ting Chow end got $2.00 Mexican per month for coal and water money, and this was given to the gangs semi-monthly at the place they received grain for their daily use. In the Liao Chow end the method of giving was the same, but since fuel was a little more expensive for them, they received $2.50 Mexican per month.

5. *Distribution Stores.*

To carry out the distribution from our eight centers, namely Yang Ch'uan, P'ing Ting Chow, Chang Chuang, Le Ping, Ho Shun, Ping Wang Tien, and Liao Chow, we organized each place with a local staff. This staff was made up of one foreigner, an interpreter, if needed, an assistant to the storekeeper, and as many coolies as were needed to carry on the weighing and other work.

These stores were from five to twenty miles apart and in addition to the other work of the storekeeper, he carried on a mess for the foreign construction men in his section. The storekeepers reported daily their balance, their receipts and their issues, with a final balance at the end of the day. This came to the P'ing Ting Chow head office daily and thus the Manager and the Chief of Commissary could know how the stores stood at any time. A bulletin board was arranged by the office manager showing at a glance the standing of each store daily. These store staffs continued to operate as long as there were laborers in their respective sections.

The property occupied by the staff, the store rooms and mess rooms, were usually furnished by the local officials but in some cases the Mission buildings were loaned to the Red Cross.

6. *Foreign Mess Provisions.*

To care for the foreign staff, messes were arranged at each of the stores where no missionaries were living and, in addition, several other messes were carried on by the construction staff themselves. We had six regular messes and five which were not as fully equipped as the regular mess. The regular mess had an equipment as follows (It was called a "two man camp" but could accommodate at least six people temporarily):

6 plates, 6 cups, 6 saucers, 6 knives, 6 forks, 4 teaspoons, 4 dessert spoons, 3 large spoons, 1 sugar bowl, 1 creamer, 1 teapot, 1 meat platter, 2 vegetable dishes, 4 soup bowls, 2 frying pans, 2 baking pans, 2 stewing vessels, 1 coffee pot, 2 tea kettles, 3 mixing bowls, 1 dish pan, 1 bread board, 1 rolling pin, 1 meat cleaver, 1 butcher knife, 1 large fork, 1 large spoon, 1 ladle, 2 water buckets, 1 dipper, 2 wash basins, coal oil, 3 lamps, 1 poker, 1 shovel, 1 bath tub, 1 large water jar, 2 empty tins (oil), 2 water jars for cooling water, and one lantern.

A cook was furnished who could prepare food for foreigners in each of the six regular messes and also in the five other messes that were furnished with fewer utensils but with sufficient to get along. A list of provisions was furnished to each storekeeper and each mess camp, showing the kinds of tinned goods, etc., that could be had at the stores from the foreign commissary depot at P'ing Ting Chow. These tinned supplies were ordered from Tientsin. The following list was an allowance for a two man camp for one month:—

Lard	8	lb.
Milk	3	doz. tins
Coffee	2	lb.
Soap (Ivory)	2	bars
Salmon	6	tins

Workmen at their noon-day meal of kaoliang cakes with millet broth (in the iron kettle). On day work, they always insisted on going to the camp for meals, but on piece work they always had it brought out to them.

A "close up." "Have a bite?"

Cocoa	1	tin
Pineapple	6	tins
Table salt	1	bottle
Oysters	6	tins
Lemon extract	2	oz.
Vanilla extract	2	,,
Worcester sauce	1	bottle
Apricots	6	tins
Potatoes	50	lb.
Pork and Beans	8	tins
Dried beans	5	lbs.
Pepper	1	bottle
Vinegar	1	,,
Peaches	6	tins
String beans	3	,,
Flour	25	lb.
Sardines	6	tins
Sugar	16	lb.
Corn	8	tins
Catsup	1	bottle
Pears	6	tins
Peas	6	,,
Jam	12	,,
Soap (laundry)	4	bars
Essence Cinnamon	1	bottle
Dried beef	6	tins
Olives	4	bottles
Butter	5	lb.
Pickles	2	bottles
Herring	8	tins
Porridge (Wheatlet)	10	lb.
Tomatoes	8	tins
Baking powder	1	lb.
Prunes	6	tins

In addition to this, the mess could buy eggs, chickens, and a few vegetables locally. The above list was kept on file with the mess so that they could order from the depot from time to time such as they were short on.

In the month of July it was very difficult to supply the foreign commissary with the proper amount of goods from the coast. This difficulty was principally due to a number of engineers being rushed in from the Shantung operations to help oversee the work here, that it might be completed as early as possible. These men had not been expected and therefore had not been prepared for in the earlier orders for the foreign mess. In addition to this, a large order for goods was misshipped to one of the other fields of operation. Thus, an extra number of men eating and the supplies ordered failing to arrive, made a situation that was very unsatisfactory to the foreigners along the road.

In all, about thirty-five foreigners were provided for by the commissary mess camps.

7. *Foreigner's Bedding Outfit.*

Each foreigner was furnished with a cot, either army or home-made, and bedding for same. The bedding consisted of one mat, two wool blankets, two sheets, a pillow and a pillow case. The linen was laundered whenever sent to the laundry.

8. *Laundry.*

At P'ing Ting Chow a small laundry was started to take care of the linens and personal laundry of the foreign personnel. This was no small task, made so largely because but few, if any, of the personnel would mark their own laundry. The actual washing, ironing, etc., was done by two Chinese men, but the receiving and sending out of this was no small task.

9. *Horses and Bicycles.*

Several horses were owned by the Red Cross and kept by the Commissary Department, and several were kept that were borrowed from the officials at various places. These, with eight or ten bicycles, furnished most of the men with a method of getting to and from their work. The Medical Department had the use of these horses and bicycles, too.

10. *Rules for Commissary Department.*

To enable us to carry out these operations, the offices at Peking and Tientsin issued certain instructions that were observed as nearly as conditions would permit. Some of these were:—

1. At close of day, quantities on Form C–14 (Report of Stores Issued and Received), should be totaled

and such totals entered on Daily Report, also in Stock Book.

2. Materials should be listed on Form C-14 (Report of Stores Issued and Received), care being taken to cross out the word "Issued." At the end of the day, Form C-14 should be totaled and the total transferred to the "Daily Report"—"Received Column."

3. The Daily Report should be completed, signed and mailed to the office at P'ingtingchow in an envelope marked "Stock Report". The Daily Report should be accompanied by Forms C-4, C-5, C-15, C-16, and all other receipts.

4. Division stores will not take responsibility for tools or other engineering equipment. Such will be taken care of by the Engineering Department.

Stocktaking—On the last day of each month all stores will take a physical inventory of the stocks on hand, which should agree with the "Balance on Hand" shown on that day's report.

If actual stock agrees, please certify on the Daily Report that it agrees with the inventory taken on that date.

If you find a discrepancy, please send in a separate sheet attached to the Daily Report showing the actual inventory, and make out an "Issue" or "Receipt" for the shortage or overplus, stating in your opinion what is the cause of the difference.

Besides those from the office at headquarters, the Field adopted some rules of a similar kind to fit the local conditions. Some of these follow :—

1. The Relief Stores Division will have charge of all relief foods in the custody of the stores, and will supervise methods of handling stores, personnel, etc.

2. The Foreign Supplies Division will have charge of the purchasing and custody of all foods required by foreign personnel in this A. R. C. operation, and those who are living in messes established along the roads. Lists of stocks to be purchased should be submitted to the Chief of Commissary for approval, before purchase is made.

3. The Transportation Division will be in charge of hiring and directing barrowmen, cartmen, and other forms of transportation used to move all kinds of supplies, both relief and foreign, also engineering, between the head store and district stores, and all other stores.

Foods for which the Transportation Division has receipted shall not be considered out of the Transportation Division and in the custody of the Relief, Foreign, or Engineering Stores, until shipment has been receipted by receiving storekeepers.

4. Advance of cash for local and current expenditures will be made direct by the accountant, but only on the O.K. of Chief of Commissary. Detailed vouchers and receipts are required in settlement of each advance and these reports shall be rendered direct to the accountant, who, after auditing and checking shall not pass until the whole has been approved by the Chief of Commissary.

(Signed) F. H. CRUMPACKER.

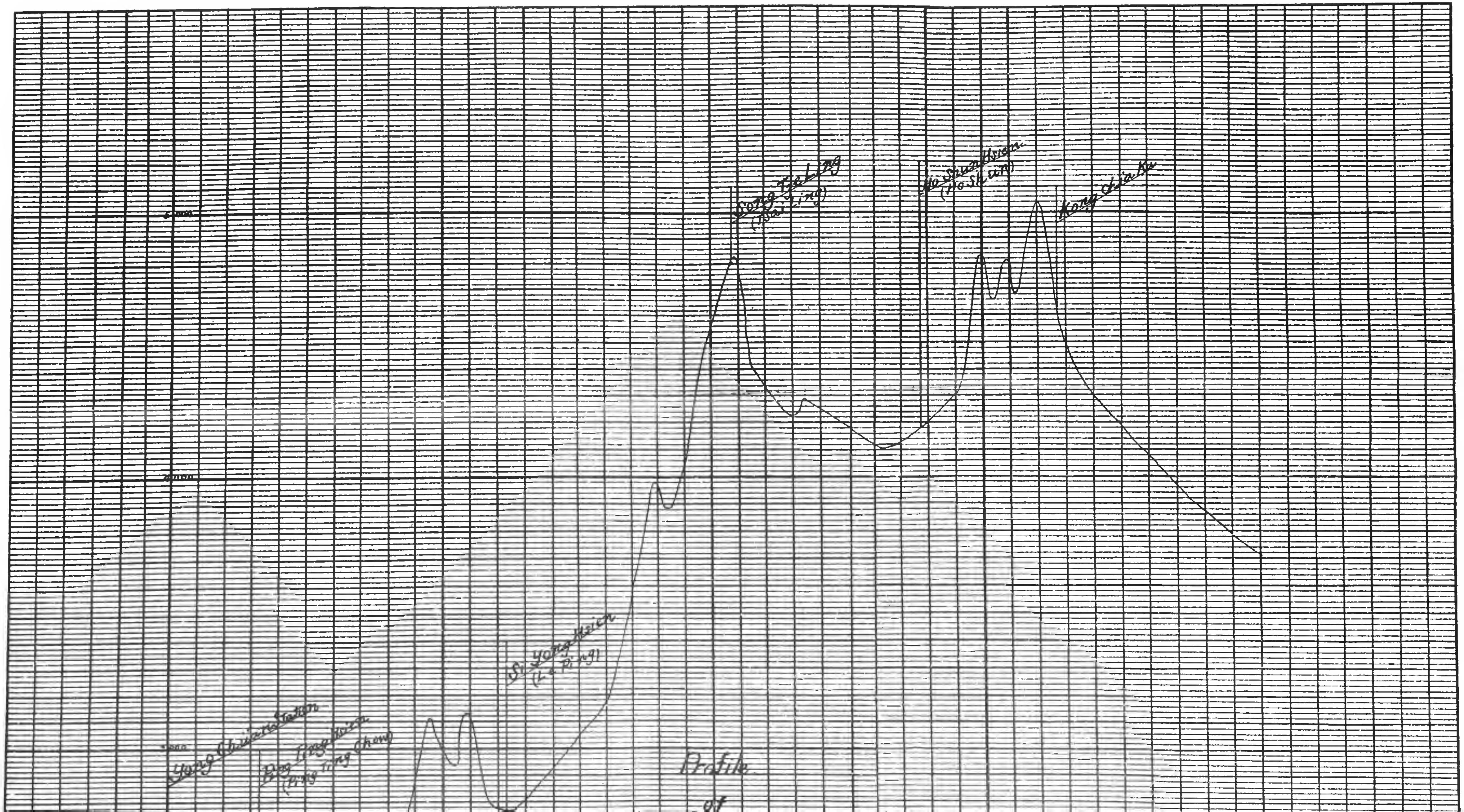
REPORT OF THE ENGINEER-IN-CHIEF

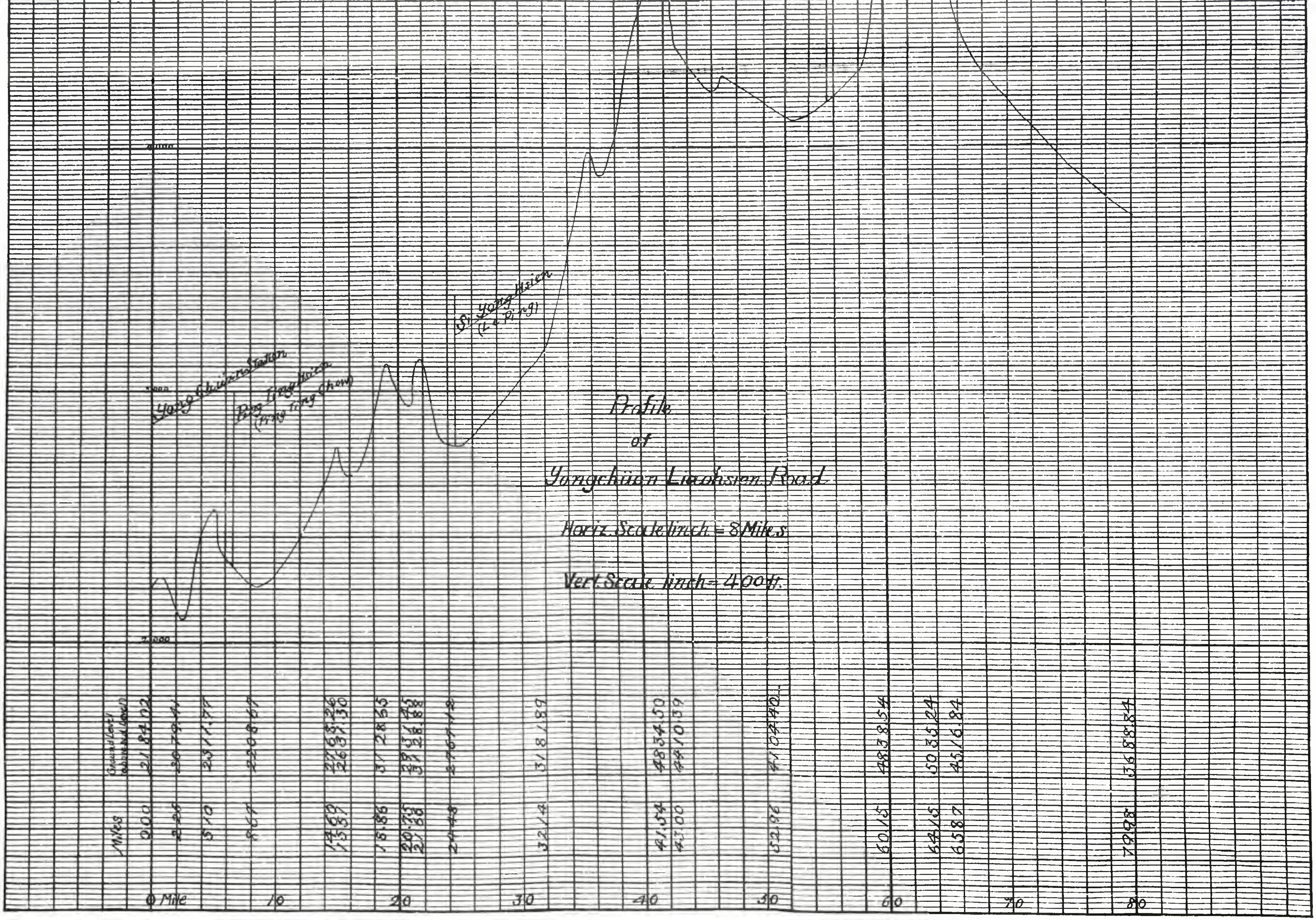
L. KOLESNIKOFF

1. *The Highway Project.*

The American Red Cross began actual work on the road the 28th of February with two Chinese engineers in the field and a few hundred workmen recruited from the famine district.

The scale of the enterprise, the physical features of the country which had to be cut through, and the short period of time (five or six months) at the disposal of the American Red Cross for completing the road, led to the necessity of creating an adequate technical staff, which was gradually increased during the operations to twenty foreign and six Chinese engineers. The Chief Engineer was


5000
4000
3000
Ho Shun Hsien
(Ho Shun)
Si Yong Hsien
Profile
of


Yong Chüan Station
Ping Ting Hsien
(Ping Ting Chow)
Si Yong Hsien
(Le Ping)
Profile
of
Yongchüan Liaohsien Road
Horiz. Scale 1 inch = 8 Miles
Vert. Scale 1 inch = 400 ft.
Miles
0.00 2184.02
2.26 2079.41
5.10 2311.77
8.67 2208.67
14.69 2763.26
15.57 2631.30
18.86 3128.55
24.48 2767.12
32.14 3181.89
41.54 4834.50
43.00 4410.39
52.96 4104.40
60.15 4838.54
64.15 5035.24
65.87 4516.84
79.98 3688.84
0 Mile
10
20
30
40
50
60
70
80

also put in charge of the whole construction of the work.

The number of workmen was also increased continuously just as soon as the surveying had been completed and the formation line decided upon, until it reached the maximum average number of 18,466 men per day during the week from May 31st to June 6th, when the construction work on the road was in full swing.

The American Red Cross closed the operations on the 10th of August, 1921, being in the field only 164 days. Table No. 1 below gives the number of men engaged in building the road during every week from the beginning to the close of operations, giving the total number of 1,840,200 working days during the whole 164 days of actual work on the road.

Table No. I.

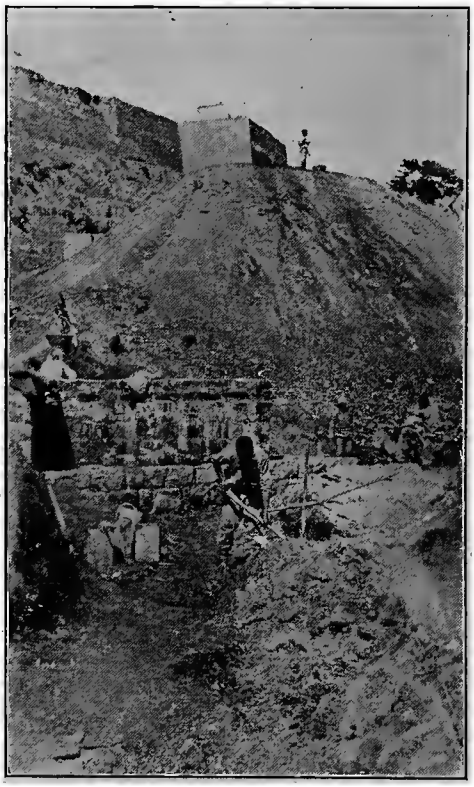
							Total number of workmen for a week	*Daily average for the same week*
1.	From	Feb.	28th	to	March	7th	8,910	1,371
2.	,,	March	8th	,,	,,	14th	15,960	2,455
3.	,,	,,	15th	,,	,,	21st	21,510	3,309
4.	,,	,,	22d	,,	,,	28th	34,320	5,280
5.	,,	,,	29th	,,	April	4th	50,750	7,808
6.	,,	April	5th	,,	,,	11th	60,480	9,305
7.	,,	,,	12th	,,	,,	18th	67,970	10,458
8.	,,	,,	19th	,,	,,	25th	74,340	11,437
9.	,,	,,	26th	,,	May	2d	84,590	13,014
10.	,,	May	3d	,,	,,	9th	82,430	12,682
11.	,,	,,	10th	,,	,,	16th	94,440	14,529
12.	,,	,,	17th	,,	,,	23d	102,980	15,843
13.	,,	,,	24th	,,	,,	30th	112,000	17,231
14.	,,	,,	31st	,,	June	6th	120,030	18,466
15.	,,	June	7th	,,	,,	13th	119,310	18,355
16.	,,	,,	14th	,,	,,	20th	114,510	17,626
17.	,,	,,	21st	,,	,,	27th	107,500	16,538
18.	,,	,,	28th	,,	July	4th	103,960	15,994
19.	,,	July	5th	,,	,,	11th	105,940	16,299
20.	,,	,,	12th	,,	,,	18th	99,830	15,358
21.	,,	,,	19th	,,	,,	25th	102,450	15,761
22.	,,	,,	26th	,,	August	1st	89,280	13,581
23.	,,	August	2d	,,	,,	8th	65,650	10,100
24.	,,	,,	9th	,,	,,	10th	11,070	5,535
					Grand	total	1,840,200	

2. *Topographical Features of the Project.*

The highway starts from Yang Ch'uan station on the Cheng-tai Railway and runs eighty miles south, passing by the county seats of P'ing Ting Chow (Ping Ting Hsien), Li P'ing (Hsi Yang Hsien), Ho Shun (Ho Shun Hsien), and having the city of Liao Chow (Liao Hsien) as its terminus on the south.

The country represents a part of a great loess plateau with irregular mountain ranges and their foothills. The attached abbreviated longitudinal profile (horizontal scale 1" equals 8 miles) gives an idea of the topographical features of the country through which the road has been built, and gives also the elevation above sea level of the principal points of the highway.

A cut through loess.



Big fill near P'ingtingchow, and culvert nearing completion.

Down grade towards P'ingtingchow.

P'ingtingchow, Red Cross headquarters at the Mission station just outside the wall at the left.

Starting in the river valley at Yang Ch'uan with an elevation of 2,184.02 ft. above sea level, the road in its whole length goes over four crests of mountains before it reaches Liao Chow:—

The first one with the highest elevation of 2,511.77 ft., located between Yang Ch'uan and P'ing Ting Chow.

The second one with the highest elevation of 3,128.88 ft., located between P'ing Ting Chow and Le Ping.

Leaving Le Ping and going along the river for about eight miles, the road at Tu Chuang begins to climb up Ts'ai Ling mountain with an elevation of 4,834.50 ft.

After reaching this peak, the road goes down to the river level again as far as Ho Shun, and then begins again to climb up the highest crest on the whole road with an elevation of 5,035.24 ft. at the village of Kung Chia Kou.

Leaving Kung Chia Kou, the road goes down a river valley and follows it until it reaches the city of Liao Chow, with an elevation of 3,688.84 ft.

So the city of Liao Chow, the southern terminal of the road, is located 1,504.82 ft. higher than Yang Ch'uan station, the northern terminal.

The high crests to be crossed by the road with comparatively short approaches to them from one end and the very short time allotted for surveying work, which eliminated any possibility of thorough surveying investigation for picking out the most practical route for the road, led to the necessity of allowing at some places quite steep grades for the road bed, although all efforts were directed to shorten up stretches with steep grades as much as possible.

The table No. 2 below gives an idea of the steepest grades used on the road and length of sections of the road with the grade mentioned:

Table No. II.

Grade	*Total length of the road with this grade*	*Percentage of the whole road*	*The longest section of the road with this grade*
7.7 per cent (1:13)	0.23 miles	0.28 per cent	0.23 miles
7.0 ,, (1:14)	1.19 ,,	1.48 ,,	0.20 ,,
6.7 ,, (1:15)	1.01 ,,	1.26 ,,	0.19 ,,
6.2 ,, (1:16)	0.84 ,,	1.05 ,,	0.23 ,,
5.9 ,, (1:17)	5.01 ,,	6.27 ,,	1.04 ,,
5.5 ,, (1:18)	1.20 ,,	1.50 ,,	0.19 ,,
5.2 ,, (1:19)	1.26 ,,	1.58 ,,	0.28 ,,
5.0 ,, (1:20)	2.06 ,,	2.58 ,,	0.24 ,,
less than 5 per cent.	67.20 ,,	84.00	
	80.00 ,,	100.00 ,,	

The above table shows that 84% of the whole road has a grade better than 5%, which seems to be a fairly good characteristic for a road through such a mountainous country.

The steepest grades are located between the four principal crests as follows:

Between Yang Ch'uan and P'ing Ting Chow—6.7% on a length of 700 ft. only.

Between P'ing Ting Chow and Le Ping—6.2% on a length of 500 ft. only.

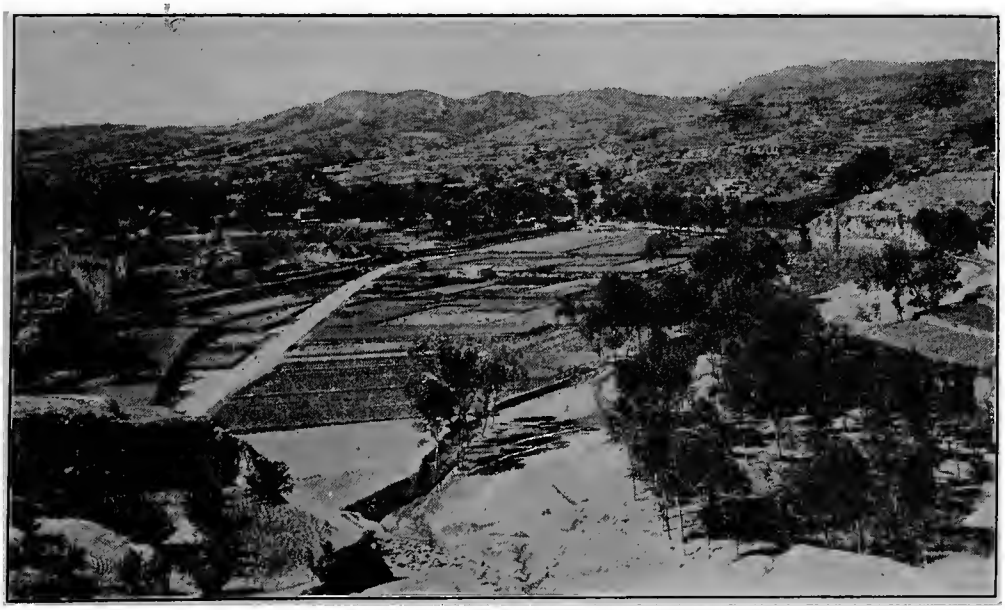
Between Le Ping and Ho Shun—7.7% on a length of 1,200 ft. only.

Between Ho Shun and Liao Chow—5.9% on a length of 5,500 ft. only.

3. *Construction Features of the Project.*

At the close of the operations, August 10, 1921, the earth part of the

Cutting a " ribbon " road over T'sai Ling mountain.



Entering the garden at Lao Fang. One of many beautiful views along this road.

whole road, 20 ft. wide and 80 miles long, with side gutters, was practically completed, and the comparatively small amount of additional earth work required was to make fills over a dozen culverts in order to make joints between the disrupted parts of the road.

In building the road bed, three principal kinds of soil were encountered:

1. loess, a very hard formation.
2. loose stone mixed with loess.
3. solid stone formation, which consisted in their turn of the following kinds, sandstone, limestone, and a very hard limestone-like semi-granite.

In the total length of the road of eighty miles, the following sections had the following kinds of soil:

Loess and similar kinds of soil—74.87 miles

Loose stone and solid rock—5.13 miles or 6.4% of the total length of the road.

The total quantity of earth work done on the road is 26,120,000 cubic feet.

The total quantity of rock work done on the road, including the solid rock as well as the loose rock mixed with loess, is 7,202,425 cubic feet, the deepest excavation being from 26 ft. to 29 ft. on a length of 300 ft.

Each cubic foot of rock work (including loose rock) is equivalent to about 7.5 cubic feet of earthwork. At this rate the equivalent of 80,138,000 cubic feet of earthwork was performed at a cost of 1,840,200 daily rations. This is an average of about 44 cubic feet per ration. It will be remembered that each gang was fed from two to five days before it began work. There was considerable "carry" for much of the work. But this is an average of less than half a fong per man per day. But the principal explanation for this relatively low average, compared with the performance of healthy contract labor, is to be found in the fact that up to June practically everything was done on a day work basis, and it was July 15 before the contract basis was used exclusively. It would have been impossible to start with the piece work basis for two reasons; one, that the men were not in physical condition sufficient to earn a living for their families at normal contract rates, and two, that to have delayed the work until measurements could have been made in advance or sufficient foreign personnel could have been secured for inspection purposes, would have been fatal to our relief purpose.

The principal tools in working out this soil were native picks, augmented later on, and to great advantage, to a considerable extent by picks of American make, steel wedges with hammers, crow bars, steel drills from four to twelve feet long. The solid limestone was worked out exclusively with local blasting powder.

In building the road through this mountainous country which is cut with so many streams, small and large, and ravines, which during the rainy season are carrying a considerable amount of water with a swiftness which to a great extent increases the destroying power of the water, the question of crossing the rivers with the road was a most difficult one to be solved satisfactorily.

This road in its run crosses 12 wide rivers, each one from 200 to 1,900 ft. wide, and a considerable number of small streams and old trails which had become, during the rainy season, natural channels for carrying the water. The lack of adequate funds and the very limited period of time for construction work eliminated entirely the idea of building stone bridges over the large rivers, and in order to protect the road bed against the washing out effect of the water running over it, the building of "dips" was adopted on every large river, with the exception of the one between Yang Ch'uan and P'ing Ting Chow, where a stone bridge with a wooden top was built in sections of a total length of 135 ft. over a river 1,000 ft. wide.

Culvert construction : Preparing foundation.

Culvert under construction at Liaochow.

Blacksmith shops on T'sai Ling Mountain.

Culvert at Chang Chuang.

Simple in its construction, with two parallel stone walls built with lime, from four to five feet deep, the top of which is about to follow the cross section of the river bed, heavy pavement between walls, and stone apron with a slope of 2 to 1 along the whole length of the dip on the down stream side, the dip is supposed to offer the least obstruction to the water running over it and at the same time it reinforces the road bed against the washing effect of the water.

Only the experience of maintaining this road must show whether the building of "dips" over the peculiar rivers of this country proves to be satisfactory or not.

For crossing the small streams and water pathways, culverts with openings of 2 to 10 ft. and small dips of similar construction were built.

At the close of the American Red Cross operations, August 10, 1921, the following number of bridges, culverts and dips were completed :—

Stone bridge with wooden top, 135 ft. long	1
Stone 3 arch bridge, 10 ft. span	1
Stone 2 arch bridge, 10 ft. span	1
Culverts, single, double, triple, from 2 ft. to 10 ft. wide, and from 22 ft. to 75 ft. long ..	234
Dips, 20 ft. wide and from 20 ft. to 1,200 ft. long	54
Total	300

Masonry retaining walls— 1,300 ft. long.

After a considerable time had elapsed since culverts were put in and the road bed was finished so that it had settled to a certain extent, the experiment of light surfacing of the road was undertaken.

The road was surfaced 3 in. deep and 15 ft. wide, leaving 2½ ft. shoulders on each side of it, and side drainages every 50 ft. through the shoulders were made on both sides of the road. After 3 in. were taken out and the road bed was properly tamped, three kinds of materials have been used for surfacing, depending on what was available at that place.

1. Crushed hard limestone 1¼" to 2½" on the bottom, ½" to 1¼" on the top, and river sand or loess dirt on the top of stone surface.

2. Crushed slag from iron works with sand or dirt spread over the top.

3. Cinders with dirt spread over the top.

Practically the total length of the road has been surfaced.

4. *Cost of Construction.*

At the beginning of the operations when the whole enterprise was chiefly a famine relief measure, workmen were paid in grain for each day of work, practically without considering the amount of work done.

Later on, after the urgent relief was rendered, piece work system was gradually introduced in order to get more efficient work, and at the end of the operations a fairly good amount of earth as well as stone construction work had been executed on a contract basis. Professional contractors and gang foremen worked as contractors for the Red Cross, as well as individual gangs *in corpore*.

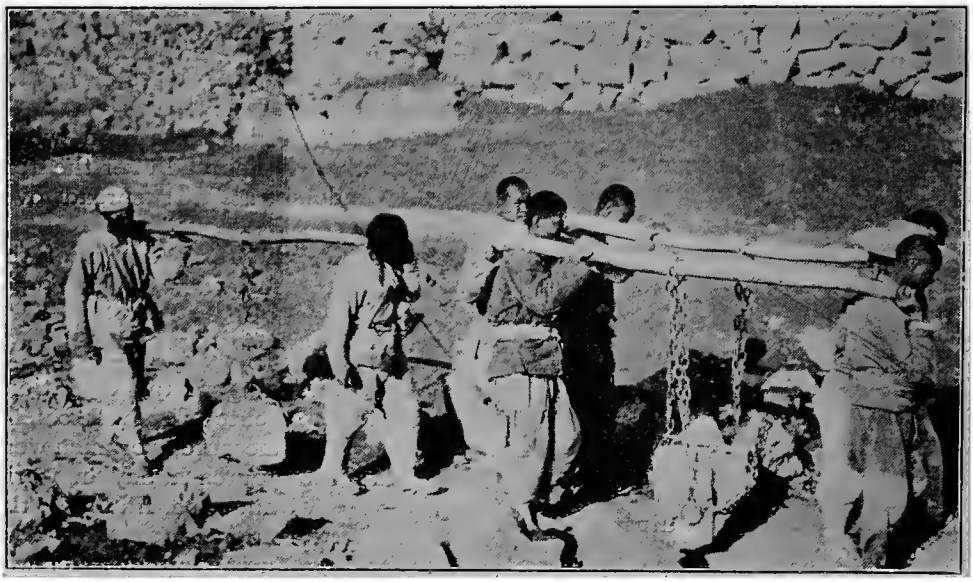
Below are given unit prices which have been arrived at and under which different contractors have been working on this road profitably for themselves and to the advantage of the American Red Cross, as the work has been done quicker and cheaper.

Earth work, with the distance of carrying not more than 250 ft.,—20 cents Mex. per 100 cubic ft.

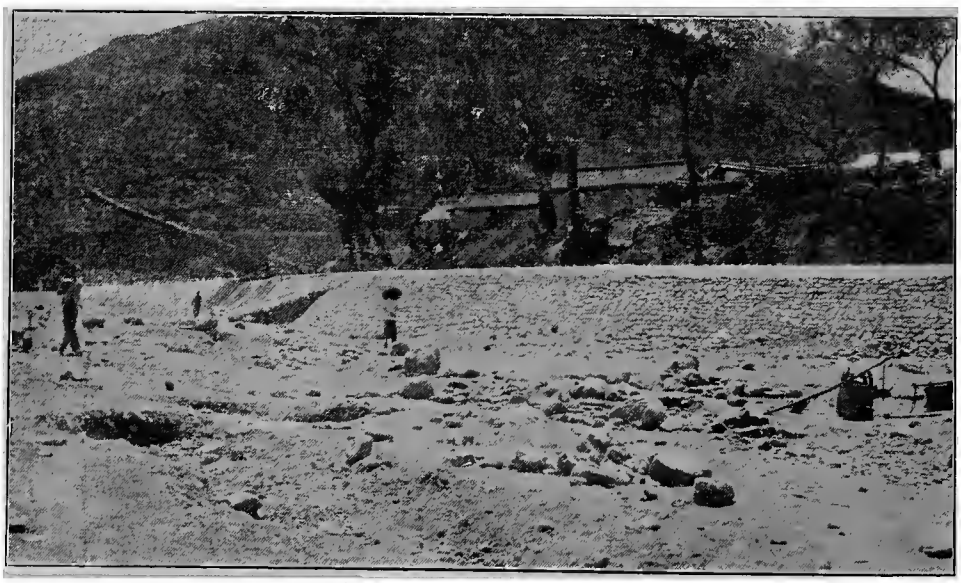
Solid limestone excavation work, without carrying, $1.50 Mex. per 100 cubic ft.

Carrying stone, for one cubic foot per one li, price 1 cent Mex.

Masonry work in building retaining walls with lime, contractor digs out foundation, quarries and carries stone for a distance of not more than one li, and supplies everything else with the



Carrying rock for culverts or protecting walls.



Protection wall near Liao Chow.

Red Cross road along the river bed. There are miles of retaining walls like this.

Types of culverts and bridges.

exception of lime,—4 cents Mex. per one cubic foot of stone wall.

Masonry work in building stone culverts with lime, conditions same as before, price 4 cents to 6 cents Mex. per one cubic foot.

Making brick arches with building wooden forms from material supplied by A. R. C., price $2.00 Mex. per 1,000 bricks.

Crushing hard limestone, size 1¼" to 2½", in piles 100 cubic ft., price $2.00 Mex. per pile.

Crushing hard limestone, size ½" to 1¼", in piles 66 cubic ft., price $2.00 Mex. per pile.

Surfacing the road bed 3" deep, 15 ft. wide, side drainages every 50 ft., and tamping and supplying all crushed stone required, and spreading sand over top of it, per 100 lineal ft. of the road, price $10.00 Mex.

The cost of this entire line, including repairs from floods during construction, was in round numbers $560,000, or $7,000 per mile of line. This includes culverts, bridges, medical service, supervision and everything. The Cheng Tai railway, through similar territory, cost over $13,000 per mile for its roadbed, exclusive of culverts, ballast, and all of the other items which have been named above. While railway work is heavier due to necessity of eliminating heavy grades and sharp curves, this extra work is neutralized in part, at least, by the fact that the railway work was performed over fifteen years ago when the cost of food (and, therefore, of labor) was barely half that of last year. A large allowance should be made also for the fact that there was not time sufficient for surveys which might have eliminated much of the heavy work.

5. Engineer's Instructions.

1. Working hours:—6:00 A.M. to 6:30 P.M.

Lunch from 11:30 A.M. to 1:00 P.M.

Morning rest from 8:30 A.M. to 9:00 A.M.

Afternoon rest from 3:30 P.M. to 4:00 P.M.

No work on Sundays.

2. Each gang is to have a foreman. Every five gangs are to have a head foreman. Every thirty gangs or less should have an overseer. There is to be one head overseer. These must all be on the road during working hours—must eat at same time as workmen.

3. Overseer must carry out engineer's instructions in full.

4. *a.* The overseers must send in reports each working day containing number of working men working on their section.

b. The length of the section under work, giving stake numbers.

c. If there is a shortage of men, give the gang numbers in which the shortages occur and the reason for the shortages.

5. In case of accident or illness, head foreman must report to overseer, who reports to engineer.

6. No man can leave the works and still receive help for self or family without a doctor's permission.

7. The noon meal is to be eaten on the works. The gang foreman may appoint a man to assist the cooks in bringing the food from the kitchen to the works.

8. Men not working up to the above rules will be punished by lack of food. The gang will be held responsible for individuals in the gang.

(Signed) L. KOLESNIKOFF.

SANITATION AND HEALTH DIVISION

All the sick workmen needing hospital attention were referred at first to the hospitals of the Church of the Brethren Mission at P'ingtingchow and Liao Chow. Later on, when the great numbers of workmen were collected on the mountains about the central section of the road, quite far removed from these hospitals, temporary hospitals were established at Tu Chuang and Ho Shun. At the

first named place, as it was only a small village, it was necessary to build

DR. D. L. HORNING

a small mud building for the hospital. Here we took care of more than fifty patients at a time. At Ho Shun we were able to secure two temples and their courtyards, which served us very satisfactorily as a hospital.

Because of the epidemic of relapsing fever, which was spread over the famine area before the beginning of the Red Cross relief operations in this section, the sanitary staff was deluged with work from the very beginning. Relapsing fever being carried by the body louse made it necessary that we use some method of delousing the workmen and their clothing and bedding or have the disease spread rapidly and greatly cripple the men as well as the working operations. Because of insufficient staff in the health department, we were not able to begin delousing until in April. The disease was kept in control before that time by isolating the sick and getting them to the hospital as quickly as possible.

About April 1st a delouser, which had been built by the Church of the Brethren Famine Relief Committee, and which had a capacity of 1,000 men per day, started operating, and all the gangs on the northern third of the road were deloused and their billets were cleaned up at least once, and some of them two and three times. Later on, a delouser built by the same committee, was used at Liao Chow, and two others were built by the American Red Cross at proper locations along the road so that the entire working force could be taken care of without losing too much time from the work. These last two never worked very satisfactorily.

The delouser had the advantage of being able to delouse the bedding of the workmen as well as their clothes, but it had the very big disadvantage of taking the men from a half day to two days from their work each time they were deloused. If the men were billetted ten or fifteen miles from the delouser, it was impossible for them to make the round trip to the delousing station in one day. Of course, they often had to wait when they got to the delouser until those ahead of them were cared for.

Ironing the clothes of the workmen and giving them a kerosene bath was used on the lower half of the road. This method of delousing had some big advantages from the standpoint of the construction work. The men could be put into clean clothes right after their kerosene bath and go on with their work while their own clothes were being ironed, thus they did not need to lose over fifteen minutes from the work.

There was no difficulty in keeping some of the gangs free from disease after they were once deloused, but with other gangs we had more difficulty because some of the men would return home for a visit and either become infected themselves or bring back some infected lice with them. There was a great deal of substituting among the workmen. Where there were two men in a family, one would register for work. He would go and work a month and then have the other man come to the work and substitute for him and the man who had been registered would return home. Thus,

constant vigilance was necessary to keep fresh outbreaks of the fever from playing havoc with the gangs.

The epidemic among the workmen reached its height in the month of June. By that time we had four delousers running and several ironing squads at work. The disease was soon under control and for the last month and a half of the operations, we had practically no relapsing fever.

Relapsing fever is not a fatal disease. Only a very small per cent of those who get it will die, and most of those who do die, die of complications; but it is a very debilitating disease, and where the people have two, three, or four relapses, it often takes them a very long time to regain their strength, sometimes even a half a year.

The few cases of the more dreaded typhus fever which we had among the workmen were very mild. The head of the sanitation division contracted typhus while working among the gangs, taking sick about the middle of June. He was very ill for more than two weeks but had fully recovered his health by the end of the operations.

The total number of cases of typhus and relapsing fever cannot be given, because the workmen would sometimes go home as soon as they took sick, without reporting for diagnosis and treatment. Judging from those entering the hospitals at P'ingtingchow and Liao Chow, where blood tests and positive diagnosis could be made, there were about 1,000 cases of relapsing fever among the entire force and not more than 15 cases of typhus fever.

Fortunately, relapsing fever has a specific treatment in salvarsan and neosalvarsan. All the cases entering the mission hospitals or the temporary hospitals were treated with this drug when positive diagnosis was made. We had difficulty in getting the drug in sufficient quantities at times, but we were able to have it for most of the cases.

Other diseases were not very common. There were several deaths from acute indigestion. There was some influenza, some diarrhea, some malaria and beri-beri. No typhoid was diagnosed and the several cases of cholera that were reported were found to be incorrectly diagnosed on investigation.

Considering the large number of workmen employed and the heavy rock work that had to be done and the precipitous cliffs that had to be cut down, it is remarkable that there were only six accidental deaths. Only one of these actually occurred while the person was at work. This man was struck by a stone from a blast. Two men, during the rest period, were sitting under a loess projection when it fell and killed both. Three men took refuge in a ravine on a mountain side to protect themselves from a rain storm. The water came down the ravine in a wall and with such rapidity that the men could not escape, but were washed down the rough stream and were drowned. There were three fractures and quite a number of smaller, insignificant casualties.

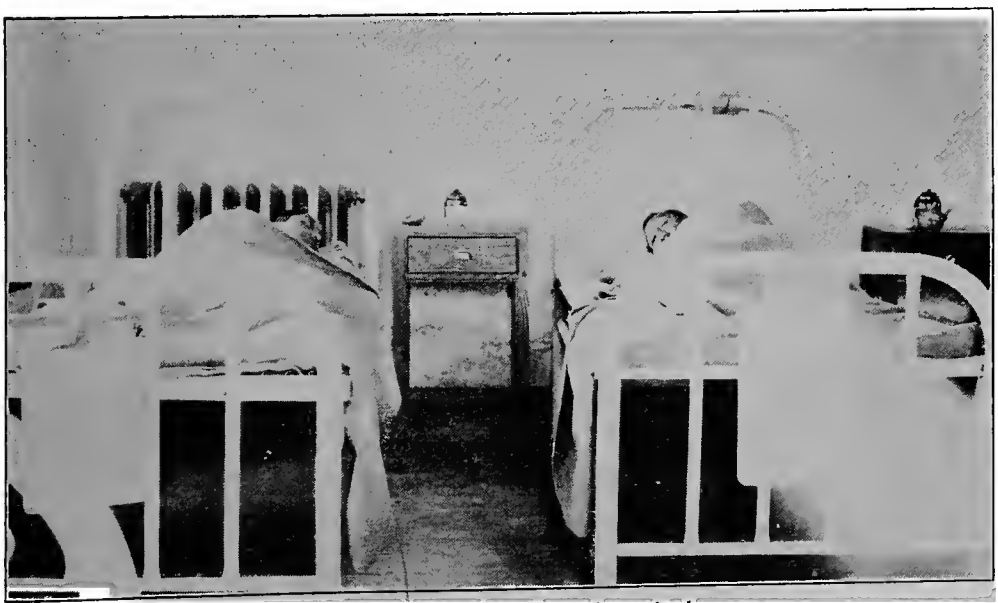
SANITARY DEPARTMENT

Health Rules for the Camps and Workmen

1. Workmen must use the latrines, under no conditions urinating or defecating at other places at will.
2. All waste water must be dumped in a hole dug for that purpose.
3. All bedding and fodder must be put out to sun for three hours during the morning every day.
4. Every day the sleeping rooms and yard must be swept.
5. All clothing must be examined frequently for lice and if any are found, destroyed by any means at hand.
6. All water before drinking must be boiled. Stations for boiling water at the place of work will be provided.
7. When any of the workmen are taken sick, if possible, they must at once be placed in a room prepared for them away from the other workmen.

(Sigd.) FRED J. WAMPLER, M.D.
D. L. HORNING, M.D.

Bringing in a patient to the P'ingtingchow hospital.



In the P'ingtingchow hospital.

The famine relief idea was kept prominent in this operation from the very beginning. Had it been a road building project, the line could have been built much cheaper by paying the men a much lower wage than was given and by putting the work on a contract piece work basis, in which only those in a first class physical condition could have competed successfully. Since the big idea was famine relief and road building a secondary consideration, the daily amount of grain given was much more than was required to pay for the services of an average laborer. Besides, the average man on the work could not do as much work as the average skilled laborer.

In addition to the direct famine relief, the amount of grain brought into the territory—nearly 4,300 tons—aided greatly in keeping down local prices, and the money that was put into circulation by local purchases of equipment and in payment of contract labor, was of inestimable value in keeping the numerous small local business men from failure and, in general, gave new life to the section.

In Ho Shun county, the official changed the streets of the city from gutters to properly rounded roads with a crown and gutters on the side. He also tore down some dilapidated pailous and repaired and painted others.

In the city of Liao, a new East Gate was built to replace the ruins of the one that was standing there.

The Red Cross road followed the main street in the East Suburb of P'ingtingchow for quite a distance. The local people, seeing the advantage of this type of road over their own streets, took this road as pattern and repaired the rest of the main street in the East Suburb.

Quarters are now being built alongside the road by the Provincial Highway Bureau for the use of regular caretakers of the road. The use of narrow tired wheels is forbidden, and transportation companies have already been formed and have purchased carts with broad tired wheels. As the entire traffic over this route has been by pack animal, there is no vested interest in narrow tired wheels to be dealt with.

Col. S. Y. Chao, Chief of the Shansi Highway Bureau, to whose remarkable energy and integrity the success of the P'ingtingchow and Fenchowfu operations is due in large measure.

Watts O. Pye, Field Manager.

R. J. McDonnell.

Dr. P. T. Watson, Assistant Field Manager.

CHAPTER IX

FENCHOWFU

Field Manager.. .. .. .. WATTS O. PYE
Assistant Field Manager.. . DR. P. T. WATSON
Chief Engineer.. .. .. .. MAJ. J. W. STILLWELL

IN the preceding chapter considerable was said concerning the need of relief in the Province of Shansi and the efforts which were being made by local authorities to meet that need. Also the fact was mentioned that before the Red Cross definitely was allotted a territory within Shantung, representatives of the Shansi authorities had made approaches in the interest of their Province. The orderliness of Shansi, the presence of a highway administration organization which had been functioning for over a year, and the assurance that questions of right of way would never bother us, made work in that Province particularly attractive. Hence, one week after the second gift of $500,000 Gold was announced, on request of Dr. Percy Watson of the American Board Mission, Fenchowfu, Captain R. J. McDonnell, a volunteer engineer, and the Director proceeded to interior Shansi to investigate at first hand the feasibility of a proposed highway, and the need of the section from which the relief labor would come.

At Fenchowfu we found that considerable funds which the American Board Mission had received from miscellaneous sources for famine relief were practically all being administered on a work basis in the improvement of grounds and erection of buildings for the only hospital in that western region. We also found that these funds were practically exhausted and the numbers of applicants for work were far beyond the requirements of the job in hand. At the Provincial capital we were assured that the territory which was being served by this bit of famine relief was only a small fraction of the most needy area.

We travelled from Taiyuanfu as far as Ping Yao by motor over a provincial highway which had been constructed by means of military forces during the past year. From Ping Yao to Fenchowfu—80 li—was the route proposed by Dr. Watson, and this we covered on horseback. The only difficulties to be encountered on the route were the Fen River which has a quicksand bed and two large irrigation canals. Hence assurances were given immediately that funds would be granted for the construction of this highway. Also a small branch was authorized from Fenchowfu to Yu Tai Ho, a beautiful river canyon at the base of the mountains where the missionaries send their families for the hot summer months in order to escape the noisome smells and contagious diseases which characterize interior Chinese cities at this season. The sum of $25,000 Gold was appropriated for these lines.

At Fenchowfu a much more ambitious proposal was made by Mr. Watts O. Pye. He urged that the line should be extended westward another eighty miles to the Yellow River. He pointed out that the food supplies for the entire Shansi plain were coming in

Yu Ta Ho Valley.

Yu Ta Ho road, in the background.

from the West by means of the River and thence overland via pack mule. In the famine of 1878 this great highway was entirely inadequate for relief food and in February, 1921, a scarcity of pack animals threatened. Mr. Pye maintained that the construction of a cart road over this route would not only give employment to thousands of laborers who might be recruited from other districts in Shansi, if necessary, but would also be the largest measure of constructive famine prevention likely to grow out of any of the efforts of the year. Furthermore, the economic value to the Province would be tremendous, — which in itself, is a famine preventive feature. The cost of transporting a ton of grain from the Yellow River to Fenchowfu was approximately $26.50 Mex. per ton. By the use of carts this cost can probably be reduced to $6.50 per ton. Customs records show that approximately seven hundred tons per day are carried over this trail. The saving to be made by the use of carts would, therefore, be $14,000 per day or $5,000,000 per year. In addition, the capacity of the route for emergency traffic would be indefinitely increased, while lower freights would stimulate the opening up of numerous coal mines whose development has waited merely because the price of coal delivered into Shensi (the Province next to the west) puts it beyond the purchasing capacity of any large proportion of the population.

Although this information was readily verified, the admitted engineering difficulties were such that no promise was made concerning this route pending a report by Captain McDonnell after reconnaisance. Such a reconnaisance was necessary, not only to prove the feasibility of construction within a reasonable time, but in addition it was necessary to know something of the cost. It seemed very doubtful if the Red Cross funds would be sufficient for this undertaking.

The subject was laid before the American Advisory Committee with the recommendation that a considerable portion of the funds which were being allocated for free relief be reserved for this piece of construction in case it should prove that the American Red Cross funds were not adequate. The American Advisory Committee replied by immediately turning over to the Red Cross $250,000, local currency.

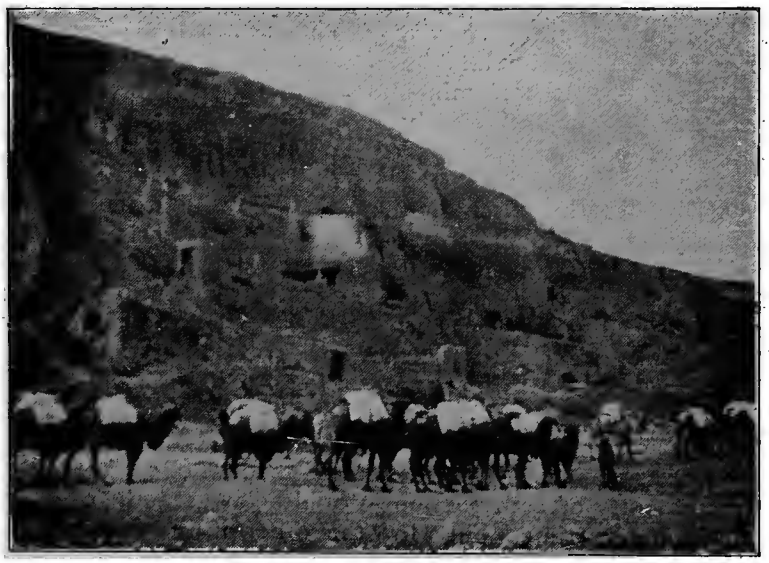
ORGANIZATION

After explanation of the form of organization required for work of this kind, the American Board Mission at Fenchowfu was asked to recommend for appointment the officers required. This was done in preference to an appointment in the first instance by the Director because of the fact that none of the members of the Mission were personally known to the Director prior to this visit. As this road would also be a valuable asset to the Mission in connecting up its outstations, it was felt that the Mission should be encouraged in every way to consider the project its own.

The line from Ping Yao to Fenchowfu is over a level plateau. It was decided, therefore, to begin with the piece work basis at once.

Whether a commissary department should or should not be established was a point of considerable importance. Manifestly it was impossible to introduce grain from Manchuria into this far interior district nearly a hundred miles away from the railway and involving at least two rail transfers en route. The natural and cheapest source of supply was from the Yellow River. While the difficulties of the mountain trail made its use expensive, these would be as great in one direction as the other if the Yellow River Road were started. Altogether it seemed best to pay laborers in money and allow them to buy their grain upon the market. The only objection was that grain dealers finding the people

Passenger transport in Shansi toward the Yellow River.



Camel train going to the Yellow River. Donkey and mule trains are more common.

Analysis of Expenditures (Gold Dollars).

The division into groups of expenditure is:

		Shantung 12-A.		Hantan, Chihli 12-B.		Pingting-chow, Shansi 12-C.		Ping Yao—Fenchowfu Road, Shansi 12-D.		Yellow River—Fenchowfu Road, Shansi 12-E.		Honan,—Hwaikingfu 12-F.		Paotingfu end Tientsin-Paotingfu Road, Chihli 12-G.		Tientsin—Tungchow—Peking Road, Chihli 12-H.		Tientsin End, Tientsin-Paotingfu Road, Chihli 12-I.		Well Digging at Tingchow, Chihli 12-J.
I	**Relief Food.**					$122,000.00														
1-1	Cost of Food	$314,500.00		$29,500.00		7,000.00										$5,500.00		$7,250.00		
1-2	Cost of Food Transportation	10,000.00		1,000.00		1,000.00								$1,000.00		250.00		250.00		$500.00
1-3	Cost of Food Agency	7,500.00		500.00		2,000.00														
1-4	Cost of Fuel and its Transportation	8,000.00				1,000.00														
1-5	Recruiting and expenses re laborers	500.00								$ 500.00						3,500.00		500.00		
1-6	Relief Wages	23,500.00		5,500.00		74,000.00		$19,000.00		170,500.00		$48,000.00				7,750.00		15,000.00		
			$364,000.00		$36,500.00		$204,000.00		$19,000.00		$171,000.00		$48,000.00		$1,000.00		$17,000.00		$23,000.00	
II	**Staff Commissary.**																			
2-1	Salaries and Wages	$11,000.00		$2,500.00		$3,000.00										$2,000.00		$500.00		$250.00
2-2	Food and Quarters	9,000.00		2,000.00		3,500.00		$1,000.00		$2,000.00						500.00		250.00		
2-3	Horses, Motors, Cycles, etc.	5,500.00		1,000.00		1,500.00				2,500.00						500.00				
2-4	Other Expense	4,000.00				500.00														
2-5	Equipment	1,000.00		500.00		500.00				500.00								250.00		
2-6	Travelling Expense	500.00				1,000.00														
			$31,000.00		$6,000.00		$10,000.00		$1,000.00		$5,000.00						$3,000.00		$1,000.00	
III	**Engineering.**																			
3-1	Equipment	$8,000.00		$1,000.00		$ 5,000.00		$ 500.00		$2,500.00		$250.00		$500.00		$2,000.00				
3-2	Salaries and Wages	9,000.00		4,000.00		11,000.00		1,000.00		5,000.00		500.00				4,000.00		$1,500.00		
3-3	Other Expense	500.00				500.00														
3-4	Supplies	1,500.00		2,000.00		8,000.00		250.00		6,000.00						500.00		250.00		
3-5	Travelling	1,000.00		500.00		1,000.00		250.00		500.00						500.00		250.00		$ 250.00
3-6	Trees and Wells																			46,750.00
3-7	Bridges			12,000.00		31,500.00		8,000.00		29,000.00		$1,250.00								
			$20,000.00		$19,500.00		$57,000.00		$10,000.00		$43,000.00		$2,000.00		$500.00		$7,000.00		$2,000.00	
IV	**Health.**																			
4-1	Medicines	$1,000.00		$250.00		$1,000.00														
4-2	Sanitary Equipment	500.00				1,000.00														
4-3	Salaries and Wages	3,500.00		250.00		2,500.00		$250.00												
4-4	Other Expense	1,000.00				1,000.00														
4-5	Travelling Expense					500.00														
			$6,000.00		$500.00		$6,000.00		$250.00											
V	**General.**																			
5-1	Salaries	$21,000.00		$ 750.00		$3,500.00		$250.00						$250.00		$500.00		$750.00		
5-2	Travelling Expense	6,500.00		1,000.00		2,000.00		250.00		$250.00				250.00		250.00		250.00		
5-3	Office Supplies	6,000.00		500.00		500.00		250.00								250.00				
5-4	Other Expense	4,500.00		250.00		1,000.00				750.00										$250.00
			$38,000.00		$2,500.00		$7,000.00		$750.00		$1,000.00				$500.00		$1,000.00		$1,000.00	
			$459,000.00		$65,000.00		$284,000.00		$31,000.00		$220,000.00		$50,000.00		$2,000.00		$28,000.00		$27,000.00	
			12-A.		12-B		12-C.		12-D.		12-E.		12-F.		12-G.		12-H.		12-I.	

Ping Yao—Fenchowfu Road, Shansi 12-D.	Yellow River—Fenchowfu Road, Shansi 12-E.	Honan,—Hwaikingfu 12-F.	Paotingfu end Tientsin-Paotingfu Road, Chihli 12-G.	Tientsin—Tungchow—Peking Road, Chihli 12-H.	Tientsin End, Tientsin-Paotingfu Road, Chihli 12-I.	Well Digging at Tingchow, Chihli 12-J.	SUMMARY
			$1,000.00	$5,500.00 250.00	$7,250.00 250.00	$500.00	12-A. ... ... $459,000.00 12-B. ... ... 65,000.00 12-C. ... ... 284,000.00 12-D. ... ... 31,000.00 12-E. ... ... 220,000.00 12-F. ... ... 50,000.00 12-G. ... ... 2,000.00 12-H. ... ... 28,000.00 12-I. ... ... 27,000.00 12-J. ... ... 48,000.00 GRAND TOTAL, $1,214,000.00
$19,000.00	$ 500.00 $19,000.00 170,500.00	$171,000.00	$48,000.00	3,500.00 $48,000.00 7,750.00	500.00 $1,000.00 15,000.00	$23,000.00	$500.00
$1,000.00	$2,000.00 2,500.00 500.00			$2,000.00 500.00 500.00	$500.00 250.00 250.00	$250.00	
	$1,000.00	$5,000.00			$3,000.00	$1,000.00	$250.00
$ 500.00 1,000.00 250.00 250.00	$2,500.00 5,000.00 6,000.00 500.00	$250.00 500.00	$500.00	$2,000.00 4,000.00 500.00 500.00	$1,500.00 250.00 250.00	$ 250.00 46,750.00	
8,000.00	$10,000.00 29,000.00	$43,000.00 $1,250.00	$2,000.00	$500.00	$7,000.00	$2,000.00	$47,000.00
$250.00	$250.00						
$250.00 250.00 250.00	$250.00 750.00		$250.00 250.00	$500.00 250.00 250.00	$750.00 250.00	$250.00	
	$750.00	$1,000.00		$500.00	$1,000.00	$1,000.00	$250.00
	$31,000.00	$220,000.00	$50,000.00	$2,000.00	$28,000.00	$27,000.00	$48,000.00
	12-D.	12-E.	12-F.	12-G.	12-H.	12-I.	12-J.

Type of temporary native bridge.

Ferry over Fen River, Pingyao road.

with money in their pockets might combine to raise prices, and so convert the situation to their own profit. Mr. Pye immediately consulted with the grain Merchant's Guild, and secured from its members a pledge that prices would not be increased beyond the level prevailing at the moment, if the Red Cross would keep out of the market. This pledge was fully carried out and the Fenchowfu operation was saved the very considerable expense and the very difficult task of forming a commissary department. Accordingly, payments to the laborers were made in cash, and they made their own purchases of food.

Under these conditions the Fenchowfu operation was divested of the more distinguishing marks of a famine relief effort, and appeared more distinctively a construction job. A billeting officer was provided to assist the gangs in securing accommodations in temples and other public buildings when they were quartered in strange towns. A Sanitary division was also maintained under the direction of Dr. Chang, reporting to the Assistant Field Manager, Dr. P. T. Watson. However, no delousing program like that in Shantung was attempted, nor were any dispensaries established. Gangs were given a certain amount of instruction in camp sanitation, a little inspection, and sick workmen were treated in camp. Serious cases were taken to the hospital at Fenchowfu.

Recruiting.

In Shansi, as in Shantung, village elders were instructed to list the most needy families, from which the laborers were selected. Gangs of thirty were formed on the Shantung plan. Because of the destitute and famished condition of these men, it was necessary to make a small cash advance, so that they might feed themselves up to the time that a measurement of their work permitted a payment for work done. Further, when a section was completed and a gang required to move ahead, they were paid for the time consumed in movement. A few weeks later, when work on the Yellow River road was about to begin, a large number of gangs were held in idleness for several days, because the survey was not in condition for them to begin work. They were paid for this time also. Thus the famine relief feature was consciously put ahead of the construction purposes, and later, when the men had earned considerable sums, no such allowances were made, and many of the advances previously made were deducted on the occasion of later payments.

While some care was exercised in the selection of the first gangs, it was soon apparent that with grain selling at fifty per cent above its price in a normal year, our rate of pay, twenty cents per 100 cubic feet of embankment, would not be attractive to men who had any other means of livelihood. It also induced to co-operation of the workmen themselves in eliminating opium smokers, shirkers, boys and men too old to do a day's work. Hence, it was found safe to take on almost every one who offered to work.

Soon after the Yellow River work was begun, the Shansi Famine Relief Society followed the Red Cross example, and undertook the construction of a connecting highway. This made it possible to send to other needy portions of the province for surplus labor. Indeed, a very considerable number came in from the Province of Chihli, the Cheng Tai railway giving free transportation for the purpose. These men were particularly valuable as they were from mountainous districts and familiar with rock work and masonry, whereas the men from the plains of Shansi were not. (It is surprising, however, how rapidly many of these plainsmen learned to become capable rock workers).

Right of Way.

The line from Ping Yao to Fengchow was laid out by Col. Chao, Chief

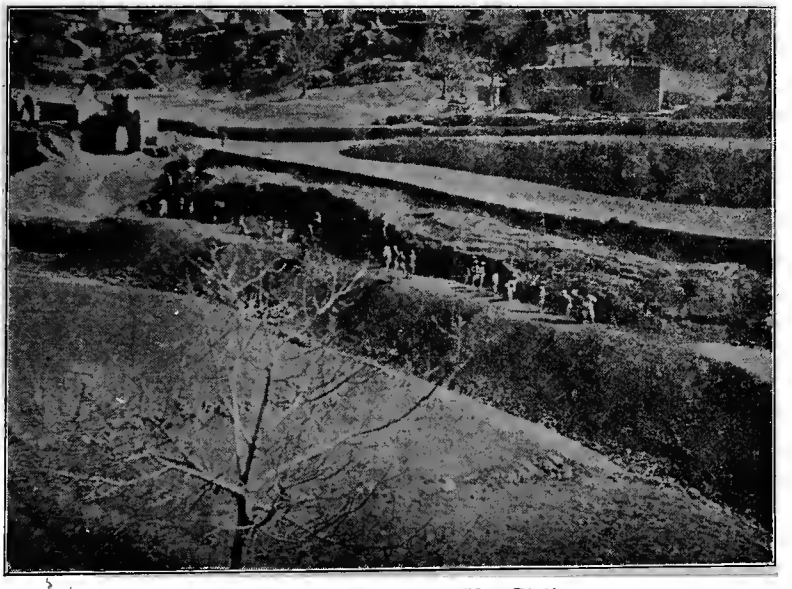
Some of the force

Front row :

1. Maj. Stillwell, Chief Engineer.
2. Hildabrand, Asst. Chief Engr.
3. Gabbott, Accountant.
4. Maj. Horsfall, District Engr.
5. Subert, Division Engr.

Back Row :

6. Robins, Stenographer.
7. Connor, Div. Engr.
8. Harter, ,, ,,
9. Hauske, Treasurer.
10. Olsen, Div. Engr.



Along the river at Wa Chih.

Engineer of the Provincial Highway Bureau, assisted by one of his engineers, beginning on March 14. Land owners were assured that payment would be made in due course, and so without objection, gangs began work on March 16. The land appraisers appeared in due course. A representative of the hsien magistrate, a representative of the local gentry, and because of the Red Cross interest in the matter, a representative of the Field Manager, usually accompanied the official appraiser. As soon as metes and bounds were established the appraiser classified the land and then set his price. Usually considerable "dickering" accompanies such appraisals, but the urgency of the work and the character of the accompanying committee made quick decisions possible. Payment was made on the spot in Provincial scrip bearing interest and redeemable in four years. If any difficulties have arisen over right of way matters in Shansi, they have not reached the attention of outsiders.

Engineering.

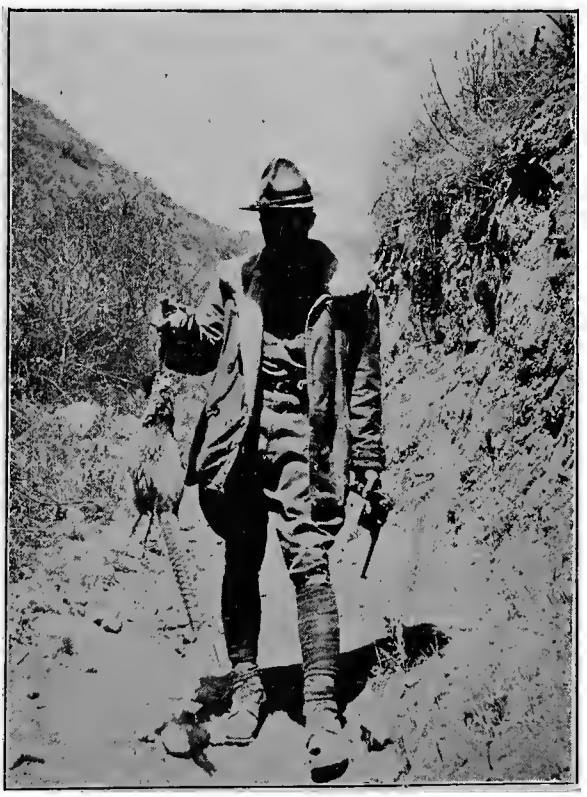
The highway consists of simple embankment thrown up loose and afterward rolled. The borrow soil is taken from the drainage ditches at the side. The grade is practically level.

On the advice of Capt. McDonnell, the line was built with a heavy embankment so as to raise it above the summer floods. In addition, a very considerable number of culverts are required for irrigation purposes, and these, in many cases, must be four feet high in order to carry the required volume of water. The soil of this plain contains a high proportion of sand, and in order to produce a proper bearing surface, it was necessary to surface the highway with cinders, slag or gravel. Fortunately, there are many old piles of coal cinders which have been accumulating for ages outside the large towns and cities. These are to be had for the taking. Practically the entire line was surfaced with these cinders before the summer rains began, and so were packed by that agency into an excellent surface. The earthwork on this line was completed about April 14th after which the surfacing and building of culverts continued. Two bridges,—one two arch 15-ft. span, the other with three arches, each of 13-ft. span; and 45 culverts have been included in this line,—in addition to which are many built by villages for irrigation purposes.

Upon completion of the Ping Yao-Fenchowfu road, the extensions to Lao Chen and to Yu Ta Ho were undertaken. Lao Cheng is in the direction of Taiyuanfu, the capital of the province, and Yu Ta Ho is a branch to the west about midway of the line to Lao Cheng. These two extensions aggregate a little over nine miles. The Yu Ta Ho branch is only 15 feet wide, in contrast to 22 feet, the width of the other roads. It is built high, however, to stand above the summer floods. It parallels the river bed and is built of river gravel, protected in places by walls of rock taken from the river bed. These two branches include 18 culverts and 2 bridges of three 13-ft. spans each. The grade is a uniformly 2 per cent ascent in the direction of Yu Ta Ho.

The total cost of Ping Yao—Fenchowfu line with these two branches, aggregating 30 miles, was practically $62,000 Mex., or $2,070 per mile. It was intended at first to build the bridge over the Fen River, for the major portion of the work would be as thoroughly famine relief work as any other. But as the difficulties with foundations were made more and more apparent, our engineers became reluctant to attempt it within the time limit imposed. Later, shortage of funds prevented any further consideration, and hence a native ferry at high water and a light temporary trestle at low water remain the means of crossing.

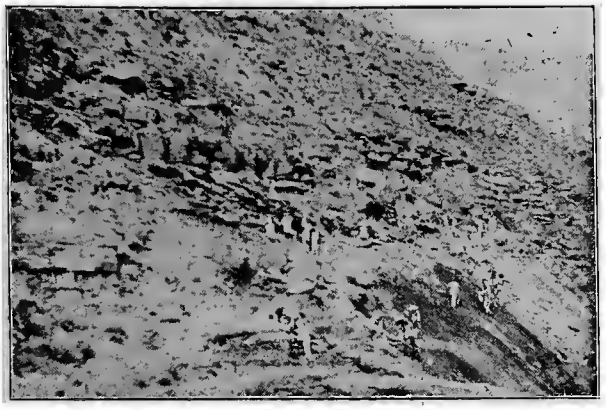
A valley of Yellow Roses (*Rosa Hugonis*).



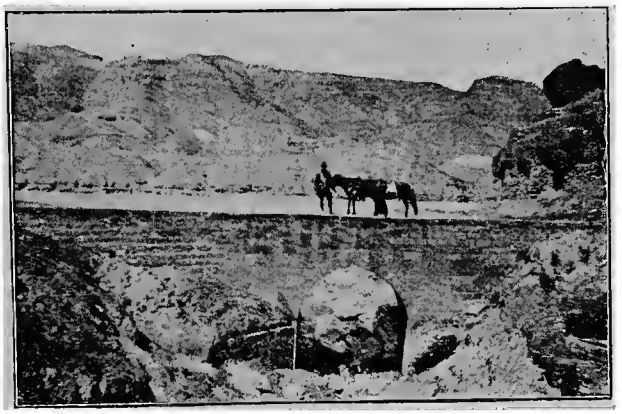
Game abounds. Maj. Stillwell gets a golden pheasant.

Beyond Yunningchow the road goes over cliffs like this for several miles.

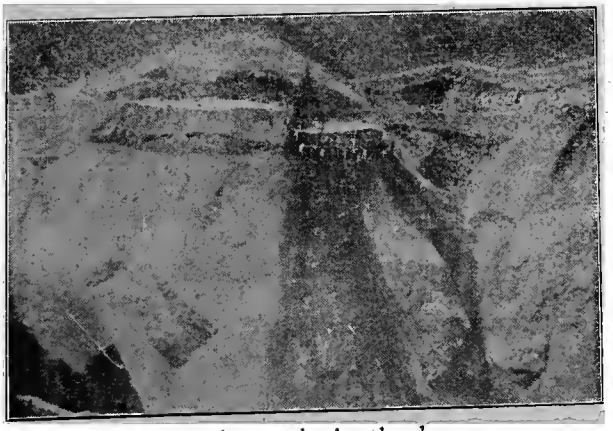
Road to the top of Hsieh Kung Ling cut through solid rock.



Cutting into a rocky cliff.



Bridge near Cheng Tu said to be six hundred years old.



Above the rock, in the loess.

Yellow River Road.

Capt. McDonnell, accompanied by Col. Chao and Mr. Hummel, started on the reconnaissance of this route on March 22nd. There was snow on the mountains and ice in the passes, which left a very vivid impression on the minds of the engineers as to the difficulties of the trail. At several points alternative paths lead to the next stopping place. One of these routes was explored on the out trip and the other on the return. Capt. McDonnell's report confirmed everything that had been urged in favor of this route, and declared feasible the construction of a highway to the River at Cheng Tu. At the same time he pointed out that the difficulties were such that surveys of two or three months were very desirable, quoting the engineering maxim that "More dirt can be moved with a transit than with a shovel."

In the meantime, the work on the Ping Yao road was drawing to a close, and we had the problem of taking care of nearly six thousand men clamoring for an opportunity of earning a livelihood. These men could not wait for a two or three months' survey, and with the backing of the American Advisory Committee's $250,000. Mex., construction on the Yellow River road was begun.

Unfortunately, Captain McDonnell was under such obligations that he could not undertake the direction of this work. Surveys were made by an assistant engineer and Col. Chao's Chinese assistants, but it was not until April 17th that any line was staked out. About this time we received tender of the services of Major J. W. Stillwell, U.S.A,, who was made Chief Engineer. As fast as they could be obtained, other engineering assistants were put into the field, and for the next six weeks it became a game of hare and hounds between the surveyors and the workmen, surveyors having hard work in the difficult country to keep ahead of the laborers. The line was completely located by the first of June, but the end of the month found a few stakes to be set. This was on the most difficult section,—the last two miles of the slope down to the Yellow River at Cheng Tu. At this same moment all of the earthwork sections, except the last eight miles, were rapidly reaching completion. On the first fifteen miles bridges and culverts were finished by July 1, so that the automobile was used on this section of the road. On the remaining portion of the line, however, which contained a great many openings of this sort, probably less than twenty-five per cent of the masonry was in place, and long sections of rock remained to be blasted.

Because the harvest in the Shansi uplands does not occur until September, it had been decided to carry on this operation to the end of July under the original Red Cross organization, and after that under the same personnel reporting directly to National Headquarters rather than to the Director of the China Famine Relief But about the middle of July the closing up of advance accounts showed that only a small balance remained of the funds appropriated for this purpose, the American Advisory Committee donation included. Unusually heavy rains resulted in mountain torrents which put a stop to active work at the same time. Forces were immediately reduced and on August 10th, the operation, together with unexpended appropriations, were placed in the hands of the Fenchowfu Famine Relief, of which the treasurer is Mr. Pye, China Famine Relief Field Manager. In the meantime, application had been made to the Shansi Famine Relief Committee for funds known to be in their treasury derived from the American Advisory Committee. Of these, $150,000. was appropriated and by the middle of August the work was again under way. It is estimated that

Preparing a blast.

Gravelled road through a cut.

the entire job will be completed by November 1st. Earthwork was completed on September 15th.

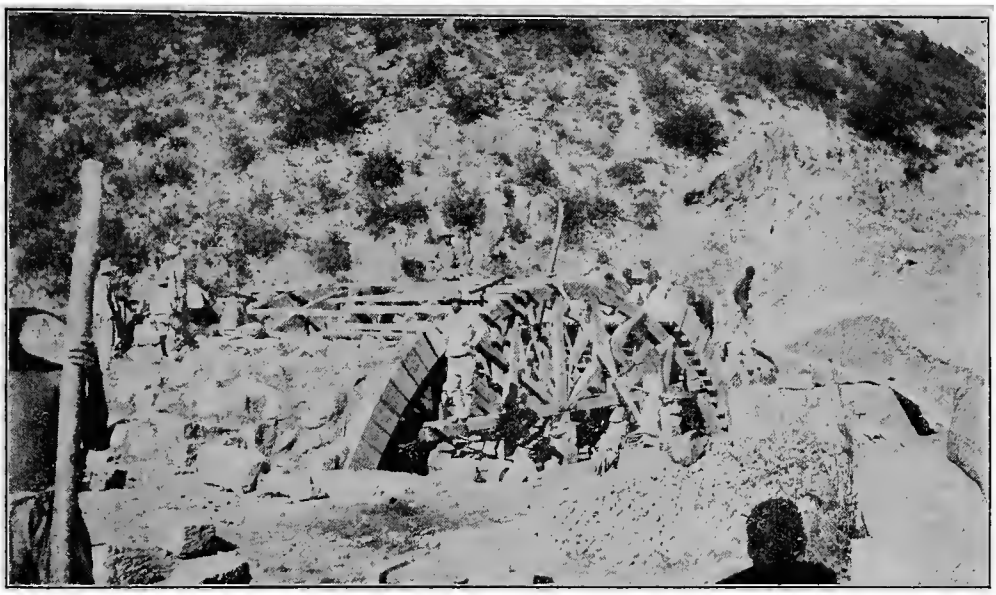
Description of the route.

The Yellow River Road joins the Loa Cheng extension at the northwest corner of the city of Fenchowfu and proceeds west by southwest through gradually rising country into the loess hills at Chin Chia Chwang, 9 miles distant. Thence in a westerly direction ten miles to the village of Wa Chih. From there, it takes a winding course generally northwest to the Hsieh Kung Pass, at a height of 4,900 feet above the level of the sea and 2,700 feet above Fenchowfu, from which it is 24 miles distant. From here there ensues a down grade almost straight north to Chou Li Nan. From there it runs alongside the river bed in a westerly course for 28 miles to the important city of Yunningchow.

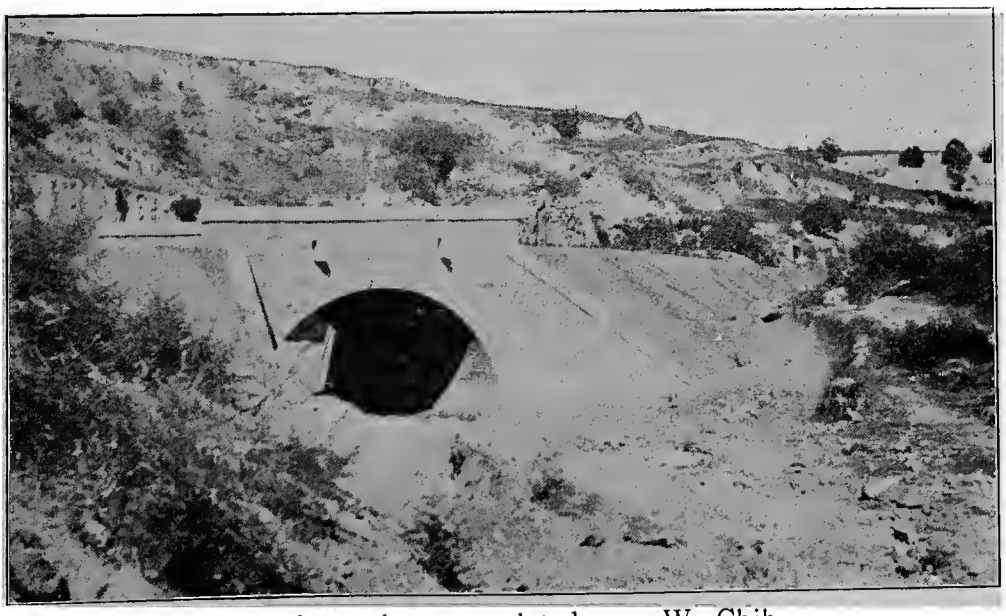
From Yunningchow the line runs in a general westerly direction, winding as the river course demands for 24 miles through a narrow irrigated valley to Hsieh Tsun. At several points, however, the road goes up over cliffs overhanging the river by perhaps a hundred and fifty feet. Hsieh Tsun is about seven miles from Cheng Tu, the terminus. West of Hsieh Tsun precipitous loess mountains are encountered for three miles. At some places sheer cliffs five hundred feet high overhang the trail, below which are declivities of equal proportions. To widen these trails means a tremendous movement of earth with consequent changes to local water courses. These changes in water courses inject a considerable factor of uncertainty and will require constant patrol of the line during the rainy season until a condition of equilibrium has been established. It was considered impractical to widen the old trails and a new route was located independent of them. This, though longer, was less expensive and also enabled lessening the grades considerably and was less likely to wash out during the torrential rains which are prevalent in this district at certain times of the year. The summit was reached at a height of about 1,200 ft. above the Yellow River, and a greater elevation was avoided by opening up an old tunnel 100 feet long which had been in use upwards of one hundred years. From here the drop to the Yellow River, which is less than two miles distant by air line, was accomplished in approximately five miles, with a maximum grade of 6 per cent and a sufficient number of reverse grades and level stretches to make the use of the route practicable for animal-drawn vehicles. This necessitated taking advantage of all available gullies and saddles and making two sharp horseshoe bends on as many hillsides. The last two miles is through almost solid pyritical rock that fortunately had been considerably disturbed by earthquake agencies, which enabled its removal with but little blasting. At the River, a narrow sand flat permits of the construction of an adequate bund where boats could be tied up with some protection from the current, which has a velocity of about eight miles per hour during low water and probably double that at high water.

On this line there are 458 culverts varying in span from two feet to ten feet. There are 9 bridges of one arch each varying in span from 12 feet to 30 feet; 3 bridges of two arches each varying in span from 12 to 30 feet; 4 bridges of three arches each varying in span from 15 to 20 feet; 1 bridge of four arches, 15 feet each span; 1 bridge of five arches, 15 feet each span; 1 bridge of six arches, 20 feet each span, 1 single arch viaduct, 20 feet each span, 52 feet in height and 1 multiple arch viaduct consisting of three 30 feet arches each 85 feet in height.

The maximum grade is 6 per cent. The entire line contains the following grades:



A 30-foot culvert under construction near Wa Chih.



A 20-foot culvert completed, near Wa Chih.

Per Cent	*Approximate Total Length*
3.0 (or less)	64.7
3.1-3.9	8.3
4.0	8.3
5.6	1.7
	83.0

The road bed is twenty-two feet broad except where heavy rock work required narrowing down. Most of the line is surfaced with gravel obtained either from the river bed alongside or from excavations. One of the peculiarities of a considerable portion of this section is that narrow seams of gravel ranging from a few inches to a foot thick are uncovered at intervals of fifteen to twenty feet in the cuts through the loess hills. It was thus possible to surface a considerable portion of the route without special organization for that purpose.

The total expenditures upon this line have been $671,000 Mex., made up of the following contributions:

American Red Cross	$271,000
American Advisory Committee	250,000
Shansi Famine Relief Committee	150,000

(Derived from American Advisory Committee)

When the construction had passed beyond the region of simple earthwork, most of the work was done by contract. Contracts for the earthwork and many of the smaller culverts were let to individual gangs. But some of the worst pieces of rock blasting and the larger culverts and bridges were undertaken by professional contractors, who selected specially skilled men from the gangs or brought in others from the needy hill sections of Chihli. Prices paid for loose rock excavation averaged about $1.75 per 100 cubic feet and for solid rock $3.20. For culverts the price averaged about $9.50 per 100 cubic feet. Many of these contracts were sublet, the first contractor furnishing the tools, blasting material and paying the transportation expenses of the workmen. At Wa Chih these prices were complained of, somewhat, due to the necessity of hauling water eleven miles.

There is an excellent opportunity for proper upkeep of this highway. The Province of Shansi is under good discipline and the officials are more than ordinarily progressive. Instructions have been given by the Governor that no narrow tired carts shall be used upon this road nor upon the P'ingtingchow road. Furthermore, since traffic over this route has been entirely by pack mule, there are no carts at present which would be tempted to use the road except at the Fenchowfu end. There are no vested rights to be violated by demanding that broad tired carts be used. Native wheelwrights at Taiyuanfu are already turning out broad tired wheels. The Red Cross sent a considerable number of American type broad tired wheels to Fenchowfu for demonstration purposes, and the first transportation companies using the highway will be equipped in this manner.


Views of the Yellow River at Cheng Tu.


Views along the rejected Chi Ko route.

Famine victim on the Yellow River Road.

This man had a pulse of only 30 when Dr. Watson found him, but with good care he recovered.

CONTRACT AND SPECIFICATIONS FOR MATERIALS AND LABOR FOR CULVERT *#104, 106*

AMERICAN RED CROSS FAMINE RELIEF ROAD CONSTRUCTION BETWEEN FENCHOW AND PINGYAO SHANSI CHINA

CONTRACTS

1. This agreement made the *5* day of *May*, 1921, between the American Red Cross Famine Relief, hereinafter called the "Owners," and *Ch'en Tien Fa*, hereinalter called the "Contractor."
2. The Contractor does hereby agree on or before the *26* day of *May*, 1921 to provide labor and materials for the complete erection of the above culvert in accordance with the drawings and specifications placed in his hands.
3. The Owners in consideration of the above agreement, hereby agree to pay to the Contractor the sum of *$65.00*, in installments as follows;

1st Installment *work begins* *35.00*
2nd ,, ,, *completed* *30.00*

4. In consideration for the Contractor completing the work by the afore mentioned date, doing first class work in every particular, and using materials as directed, he will be paid the following bonus *$10.00*.
5. All work is to be done in a substantial and workmanlike manner, and first class material is to be used throughout.
6. Should the Contractor during the work become insolvent, fail to do first class work or to use first class materials, or fail to perform the work in strict accordance with the drawings and specifications, the Owners shall have power to take possession of the work at the discretion of the Culvert Superintendent, and deduct from the price of the Contract the amount necessary to complete the work.
7. Should the Contractor fail to complete the work by the afore mentioned date he hereby agrees to deduct from the Contract price the sum of *$1.00* per day until the work is complete.

SPECIFICATIONS

1. EXCAVATIONS Excavations are to be made in accordance with the drawing, the bottom of the pit to be pounded well before any filling is done. There are to be 2 courses 6″ deep when pounded of lime and earth composed of 1 part lime to 5 of earth.
2. BRICKWORK All brick used are to be of first class quality. The brick are to be soaked before laying, and are to be laid plumb and true.
3. ARCHES All arches are to be laid true to a center upon a wood framework that shall be approved by the Superintendent.
4. MORTAR All brick, except as hereinafter mentioned, are to be laid in a mortar composed of 1 part lime to 2 of clean sand. (No mud is to be mixed in the mortar). All joints are to be full of mortar, and each course is to be well slushed before the next course is laid.
5. INSPECTION No work is to be covered up before it is inspected and passed upon by a foreign superintendent.

Prepared by J. B. WOLFE, April 20, 1921.

修汽車路橋包工與料合同規則單

修橋第一百零四號六

美國紅十字賑濟會修汽車路由汾州至平遙

一　本合同在西歷一千九百二十一年五月五日由美國紅十字賑濟會與包工人陳殿法訂定

二　包工人必要應許按本合同與圖樣連工帶料在本年五月二十六日完全告竣

三　本工程之主人應許給包工人大洋六十五元分二次支取第一次開工時支洋三十五元第二次完工支洋三十元

四　若工程在所定之日期內告竣所做之活實在所用之料亦歸上等本主人應許賞大洋十元

五　本工程必要用頭等之料做頭等之活要隨工程師與兼工人之意

六　若做活不按圖樣與合同所用之料不好本主人有權柄除包工人之錢將本工程另包給他人做

七　按第二號包工人所應許完工之日期倘未告竣晚完一日除洋一元

規則

一根基　做根基之層數與尺寸必要按圖做槽已妥必須先砸好而後再填土灰渣灰用水潤濕使鐵餅或石餅砸共填兩層每層六寸厚

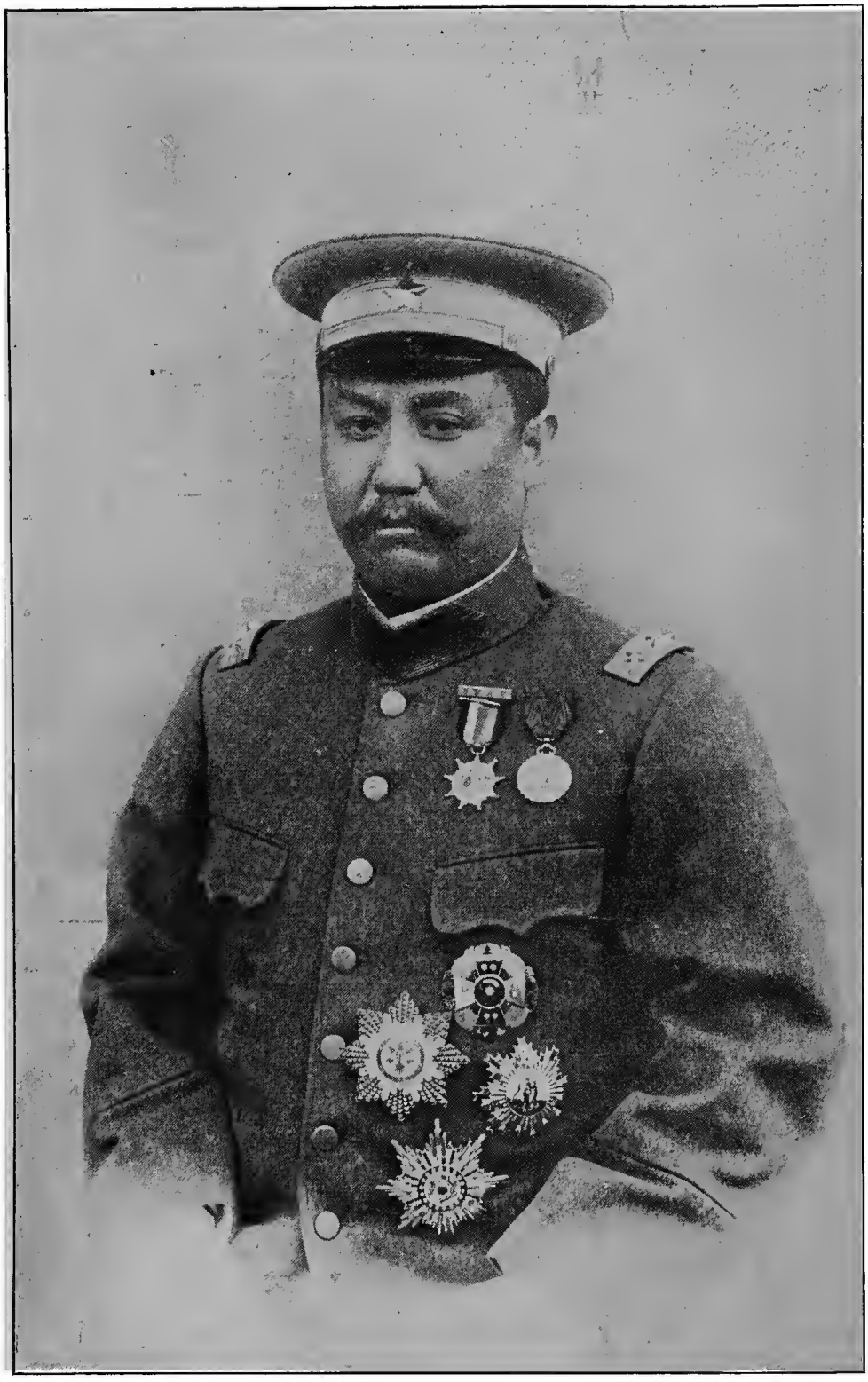
二磚活　用磚必需頭等之磚未壘以先必用水浸濕壘時切要平直

三旋　做旋時必要在下邊作一木輪爲規

四膠泥　用一份灰二份沙子膠泥裏不要雜泥土壘磚時將每個磚要抹滿膠泥每壘一層必須灌漿一次

五察看　無論做甚麼活未做滿以先必須請兼工人看過爲是

西曆五月五號陳殿法



Governor Yen Shi Shan of Shansi.

CHAPTER X

HONAN OPERATION

Field Manager .. .. .. REV. J. A. MOWATT
Associate Field Manager . REV. H. A. BOYD
Treasurer .. .. DR. D. R. REEDS
Secretary .. .. MISS A. E. ROSS

REV. J. A. MOWATT

THE Province of Honan because of its productivity is known to literary Chinese as "Land of the Central Flower." It has a population of 25,000,000 on an area like that of Minnesota. It was one of the four provinces hard hit by the drought of 1920.

The missionary enterprise in this province is largely in the hands of the Canadian Presbyterians, and the members of this group were, in perhaps a majority of cases, in favor of relief through employment upon work of public improvement. They have built a macadamized highway from Wuan, in the northern tip of the province, to Hantan, on the Peking-Hankow Railway. (See Chapter XI, Hantan Operation). They were instrumental in securing the improvement of the streets of Weiheifu by relief labor. And they attempted to improve the highway from Chinghua to Tsiyuan, but were called off from this work by the threat from certain sources of funds, that if more money was put into improvements, all further support would be withdrawn.

Chinghua is the western terminus of the Taokow Chinghua railway,—a branch line to the Peking-Hankow Railway. The native road from Chinghua to Tsiyuan is through low country, actually below the level of the Yellow River in several places. In fact, many of these spots are little better than a bog and the road was used as an irrigation ditch during certain portions of the year. The eastern section of this route often required twelve hours for the fourteen miles, even with light loads. When famine relief grain was sent by rail for free distribution, it was absolutely impossible to get it out to Tsiyuan without making some improvements; and after the improvements, six animals were lost in the mire and considerable of the grain had to be stored along

the way, awaiting a more favorable condition of the road for transportation.

Hence on March 29th, Rev. Jos. A. Mowatt addressed the American Red Cross asking financial assistance for the further improvement of the road, explaining that the needs for relief were so great that the small number of workmen which he already had on the job were being changed every two weeks to give as many as possible a chance to earn something. With characteristic enterprise, he followed the letter in person, and finding the Director away on an inspection trip, macadam, which later resulted in a further appropriation.

GENERAL PLAN

By the time this operation was begun, information was definite that the country at large was fairly well stocked with grain, and that prices in the famine area were comparatively little above those in the markets where the famine relief societies could purchase with some hope of delivery. The credit for this condition may as well be given here as anywhere to the Ministry of Communications, whose able head, Hon. Yeh Kung Cho, in

REV. H. A. BOYD. REV. J. A. MOWATT. DR. D. R. REEDS.

followed up, and almost literally sat astride the pass by which the Director's return trip must be made. There is no refusing a man like that. An appropriation of $18,000. Mex. only was made for the earthwork on this line. Nothing was promised for macadamizing at the time, for it was not known how fast some of the other operations were going to require funds. However, from the description of the location and character of the soil, the Director made a mental reservation in favor of the early part of September ordered the rates on grain from points outside of the famine area to points inside the famine area to be reduced twenty-five per cent, and those in the reverse direction to be increased a similar amount. The result was an immediate grain movement, perhaps ten times as great as any previous year, and a pretty thorough breaking of speculative control of the market. Besides, the people who were to be relieved by this road building, were not those along-side

the road, but rather those eight or ten miles away, up in the foothills. There was grain to be had down in the lowlands, if one had the price. In view of the limited forces now available for supervision, it was decided to handle this project on much the same basis as the Yellow River Road; that is, pay cash and dispense with a commissary department. The Mission medical forces were relied on to prevent epidemics from getting a long start.

Operation began April 26th under the organization shown at the beginning of the Chapter. Field Manager Mowatt while giving general attention to the entire operation, acted as Chief Engineer for the eastern section, Hwaiking to Chinghua. Mr. Boyd took in hand the line west of Hwaiking with the assistance of foreigners drawn from other Canadian Presbyterian Missions. Both Mr. Mowatt and Mr. Boyd were experienced men, having handled coolie battalions in France during the war.

Raising the grade.

Right of way.

The old public road was followed without deviations. Land is extremely valuable in this region. However, no difficulty was found in taking from the adjoining farm properties all the soil needed for raising the grade. Even as late as two weeks before the harvest, the Director on an inspection trip noted only one protest to heavy crops being destroyed for a width of six or eight feet. The explanation for this unusual condition is to be found in the fact that this region is far enough south for rice culture. Rice is a more valuable crop than wheat or barley. These borrow pits make excellent rice paddies. Trust a Chinese farmer to keep still when his property was being improved without expense to him.

Earthwork.

The earthwork was in fact mud work, as practically all of the ditches were very quickly under water. Laborers were paid on the basis of the Chinese chang (ten linear feet, irrespective of width),—the price per chang varying according to the width. In arriving at this price, twenty cents per fang (100 cubic feet) was held to. Where there was a considerable carry

involved, the rate was slightly higher. In view of the heaviness of this wet soil, this is probably the lowest rate paid on any job. Because of the heaviness of the mud, and the fact that the construction was carried on under traffic, no tamping was required. The gangs were listed in groups of forty, in contrast to thirty which obtained on the other operations. They chose their own headman or ganger. They were allocated to sections of varying size depending upon the exigencies of the work and convenience to the supervising foreigner. When the allotted work was done, measured and accepted, a voucher was made out in the presence of the entire gang, the amount filled in and read aloud so that all might hear. The head man then took this voucher to a Chinese intermediary who acted as a sort of professional identifier or sub-treasurer. The sub-treasurer took the finger print of the head man and recorded in his book the amount of money required, then went with the headman to one of the banks where the Red Cross money was deposited and where the headman cashed his voucher. The headman then returned and distributed the amount among the members of his gang. The banker was responsible for the payment of the money until given a check by the supervising foreigner covering the payments for that particular section for the day. In all cases of dispute the gang was required to choose two coolies from among their number to assist in making an investigation.

Transportation of Rock.

The heaviest portion of the work was that of transporting the rock from the mountains, an average distance of seven miles. While carts were used to a considerable extent, most of it was done by wheelbarrow. The stone was paid for delivered, the supplier being left to his own devices in securing the rock. Prices paid varied according to distance hauled and quality of the rock. A higher price was paid for stone of large size that had rolled down the mountain side but had not been worn smooth like the stones in the river bed. A still higher

Wheelbarrow for carrying rock.

price was paid for quarried stone. The average price at Chinghua was $2.75 per fang. At Hwaiking $4.70. On the most western sector as much as $6.00 and when irrigation made large detours necessary, as much as $7.00 and even $8.00 per fang was paid for quarried stone. The basis for arriving at these prices was one and one half cash per catty for twenty-five li. This is equivalent to fifteen cents gold for one hundred and thirty-three pounds for a haul of nearly nine miles.

Stone delivered in sections.

A barrow man will push two piculs at a load without much difficulty and hence can make the equivalent of fourteen cents gold by pushing these two hundred and sixty-six pounds nearly nine miles and walking back with his empty wheelbarrow. If the roads are not bad, he can do more than this in twenty-four hours, but on the average this would be a day's work and a day's pay.

Rock was delivered to the road in sections. The headman for a rock section took up his stand at a convenient cross road where he weighed or measured the stone as it passed and paid each barrowman or carter immediately. The price per fang paid on such a section was posted up in a conspicuous place and the number of catties in a fang stated in the same notice. When a fang had been completed, a red mark was made and it was the duty of the foreign supervisors to check the number and completeness of these fang. When the amount delivered had been verified, payment was made in the manner described above. When two sections came close together, it was rather more than human nature could stand—the temptation to steal a little rock from the next section, rather than transport it so far. And in measuring the delivered material, it was found that only foreigners have the prestige and the personality to secure honest results.

Rock Breaking.

As soon as the received fang had been measured, it was marked by a liberal sprinkling of lime in various patterns. A slip stating the number of fangs to be broken was then handed to the headman of the stone breaking gang. Breaking of the stonento the proper sizes is done entirely by hand,

Rolling Macadam.

Breaking the Rock. Note the traffic.

and the price varies according to sizes and quality of the stone. Some stone which was brought in from towns or villages where it had been used in temples or foundations was especially difficult and many gangs refused to work on it because they broke too many hammers in the operation. The lowest price paid was the equivalent to one dollar Mex. per fong and the highest was two dollars. The method of payment was the same as that described in connection with the earth work.

Laying the macadam.

The form of the road is merely ordinary embankment with a slight crown. Its width varies from fifteen to twenty feet. The macadam was put on in four layers with screenings for a top dressing after some rolling had been done. The first layer consisted of four inch rock spread out to within two feet of each side of the embankment. On top of this was placed a three inch layer. The three and four inch layers were put on the same day. On the following day a layer of two inch rock was applied, followed on the next day by a layer of one inch rock and screenings. Each layer was mixed wet with lime and sand. The pay for this work was about eighty cents Mex. per chang complete. Each of these layers was rolled with heavy stone rollers weighing perhaps three tons. However, the corners of such rollers had been chipped away so that the entire bearing space was so reduced that a pressure of about one ton to the foot was secured. This work of putting on the macadam was carried on continuously night and day for the same reasons that the pouring of concrete must be continuous. Three gangs worked in alternate shifts of four hours each. Each man received ten cents Mex. per shift.

Due to the position of this highway between a mountain range less than ten miles away and the Yellow River, drainage was an important factor. Unless means were provided for drawing away the water, which might accumulate alongside the road, the foundation would gradually "melt" away. Besides this, no matter how high the road might be raised above the surrounding fields, there was

Old Chinese culvert. Later this was extended to full width of the road.

constant danger of its being swept away by freshets. Accordingly, 128 bridges and culverts were made. Some of these culverts are very complicated, having to take care of irrigation ditches which cross the drainage ditches at right angles. There are instances where triple culverts were required. An effort was made to build them level with the road so as to save the bumping usually experienced in passing over a Chinese bridge. For the most part, the culverts were made of stone throughout, but in the case of double and triple culverts in order to save dimensions, brick was introduced. Temporary bridges had to be erected over the Chin River to enable passage of stone to the new road, but these were removed when the floods came on so as to avoid loss of material. A permanent structure cannot be built here or at the Tan River except at great expense, due to quicksand foundation.

As the floods came on, additional culverts were found to be necessary. In order to save the road, openings were purposely cut at several places. These culverts will be built by funds in the hands of Field Manager Mowatt, derived from Canadian Presbyterian sources.

The entire length of road was finally found to be a little over 39 miles, of which 30 miles were macadamized. The macadam covers all the worst portions of the route. The remainder of the macadamizing will be done by funds similar to those available for culverts. The total cost to the American Red Cross was almost exactly $100,000 Mex. or an average cost of $2,560 per mile.

Amount of Relief.

Due to the method of contracting this work, there are no recruiting records to show the approximate number of men employed. But from actual counts made on several sections, it is estimated that on an average of six thousand laborers were employed from May 1st to July 31st when the operation closed. Fully 30,000 people thus received relief.

This highway under old time conditions was an important artery of commerce. For years an extension

Mr. Boyd on an inspection trip in the only American buggy west of the Peking-Hankow Railway.

of the railway through Hwaikingfu has been under consideration. There is also a heavy traffic from Hwaikingfu to Tsiyuan and return. Under improved conditions the traffic will undoubtedly be many fold heavier. During the recent floods all of the other roads in the district were impassible, but the Red Cross road stood out dry and ready to bear any amount of heavy traffic. Six broad tired carts are now in operation, wheelwrights are studying their construction, and a road committee is reported to be in process of formation for the maintenance and administration of this road and others which they expect to build. Unfortunately the Tao Yin of this district who had been very much interested in the work has been replaced by a political favorite whose attitude, of course, is still problematical.

今將修馬路辦法開例於後

第一號條　爲收買碎石之用樣式

第二號條　爲監工工頭每日或每月領取錢樣

第三號條　爲買石頭樣

第四號條　爲條上所有英文樣

第五號條　是修土路領錢樣

第六號條　是打大石使爲小塊樣

第七號條　是本會在本處錢店或銀行內所存之錢憑條去(店行)內取(錢銀)樣

以上小條上一一寫明

前六個號條每條上必得有（美國紅十字會）小印一個蓋在上面也有掛頭或去領錢人大母指印

也必得有英文因爲恐有假條如一號條

No. 1

美國紅十字會　總監工
Section. No.

第　排
碎石頭

每方　千　百　拾　文
Per Fang

共　方
Total Fang

共錢　千　百　拾　文
CASH

中華民國拾年　月　號排頭

No. 2

美國紅十字會　總監工

第　排

每人每日　百　拾　文

共　人

共錢　千　百　拾　文

中華民國拾年　月　日排頭

for culverts and also
Form for special labour not
possible for contract

No. 3

美國紅十字會 總監工

第 排 Section. No.

買石頭 Purchasing stone

每方 千 百 拾 文 Per Fang.

共 方 Total Fang

共錢 千 百 拾 文 Total Amount.

中華民國拾年 月 號 排頭

此錢條爲買石頭用

No. 4

美國紅十字會 總監工

第 排 Section. No.

石頭

每方 千 百 拾 文 Per Fang.

共 方 Total Fang

共錢 千 百 拾 文 Total Amount.

中華民國拾年 月 號 排頭

Form for grading Earth road No. 5
此錢條爲土路用

美國紅十字會 總監工
第 排
自第 號起至 號止
每丈 千 百 拾 文
共錢 千 百 拾 文
中華民國拾年 月 日排頭

all payment to workmen gaugers have signature and finger print

No. 6

美國紅十字會 總監工
第 排
打石頭
每方 千 百 拾 文
共 方
共錢 千 百 拾 文
中華民國拾年 月 號排頭

Breaking stone
此錢條爲打石頭用

Sample stub and cheque for drawing money on local Bank.

No.....

Bank.....

Pay.....

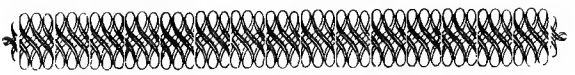
For.....

A/c.

$.....

19.....

此上半條是本會存根



此下半條是着人取人取不留在行店內

美國紅十字會 憑條取

本會人員名

行店字號

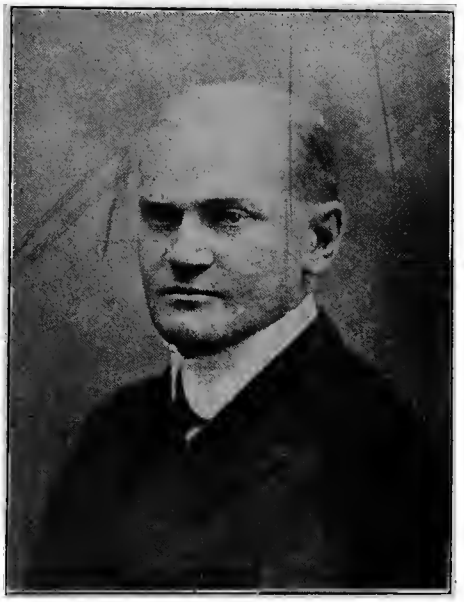
銀幣 圓 角 分

中華民國 年 月 日開第 號

CHAPTER XI

HANTAN OPERATION

Field Manager .. .. .. WAYNE C. JORDAN
Chief Engineer .. .. .. L. E. OSBURN
Chief of Commissary .. .. W. M. COPPIN



WAYNE C. JORDAN

PRELIMINARY

WHEN the Red Cross area in Shantung was extended westerly of Lintsing and the Grand Canal, one of the possibilities kept constantly in mind was that of extending the Red Cross roads on into a badly affected area in and about Taimingfu in the province of Chihli, and thence on to the Peking-Hankow Railway at Hantan. Hantan was the natural terminus of such a line, for it was the eastern terminus of a highway being constructed under the direction of the Canadian Presbyterian Missions from Wuan, in the province of Honan. It seemed a fitting thing to connect up as many of the construction projects as possible, for in such case, each contributes to the value of the other. Additional point is lent to this purpose when the construction in Shansi is also considered. It is only a matter of a very short time before a highway in Shansi connecting the provincial highway at Taikuhsien with the Red Cross road at Lia Chow will be constructed, because such a line is now only a relatively short missing link in a modern highway over the historic Yellow River—Shuntefu trail. When that link is built, then a short but difficult line from Liao Chow to Wuan would make a continuous highway from the western boundary of Shansi to the sea. (See map).

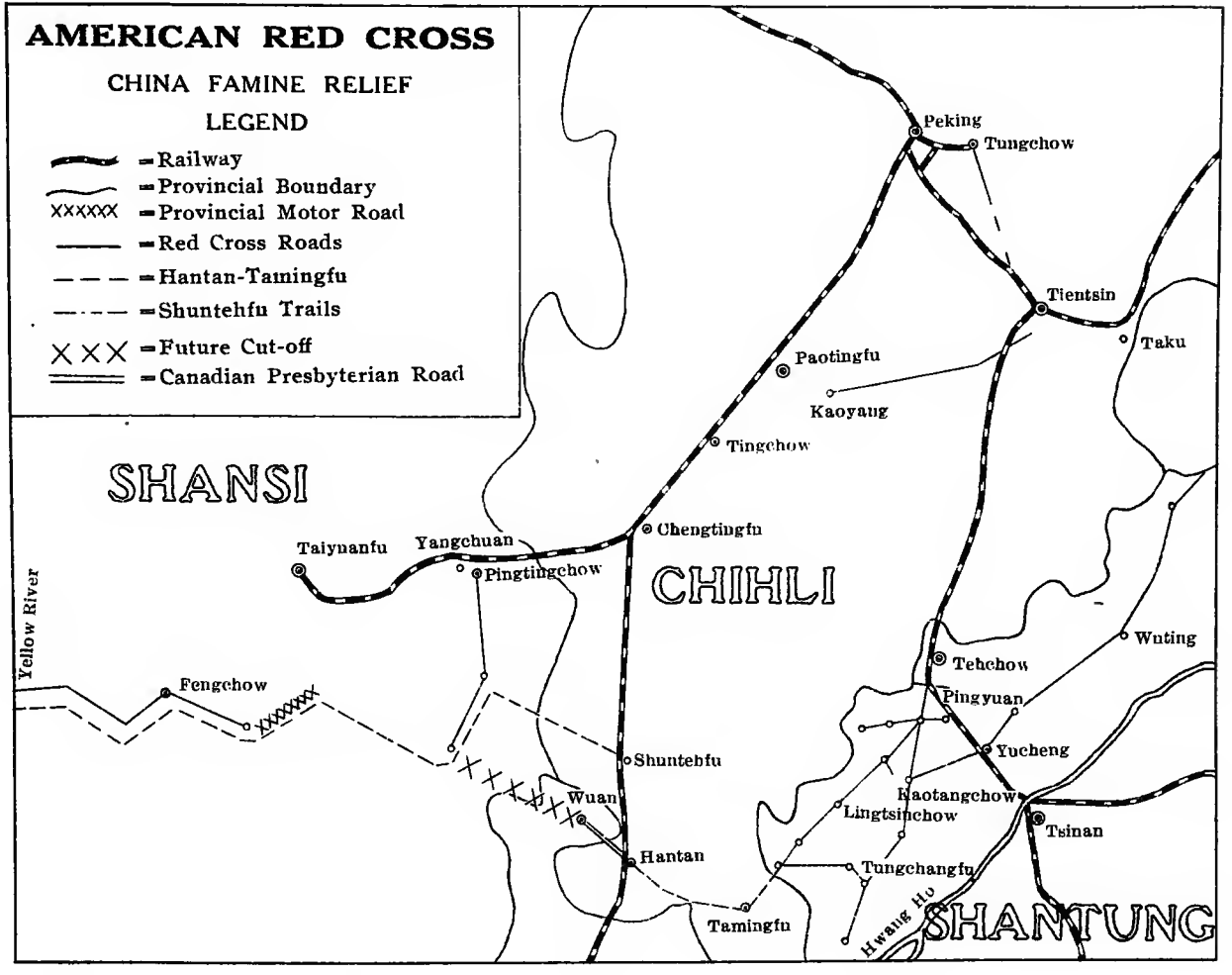
Accordingly, as soon as the Shansi projects were set afoot, formal letters were dispatched to the American Legation and to the Ministry of the Interior, announcing willingness to enter upon construction in Chihli as well as in Shansi upon the same terms as observed in Shantung. On March 12, the same date as a favorable reply from the Ministry of the Interior, a letter was addressed to the Civil Governor of Chihli, His Excellency Tsao Jui, reading in part as follows:

"If it meets with your excellency's approval, the American Red Cross will furnish sufficient funds to build an ordinary dirt highway from Hantan, on the Peking-Hankow Railway, by

Famine refugees aboard cars at Hantan.

Old woman resting in the streets, on her way to claim relief.

Normal Chinese children in summer.


AMERICAN RED CROSS
CHINA FAMINE RELIEF
LEGEND
=Railway
=Provincial Boundary
=Provincial Motor Road
=Red Cross Roads
=Hantan-Tamingfu
=Shuntehfu Trails
=Future Cut-off
=Canadian Presbyterian Road
SHANSI
CHIHLI
SHANTUNG
Peking
Tungchow
Tientsin
Taku
Paotingfu
Kaoyang
Tingchow
Chengtingfu
Taiyuanfu
Yangchuan
Pingtingchow
Yellow River
Fengchow
Shuntehfu
Wuan
Hantan
Tamingfu
Wuting
Tehchow
Pingyuan
Yucheng
Kaotangchow
Lingtsinchow
Tsinan
Tungchangfu
Hwang Ho

the most appropriate route, to a connection with the highways which it is constructing in Shantung. As soon as possible engineers will be dispatched to examine the possible routes and a report will be made to your excellency concerning the advantages and disadvantages of each.

"The ways and means for acquiring the land necessary for such highways will then be at the discretion of your excellency, it being a fixed policy of the American Red Cross not to purchase land in any foreign country. Such matters as the movement of buildings, trees, graves, etc., would also be attended to by the Chinese authorities. The American Red Cross must be kept harmless from all claims due to building upon public and private lands."

To this, the Civil Governor replied on March 26, as follows:

"In reply to your letter of the 12th instant proposing to construct an ordinary dirt highway with famine labor from Hantan, on the Peking-Hankow Railway, by the most appropriate route, to connect with the highway which is being constructed in Shantung.

"I wish to express my deep appreciation of your benevolent sentiment and good will. I shall be pleased to be informed of the movements of your engineers so that I may instruct the local authorities to render them protection and assistance.

"As to the matter of acquiring the necessary land for the highway I shall, upon being informed of the definite route, instruct the magistrates to take up with the local gentry so that the matter will be properly attended to. I am personally interested in the matter and shall do my best to assist you in having the work carried out."

In the meantime a conference had been held with his excellency in which the plans were gone over in detail, and approved. A written undertaking was also made to withdraw from the field on July 1, or before on request, at which time the Red Cross would "relinquish all claim to or control of the highways constructed by it."

The area in question was one in which the United International Famine Relief was already giving relief on the "free" plan. Hence, it was essential that the Red Cross should form relations with that organization more intimate than the mere asking of permission to undertake the work planned. Otherwise, all kinds of overlapping and abuse would result. Every step in the procedure, therefore, was taken only after careful consultation with the executive office of that society, and it was agreed that the United International should select from its workers in that region a person suitable for the position of Field Manager for the Red Cross. In this way the work of the Red Cross could be made to supplement that of the U. I. F. R. to the best advantage.

The country in and about the route from Hantan to Taimingfu is essentially the same as that in Shantung. There appeared to be no special difficulties in the way of this job, and its shortness, forty-six miles, made possible several simplifications of the plan followed in Shantung. This territory being short of grain supplies, it was planned to pay workmen in grain the same as in Shantung. But the distances were short enough so that it was feasible to dispense with all transportation of grain into the interior, leaving the workmen to look after that on their own initiative. Hence, an allowance of five percent additional was given to gangs who came in for it more than fifteen miles and an allowance of ten percent for the gangs who came more than thirty miles.

It was estimated that a gang of thirty men could build a li (one third

of a mile) of road in six weeks or two months. Hence, each gang was assigned to a section consisting of one li, extra gangs to be put on where extra work was required. The engineers were instructed to stake out the road, and then estimate the fongage on each li. This figure multiplied by five catties per fong would give the amount to which each gang was entitled for work. The transportation allowance would next be added—see Form C-20. This total would then be advised to the Commissary Department which would set up an account for each gang, as per Form C-17. Engineers would inspect the work from day to day, and every week, say, issue a certificate giving the per cent complete, which would entitle the men to draw on the commissary for their pay in grain. The engineer would have to be careful only to obtain good quality of work and to keep his certificates of completion a little in arrears. The Commissary would have merely to weigh out the grain and enter the amounts on the sheet provided, and see to it that no gang overdrew its account. The list of rules given in the appendix to this chapter will give a clear idea of the plan.

The investigation and listing of deserving families had been accomplished already by the United International Famine Relief Society as a preliminary to their free distribution. All that seemed to be required was a re-listing of those who should go on to the Red Cross rolls. A visit to Hantan was convincing to the most skeptical that a great work of relief was necessary. Great crowds stood in line for days at a time, each man waiting his turn to obtain his measure of grain. Wretches who claimed to have lost their tickets kotowed, followed and wept whenever a foreigner appeared, hoping to obtain one of the magic pieces of paper which meant a sack of grain. Old women rose up in droves around the corner and surrounded one, literally tearing one's clothes off to get at the tickets supposed to be hidden in one's pockets. People froze in the streets by night, many dropped on the way back with their loads which proved too heavy for their exhausted condition, and occasionally some trusted neighbor absconded with the entire allotment for his village. It was a wild place. Under such conditions it seemed that our simple plan would have absolute simplicity of operation.

The first cloud on the horizon was the explanation of a hsien magistrate that while the Civil Governor had given instructions that land was to be furnished to the Red Cross for the highway, no funds had been furnished by the Governor for the purpose, and that the Hsien itself would be in hard straights. Then came trouble with land owners concerning the destruction of their growing crop, which at this time was very promising. Women laid on the land and dared workmen to bury them before they would move and permit the crop to be destroyed. The Magistrate said that he would have no funds for compensation for crops until tax time. The crop owners seemed to be willing to take a chance on payment for the land (many of them were "squatters" on the old official road), but not for the crop. Many of these crop owners were on the relief lists and needy at the time. So as a means of getting on with the job, the Field Manager was authorized to compensate owners on the basis of about half of the estimated yield of the area destroyed. This was the entering of the camel's nose into the Red Cross tent.

The Field Manager now found that tickets for free distribution had been distributed to all of the poorest class, giving them food for fully a month ahead. It would be difficult to call in these tickets, and put the holders onto the Red Cross work job. Hence, he

recruited from the next poorest class. These were the people who had received no relief to date, who were in the best physical condition, who lived along the road, and who were of more substantial substance than the poorer class. This seemed favorable in that it appeared possible to get on faster with the work, there would be no bother with billeting, and less danger from epidemics breaking out among the men. As a matter of fact, we dispensed with a Health Division until the close of the Shantung operation made a physician obtainable.

But after these people had been at work a few days, they demanded millet as the grain for their pay. It appeared that millet was being issued by the Canadian Presbyterians who adjoined us, and hence a precedent had been set. A Chinese peasant will starve his ancestors rather than yield anything to which he thinks he is entitled by precedent. Besides, these eminently respectable people whom we were employing felt highly insulted when we offered them bean cake and peanut cake for food. Bean cake and peanut cake, they were accustomed to mix with their night soil for fertilizer. Tell them all you were a mind to about the food value of this cake, how Shantung people liked it, how Shansi people came back for more—they would have none of it—except after a bargain. So finally, to get on with the job, and because he felt that actual relief was needed, the Field Manager yielded the following:

Payment to be five catties of millet per fong, this to be equivalent to:

five catties of oats.
five ,, ,, beans.
six ,, ,, kaoliang.
six ,, ,, salt.
seven ,, ,, barley.
seven ,, ,, buckwheat.
seven ,, ,, bean cake.
seven ,, ,, peanut cake.

It was specified that fifty per cent of this issue must be taken in kaoliang, ten per cent in peanut cake, ten per cent in bean cake, and the remaining thirty per cent in other cereals as headmen of the gangs desired. The Field Manager, believing in encouraging Sunday observance, and that it would promote the work and good feeling, also authorized a Sunday allowance of 79 catties per gang of thirty men, although they did not work on Sunday. It will be remembered that in Shantung, while workmen were on day basis, they were required to work half a day on Sundays as a means of keeping them occupied. This was on the advice of elders of the native Christian Church. It appears that in Hantan the workmen on Sundays merely turned their activities to their own farms, instead of resting. From the standpoint of famine relief and the encouragement toward a full crop for the next season, this was not entirely unfortunate. But all of these variations broke into the simplicity of the plan, and what was more important, indicated to the populace and to the local officials that a given amount of opposition would produce for them better terms. The "take it or leave it" attitude which had characterized our Shantung negotiations seemed to have been abandoned. Finally, responsibility was assumed for payment of damages due for the destruction of certain buildings, several trees, and the removal of graves. This shows the lengths to which one will be driven if one sign of weakness is ever shown in negotiations of this sort in China.

Please observe that these various points were not yielded all at once, but only at various stages. If they had been all brought to issue at any one time, the operation would have been closed down forthwith. Hindsight is so much better than foresight. But after we had stocked our stores with a special train of supplies, it would have been a big waste to move them out or to sell them, for free transportation was obtainable only from outside of the famine region inward, and bean cake and

North and south pailous of Weihsien, the "buried city" through which the Taimingfu-Hantan road passes.

Tamping by use of a "flapper." A "flapper" is a disk of iron or stone weighing about 100 lbs., to which four or more ropes are attached by means of which the workmen swing it up.

Tamping.

Finished road after some days of illicit narrow-tire cart traffic.

Finishing.

peanut cake had a local market only as fertilizer. By the time that the next dispute developed, considerable land had been temporarily destroyed in the work of construction, together with a few buildings, trees, etc. It seemed bad faith to pull out and leave the local magistrates "holding the sack," so to speak, by having to repair the damages caused by our entry into the field. Hence the Field Manager was instructed to worry along as best he could, yielding no more than necessary to get on with the job, and making an absolute stand that the Red Cross would pay for no land nor assume any responsibility for any claims beyond the period of our operation.

Recruiting.

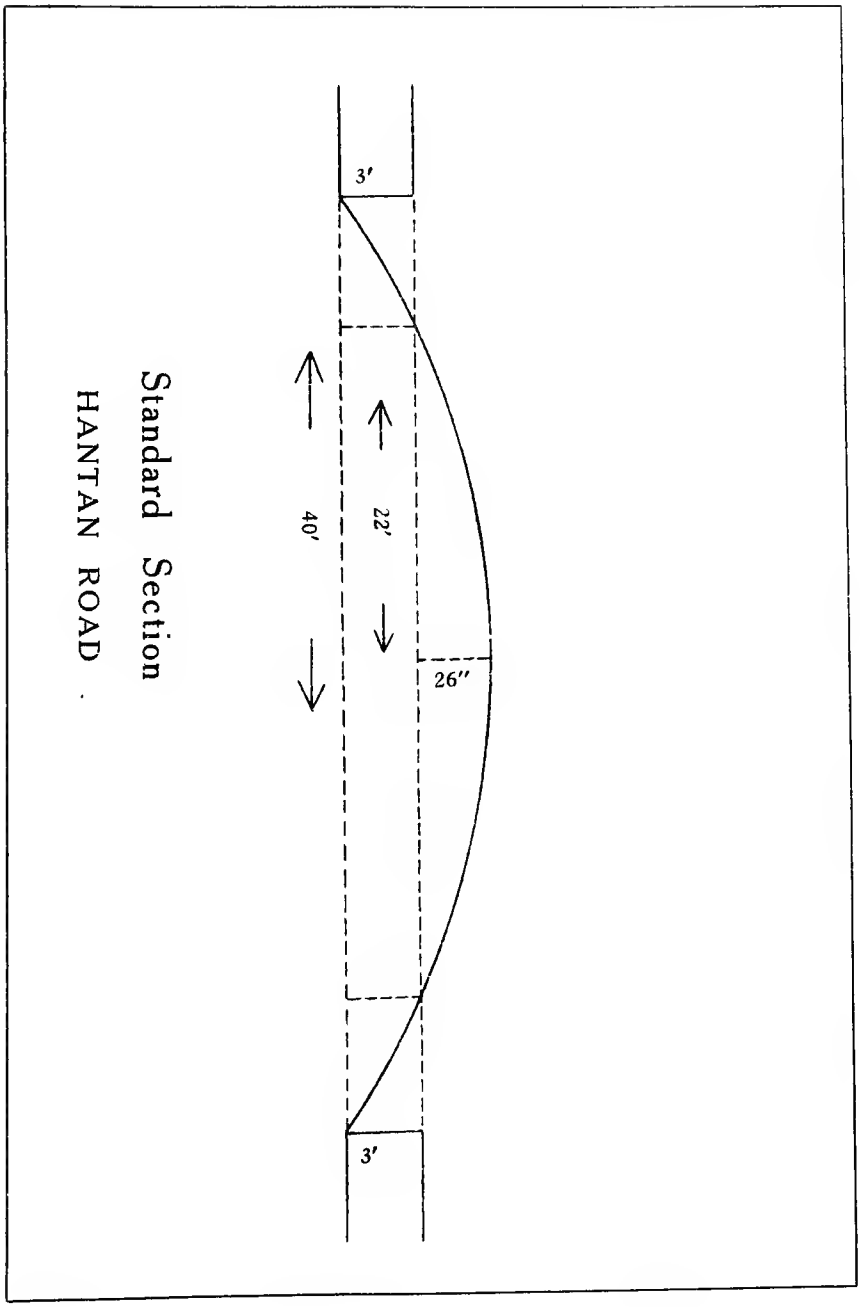
Recruiting was done under the direction of the Field Manager by Chinese assistants along lines similar to those pursued in Shantung. Most of the investigation work had been done in advance by agents of the United International Famine Relief Society. The Gang Lists on this operation were simplified by classifying dependents only as male and female, adults and children. In the families of 3,908 men employed on May 31st, in regular gangs, there were 21,178 dependents, or 5.4 per workman. Of these, adults exceeded children, the children numbering 9,344 and the adults 11,834. The maximum number of laborers reported was 5,500—in June. At this rate 29,700 people received assistance, in addition to the workmen, or 35,200 altogether.

Engineering.

The engineering was seriously handicapped in the early stages. Even before it was decided to open this operation, an engineer was employed to investigate the routes, for it was known that some bad sandy stretches would be encountered. But just as the work was about to begin, this engineer's strength failed, due to insufficient convalescence from typhoid. Nearly two weeks were consumed in returning him to Shanghai and in placing a successor in the field. The successor soon proved incompetent and was removed. But over three weeks of delay had occurred, a period which was all important in getting the work going smoothly and getting it completed before the harvest. The line had been laid out with railroad grades and curves. Except for slight kinks in passing through some villages, there are only three curves in the entire forty-six miles. The twenty miles nearest Taimingfu is absolutely straight.

The effort toward an air line was not without peculiar consequences. At one point a tremendous elm was in the way, and the engineer ruled that it must come down. But a red cloth around the trunk and other insignia indicated to the properly initiated that this was a spirit tree and required special consideration. The local villagers were sure that anyone who cut down this tree would come to some serious harm. None of them would take chances with it,—even for pay. At least, a potion must be prepared that would take twenty-one days, and the spirit must be carefully escorted from one tree to another until he could be brought to a safe dwelling in the twenty-first tree. After some delay, a native Christian offered to organize a gang to cut the tree. The elm fell with a crash, for its heart was rotten, and none of the gang have suffered any particular bad luck so far. Evidently the potion was properly mixed. The Field Manager reported some time ago that the red cloth had started on its journey from one tree to another, and undoubtedly the spirit is now at rest in a sounder, if younger, tree.

The type of road is somewhat different from that built in Shantung, as will be indicated by a comparison of the cross sections. The road was built with a twenty-two foot base allowing nine feet on each side for borrow pits from which to secure the clay for building up the center. It was a round-top



Standard Section

HANTAN ROAD .

road, of the type known throughout the Philippine Islands as a military road. The advocates of this type claim that it will withstand heavy rains better than other types built from ordinary earth. It was the policy of the Director to allow engineers who had positive ideas concerning types to follow their individual preferences. There is no highway experience in China which has any particular value as yet, and the test of time upon the various types will ultimately be of considerable worth. Motorists using this road for the first time complained of it. But those who later became accustomed to it, withdrew their objections.

All except about a mile was built of ordinary dirt. The exception was over the Nan-Pu sand stretch. For nearly three li, the road bed here was constructed of three layers:— first, sand floor thoroughly tamped; second, sun dried clay bricks 4″ x 12″ x 12″, cemented by mud and wheat straw plaster; and third, a layer of lime and earth concrete, consisting of one fourth lime and three fourths clay, 10 inches deep at the sides and 14 inches in the center. This dried within a short time and presents a surface of stone-like hardness. It is guaranteed by the builder and his guild for ten years. On either side of the pavement, a wall of clay bricks plastered with wet clay was erected, so as to hold back the shifting sand from covering the road. It is planned to plant drought resisting shrubbery for a considerable distance on either side of the road at this point, which will ultimately hold down this sand. But until the shrubbery grows to some proportions, the wall is necessary to keep the road from being buried.

Within a short time the native carts crossing a highway of this kind soon cut deep transverse ruts, which are a serious menace to motor transportation. One hundred and sixteen of these have been surfaced with a lime and earth mixture similar to that over the Nan-Pu sand.

The road contains seven bridges, two of which have spans of thirty feet, the other five having spans of twenty feet. All seven of them are high enough for any vehicle to pass under, being about ten feet in the clear, and thus eliminating native crossings at grade. The original plans provide for three hundred and seventy culverts, this including the small culverts parallel with the road under the native cart roads crossing ours. Two hundred and seventy were completed by the Red Cross. The remainder could not be completed because of the termination of the Red Cross period of operations. Local organizations are now preparing to complete this work, which includes sixteen large culverts now shown by the recent floods to be very necessary.

Sixty-three wells were dug and bricked up at about equal distances along the north side of the highway all the way from Hantan to Taimingfu. These wells were designed to serve a triple purpose: (1) To assist in tamping the dry earth while construction was in progress; (2) to assist in maintenance of the road during operations; and (3) for irrigation to adjacent property. These wells are rather larger than those described in a later chapter on the Tingchow operation.

The total cost of this project was approximately $130,000 Mex. It is impossible to give the exact cost of the different features of the work, such as the cost of wells, bridges and culverts, and earth work, for the reason that a considerable part of this expense was paid for in grain on the same basis as other labor and our accounting forces were not sufficiently large to make a cost segregation of such issues. However, specific contracts for the paving and walling of the Nan-Pu sand mounted to $12,000 Mex. and for bridges and culverts $18,000 Mex. The sixty-three wells cost at least $4,000 Mex. The concreting of crossings cost $2,000 Mex. Altogether $36,000 Mex. of special features are incorporated in

A native foreman.

As it used to be.

Showing side walls, brick floor laid, and lime-and-clay ready for mixing.

Complete, after days of traffic. While the wheel tracks can be seen, note that they are not ruts.

Types of culverts and bridges.

this highway, leaving $94,000 Mex. for the earth work, compensation for crops and buildings destroyed, salaries, commissary and general expenses, or about $2,050 per mile.

A motor bus service has already been installed over the eastern half of this line and will be extended through to the railway as soon as the breaks caused by the flood can be repaired.

Native carts on roads miles distant leave the direct road and converge on the paved Nan-pu section. It is estimated that with a toll of five coppers per cart, the present traffic over this piece of paving will pay normal upkeep over the entire length of line from Hantan to Taimingfu.

Local authorities have already installed maintenance gangs upon certain sections of the route and plans are being made for branch lines.

HANTAN PROJECT

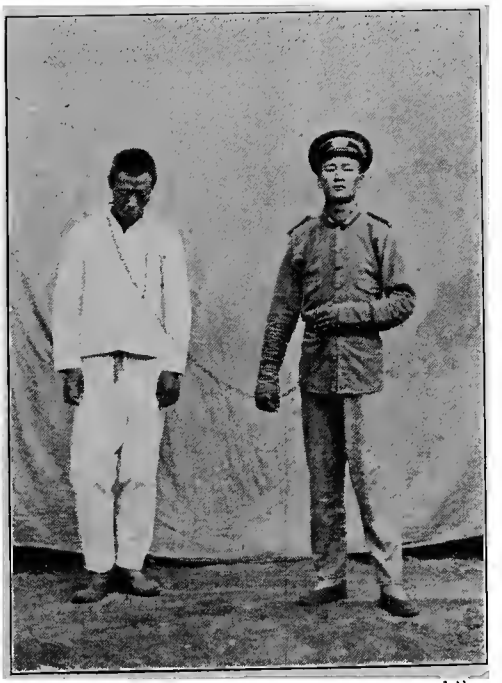
1. The Field Manager is the representative of the Director, China Famine Relief, American Red Cross, and all communications from the four following officers should be through him.
2. The Field Accountant is the representative of the Director of Accounts.
3. The Chief Engineer, Chief of Commissary, Superintendent of Recruiting and the Health Officer are subordinates of the Field Manager.
4. Chief Engineer will number each Chinese Li, Hantan to Taiminfu.
5. The Supt. of Recruiting shall assign Gang No. 1 to Li No. 1, etc.
6. Payment for work shall be in grain according to the amount of work done.
7. Each gang shall elect its own head man to represent it in business dealings.
8. Each head man will be furnished a suitable number stamp by which to receipt for supplies.
9. Each man in a gang will be furnished with a tin tag showing number of the gang and number of the man. This is his evidence of right to work and right to share in provisions.
10. Provisions will be issued to gangs in bulk, leaving the gang to make its own distribution.
11. Gangs must arrange their own transportation from stores.
12. So far as possible gangs will be recruited close to the road in order that they may arrange their own housing.
13. No payment will be made for work not up to standard.
14. Engineers will compute in advance the total quantity of work to be put in place on each Li, and advise same to the Commissary, so that the total grain value of the completed job can be set up in the books. This is necessary in order to make sure of getting the proper quantity of supplies to headquarters, and to guard against mistakes in issues.

(See Forms C-20, C-17)

A bridge near Hantan
(Red Cross No. 1.)

During the floods, the Red Cross road was the only means of ingress to Hantan besides the railway.

Ting Chou—thief



Fate of a foreman who "squeezed".

Form R-10

美國紅十字會
AMERICAN RED CROSS
CHINA FAMINE RELIEF

班 號
Gang No. .....

縣
Hsien .....

村
Village .....

工 頭
Head Man .....

印 記
Stamp .....

數 No.	姓 名 NAME	倚賴者 DEPENDENTS				注 意 REMARKS
		成人 ADULTS		孩童 CHILDREN		
		男 Male	女 Female	男 Male	女 Female	

No......

.....*1921.*

To

The FIELD ACCOUNTANT,
AMERICAN RED CROSS,
HANTAN.

I hereby certify that the bearer:—

....

has rendered services to the American Red Cross as stated below and is therefore entitled to reimbursement by the amount of:—

.....Coppers.

..... Big money.

.....Catties of Grain.

Particulars of service.

.....
Signature

Note. Amount of cash or grain must be entered in words not figures.

AMERICAN RED CROSS
CHINA FAMINE RELIEF
TIENTSIN

Form C-

CERTIFICATE OF COMPLETED WORK

To the Commissary Department:—

The following amount of work has been completed to date, by gang as indicated, and they are entitled to draw food as allowed for the same.

GANG No.....SECTION No.....

No. FONG COMPLETED TO DATE..... .....
(ON THIS SECTION)

for which payment is due, less previous advances.

State here if section is completed and this is final payment.....

Date.....*1921*

.....
Engineer

Form C-20

AMERICAN RED CROSS
CHINA FAMINE RELIEF
美國紅十字會
中國災民救濟會

GANG ACCOUNT
組工記載
SUMMARY
要略

期限
For Period....., 1921 to
....., 1921, both dates inclusive

Gang No. 組數	Section No. 區域	Total Fong in Job 總方數	Allowance per Fong (catties) 每糧數 (斤數)	Total Value of Job in Food (catties) 工程糧數 (斤數)	Trans-portation Allowance (catties) 轉運費 (斤數)	Grand Total Food For Job (catties) 總糧數 (斤數)
Total						

(Used by Engineering Department to notify Commissary)

Gang No. 組數	Section No. 區域	Total Fong in Job 總方數	Allowance per Fong (catties) 每糧數 (斤數)	Total Value of Job in Food (catties) 工程糧數 (斤數)	Trans-portation Allowance (catties) 轉運費 (斤數)	Grand Total Food For Job (catties) 總糧數 (斤數)
Total						
Grand Total						

驗允 **APPROVED**

.....
區長 *Field Manager*

Date....., 1921
日期

繳對 **CERTIFIED CORRECT**

.....
工師 *Engineer*

Date....., 1921
日期

驗付 **CHECKED AND PAID**

.....
Chief of Commissary

Date....., 1921
日期

AMERICAN RED CROSS
CHINA FAMINE RELIEF
美國紅十字會
中國災民救濟會

GANG ACCOUNT
組工記載

Form C-17

For Period..... , 1921 to
期限
....., 1921
both dates inclusive

頁數 Sheet No.....

Gang No. 組數	Section No. 區分數目	Engineer's Estimate Total Fong in Job 工師計定總方數	Allowance per Fong (in catties) 每方糧數（斤數）	Total value of Job in Food (in catties) 工程糧數（斤數）	Transportation Allowance (in catties) 運輸費（斤數）	Grand Total Food for Job (in catties) 總糧數（斤數）	ISSUES 發給							
							First 第一		Second 第二		Third 第三		Fourth 第四	
							Catties 斤數	Receipt Stamp 收據蓋戳	Catties 斤數	Receipt Stamp 收據蓋戳	Catties 斤數	Receipt Stamp 收據蓋戳	Catties 斤數	Receipt Stamp 收據蓋戳
			(Commissary Department's Account)				Date: 日期		Date: 日期		Date: 日期		Date: 日期	
							Date: 日期		Date: 日期		Date: 日期		Date: 日期	
							Date: 日期		Date: 日期		Date: 日期		Date: 日期	
							Date: 日期		Date: 日期		Date: 日期		Date: 日期	
							Date: 日期		Date: 日期		Date: 日期		Date: 日期	
							Date: 日期		Date: 日期		Date: 日期		Date: 日期	
							Date: 日期		Date: 日期		Date: 日期		Date: 日期	
Total (this sheet)														
Total Previous Sheet														
Total Forwarded														

APPROVED 驗允　　CERTIFIED CORRECT 驗付　　CHECKED AND PAID 驗付

Field Manager 區長　　*Engineer* 工師　　*Chief of Commissary*

AMERICAN RED CROSS
China Famine Relief

收成酬報
CROP COMPENSATION

按每畝高粱百觔核算
(To be based on a maximum of 100 catties kaoliang per Mow)

地主 Owner of Land	住址 Address	坐落 Location of Land	畝數 Area in Mow	收成 Percentage of Crop	觔量 Payment in Catties	收受 Receipt for Payment	證人 Witness	日期 Date	附記 REMARKS

Approved.....
Field Manager.

Certified correct.....

AMERICAN RED CROSS
CHINA FAMINE RELIEF

CHIHLI FIELD

CONSTRUCTION AGREEMENT

No.....

		ENGLISH	CHINESE
築造之物體與地點	Object to be constructed, and location.		
要求以下定種	Specifications required to be followed. (Attach separate sheet if needed)		
何時止工	Time-limit when work must be completed.		
用何種工人	Class of workmen to be employed.		
成功以後用之規則	Regulations about use, when completed.		
失敗成功之結果	Consequences of failure to complete.		
擔任工作之管理	Responsibility for supervision of work.		
監察工作之準備	Provisions for inspection.		
應給之金	Terms of payment.		
姓名住址及擔保	Name and address of Guarantor.		
日期地方簽名合同	Date and Place of signing Agreement.		

.....
Contractor.
承辦人

Witnesses.....
證人

.....

.....
Guarantor.
保人

.....

.....
American Red Cross
Hantan
美國紅十字會

.....

.....

American Red Cross
China Famine Relief
South Chihli Field

FORM OF CONTRACT.
承 辦 合 同

Contract No......

	ENGLISH	CHINESE
Contract for. 承辦何物		
Quality. 等 類		
Quantity. 額 數		
Delivery. Particulars. 運輸條件		
Price. 價 值		
Payment arrangements.		
Special clauses. 特別條件		
Name and address of Contractor. 承辦人姓名住址		
Name and address of Guarantor. 保人姓名住址		
Date and place of signing contract. 立合同之地址年月		

.....
Contractor.
承 辦 人

Witnesses. .....
證 人

.....
Guarantor.
保 人

.....
American Red Cross
Hantan
美 國 紅 十 字 會

APPENDIX

Departments:

Recruiting
Engineering
Commissary
Health

I. *Recruiting:*

1. List deserving men in groups of thirty on Form R. 10.
2. Instruct each group that they are to elect their own head man who will represent them in all business dealings. As to the character and kind of construction work, they will be under the direction of foremen appointed by the Engineering Department.
3. Workmen must furnish their own tools.
4. Each gang will be paid according to the quantity of work performed, —probably five catties of grain like kaoliang, bean cake, rice bran, etc., per fong of dirt put in place and tamped so that when water is poured into holes punched for the purpose, it will not run away.
5. After two days' work, each gang will be allowed to draw 300 catties. Following this first payment, nothing shall be paid until earned. Engineers will certify to all claims for payment before same will be honored by Commissary.
6. Each li will constitute a section, and will be numbered beginning at Hantan. Tags will be furnished to the Recruiting Department for the workmen, and these tags shall be so assigned that Gang No. 1 shall work on Section 1.
7. Care should be taken to recruit men close enough to the road so that they can live at home.

II. *Engineering:*

1. The Chief Engineer will appoint division engineers furnished by the Director to have jurisdiction over definite portions of the line.
2. The number of Chinese Li beginning at Paotingfu by the route selected shall be ascertained. Each Li shall be numbered, successively, beginning at Hantan, and its limit shall be marked with white line, post, or other suitable indication.
3. Each gang shall have a definite Li, or section, within which to work.
4. The earth should be put in place in layers not exceeding one foot in thickness, and each layer tamped or rolled solid.
5. Division Engineers shall test the quality of the tamping by driving a rod into the surface. Then withdraw rod and pour water into the hole. If the water stands, i.e., does not soak away, the packing has been satisfactory.
6. After any gang has been at work two days, the Division Engineers shall certify that fact to the Headman of the gang on the forms provided for that purpose. This is to enable the gang to draw immediate rations.
7. The Chief Engineer may employ a suitable number of qualified foremen to instruct Headmen in proper methods of construction, and to assist the Division Engineers.
8. While the authorities of the Hsien traversed will see to the

purchasing of necessary lands, it frequently happens that portions of the public lands lying within the road confined have been planted. The Chief Engineer shall determine the areas of growing crops which in such cases it will be necessary to destroy and advise same to the Field Manager, with recommendation as to recompense to the planter for seed lost. Payment shall be made in grain as approved by the Field Manager.

III. *Commissary:*

1. Chief of Commissary shall be in charge of all supplies belonging to the Red Cross.
2. He shall check in the numbers of sacks, and verify the weights of all food supplies received, and record same upon forms provided for that purpose.
3. The unit of weight shall be the catty.
4. The general accounting rules provided by the American Red Cross, China Famine Relief, shall be followed, except as specified herein.
5. Food supplies shall be issued to headmen of working gangs only upon the certificate of the Division Engineer to which such Headman is subject.
6. Headmen will come in person, or send duly authorized representatives, to the store at Paotingfu for supplies earned. Gangs Nos. to shall receive no allowance for transportation. Gangs to inclusive, shall receive a 5 per cent increase to compensate for transportation, and gangs to inclusive, shall receive a 10 per cent increase.
7. Headmen shall receipt for supplies drawn upon the forms provided, by impressing a stamp provided for that purpose.
8. If deemed expedient, the Commissary may arrange with the Engineering Department for certificates from the Engineers, calling for equal quantities such as 300 catties, etc., so long as payment does not exceed work done, leaving the exact reckoning to the final payment.

CHAPTER XII

TIENTSIN—PAOTINGFU HIGHWAY

IMMEDIATELY after the second gift of $500,000 gold was announced in China, the Director was urged by unofficial representatives of various American interests at Tientsin and Peking to undertake road construction in the immediate vicinity of those two cities. The reasons were as follows:

(1) "Your improved roads," they said, "are hundreds of miles down in the country where there are no automobiles. At Peking and Tientsin, where there are plenty of automobiles, there are practically no roads. Might as well do something that will promote a legitimate American industry. Besides, some good roads in this region where the well-to-do officials are to be found, will promote the good roads movement in China more than anything else."

(2) "The route from Tientsin to Paotingfu runs directly through some of the worst famine districts, while the route from Peking to Tientsin could be manned by the thousands of refugees now in camp in Tientsin. These camps constitute a positive menace to the health of the entire city and some means should be found for breaking them up before warm weather sets in."

This plea was resisted for the following reasons:

(1) Difficulty was being experienced in securing adequate personnel for supervision.

(2) Knowing the intrigue that surrounds the Capital, endless delays and exasperations were feared. Much of this arises from the fact that no underling in Chinese official life can make a definite promise without first consulting his superior as to the substance of that promise. The superiors are usually busy with matters which they consider more important than dealing with missionaries and relief societies.

(3) The higher officials of Chihli Province from the first had been represented as being indifferent to all famine relief work, making no contributions personally to that cause and often commandeering railway equipment for personal use which was badly needed for movement of food stuffs.

(4) Along the Tientsin—Paotingfu Highway free relief societies were already covering the ground very well.

However, in a conference with the Civil Governor concerning the Hantan road, His Excellency, Tsao Jui, expressed the wish that the Red Cross undertake the repair of the highway from Tientsin to Paotingfu. At the same time his Yamen had given a certain encouragement to the National drive in China for famine relief funds and the Governor himself had made a trip into the interior for the purpose of investigating at first hand famine relief conditions.

On March 31st, a letter was received from the Honorary Secretary of the North China International Society for Famine Relief at Tientsin specifically requesting the Red Cross to undertake this work and stating that the magistrates of the districts which would be traversed had petitioned "to have the highway from Tientsin to Paotingfu repaired, so that the famine sufferers in these districts could find employment and get relief." This Honorary Secretary was one of the

English Secretaries to the Civil Governor. Thus the assistance of both the Government officials and of the Famine Relief Society which operated over the greater part of the route seemed to be assured, and with this assistance considerable hope for speedy and effective work was justified. There was the more reason for expecting this in view of the fact that the Military Governor's Yamen is located at Paotingfu while the Civil Governor's Yamen is located at Tientsin. These two Governors are brothers. Hence it was highly important to them to have direct connections between their two capitals to supplement the present round-about railway connections. Consequently the Director made an appointment to go over the route on April 3rd.

A representative of one of the motor car companies a short time before had made the drive of 115 miles in less than eight hours. But on the Director's trip the west 45 miles was found to be almost impossible. It had been cut up with narrow tired carts and in addition the soil was found to be rather sandy. One stretch of 10 miles, some 35 miles away from the western terminus, consisted of an old river bed and the sand was so light that the wind was shifting it in clouds on the day of this trip. The last 45 miles required six hours. Apparently, a relatively light amount of work would put the highway into good condition for the first seventy miles nearest Tientsin and the last thirty miles nearest Paotingfu. But the intermediate section of 15 miles would have to be specially surfaced which, with its long distance from all sources of supply, constituted a larger job than the whole Shantung operation.

In view of these conditions and in view also of the keen interest felt by so many different interests in the Peking—Tientsin highway, the Director felt that a conference should be held between the representatives of all concerned with the idea either of concentrating upon the Peking—Tientsin highway to the exclusion of the Tientsin—Paotingfu highway, or at least, of securing the Governor's assistance towards the construction of the Peking—Tientsin highway in reward for the Red Cross attempting to put into repair so much of the Tientsin—Paotingfu highway as lay on either side of the sandy stretch. Such a conference was finally convened on April 12th, there being present besides representatives of the Red Cross, representatives of the following:

1. The United International Famine Relief Society (Peking).
2. North China International Society for Famine Relief (Tientsin).
3. Civil Governor.
4. Motor Car Association.

At this conference the Governor's representatives were disappointed at the report on the ten mile stretch of sand, but offered to make the Hsien magistrate responsible for its repair. This was almost equivalent to promising the moon, since the Hsien magistrate of a famine area certainly was not in possession of the means to buy the lime and transport the rock a mean distance of 50 miles. The representatives of the Governor stoutly resisted the suggestion to concentrate on the Tientsin—Peking Highway. Accordingly, as a means of satisfying all parties, if possible, upon the suggestion of one of the Motor Car Association representatives, it was agreed by the Red Cross to devote $40,000 Mex. to each route. Representatives of the Governor considered this as grossly inadequate, but the computations made by the Director based upon the performance which was then current in the Shantung area, made it apparent that if no hindrances were put in the way, this amount would be sufficient to put into condition one hundred miles of repair work on the Tientsin—Paotingfu line

and to make a passable route also from Tientsin to Anping, where another road would be intercepted leading to Peking. Subsequent developments proved that except for the "if" above mentioned, this would have been accomplished.

The gist of the agreement reached at the conference described above was recapitulated in a letter to the Governor dated April 13th, in which the Red Cross offered to appropriate "at least $50,000 Mex. to be used in the payment of labor on the repair of this highway" under the following conditions :—

"1. That the North China Famine Relief Society and the United International Famine Relief Committee will cheerfully co-operate in the recruiting of labor.

"2. That you (the governor) will co-operate in the furnishing of engineers now employed in enterprises under your control.

"3. That you will purchase the material necessary for doing the work upon the section undertaken.

"4. That the expenditure above mentioned shall be completed not later than June 15th, when the famine is supposed to be over, so that the American Red Cross may retire absolutely from the field not later than July 1st. At this time the American Red Cross will yield the highway worked upon unconditionally to the people of Chihli. At the same time the American Red Cross must be saved absolutely harmless of all claim of whatsoever nature due to the construction of highway upon either private or public property.

"5. That all matters concerned with the securing of necessary land and materials will be taken in hand by your organization.

"6. That the American Red Cross will appoint the Chief Engineer, will pay necessary salaries to foremen and will provide its own commissary and accounting organization."

These conditions were accepted by the Governor in a communication which reached the Red Cross April 20th.

It was planned to divide the line into two sections corresponding roughly to the territory covered by the two respective famine relief societies which were to do the recruiting. Incidentally the sand stretch lay along the border between the two jurisdictions. At the Paotingfu end the plan to be followed was that used at Hantan. On the Tientsin end the Hantan plan was to be varied only by the setting up of headquarters at two or three different points where the Tientsin—Pukow Railway and various canals crossed the route. (Later, the canals were found to be too low for use).

PAOTINGFU END

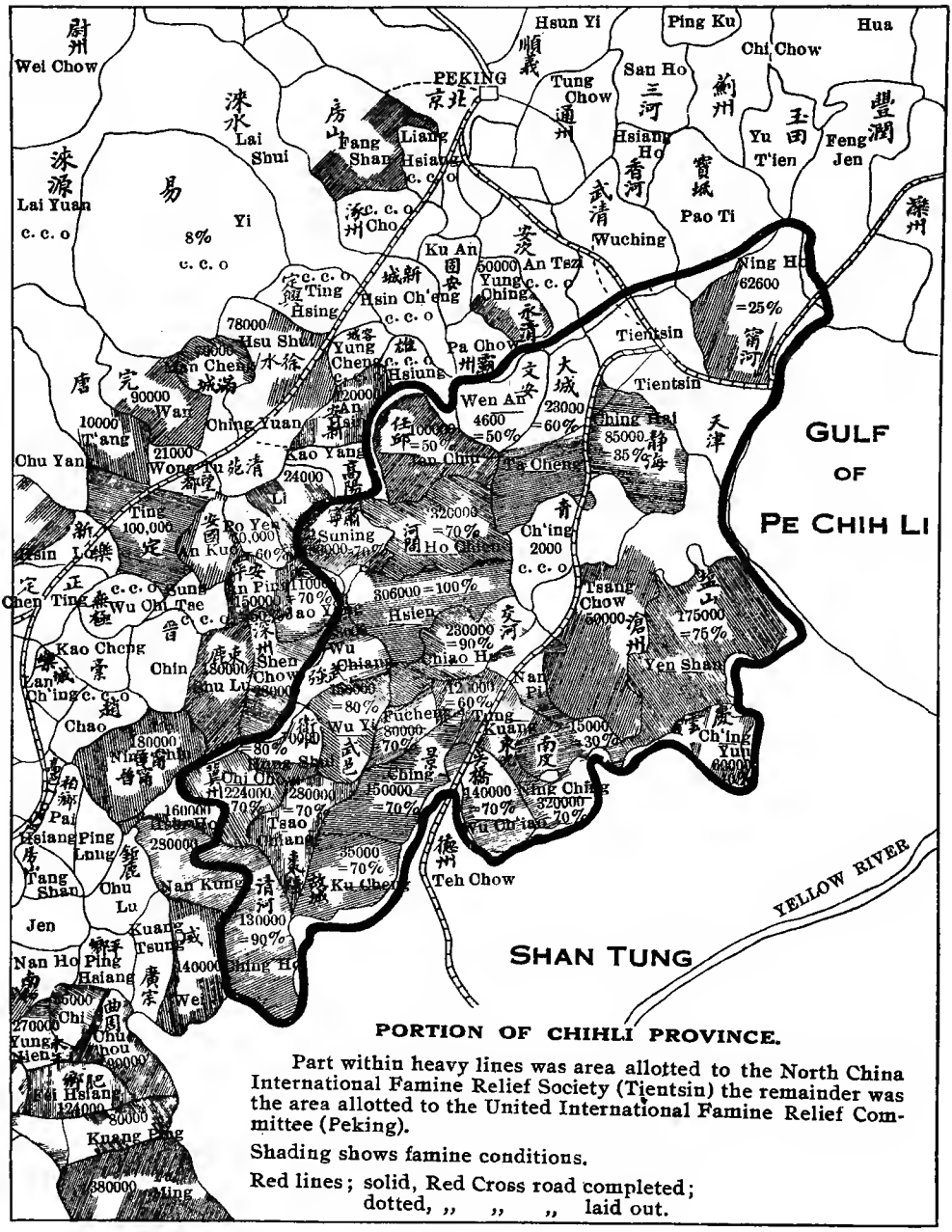
REECE OLIVER, *Field Manager*

Mr. Oliver took up his duties, April 30th, prepared headquarters, made the usual calls and was prepared for work when a series of incidents occurred whose sequence and effect can best be indicated, perhaps, by a brief chronology.

May 4. "Hsien officials imply that they have received orders from the Governor to recruit the labor themselves. It is time we knew whether we are being assisted by the Governor and his men or whether we are being opposed."—Oliver.

May 8. "Cannot recruit laborers until Civil Governor notifies Hsien officials to co-operate."—Clack (Representative of Peking United International Famine Relief Committee.) After some negotiation by wire, the following was possible:

May 10. To Oliver—"Governor's telegram supporting our position being sent to police chief, Paotingfu." —Baker. In the meantime our grain had arrived and was put in stock. Two engineers had also arrived and were ready to work.



PORTION OF CHIHLI PROVINCE.

Part within heavy lines was area allotted to the North China International Famine Relief Society (Tientsin) the remainder was the area allotted to the United International Famine Relief Committee (Peking).

Shading shows famine conditions.

Red lines; solid, Red Cross road completed;
dotted, ,, ,, ,, laid out.

May 15. "As to payment for land, it is now said that the owners are being told that it is the American Red Cross who is taking their land from them, and thus hatred for the foreigner has been materially stimulated. We have insisted that the people be informed that the American Red Cross is not at all responsible for the right of way, but is concerned with labor and grain distribution only. This matter in itself is now holding up our project. We hope for an early settlement." —Oliver.

May 16. "Gangs began work to-day." —Oliver.

May 18. "Gangs displeased with grain issue. Recruiting Committee informs that it is quite likely that there can be no more gangs recruited unless we can assure the men a better class of grain, say millet or kaoliang."—Oliver.

May 19. "Disband all gangs who refuse grain offered. Stop. Allow magistrates to furnish labor on our terms. Stop. If they choose otherwise Paotingfu closes. Make arrangements to sell our supplies." —Baker.

The Director visited the field immediately and found that some of the grain was dirty and needed to be cleaned. This was ordered. But he also found that there was demand for labor in the fields at the rate of fifteen coppers per day plus three meals. Hence road building terms were not attractive. At the same time a request had been received at the Peking Office of the United International Famine Relief for three months' supply of grain for free distribution. The two facts seemed to be incompatible. Local magistrates insisted that there was some misunderstanding somewhere and asked for another chance to recruit labor at slightly improved terms. The improved terms were refused but an additional opportunity was granted. There was abundant evidence that a considerable section of this region, especially in the outlying foothills, was in for a summer drought. The magistrate represented that the famine societies' recruiting committees had not bestirred themselves to get out into this foothill region and recruit.

Negotiations were immediately set on foot to secure kaoliang and millet from the United International Famine Relief Committee with which to pay the workmen, trading our barley, rye and other grains to which the workmen were not accustomed. The Famine Relief Committee agreed that our grain was plenty good enough for people who were in danger of starvation, especially if they were getting it free. We had notice of this arrangement on May 27th and on May 30th, the Field Manager reported that five gangs had begun work. The next day, however, he reported that they had quit.

As a result, Field Manager Oliver was instructed to ship half of the supply of grain on hand to the Pingtingchow operation. And on June 15th orders were given to follow it with another two hundred tons. This grain was badly needed in Pingtingchow, and it was accepted there without trouble.

In the meantime, on June 2nd the following instructions were given: "In view of the rapid reduction in the price of grain, and other factors affecting willingness of laborers to work on highway projects, this will authorize you to offer seven catties of grain such as can be arranged for locally, either from our own stock or by exchange with the United International Famine Relief Committee." On June 22nd, Field Manager Oliver reported: "It is evident that our grain offer is still insufficient to attract laborers to our project." He tendered his resignation on the same date and Mr. R. W. Powell, Chief Engineer, was made Field Manager and

instructed to sell out the remainder of the grain.

Two days later a very interesting letter was received from a person in close touch with the whole operation, stating that in his opinion, there were forces at work keeping the people from working on the road. He cited the fact that a number of missions in the same field were doing relief labor jobs out of private funds received from America and were having no trouble in getting men and holding them at a lesser wage than the Red Cross offered. The local Chinese recruiting committee resigned for the reason that some one was tampering with the men after they had been recruited. "My personal opinion, however, is that a certain personage in Tientsin is giving orders to delay the work in the hopes that the Red Cross will finally quit in disgust and turn the whole sum of money over to him to manage. One of the chief reasons for this opinion is the apathy of the local officials, who act as if they were trying to queer the whole thing." He also mentioned that the type of grain used at the start had comparatively small influence on the situation. In view of later developments on the Tientsin end of the job, some color is lent to what was considered, at the time, a highly imaginative construction.

CAPT. L. IMPEY

TIENTSIN END

CAPT. L. IMPEY, *Chief Engineer*

As stated before, the reply from the Civil Governor accepting the Red Cross terms for repairing the Tientsin—Paotingfu highway was received April 20th. Although a skeleton organization was ready immediately for the Paotingfu end, it was not so easy to provide an organization for the Tientsin end. The engineers which had been promised unofficially by the motor car association we found were intended for the Tientsin—Peking highway. The Governor's engineers did not care to take the responsibility for starting the road and we were requested not to leave them to their own resources, but to appoint a foreigner to take charge. Captain R. T. McDonell, who had assisted in the reconnaisance of the Shansi roads, went over the proposed line with the Chinese engineers, indicating where it should be staked, but his own affairs were such that he could give no further attention and nothing resulted. On May 8th, Captain Lawrence Impey, Chief Engineer on the Shantung project, was transferred to Tientsin with the same title but exercising the powers of Field Manager.

A week was consumed in getting an organization together in Tientsin and then grain was loaded onto the canal boats for the stores which were located down the line. By this time the canal had become so low that the boats stuck. The commissary men in charge of them were not particularly resourceful and returned to Tientsin for instructions. Captain Impey attempted to float the boats further down by constructing small dams in the shallow places, but it was necessary to unload the boats and cart the grain to destination.

It was impossible, of course, to take on any workmen until the commissary arrangements were in condition to care for them. Thus it was May 23rd before any men could be put on the job. The work of recruiting was facilitated by the fact that the North China Famine Relief Society at Tientsin withdrew free relief to the encampments there at the same time. But when these men appeared on the job they failed to comply with instructions, having no cooking utensils or tools. A few of them could be used at the commissary quarters for unloading the grain, but when this work was done, there was nothing further for them and they were allowed to depart.

In the meantime the threatened spring drought had developed considerably. In fact, there was considerable panic in many quarters. The magistrate of one district sent word that he had fifteen hundred men anxious for work. Hence, the Director notified the authorities that an additional thirty days would be allowed for the completion of the program.

By this time difficulties with respect to the right of way began to develop. Although assurances were received from the Governor that magistrates had been notified to announce to their citizens that the Chinese authorities were solely responsible for payment for land, as late as May 22nd it was necessary to inform the Governor that the magistrates had not put out any notices on the subject, and even as late as July 12th, Captain Impey reported: "Down the line beyond Jen Chiu I was informed by the local people that the persons appointed by the Governor to deal with the land question had been in the habit of informing the people that they regretted that the people should be expropriated from their land for the road construction, but they were not in any way to blame, as the foreigners were doing it all."

In the outskirts of Tientsin a graveyard was encountered, with disastrous

results. The graves belonged to influential families who, of course, would not permit the road to run through, but what was still worse, would not permit the only possible detour since that would destroy the "feng shui" of the place. Possibly it was not without significance that in this enlightened treaty port, more difficulty was found on this point than in any place in the interior.

In the meantime, the harvest period had arrived, and while certain sections which were to be traversed had practically no harvest, all of the surrounding regions were well blessed. No further grain was sent into the district and instructions were given that if within the next few days any considerable number of workmen appeared, they might be paid in cash at the rate of twenty-five cents per fong. Almost immediately some three thousand appeared.

Captain Impey then divided the line into two sections, one, that between the Tientsin—Pukow Railway and Tientsin and the other, westward of the railway. The gangs were grouped to the number of twenty or thirty under native foremen. They were furnished with bamboo poles and matting out of which to construct for themselves temporary shelter whenever temples were not available. A day's work for each gang within such a group was staked out by the foremen, and by night the entire section would be connected up. Every few days as the distance from the temporary billets became too far for convenience, such billets were taken down and moved forward. Within the space of six weeks almost exactly seventy-five miles of highway was put into repair. The portion covered was entirely within the territory of the North China International Famine Relief Society of Tientsin. The ten miles immediately outside of Tientsin we were prevented from repairing. The appropriation was practically exhausted by the middle of July and the work was closed down as soon thereafter as possible. Except for the losses sustained on the grain transferred from Paotingfu, in salaries to officers idle for a month and a half before work began, the entire distance except for the sand stretch would have been put into a good state of repair within the fifty thousand dollar appropriation. The average cost per mile of road repaired was about $773 Mex.

The method of payment used on the second section is one which deserves particular attention. Every second or third day the Chief Engineer with a paymaster traversed the entire district in an automobile, measured the completed section and then while the gangs stood at attention, paid the head men the sums due and took their receipts. The amount paid was called out so that everybody could hear it, so there was no opportunity for any gang to be misinformed as to their dues. As the automobile went over the road the quality was immediately tested and deductions for insufficient tamping could be made where the fairness of the penalty was publicly attested. In spite of all this, however, it is reported that within ten days after the Red Cross evacuated the field, one of the foremen collected from each head man of the gangs under his direction sums ranging from three to ten dollars with which "to buy a present for the foreigners."

After the close of the American Red Cross operations at Paotingfu, official forces put the road from Paotingfu to Kao Yang in such condition that a motor bus service was inaugurated between the two points. A recent news item states that this motor service company is increasing its capital by $100,000 for the purpose of extending the service to Tientsin. This company is undoubtedly allied with official personages and will

probably have monopoly privileges of a common carrier service over this route. However, the Red Cross has secured in writing from the Civil Governor the pledge that this highway shall be a public road so far as ordinary motor service and broad tired carts are concerned.

Murray Sullivan, Chief Engineer.

CHAPTER XIII

PEKING—TIENTSIN HIGHWAY

MURRAY SULLIVAN .. .. *Chief Engineer*
V. A. SHELDON .. .. *Superintendent of Relief*

IN the preceding chapter the genesis of the Peking—Tientsin Highway was set forth. The terms under which the construction was undertaken were identical with those applying to the Tientsin—Paotingfu project.

The title, Peking—Tientsin Highway, was adopted in order to include the section of 13 miles from Peking to Tungchow constructed under the direction of the American Red Cross with funds from both the Red Cross and Chinese sources donated for the relief of flood sufferers in 1917–18,—this first section being considered as merely a link of the whole Peking—Tientsin Highway project. The completion of this highway project was the purpose of the present relief work

The construction of the next section of the highway extending from Tungchow to Anping, a distance of 20 miles, was undertaken by the office of the Metropolitan Governor of Peking under an agreement with the Chinese Government Highway Bureau having in charge the construction of the road from Tungchow to Tientsin. Funds were obtained by this Bureau through a loan from the Banque Industrielle de Chine at Peking. But very little actual construction work was accomplished and the work that was done was not on the location agreed upon for the highway. Approximately $80,000 Mex. was spent in this manner, leaving a balance of about $170,000 Mex. in the hands of the Chinese Government Highway Bureau. In addition to these funds, this Highway Bureau provided funds for the construction of the reinforced concrete bridge across the Yuen River at Yangtsun for which a contract was let to French interests and the funds for this purpose were deposited in the Banque Industrielle de Chine.

In view of the various organizations interested in the construction of this highway and of the various funds which were available for this purpose at that time, no one of which was sufficient to complete the highway, it was proposed to combine all the organizations into the Peking—Tientsin Highway Commission—an informal and voluntary organization, the purpose of which would be to co-ordinate all interests in the highway and to carry the work to a conclusion without breaks or interruptions. Accordingly while the American Red Cross organization was being formed, conferences were under way towards the formation of what was afterwards denominated as the Peking—Tientsin Highway Commission. This Commission as finally constituted, consisted of a representative of the following organizations:

The Northern Five Provinces Famine Relief Society, represented by Former Premier Hsiung Hsi Ling, Chairman, who also had charge of the funds of the Chinese Government Highway Bureau.

Chinese National Famine Relief Bureau, represented by Hon. Yuen Pao Hwei, Vice Chairman.

The United International Famine Relief Committee, represented by Mr. Andre D'Horman.

The American Red Cross (until withdrawal from field), represented by Mr. J. E. Baker, Director, American Red Cross, China Famine Relief.

Together with the Chief Engineer to be appointed.

It was planned to use the Chinese road funds for the acquisition of right of way as far as necessary, the remainder being reserved for macadamizing the earth work which would be put in place by Red Cross forces.

The route of this Highway lies in two administrative areas, namely, the Metropolitan District from Tungchow as far south as the village of Hankou, six and a half miles south of Yangtsun. From there to Tientsin the territory traversed lies under the jurisdiction of the Civil Governor of Chihli Province. The Commission immediately addressed petitions to the authorities of both of these areas asking for their assistance in arranging with property owners for the immediate expropriation of their lands,—settlement to be made as fast as land diagrams and similar formalities could be prepared. The oral assurances which were given to the representatives of the Commission charged with this matter seemed entirely favorable.

Meanwhile the Commission had appointed as Chief Engineer, Mr. Murray Sullivan, the leading American railway engineer in North China, who happened to be open to engagement at the moment. Mr. V. A. Sheldon was appointed Superintendent of Relief, reporting to the Chief Engineer. Mr. W. T. Barker was appointed Chief of Commissary. The recruiting was in charge of Rev. J. R. Lyons in the United International Famine Relief Committee territory and of Rev. Robt. E. Chandler in the area of the North China Famine Relief Society. It was the duty of the Superintendent of Relief to co-ordinate the efforts of all of these Divisions with the program of the Engineering department. It was planned to supply food for the laborers from the canal which roughly paralleled the highway route. Stores were stocked at Tungchow and Yangtsun, rail points. No Health Division was provided, both because physicians were not available, and because a general health program in the Province of Chihli had been under way all winter, supported by the American Advisory Committee.

In view of the fact that the road is to be macadamized, careful surveys were authorized for purposes of ultimate economy. These surveys were completed about the middle of May. After considerable negotiations, the construction of the Tungchow-Anping section along the approved route of the survey was undertaken by the Metropolitan Governor's office, —this being done to replace the work previously done which was of no value and could not be used, and the Red Cross laborers began work on the next section to the south, but were immediately driven off by the owners of the land. New assurances were obtained as to the right of our laborers to proceed and promises of police protection therefor were received, but it now became difficult, so the recruiting forces reported, to obtain workmen in large quantities, light rains having encouraged the farmers to begin to plant.

The United International Famine Relief Committee recruiting agents tried in a supposedly needy district in the Western Hills not far from Peking, but met with no success. Representatives of the Catholic Church then offered their services as recruiting agents, assuring us that they could furnish ten thousand men, but when actually put to the test, found the men demanded better wages. This wasted perhaps two weeks but it served very effectively to clear the atmosphere of doubt concerning the

severity of famine conditions in the area contiguous to Peking. All relief agencies withdrew their aid before the end of the first week of June.

By this time the operations in Shantung were being closed down in accordance with the undertaking which had been made by the Red Cross at the beginning of operations there. Our representative from the northeastern district reported that large numbers of men were applying for work and were willing to work elsewhere if given an opportunity. At this juncture the Ministry of Communications offered to the Peking—Tientsin Highway free transportation of stone for macadam. Hence, it seemed wise to transport some two thousand men from Shantung to this Highway. The men walked overland from Haifeng to the Tientsin—Pukow Railway and were transported free of charge by that line and the Peking—Mukden to destination. Also applications for relief work were received from over five thousand famine sufferers in the territory south and east of Peking and from the southern portion of Chihli Province.

Just at the time that the laborers from Shantung were coming to the job, the Banque Industrielle de Chine closed its doors, thereby tying up the funds which the Chinese members of the Commission were putting into the work. However, the state of the Red Cross treasury seemed to indicate that a few thousand dollars would be available beyond the appropriation, and as positive famine relief work was being done by the employment of these Shantung and Chihli men, orders were given to recruit an additional one thousand. This last thousand were ready to go forward just at the moment when the June accounts of the various operations showed that, after all, no further funds would be available. The Peking—Tientsin Highway Commission was immediately notified and these additional laborers were returned to their homes. Americans interested in the success of the project, however, made representations to the American Advisory Committee and secured from that organization an additional fifty thousand dollars Mex. The funds of the Red Cross were sufficient to keep the work going to about July 31st, which had been originally fixed as the limit of Red Cross participation.

At the beginning of the month, about four thousand laborers were at work, but this number had gradually dwindled as the men from Shantung were able to find more lucrative employment in the vicinity of the road.

The $50,000 Mex. appropriated to this work was exceeded slightly before all the accounts opened under the authority of the Red Cross were finally settled. The results accomplished by this expenditure may be summarized as follows:

1. Careful surveys were made of the entire route, aggregating over 130 miles, which includes alternate lines surveyed as well as the final location.

2. Sections of completed Highway, in all measuring 12 miles, were constructed and at various points along the route the grading work was started and the embankment partially built when our forces were compelled to withdraw.

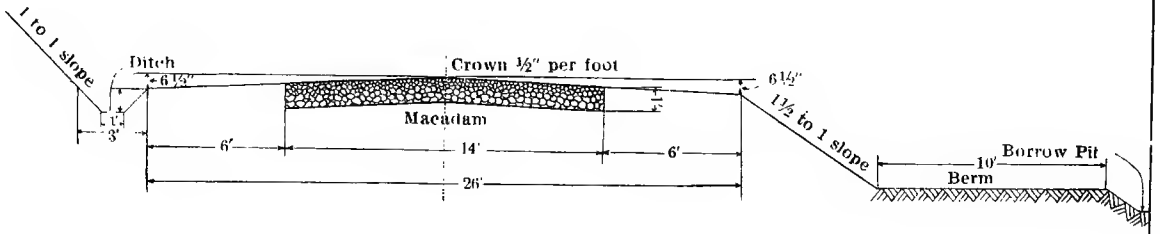
The distance from Tungchow to Tientsin along the final location is 62.7 miles.

The average cost per mile, about $4,500 Mex., is excessive. However, it must be stated that the earthwork on this line is very much heavier than on any of the other lines. Because the route traversed is subject to frequent floods, and because the highway when macadamized will be subject to heavy motor traffic between the two largest cities of north China, the embankment has been raised well above the level of all ordinary inundations. Still the results are not commensurate with the expenditure.

The Chief Engineer reports the following causes:

"First, interference with our work on the part of officials and natives who went so far in some instances as to drive our men off the work; Second, failure of our recruiting department (the famine relief societies) to supply the men needed for this work; and Third, failure on the part of the Chinese authorities to furnish the necessary right-of-way in accordance with the agreement." At the time this report is being written, right-of-way in the Province of Chihli has not yet been secured. And the same expensive delays with reference to right-of-way (but not as regards labor) have been experienced in the expenditure of the funds contributed by the American Advisory Committee as was previously experienced by the Red Cross organization. The failure of the Banque Industrielle de Chine, coming as it did at this unfortunate time, tied up the funds of the Chinese organization and was directly responsible for this failure on the part of the Chinese officials to secure the right-of-way. The one hundred thousand dollars which jointly have been contributed would have been adequate for the earthwork if no interference and delay had been experienced.

It is of interest, however, to add that the Peking—Tientsin Highway Commission has now negotiated a loan for the Chinese Government Highway Bureau from another French Bank, in lieu of the loan formerly obtained from the Banque Industrielle, for the completion of the Highway. The bridge over the Yuen River, which is a modern reinforced concrete structure approximately two hundred feet in length and which will cost about $40,000 Mex., is now nearing completion and notwithstanding the delays and difficulties encountered by the American Red Cross and other supporting organizations, it now appears that the Peking—Tientsin Highway will probably be carried through to completion and that the efforts of the American Red Cross in connection with this work will not have been in vain.



PEKING-TIENTSIN HIGHWAY COMMISSION

STANDARD SECTION

OF

HIGHWAY

SCALE: 1 INCH = 5 FEET

Chief Engineer s Office

Peking

May, 1, 1921.

.....

Chief Engineer

Approved .....

Chairman

CHAPTER XIV

TINGCHOW WELLS

REV. F. J. GRIFFITH .. .. .. *Field Manager*

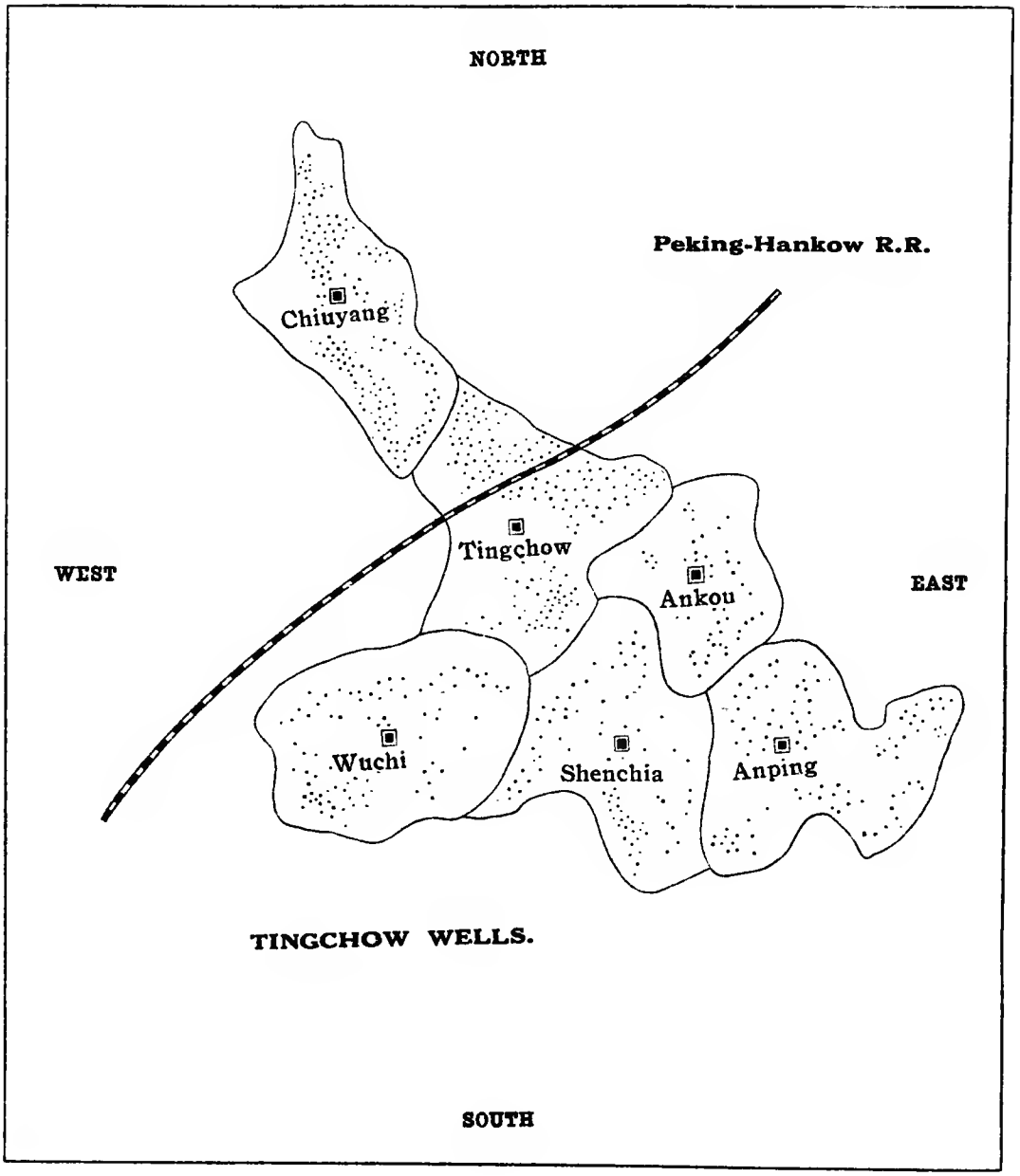
REV. F. J. GRIFFITH

TINGCHOW is situated about thirty-five miles south of Paotingfu and about one hundred and twenty-five miles south of Peking, on the Peking—Hankow Railway. Its history goes back thousands of years, and during the Chow dynasty, it was the capital of the Middle Kingdom. During the centuries since, rivers have so coursed through this region as to cover most of it with sand. Every dry year sees the wind blow this sand about and extend the area covered with this barren soil. During the past year it was one of the worst famine districts, and the United International Famine Relief Committee distributed grain there throughout the winter and spring. The prospect for a crop in 1921 was very poor, and at the urging of Rev. F. J. Griffith, who was in charge of the relief work there, the United International Famine Relief Society sent a geologist to investigate the subject of irrigation by means of wells. The geologist, Prof. Barber of Yenching University, reported favorably, but the United International Famine Relief Committee seemed reluctant to appropriate the funds. Rev. Mr. Griffith then came to the Red Cross, China Famine Relief. As the digging of the wells would afford relief on the "work" plan, while the wells themselves would serve as a means toward famine prevention, $100,000 was appropriated on the condition that the work be finished by July 31st.

This appropriation was made with the approval of the United International Famine Relief Committee and since Mr. Griffith had been their local representative and had his organization ready, he was immediately put in charge under the title of Field Manager.

The various questions in this connection had been carefully gone into and it was decided that the following rules would best govern the situation:

1. Grant of $100,000 Mex. to be made for well construction in the six Hsiens of Ting Hsien, Ch'u Yang, Shenchai, Wu Chi, Ankwo and Anping.



TINGCHOW WELLS.

Interior of Red Cross Compound.

2. Wells to be finished by July 15th and accounts to be sent in by July 31st.

3. Wells to be built in those villages that have been suffering from drought.

4. Method of apportioning wells to be—The total number divided equally among the six counties. The exact location of the wells then decided by lot.

5. The plan of construction to conform to the arrangements and conditions laid down for the other wells that have been built:

a. Well to be lined with brick.
b. Six feet of water at bottom.
c. Well to be eight feet at the bottom diameter and five feet at the top.
d. Half the grant to be made when contract is made. Full payment to be made upon completion.
e. The builder of the well to sign a contract that he will conform to the rules under which the grant is made, and he must also find a guarantee.
f. 540 wells to be built in each Hsien. Average price $30 per well.
g. Each well to be numbered and a brick placed along side with this inscription — "American Red Cross, number 1, 2, 3, etc."
h. Well to be inspected during construction and also after completion before payment is finally made.

The $30 per well which the American Red Cross agreed to pay was estimated to be the cost of labor. The site, bricks for lining, wood for the base, tools and all other expenses were looked after by the person to whom the well was allotted. Labor costs for well digging had been computed from the reports of the local authorities in these six hsiens and also confirmed by direct investigation. The payment was made in money, since the famine had passed the acute stage and money provided a greater amount of relief than grain would. This system differed from our other operations in that the village was selected for its neediness rather than the individual. The village that had suffered most from the famine got the wells, and in this way it narrowed down to the most needy individuals getting the employment. See form of registration :

REGISTRATION FORMS

區	Section
村	Village
等級	Degree of famine
井數	No. of wells per village
築井者姓名	Names of recipients
號數	Official well number
補助費	Sum received
開築期	Date of beginning
工竣期	Date of completion
保人	Guarantee
備考	Remarks

These new wells will be called upon to give water for irrigation only, since there is an adequate supply available for personal use. In the six selected Hsiens, there are roughly sixteen hundred square miles of 1,024,000 acres. Each well is supposed to water at least 20 mu (equal to four acres). In other words, the American Red Cross in one month built enough wells to irrigate 71,440 mu or about 14,000 acres.

Mr. Griffith was assisted in his inspection work by a few foreigners and a large number of trusted Chinese. After a contract was made by the person who had drawn a well, the site was inspected by some one from a branch office before work could be begun. Then during the work, inspection tours were made at unexpected and varied hours to see that specifications were being lived up to. The final inspection either proved or disproved the right to the last half of the sum awarded for that particular well. So far as possible, it was arranged that three or four families jointly built the well and thereby obtained benefit for their respective plots of land.

There was usually great competition for this subsidy of $30 and in some villages they would agree to increase the number, thus decreasing the cost of each well. One difficulty was in the scarcity of bricks for lining the wells. All the brick kilns in the vicinity re-started. At places, the city magistrates issued instructions that, for the time being, private building operations must cease, and all bricks be used for this public work. Again, in other areas, temples and old buildings were demolished to release bricks for this purpose.

The building of these wells is an unexpected and at the same time very interesting procedure. The cavity is made somewhat larger than the final well-hole down to the water level. A brick chimney is built at or above the water level, slightly tapering upwards, the top and bottom diameters being five and eight feet respectively. This chimney is built up eight feet above the ground level and is plastered over with a mud mortar on the outside, the inner surface being clean brick. Men are then hoisted down inside the chimney and dig away the bottom. As this is removed the column subsides. As the water depth at the bottom increases a chain of bucket men is established to bale out the well as rapidly as possible and the diggers again go down until the water rises to their necks. Three men can usually work at the bottom at one time.

The wooden base.

The Chimney.

Sometimes there is a scaffolding just above the water level on which other men stand and keep baling. This process is not always so successful, as in one or two instances during our operations the brick chimney collapsed, causing the death of the workers inside. Five men were killed in this fashion.

The depth of the wells, of course, varied with the locality. Water was struck anywhere between fifteen and twenty-five feet below the surface of the ground. The rule was followed that there must be six feet of water in the well. In a hand dug well it is practically impossible to get a greater depth than this, since a man cannot very well dig when the water is above his shoulders.

The matter of improving the methods of drawing water out of these wells was made a special subject by an American Red Cross engineer. The most common method of bringing water to the surface is to merely lower a wicker bucket on a rope without a pulley. For drawing a greater volume, a rope which winds around a drum operated by a man turning this drum by means of a handle, is the system. That will probably be the commonest form on our wells. Then the advanced method is to revolve a drum to which is geared a chain of buckets. This drum can be revolved by man power in the form of a tread mill or by a donkey walking round and round.

It was an adaptation of this latter form that our engineer worked upon. This same drum and chain of buckets were to be worked by means of sails mounted on a superstructure above the drum. The important point to guard here was the initial cost. An American or Dutch windmill would have been very nice but because of its cost an entirely different scheme was tried. Four cloth sails were supported at equal distances by a framework of wood in the form of a square. These hung loose so that they could follow the wind as the structure revolved. As it worked out, however, the wind was not strong enough to lift the water. The sails were then increased to six but the results were not very satisfactory. Before a highly successful type could be worked out, our operations closed and the problem was dropped

Sinking the Chimney.

Laying a lining below ground.

Working below ground.

so far as the American Red Cross was concerned. However, the plans and experience of our engineer have been passed over to the body which will likely resolve into a permanent famine prevention organization, for further study and experimentation. Hence, it cannot be said that this was wasted effort. Chinese interest of the right sort was raised in this project through the original windmill being built under the direction of a teacher, himself an engineering school graduate, by boys in a mechanical school.

Windmill.

Tengchow Sand.

This scheme was essentially a famine relief measure since there were employed approximately 35,800 men during the entire operation. The greatest number digging wells at one time was probably during the last week of June, when on one day, approximately 30,000 men were at work. Added to this, however, is the powerful factor of famine prevention. The figures for the spring crop are enlightening on this phase. In this very district, small patches of land that had been watered by artificial means produced a crop which was 30 per cent normal against a crop of 5 per cent or less in areas where no water was available. This naturally makes the land more valuable. A small tract with a well is worth from two to four times more than a similar piece of land without a well.

This operation may well be considered one of the most successful. In all, there were built under the supervision and at the partial expense of the American Red Cross, some 3,572 wells. The average cost to the Red Cross was $27.19. Private initiative was so awakened, that probably an additional 2,500 wells were dug without aid from the Red Cross. The short time in which this was accomplished and the very pleasant memory left behind with the Chinese are gratifying factors. One Chinese expressed the general feeling of the district when he said, "There are none who do not approve."

Wheat under irrigation.

CHAPTER XV

PROPAGANDA FOR HIGHWAY MAINTENANCE

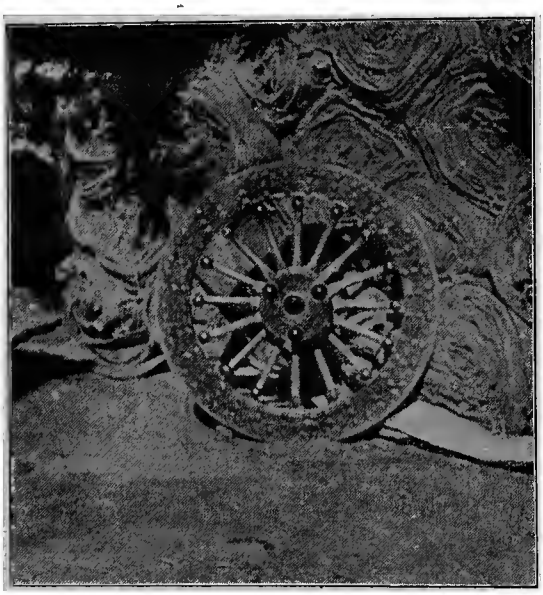
THE American Red Cross, China Famine Relief, takes the position that the "work" method of relief in the long run is the cheapest method. It is the cheapest because it simplifies preliminary investigation, and automatically excludes beggars, opium smokers and all those over-thrifty souls who are always ready to accept something for nothing. With so great a need for public improvement, there is plenty of work to be done, and by the same token all construction should be made as permanent as possible. Hence in Shantung, in Shansi and in Chihli, promises were obtained from the highest authority that the roads constructed by the Red Cross would be maintained.

In China, as elsewhere, promise and fulfillment are often far apart. The organization required for highway maintenance is a new thing, and technical efficiency is no more to be expected than a good fit is to be expected from a Chinese tailor who cuts his first foreign coat. Public opinion in China in no way demands good roads. In fact, it looks upon the regulations necessary to that end as an infringement of personal liberty. More especially, Chinese carts make the maintenance of roads very, very difficult.

Because of bad roads, the Chinese wheelwright has invented the most efficient instrument on earth for making bad roads still worse. Consider the saw-toothed wheel, which dandies and men of wealth have imported from Shansi for their pleasure carts. Could any refinement of cruelty to the surface of a highway be invented which would go beyond this particular type of wheel? Then, there is the concave-tire wheel which puts a cutting edge on each side of the already narrow wheel by which to assist the cart in climbing out of ruts; but in assisting, it cuts the side of the rut to powder, which at the first wind, blows away and leaves a deeper rut. The deep-lying canyons which constitute many of the Chinese roads may be attributed largely to this cause. The Chinese cart at best, having only two wheels to carry the load and with no springs to lighten the blow upon any obstruction, is severe enough upon any road, even if it were not equipped with these instruments of offense.

So long as the saw-tooth wheel and the concave tire remain as the common forms, not even the best macadam road can stand for more than a few years. However, in Peking and other cities where these wheels are kept off from the macadam portion of the streets and only lighter vehicles, most of them rubber-tired, are allowed to use the street, the macadam requires digging up and re-rolling every three or four years. This is a tremendous expense,—just how large, the writer does not know. In the Philippines, for example, the maintenance cost of the splendid highways there is said to be 1,400 pesos per year per mile, roughly $1,400 Mexican. Apparently the better the road the higher the cost of upkeep. This cost is practically equal to the cost of producing highways which have been built by the Red Cross in Shantung this year.

Saw-tooth wheel. Used on fashionable passenger vehicles.



Side view of Chinese cart wheel, showing iron studs on felloe to protect it against wear in ruts.

The cost of maintaining macadam roads, except in congested and well-to-do centers, is out of the question under the present conditions of Chinese finance, both Government and private.

The cost and difficulty of highway maintenance undoubtedly can be reduced considerably if the present carts, which are now instruments of destruction, could be turned into instruments of maintenance. This can be done by changing the tires of such carts to the broad type, say $3\frac{1}{2}$ to 4 inches. The effect of such tires is to roll the road hard and smooth. In the first place, with the broad tire the load does not cut deeply into the surface, for the bearing surface will be a total of 8 inches instead of about 3 inches as at present. The rut cut by any single load is therefore less than half that made by a narrow tired cart. Still more important, however, is the fact that because of the width of the tires, succeeding loads do not follow exactly in the same track, and so succeeding carts tend to roll out any rut which had been cut rather than to deepen it. With broad tires, the tendency is for each wheel to roll a surface about two feet broad. This, with the animal tracks, turnouts, etc., in practice results in a rolling of the entire surface. The loess soil of the coastal plain is such that under the smooth iron surface of these tires a hard polished track is made, which so long as the road is dry, stands up like asphalt. The whole problem of maintenance, therefore, is then reduced to the patching of side washes and the building up of a few low spots. The work of a single man one day per week would keep in condition a li of road in most places where the highway has been graded up. At this rate, cost of maintenance would be reduced to $45.00 per annum per mile.

It has been urged that while the broad tire wheel would serve very well upon the new roads which have been graded up, it would not do at all upon the ordinary country roads, which constitute the principal portion. When narrow tires are in the vast majority there is something in this contention. The deep ruts in the country roads are cut during the rainy season and again immediately after the frost is out of the ground. A broad tire following a narrow rut would be hard to pull. Of course, if sufficient broad tires were put upon these roads, such deep ruts would not be created in the first instance and other broad tires could follow

Chinese cart fitted with broad-tired wheels by the Red Cross.

immediately with greater ease than the present narrow tired wheel follows the rut cut by its own predecessor. In fact, a large proportion of the present country roads are not the deep canyons which are featured by the pictorial artists. The typical country road is merely a trail taken "cross-lots" by the wayfaring carter in order to avoid these sunken rutted roads, and once the trail is made it is followed until it is abandoned in turn. In this way, tremendous quantities of land are taken up by unnecessary duplication of roads and the farmer's crop is nowhere safe against the inroads of an enterprising carter. On these flat country roads the broad tired cart could be used as easily as anywhere on earth,—in fact, it was exactly this condition which led to its use in America, where until twenty years ago there had been no particular attempt made to improve the character of the country roads. Broad tired wheels anywhere on loess soil (having as it does, a lime content) would produce roads which in dry weather could be used by motor cars all over the coastal plain.

In the interest of better maintenance for the highways which were building under its direction, the American Red Cross, China Famine Relief, attempted to stimulate interest in the subject of broad tires. Ten pairs of wheels with axles were built for it in the shops of the Peking Higher Normal School, and shipped to Shantung, with instructions that these should be used on carts hauling commissary supplies. They served both as demonstration and in rolling the new roads. Another ten pairs were ordered as soon as the first ten had been shipped. Later ten pairs of iron wheels were purchased from a mail order house in America and sent to the Shansi highways, where the metal workers would be able to copy them. Further contracts were placed in Tientsin for wheels to be used in south Chihli, Honan and Shansi. The latter were particularly necessary in order that a sufficient supply of carts fitted with such wheels should be the first to use the roads nearing completion.

In addition, Mr. Herman Gluekauf, the teacher of manual training of the Peking Higher Normal School, was sent into the field to teach native wheelwrights the process of building these wheels,—especially, that of shrinking on the tire. His method was to let contracts with such wheelwrights for a number of wheels to be constructed to specifications under his direction. In this way the Shantung field was fairly covered, as follows:

Tehchow	6	pairs	with	axles
Enhsien	5	,,	,,	,,
Kaotang	5	,,	,,	,,
Yucheng	5	,,	,,	,,

The South Chihli field had its quota constructed with 4 pairs at Hantan and 5 pairs at Taimingfu.

While this work was going on, Prof. Bailie was sent into Shansi for the same purpose and found, happily, that the wheelwrights of Taiyuanfu were already constructing broad tired wheels with shrunken tires. In addition they were building a wheel with a broad felloe after the native pattern, which merely shoes the wheel but is so constructed that the strain is put directly on the spoke. This appears to have all the strength and durability possessed by our own type.

In Shansi, South Chihli and Honan, these wheels have been sold. But in Shantung they have been loaned to local mission stations in the hope that repeated demonstration will create interest in their favor.

Possibly to change the type of wheels used is a task greater than that of building thousands of miles of highway. Certainly it would be a greater task if the attempt were made to make the change immediately complete. Mental habits are always more difficult to move than large masses of mere inert matter. Whatever

is done must be done in such a way as to take effect gradually and to enlist the self interest of those who are using the present narrow tired wheels. The provinces which now find themselves in possession of a considerable mileage of new roads are wrestling with this problem. Possibly the solution will come from a combination of the need for funds for the maintenance of the roads with the desire to reduce the amount of funds needed for maintenance. It has been suggested that a small toll be charged each cart using the improved roads and that this toll be larger for carts with narrow tires than for carts with broad tires. Indeed, it has been proposed that since the broad tire is an instrument of maintenance, a small bonus should be paid to the broad tired cart instead of demanding from it a toll. Another form of the same idea is to commute such tolls into an annual or semi-annual license (and bonus).

However, the tolls which can be collected without causing considerable commotion are so small that it would not cause the immediate changing of any considerable number of narrow tires to broad tires. Hence it has been thought well to announce in advance that such an arrangement would persist, say for three years, after which a higher toll or license would be required of the narrow tired wheels. Thus a carter would quickly figure that during the course of three years he would probably save enough in taxes and bonus to pay for the cost of changing and at the end of the period he would be free from the higher toll which his narrow tires would face. This idea is also elaborated by adding the provision that at the end of five or seven years narrow tired carts would be prohibited absolutely, at which time broad tired carts would begin to pay a maintenance toll or license fee instead of receiving a bonus. A further proposed step in this direction is that the makers of cart wheels be licensed and that for every narrow tired pair of wheels turned out hereafter a tax, say of $5.00, should be imposed, whereas broad tired wheels would bear only a nominal tax. This tax, of course, would be immediately shifted to the purchaser of the wheels and would establish a differential in favor of the broad tired wheels and bring it about that no more narrow tired wheels would be manufactured.

There is no reason why the broad tired wheel should cost any more than the narrow tired wheel. The hub and spokes remain the same. Only the felloe and tire are altered. The broad tired wheel would take no more wood in the felloe than the present narrow tired wheel. The depth of the wood would merely become the breadth instead. So also with the tire. The present tires are fully 5/8 inch thick, in addition to which there are all the studs which are used to protect the flat of the felloe. These studs, together with the present tire, contain sufficient iron to make a broad tire 3/8 inch thick.

Wherever good roads have been introduced for motors and rickshaws, the carts which carry the great mass of the country's goods are religiously tabooed from the use of them. With broad tired wheels not only would their use on the present macadam roads be permissible, but it would be desirable, for it would help to maintain such roads and reduce the amount of re-surfacing which is now required. The rubber-tired vehicle sucks up the dust between the sharp points of the macadam and so flicks it into the air that every passing breeze blows it to one side, thus exposing the sharp corners of the broken rock and producing pits. If broad tired carts were used upon these same roads, these sharp exposed corners would be ground down to a certain extent and the dust would be packed into the

depressions. Practically all of this dust has a cementing quality which under pressure from a hard surface tends to form a coating similar to concrete. Thus broad iron tires would improve automobile roads.

Considerable time and attention has been given in calls upon officials to explain the value of broad tires, to assist them in planning the maintenance of the highways, and in passing on simple information regarding the best methods of upkeep. There are only two periods where dirt roads are subject to complete destruction,—just as the frost comes out of the ground and during the summer rains. Some demonstration has been made of the use of the King drag in levelling roads at such times. But, so far, preference runs to hand labor. But if the ruts be filled by either method just as the road is drying out, and the surface is then rolled with a heavy roller, the common clay roads which have been built in North China would be useable even by motors at moderate speeds. Constant maintenance is a conception which it seems difficult for Chinese officials to grasp. They always seek some method which, though it may be expensive, will permit of absolute neglect after the first outlay. This accounts for the popularity of macadam in much of their discussions. But macadam is proving to be considerable of a delusion, as well as a great expense.

CHAPTER XVI

IF WE HAD IT TO DO AGAIN?

WITHIN a period of ten months the American Red Cross has brought succor to over 900,000 people in four different provinces. It has employed 160,000 workmen on nine different jobs, and at the peak of its operations 95,000 men were at work at one time. It has constructed 850 miles of highway through mountains and over plains, dug nearly 3,700 wells, and planted 40,000 trees. These operations have been conducted in an area whose greatest distance from east to west is about 420 miles and from north to south 360 miles. This work was undertaken first by volunteers purely in response to the suffering call of humanity. As it extended, professional engineers were employed, and these in turn were assisted by whomsoever could be found willing to accept the hardships of the interior. A dozen different nationalities, soldiers and sailors, scholars and near-illiterates, missionaries and "beach-combers," all have worked together on this aggregation of jobs. This diversity of locality, method, and personnel certainly has some lessons for him who "putteth the armor off" and perchance may have some for those who may sometime have to put it on.

Recapitulation of Construction and Relief accomplished:

Operation	*Miles*	*Total number laborers recruited*	*Persons per family*	*Total number receiving relief*
Shantung	485	61,000	7	427,000
P'ingtingchow	80	25,000	5	125,000
Fenchowfu	113	21,000	5	105,000
Honan	39	6,000	5	30,000
Hantan	46	5,500	6.4	35,000
Paotingfu-Tientsin	75	3,000	5	15,000
Tientsin-Peking	12	2,400	5	12,000
Tingchow Wells (3,572)		35,800	5	179,000
TOTAL	850	159,700		928,000

Reserve powers of the Chinese people.

The first, and perhaps the most important, lesson which has been learned from these operations is the surprising reserve powers of the Chinese masses. The most conservative estimate, made by any person in a position to judge, called for an amount of money to be expended in relief work far beyond that which actually was expended by all of the relief societies combined, yet there has been no extensive increase in the death rate during the past year. The drought and crop conditions in the fall of 1920 were identical with those preceding the famine of 1878,

according to all accounts. What has made the difference in results so marked? Communications. Railways and telegraphs.

The famine of '78 was dire before any news of it could get to sources of relief. Before such news could be verified, half the season had passed. In 1920 verified information was a matter of relatively few days. In '78 after the fact of famine was established, there were only slow going junks, carts and pack animals to bring in food from sources hundreds of miles away. During the past season thousands of miles of railway have been at the service of the merchant and the relief societies pouring a stream of food into the stricken regions. At the peak of the demand, 4,000 tons of food each day were being unloaded from railroads within the boundaries of the famine area. This constant supply of food, and the certainty that it would continue, prevented the population from becoming panicky, and put an effective stop to profiteering. Prices being somewhere near normal, the few possessions of the poor could be traded for food which lasted for weeks, and months, after their own products had been consumed. Thus the most valuable act of famine relief during the past year, was that of His Excellency Yeh Kung Cho, Minister of Communications, in reducing the freight rates on grain bound for points in the famine area 25 per cent, and advancing rates in the opposite direction by an equal amount.

In the future, it will be safe to rely upon the private resources of the people themselves for several months, provided that the transportation of food is handled as efficiently as during the past season. A further proviso must be made also, and that is that the areas affected have had a few years of prosperity within which to accumulate some property, personal or real. Provinces which have maintained the old custom, prevalent during the Empire, of requiring each household to store in the village granary a measure of grain every year of good harvest will be in better position than those which have allowed the practice to lapse. During the past winter it was discovered that two methods of maintaining the public granary had been followed. One method was to accumulate the grain for seven years and then cease to extract the contribution from each family. The other was to require the contribution each year, but after the seventh year, to unseal the bins of the first year, and give back a measure of the old grain in exchange for the new. It was found that those villages which followed the latter practice, had a comfortable grain reserve, while those which followed the former practice in many cases had been betrayed years ago by their village elders,—which ones nobody knew.

With a small amount of property which can be exchanged for food, and the ingenuity of the Chinese farmer in converting leaves, weeds, and other refuse articles into food, any community will be able to subsist for a considerable period without outside help. Preparation against future famines is, therefore, largely a question of improving the economic condition of the countryside.

Method of Relief.

Decision as to whether relief shall be given on the "Work" plan or on the "Free" plan rests almost entirely upon one's fundamental faith. If the mere existence of numbers is desired, to be sure greater numbers can be kept alive on the "free" plan. The "work" plan requires money for supervisory forces, for surveys, and tools. A working man must also eat more than one who hibernates. In order to estimate what the "work" plan costs, the American Red Cross, China Famine Relief, has analyzed its accounts somewhat.

The total expenditures on all operations was approximately $1,214,000 Gold. At two dollars Mex. for one Gold, this makes approximately $2,428,000. Of this $2,025,000 or 83 per cent was for food or cash payments to workmen, while $403,000 or 17 per cent, was for commissary, engineering, medical and general expense. Much of the $403,000 would have been spent under a "free" plan and the food and cash payment to workmen might have been much reduced if the object had been merely to keep men alive. But the Red Cross policy was to feed workmen and dependents, both, enough to keep them in good health, and this required that the workmen be given double the amount allotted to an idle dependent. Now, on the average, each workman had four dependents. Hence, we paid to each family rations for four idlers and one workman, or sufficient for six idlers whereas only five persons were fed. In this way our food costs were made one-sixth higher on account of the "work" feature. The allocation of the other expenses between the purely relief and the work phases is necessarily arbitrary, and the best judgment of those engaged in the work is the only guide. The following table is an attempt to get at the final cost of the "work" feature, upon the basis stated above:

Subject	*"Free" portion*	*Due solely to work*	*Total*
Food and wages	$1,650,000	$375,000	$2,025,000
Commissary	23,000	69,500	92,500
Engineering	..	159,000	159,000
Medical	25,500	..	25,500
Horses, autos, etc.	5,000	17,000	22,000
General	52,000	52,000	104,000
	$1,755,500	$672,500	$2,428,000

From the tabulation just given it appears that the features in the Red Cross activities which were peculiar to a "work" scheme absorbed 28 per cent of the expenditures, leaving 72 per cent for the purely relief features. In other words, the "work" plan is nearly 39 per cent more expensive than the "free" plan for an equal number of persons reached.

"For an equal number of persons reached," yes. But the "work" plan if well organized with wages scaled to the situation immediately eliminates the professional beggars, opium smokers, and all those who are crafty enough to fool the investigators. On the Paotingfu highway, for example, whole hsiens were clamoring for three months "free" rations, in advance, at the same moment that no workmen could be secured by the Red Cross for standard rations,—and very likely would have got them if the Red Cross demonstration had not been in the field. Hence, it may be asserted with confidence that the 39 per cent which the "Free" plan saves in feeding an equal number of persons, it loses in the larger numbers which it must feed.

The principal value of the "work" plan, however, is to be found in the preservation of the moral tone of the community served. Certain Chinese communities have been the recipients of free relief so frequently that they expect it as a matter of course, and are little better than wholesale beggars. Then, too, there is the lesson of organization for the construction of public improvements. If China is ever to become a modern nation, the ideas and practices of its villages must be modernized. This can be

done only by schooling through example. With China's great labor force, mere organization would be sufficient to produce a modern mode of life within a short time. The example of road building has been quickly copied in many sections, and there is much to support the view that if the "work" method of relief is wisely followed for a little time, the Chinese will learn this lesson, as they have learned others which have been set by their Western friends.

Jobs suitable to famine labor.

One of the first requisites of a job suitable for famine labor is that it shall not require a large outlay for equipment, or the use of strange machines the handling of which cannot be learned quickly. Fortunately nearly all of the public improvements which can be named involve as tools nothing more than shovels, picks, baskets, trowels, hammers and similar hand tools. It is also important that work begin rather promptly, otherwise the people are dead before relief is given. This means that the job selected must not involve extensive surveys. This rules out extensive irrigation projects, unless the surveys have been completed in advance, as well as railway construction through difficult country. But if the surveys have been completed, either of these are suitable.

Another factor that needs to be taken into consideration is the demands of the job for skilled supervision. Skilled supervision is expensive and comparatively rare in a country like China, and the job selected, if possible, should permit the supervision of large numbers of laborers by a single skilled overseer. This means that the job should permit of the concentration of large numbers of laborers within a relatively small area. Here was one of the disadvantages under which the Shantung road operation labored. In order to inspect the work of a thousand men once a day, the engineer was compelled to walk or ride a distance of twenty miles, or thereabouts. The physical exertion necessary for such a performance leaves little energy for the handling of unusual matters which are always coming up, except in the case of exceptional men. Besides, for all but a few minutes a day, the laborers are out of sight of their responsible chief. There is no time for explaining doubtful points, for clearing up misunderstandings, or for settling disputes. An additional disadvantage of light road work is that every few weeks the work is completed, and the entire force has to be moved to a distant territory. For these reasons, dykes, railway, embankment, canals, or mountain roads make more satisfactory jobs than highways on the coastal plain.

Of course, construction of any kind is out of the question, unless the public authority which is to enjoy the benefit is willing and able to provide the land required. The heavier the construction upon a given area, the smaller the area which must be purchased in order to yield a given amount of relief labor. This is another important factor in favor of the construction of dykes, railway embankment, canals, or mountain roads in preference to roads on the plain.

All of the above deals with the employment of men. While the employment of women offers some peculiar difficulties, there is no other reason why women and large children ought not to be required to do something to earn their food.

Hairnet classes, straw weaving, and sewing groups have been tried and are good so far as they go, but they do not permit of mass employment. A considerable portion of the rock on the Peking streets is broken by women and children. Thus the whole subject deserves study.

Size of jobs to be preferred.

There is really no popular demand for public improvements of any kind in China. There is merely a desire for the fruits of public improvement. Any change always interferes with some one's vested rights and so there is always some active opposition to any work which might be undertaken by famine relief societies. Unless there is someone in the community actively interested in putting through the project, with energy and skill in meeting opposition, and with standing enough to command the respect and enlist the support of local magistrates, the project will invariably have a stormy voyage. So far as international or foreign relief societies are concerned, this means that the job must be such as the local missionaries not only approve but strongly desire. Furthermore, the local mission head must be able to speak with authority when he interviews a magistrate. The promises he makes he must be in a position to carry out. The threats he makes he must be able to fulfill. Unless he has this power, and the willingness to use it, the job is likely to suffer. No one is in so good a position to make the most of promises and threats as the man who is personally well known to the local magistrate and who can speak to him in his own language. No interpreters can "get it across." It is a rare interpreter who will consent to translate as it is told to him, the straight-from-the-shoulder talk which foreigners use when they mean business. This all comes down to the statement that a local missionary makes the best Chief of Operations for the territory covered by his mission.

In actual practice, this local missionary, if best fitted for the responsibility, will have dogged the steps of the relief organization with a plan in his pocket of whose success he is assured. As Chief of Operations, he should be carefully instructed in the fundamentals of policies adopted by the main organization. He should be assisted, perhaps, in his first negotiations, so that when unexpected points arise he may be guarded from improper commitments. After that, within his own territory, the job should be his to make or mar.

The success of the Tingchow Well, the Honan, the Pingtingchow, and the Yellow River operations was due in large part to the fact that all of these operations were in charge of local foreigners who believed in them thoroughly, who commanded the confidence of local officials, and who were able to get their ideas across in the native dialect. The success of the Hantan operation was retarded not a little by the fact that the Field Manager was but recently known to the people of the locality. Although he was able to speak Chinese fluently, his dialect was somewhat different, and no one would co-operate with him until they had proven his mettle. The comparative failure of the projects running out of Tientsin can be traced largely to the fact that near the capital the Chinese officials are of such national importance that no foreign manager, the Director included, was particularly trusted or respected by them. Added to this was the fact that most of the missionaries who were expected to interest the people in the project, either had some suspicion of some phase, or else were so wearied with their winter labors that they made but a feeble effort. In the Shantung operation there was general approval and co-operation on the part of the local mission, but in the Director's opinion, better use could have been made of it. Theoretically, the whole job was directed from the Field base at Tehchow, the outlying missions acting merely as recruiting centers. As a matter of fact, some vigorous person in most of these outlying missions voluntarily

took it upon himself to help smooth out many of the difficulties as they arose. If he had not done so, the work would have been delayed interminably. Tehchow was distant several days journey. Ten minutes after the Field Manager had departed, difficulties might arise which could not be settled for a week,—the time required for a messenger to reach Tehchow and return. It was at such times that the vigorous and interested missionary took a chance, and staked his standing in the community on the settlement which he worked out and for which he later asked sanction. We should have done better if we had made such a man District Manager, with a District Commissary chief and a District Engineer responsible to him, Tehchow headquarters being responsible for co-ordination, general supplies, and supervision only.

In a word, the size of the job most favored is that which does not extend beyond the area of a single mission station, or affiliated mission stations. If a greater area is unavoidable, it should be divided into units corresponding to such mission station territories. These remarks do not apply, of course, to purely engineering undertakings which, though occurring at time of famine, are not organized with special attention to relief purposes. They assume also, that within the technical phases of the word, the engineers in charge shall have full authority and full support; that contracts for work and material will not be made except with their approval; that payments shall not be made for work done except upon their order; and that in every case of reasonable discipline the engineers will be supported in deed and word.

Perhaps if we had it to do again, more attention would be paid to delimiting the scope of the various departments. This is important. For the tendency of Chinese foremen is to talk to the man who can understand him. So if the missionary isn't careful, he finds that he has encroached on the engineer's prerogatives, and that the engineer resents it.

Method of pay.

Those who have read the preceding chapters will have noted three distinct methods of paying the laborers; (1) by the day, (2) by units completed, (3) and by contract. Which is the best plan?

The plan to be selected depends very much upon conditions. If the work can not be easily measured, if it is not known how much a man ought to do in a day, if the men are too weak to earn a fair day's pay on other systems, there is no alternative to payment on the daily basis. For a time, the fear of losing their jobs can be made to influence men toward honest effort. Some engineers have been able to lay out a daily stint, failure to complete which meant a deduction from the daily pay. But on the whole the laborers soon discover that a decision has been made to take care of them, and they begin to loaf. It has been urged that so long as famine relief is the object of the work, it does not make so much difference how much they do. Better use the "free" relief plan outright than to make a mockery and a failure of the "work" plan. The moral effects are no worse. Anything but an honest day's work defeats the purpose of the "work" plan.

The piece work plan requires considerable supervision in order to measure the quantities of work produced and to obtain a good quality of workmanship. The measuring of quantities requires some skill and a little mathematics, for the excavation or fill is almost never in regular form. If the supervisory force is either ignorant or indolent, its faulty measurements will cause no end of trouble with the laborers, whether underestimated or over-estimated.

It is essential also that unit prices be scaled very closely or on the one hand the laborers will not be able to earn enough to support their families, or on the other hand the work will be so attractive that every working man in the community will want a job.

The contract plan recommends itself because of its simplicity. A given piece of work,—who will do it the cheapest? If competition in the bidding can be assured, the cost will not be excessive and after the contracts are all let, there is definite knowledge as to how much the entire undertaking will cost. If the contractors are required to furnish reliable guarantors and the penalty clause is rigid enough to ensure prompt execution of the work, there is little left to do but to inspect the finished product and pay the bill.

But under the contract plan the relief features of the work are very likely to be lost sight of entirely. Large contractors invariably subcontract. And in sub-contracting, the wages which the men are able to earn are generally pitifully low. The contractors are out for a profit, as a rule, and do not hesitate to take advantage of the necessities of those whom the famine relief society has set out to relieve. The result is that while the workmen are probably kept alive, their families are left to suffer. Then, too, in many cases a highly paid skilled worker is in the end a more economical employee than a lowly paid unskilled worker. Hence, the contractor may select men who may not be in need of relief at all, to the exclusion of men who may be needy. The contract method, however, will generally be found to be less expensive for a given job than either of the other methods mentioned.

The experience with these various forms of payment during the past year has been such, that each of them is to be recommended under certain special conditions. If the condition of the population is such that work can be deferred until sufficient supervisory forces can be collected and the work properly laid out, the piece work system is by far the best. By "piece work," it is not intended that each man be paid individually according to his product. The gang of thirty is a unit small enough, if the thirty men come from the same village. Self government has no better example than in the Chinese village. If the supervisory forces are sufficient so that the work of each gang can be measured and payment made in the presence of the entire group, there is very little chance for the food or money to go to others than those for whom they were intended. (See Chapter XII, Tientsin-Paotingfu Highway, for a fuller description of this method.)

During periods of frost the piece work must be raised so that the men may earn a living wage. This can be done by making an allowance similar to that when rock is encountered imbedded in earth. The allowance can be altered weekly to keep pace with frost conditions. If this is made clear to the workmen, there need be no difficulty in reducing it when the frost begins to leave the ground. Such allowances should be made only on the authority of the Chief Engineer.

If the condition of the population is such that they can not wait for the organization of a piece work system, or the men are too weak to earn a living wage at rates fair for normal men, they should be started on the day basis with the distinct understanding that the piece work basis will be introduced within a fortnight or a month. Chinese respond surprisingly fast to proper feeding, and certainly within a month, and probably within two weeks, any man able to get a job would be back to normal strength. Once able to do his normal day's work, a Chinese prefers to be paid on the piece work basis, for it gives him

a chance to earn a little more than the average if he tries. And he should be paid without a murmur if he does the extra work, and a piece work price once made should not be altered except for exceptional reasons. Chinese laborers have pretty good ideas of justice in these matters and the foreigner who maintains his ground when it has been well taken will find himself more popular with his forces than one who yields to pressure on doubtful issues.

It frequently happens that a given piece of work is larger than can be finished within the famine period, but that it is very desirable to leave a finished job. In such cases, the contract basis is quite satisfactory and justifiable, for these unfinished portions.

On the Yellow River road a combination of the piece work and contract bases was used extensively. A gang, or a combination of gangs, would be offered a lump sum payment for a given section of road, or a certain number of culverts of given dimensions. The entire force was notified as to the conditions of the contract, and informed that they were to share equally in the payment. In such cases, there is no sub-contracting or cutting of wages. This plan was used very successfully.

Payment in cash or in food.

Whether famine workmen shall be paid in food or in cash is another question which must always be decided according to the circumstances. Where shortage of food supplies in the affected regions has raised prices to a point above the cost at origin plus normal costs of transportation, the threat of a powerful organization to enter the market is very potent to discourage profiteering. In Shantung local food prices dropped fully fifty per cent immediately following the delivery of a train load of supplies by the Red Cross. Whenever relief societies receive preferential treatment from the railways, there is an added inducement for such societies to pay in grain. But under equal conditions, the regular merchants have a knowledge of the market and have connections which enable them to put grain on the market at very much lower prices than the cost to a foreign relief society. There are times, of course, in which transportation agencies need revision or intensifying. This, individual merchants can not do very well, while an influential society can secure the backing of the authorities necessary for such purposes.

To a certain extent, the payment in grain tests out the severity of famine conditions. It should be assumed that famine relief societies will pay workmen in part, at least, with the wholesome but cheaper foodstuffs, like bean cake, peanut cake, buckwheat, oats, barley, and cottonseed. These all have food values which in the bulk will average as high as their customary kaoliang and millet, and certainly are not to be compared with the weeds, chaff and soapstone which are the expedients resorted to by starving people. Yet, the population of China is not accustomed to the use of bean cake, etc. (except Shantung and Shansi, since last winter). Hence if they are not in dire need, they will not work for such foods. These foods then become the test of which people actually are threatened with starvation and which merely desire to be fed well at no expense to themselves. Naturally, famine relief should not be given to this latter class.

While the market is high, payment in millet and kaoliang is attended with a positive temptation to abuse. A workman who is given a ration sufficient for himself and family is receiving goods which can be sold for cash, and his daily reccipts can be sold for very much more than the ordinary daily wage. Enterprising farmers, who had supplies of their

own enough to see them through the winter, have been known to try to buy their way on to the list for this very purpose.

Grain payments are more likely to be taken home to the family than are money payments. One of the besetting sins of the Chinese, rich and poor, is the passion for gambling. While gambling sharks were run out of the camps whenever found, yet the mere social gambling among the workmen undoubtedly worked a considerable hardship on many families.

The Red Cross found that it was advantageous on some jobs to change from grain payment to money payment after the territory was well stocked with grain,—especially in the later days of the work, when the intention was to assist in the partial rehabilitation of those who had been saved from starvation. On the other hand, it was found necessary to change from cash payments to grain payments in a district on one job, for the local market become threatened with exhaustion several weeks before harvest. Hence, no rule can be laid down in advance as to what is good and what is bad, and any organization that adopts a rigid policy will fail to secure the best possible results. Emphasis should be placed on the necessity of the responsible officers being intimately informed of local conditions at all times. This again points to the necessity of placing in responsible positions Chinese speaking foreigners of ability and standing in the locality.

Supervisory personnel:

If we had it to do again, and were again assured that only $500,000 Gold were available for the entire relief work, and again it appeared that no other large gifts for famine relief work were forthcoming, we should again decide to "carry on" with such forces as could be secured in China. But if we had any idea that the funds would be doubled five months later, and that other relief societies would have such funds as to demand a large portion of the available foreigners, we should immediately send to America asking for a few experienced engineers, and a much larger number of young engineering graduates who were looking for experience and a chance to serve.

When the second gift of $500,000 gold was received, it was mid-February. At best, about six weeks would be required to recruit in America and bring to China any valuable engineering assistants. The operations were expected to taper off after the middle of May and to be pretty well closed down by the middle of June. These six or eight weeks of service would scarcely justify the expense of importing engineers. Besides, China was in the midst of a business slump and an incursion of educated Russians, which made a considerable number of men available. If these two conditions had not been present, it would have been necessary to have sent, at least, to the Philippines and to Japan for engineers. As it was, a considerable number came from the Philippines.

Unless there is a business slump which makes available a number of good men, advertisements for help in the Orient will only produce applications from the unemployables and the derelicts whom consuls wish to get rid of. Our forces included a few of this kind—some even with police records. Some of these men know a great deal about different kinds of work, and as long as they can be kept under discipline,—and without money—they are useful. Some of them have used the opportunity to get a new grip on themselves. But for the most part, such men are not useful much beyond the first pay day. If such men must be used, they should be paid only a small portion of their wages on the regular pay days, the remainder being deposited with the Consul and held

by him until the completion of their employment. Such a deposit will save the Consul embarrassment in providing transportation for such men elsewhere, and may at times come in handy to the relief society in straightening up irregularities in accounts.

A moot question arises as to the effect of the "beach comber" upon American prestige in the interior. There is no gainsaying that the regard in which the individual American is held is undeservedly high. The word "undeservedly" is used advisedly, for the entire conception of Americans held by rural Chinese is derived from contact with only the most moral and idealistic types,—the missionaries. Many missionaries deplore the entrance of any element which will destroy, or at least lower, this high conception of the American held by the Chinese. Another missionary view, however, is voiced by one who said, "I welcome the coming of men who represent the anti-missionary attitude. We cannot keep the Chinese forever in ignorance of the existence of this type of American. There is no better time for them to come than now. Chinese have said to me that the things in western civilization which they admit to be better than their own are due to the fact that we are of different race, rather than to the difference in our religion. When I have time to get back to my missionary work, these drunkards and rowdies will give me just the examples I need for teaching that Christianity makes the difference rather than race or nationality."

Exclusive territory.

The experience on these jobs is quite conclusive to the point that no two organizations should attempt to give relief in the same territory. In Shantung, representatives of another nationality distributed free relief in several regions after the Red Cross had been in occupation for some time, and in almost every case trouble of some kind broke out soon after. These troubles may have been a mere coincidence, but the coincidence was so regular as to argue the existence of a causal relation. On the Hantan job, we were practically forced to come to the same terms as those given by the Canadian Presbyterians, which in our view were too liberal, and this had the effect of encouraging the people to obstruct and "dicker" for still better terms. On the Paotingfu and Tientsin jobs, the distribution of "free relief" had been so general that there was no disposition on the part of anybody to work for relief rations. Except where a "free" region can be put entirely upon a "work" basis, it is almost hopeless to do successful relief work on the "work" basis, in competition with the "free" basis.

Final Appraisal of Results.

No final appraisal of results can be made for years to come. Insufficient famine relief reveals itself in heavier death rates and weakened condition of the population in after years, fully as much as in death rates during the year of famine. The moral effects of different methods of relief is also to be seen in the future, and may be subject to dispute, like all other opinions dealing with intangibles. If the communities served by the roads which had been built maintain them, that will be conclusive evidence of a certain moral effect. If they press on to build more, that will be even more conclusive evidence. It is not to be expected that all communities will do so. Some have been given rather too large a task. They would do better by the roads if a smaller mileage had been constructed. Yet the mental shock of so large an effort will probably have its effect in time, even though the first results pass away.

In order that this year's work may teach its full lesson, the entire mileage ought to be visited next year, so that

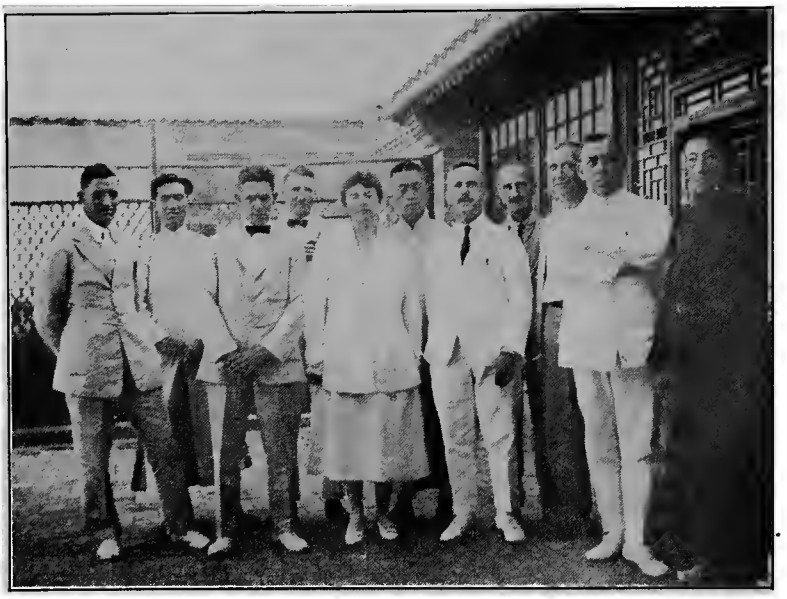
results may be observed. If an engineer were included in the observation party, no doubt valuable data for future use in highway construction would be obtained. It is too much to expect that the roads which have been constructed shall not be subject to breaks from time to time. The railways of China after years of repair and adaptation of protection works, are still at the mercy of floods. The Red Cross roads will be subject to the same attacks. In fact, it is much more economical at this stage of China's development to repair certain kinds of periodical breaks than to attempt to make the work break-proof. For the information of engineers who may inspect the work which has been done, the following list of costs is given:

	Miles Completed.		*Expenditure Mex.*	*Average cost per mile Mex.*
Shantung	485		$834,000	$1,719
Hantan	46		130,000	2,826
Pingtingchow	80		560,000	7,000
Pingyao (and branches)	30		62,000	2,667
Yellow River	83		*645,000	7,771
Honan	39		100,000	2,560
Tientsin-Paotingfu	75		58,000	773
Tientsin-Tungchow	12		56,000	4,667
Tingchow Wells		3,572	97,000	($27.19 Red Cross portion per well)
	850		$2,542,000	

* Includes $150,000 Mex. from the Shansi Famine Relief Society.

CHAPTER XVII

THE ACCOUNTING DEPARTMENT



Head Office Accounting Force.

REPORT OF THE DIRECTOR OF ACCOUNTS,

AMERICAN RED CROSS CHINA FAMINE RELIEF

1920—1921

Beginnings:

The details concerning commencement of operations by the American Red Cross, China Famine Relief, are dealt with by the Director in the earlier pages of this report.

From that time until January 3, 1921, Mr. W. M. Cornwell was the financial and accounting man; with the aid of a Chinese clerk a careful record was kept of expenditures. The voucher form used was the regular American Red Cross style, and to suit the exigencies of the organization this voucher was printed both in Chinese and English.

A receipt book was also printed in the two languages, and used for the securing of written acknowledgment by payee, where such payee did not have his own printed form for receipt.

A system of classification of accounts was started by Mr. Baker, who from railway and other experience was well qualified to know what was required in a record of this nature.

Appointment:

In November, 1920, cable instructions were received in Vladivostok, Siberia, from Washington Headquarters of the American Red Cross, these orders being that the Auditor of the Siberian Commission should proceed to China and assume duties as Director of Accounts of the American Red Cross, China Famine Relief. Thus, on January 3, 1921, he arrived in Peking and reported to Mr. Baker, finding the accounts in good shape from which to take hold and plan for the accounting in connection with the larger detailed operation which was seen by this time to be developing.

The transactions from the beginning up to that time were rewritten and set up on the books according to the system which Comptroller W. Cooke Lewis of the American Red Cross National Headquarters at Washington, had installed in Siberia and which had proved so satisfactory in enabling detailed monthly reports to be made.

The books were opened in two currencies,—U. S. Gold, as mostly all moneys were from Washington and all appropriations made on that basis; and the Silver Dollar in which nearly all the transactions were handled.

Exchange:

The great majority of our funds being in United States gold, there was the necessity for constant exchange transactions from gold to tael and then from tael to local currency dollar. The average rate which we have secured is 1.975 silver dollars for one gold dollar, and is thus almost at the two to one rate. It will be noted that these transactions cover the period from beginning of our operations in October, 1920, up to the present time. The minimum and maximum rates at which we have exchanged are 1.495 in November, 1920, and 2.27 in March, 1921.

The daily fluctuations in the exchange rate of silver have been shown in the graphs attached to the monthly accounting reports. These changes were many and at times certain advisers stated that gold had better be changed in order to take advantage of the good rate of exchange. The Director of Accounts, however, has acted on the principle that gold should be exchanged for silver only as needed and that it was no part of his duty to take chances on the rates. From every reasonable viewpoint there was no cause to imagine that when the banks were quoting $2.37 silver for one dollar gold, that the pinnacle had been reached.

The political atmosphere was surcharged with uncertainty, while conditions militaristic were also full of possibilities. The business life of the nation was in a pessimistic state and the general world depression had come on China no less severely than on other nations. Unemployment was rife and many foreigners were seeking positions at this particular time. With all these factors in mind, plus the feature of action and reaction between gold and silver, the curve of rise and fall in the relations between the two precious metals will be better understood.

Currency:

The currency question has been involved, as indeed everyone finds it, who handles money in China, which country is on a silver basis. It must be understood that in one sense there is no national currency. The Chinese banks, as well as the foreign financial institutions, put out their own bank notes,—the foreign bank notes pass at par, as do some of the Chinese banks. Other Chinese banks, such as the Bank of China, Peking, have their notes discounted.

The notes of these various banks pass current in the cities and some of the big towns, but in the interior

parts actual silver is preferred. The financial unit is the tael, and the coinage unit is the silver dollar, some of which are known as "Mexican" and others as "Yuan Shih Kai." These silver dollars are exchanged into small silver coins (ten and twenty cent pieces), which coins are once again convertible to coppers, and these in their turn can be exchanged for "cash." The silver coins are known as "large" and "small," the distinction being that the large money is also of the Yuan Shih Kai issue, and ten 10-cent pieces are received for one dollar. The small money, however, is depreciated, and in exchange for one silver dollar there can be received eleven so-called 10-cent pieces plus a few coppers, the amount varying from time to time and at different places. The currency scheme in the beginning called for one hundred coppers as the equivalent of one dollar, and a regular decimal coinage was thus planned, but at the present moment the number of coppers received for the dollar varies from 140 to 155. Thus, the big money 10-cent piece will be convertible into about fifteen coppers (a copper being a one-cent piece), and the small 10-cent piece can be exchanged for about twelve coppers. These coppers are issued in one-cent and two-cent pieces. The cash is a small coin with a hole through the center and is generally to be seen in strings of about 200 to 240. The "cash" change in the interior at ten to the copper, or, for the dollar, at about 1500, although sometimes as high as 1560 to one dollar, or even 1600, can be received. In the cities the "cash" is not a great deal used, prices having gone up in the last few years.

These differences have caused troubles, of course, in the accounting, for the Chinese clerks and interpreters would pay for their minor purchases in "cash" or coppers and then turn in their accounts accordingly. It would be necessary at that time to convert the "cash" or coppers to the dollar equivalent, as our silver books have been kept at all times on the dollar basis.

Bookkeeping System:

When the advice from Washington as to amount of the appropriation was received, a debit account was opened entitled "Washington Appropriation" and a credit established under "Unallotted Appropriations." Then, as the Director made his appropriations for different operations, the "Unallotted Appropriation" account would be debited and an "Allotted Appropriation" account credited. This "Allotted Appropriation" was a control account, and separate accounts were opened for each of the operations.

Under the system installed, the main accounting office for the China Famine Relief reported direct to Washington in terms of gold dollars. There was figured an average rate of exchange for the month, and expenditures for all operations were converted into gold at this rate, while cash on hand and in banks, together with unspent advances, were also figured at the given average rate for the end of the month. The books would be reopened on the first of the following month with that rate of exchange. New purchases of money during the month would be added and then a second average rate secured, with expenditures for the current month figured accordingly.

Reports from Field Stations:

From the main accounting office each operation received advances of cash, with separate bank accounts, for each of which two signatures were required on all checks. A uniform system of bookkeeping was installed at each office and every month the books were closed and a report made to the central office, these reports from the field stations being always in Chinese dollars only, and comprising:

1. Statement of expenditures with division into the classification headings. This expenditure was divided into separate reports for direct cash payments and for journal expenditure. The latter arose through sub-advances being made by the field stations to their operating personnel, who reported back to the field station with their receipts and vouchers. The benefit of having these field reports divided into cash and journal was that an additional check was secured—the analysis of the actual cash vouchers would have to agree with the total in the columnar cash book under the column Allotted Appropriation or Expenditure. Similarly with the Journal.
2. Trial Balances.
3. Details of the field station account with the head office. The balance in this account, of course, would be the amount which the field station owed to the main office, and would be covered by cash on hand and advances unspent.
4. Bank reconciliation statement.

Banking:

The banks in which the different field station accounts were opened had been requested to send at the end of each month all statements and canceled checks, to the main office; there an inspection was made and then both statements and checks forwarded to the field. On receipt of these statements and checks the field accountants reconciled with their own check books, listing the outstanding checks and forwarding a report to the main accounting office. Our accounts were kept with the Asia Banking Corporation, International Banking Corporation, and the Hongkong and Shanghai Banking Corporation. This latter bank does not return the canceled checks, merely giving a detailed list, which of course is not so satisfactory as the practice with the two American banks.

Cashier's Daily Statement:

The plan was that each office should make up a cashier's daily statement, the purpose of which was to keep the executive informed of the state of the cash balances, and copies were to be forwarded to the main office. These cashier's statements would start with the balance at the beginning of the day, add in the receipts, and then show the disbursements, giving a summary at the end of the sheet which would show the balance in banks and on hand at the end of the day, with a total figure. At not all stations was this kept up daily due to too few trained personnel.

Advances:

In the same way as the main office made advances to the stations, so they, in order to get money to their people in the field, had to make advances for which they took receipts on their field vouchers and opened ledger accounts with each of the personnel receiving such advances. These men would make their expenditures and secure receipts, giving details of what the expenditures had been for. From time to time the vouchers would be grouped and forwarded to the field office, where an audit was made and the amount properly creditable placed in the ledger. The personnel would thus keep a running account with the field office, receiving funds and accounting for them from time to time. Definite instructions were issued that all advances should go from the field offices only, so that a man receiving an advance in the field was not to make advances to any other person. The idea was that it would be better to keep the tree with as few branches as possible—where the system of advances runs as far as the twig of the tree there is sometimes difficulty in getting the sap back to the root.

Monthly Reports:

When the different month-end statements were received in the main office from the field, the figures were checked over as for totals, etc., and then placed on the main office books as debits to expenditure and credits to the particular advance account concerned. Each field retained its own vouchers until the end of the operation because of the necessity of having available these vouchers for ready reference. We have not used the system of duplicate vouchers for every payment, because the amount of detail work involved, in any case, has been tremendous, and to require each field to furnish duplicate vouchers for every payment, and then to send these to the head office to be gone over, was a work which we felt could not in the urgency of the need be properly installed.

Having received the reports from the fields, in the early days of each month, the average rate had already been worked out, and then all local currency expenditures were converted to their gold equivalent. All cash on hand and unspent advances were converted also and transferred to the gold ledger. Then the gold ledger, in its turn, was closed by charges to Washington and a cable report compiled which, under an agreed code, gave Washington the facts as to amounts received and expended during the month and balances on hand. The cable was confirmed by a written report giving all details as to the way in which the cable figures were reached, and showing the exact condition of the China books at the end of each month.

Difficulties:

In proceeding to carry out this plan there have, of course, been the expected difficulties in dealing with nearly three hundred foreign personnel and also in addition several hundred Chinese salaried personnel. These people were, naturally, of different training and temperament. To a very few accuracy in figures was proper, but with the great majority exact figures were a lost art. The insistent demand of the Accounting Department for full details and for accurate figures was met constantly by the cry that it was a famine relief work, and tired engineers or harassed storekeepers could not be bothered with such trifles. While much can be said, of course, for fatigued personnel, yet on the other hand the Accounting Department throughout has felt that the contributors were entitled to as detailed and accurate a report as was humanly possible. It is hoped that the records taken back will be satisfactory along these lines. We might mention again here, as we have mentioned elsewhere, that even some of the higher of our personnel were of the opinion that if men of honesty and probity, men of dependable caliber, stated that the money had been spent, that should be a sufficient report. We ventured to disagree, and are glad to say that these same gentlemen were perfectly willing to help us as much as their training and experience would permit.

Figures:

At the time of writing this report the exact figures are not complete, but the amount expended has been approximately Gold $1,214,000.

The original total appropriation granted by National Headquarters was G. $500,000, and then later a further G. $500,000 was appropriated, making in all G. $1,000,000. To this has been added the donations received in America and in China, which total Local Currency $408,358.74 and Gold $1,872 plus any monies received later in the States, and of which advice has not yet reached China. Then our funds have been increased by interest on the various bank accounts, and in addition, since the time of beginning

to close the operations, we have received income from proceeds of sales. The proceeds from interest and sales revert to Washington under the American Red Cross accounting regulations, and thus, while we have listed them in the table given below, yet we have shown them deducted so as to get the net amount for which we have to account.

In connection with the sales we might mention that the instructions from the Comptroller's Department were that all expenditure should be charged directly to expense, whether for expendable or non-expendable material. At the conclusion of operations whatever salvage value can be received for equipment belongs to National Headquarters and cannot be used in the operation concerned without a special authorization being given.

Gross Totals.

	Local Currency $	*Gold $ Equivalent*	*Gold $*	*Total Gold $*
I Exchange	$1,982,376.87	$ 995,608.52		$ 995,608.52
II Donations	408,358.74	215,085.82	$ 1,872.00	216,957.82
III Interest on Bank Accounts	1,534.17	741.77	1,963.87	2,705.64
IV Sales	39,964.48	19,416.49		19,416.49
	$2,432,234.26	$1,230,852.60	$ 3,835.87	$1,234,688.47
Deduct III and IV which revert to Washington	41,498.65	20,158.26	1,963.87	22,122.13
Gold not changed	$2,390,735.61	$1,210,694.34	$ 1,872.00	$1,212,566.34
			17,500.00	17,500.00
Receipt totals	$2,390,735.61	$1,210,694.34	$19,372.00	$1,230,066.34
Spent	2,370,000.00	1,200,000.00	13,803.59	1,213,803.59
Balance, unspent	$20,735.61	$10,694.34	$5,568.41	$16.262.75

Donations.

Included in the donations is the grant of local currency $250,000 made by the American Advisory Committee and which Washington authorized us to accept. This was entered on our books as Gold $125,000 and was earmarked at the time of the grant for operations in the Province of Shansi and in the Yellow River section. The report shows that considerably more than that sum has been spent on the project of the road from Fenchowfu to the Yellow River.

Other larger donations were through the Philippines Chapter in the very early days of the work—Pesos 99,000 —which realized Local Currency $70,273.78. Later there reached us further through the same source more than local currency $10,000. There was also the Standard Oil Company grant of Local Currency $24,937.50, and then through the China Central Committee of the American Red Cross, Shanghai, from the various American Red Cross chapters in China, we received some Local Currency $19,000. The Peking Chapter, American Red Cross, did not put their donations through us, having made other arrangements earlier in the Fall of 1920. The Hawaiian Chapter was the medium through which some local currency $25,000 was donated to our work from the Territory.

Classification.

In reference to expenditures, the scheme of accounts called for division into five main groups:

I *Relief Food*, which comprised the actual purchase price of the

grain distributed, cost of transportation, agencies in purchasing, etc., and also expenses in connection with recruiting and caring for the laborers. In this division, also, was charged cash paid to the workmen.

II *Commissary*, under which designation was placed the expenditures on food and quarters for the supervising personnel, salaries of those who were caring for the grain supplies, and expenses incident thereto.

III *Engineering*, to segregate the cost of engineering personnel, equipment, supplies and connected work.

IV *Health*, to group charges for medical and nursing staff, their materials and equipment, which included not only caring for the Chinese laborers when sick, but also preventive works of delousing and disinfestation. In addition, the medical staff cared for the health of the foreigners employed.

V *General*, covering, as the term implies, cost of general supervision at the main offices in Peking and Tientsin, and also at the field stations.

Expenditures.

The following figures show the expenditures charged by the Accounting Department under these five main heads, while an additional table gives the expenditures under sub-headings. It should be noted that some of the costs under "Engineering" are relief work. For example, bridges and culverts, which while engineering, yet gave labor employment to many men who were in need. Furthermore, the materials used in this construction also assisted in keeping open the channels of industry, as for instance the preparation of lime, cutting of stone, making of shovels and picks, etc. This same explanation can be used with equal truth to the engineering subdivision "Trees and Wells," where again work was employed in an immediate famine relief measure, but also for the very important phase of famine prevention. In the brick lining of wells there was opportunity afforded for reopening brick kilns and the employment of labor that would otherwise have suffered. Thus, immediately after the table of analyzed expenditures I have regrouped these items, totalling each department.

On the accounting records there have been ten (10) operations, and for each of these works separate analyses have been made of all expenditures, in the majority of cases with a complete and separate set of books in each field station. This has involved a large amount of detail.

Account No.	*Field*	*Amount Expended Throughout the Operations*
12-A	Shantung	G. $459,000.00
12-B	Hantan, Chihli	65,000.00
12-C	Pingtingchow, Shansi	284,000.00
12-D	Fenchowfu—Ping Yao Road, Shansi	31,000.00
12-E	Fenchowfu—Yellow River Road, Shansi	220,000.00
12-F	Honan	50,000.00
12-G	Paotingfu End, Tientsin—Paotingfu Road, Chihli	2,000.00
12-H	Tientsin—Tungchow—Peking Road, Chihli	28,000.00
12-I	Tientsin End, Tientsin—Paotingfu Road, Chihli	27,000.00
12-J	Well Digging at Tingchow, Chihli	48,000.00
	Total Expended	G. $1,214,000.00

This total expenditure, you will note from the earlier table, is made up of Local Currency $2,370,000 plus actual gold expenditure of about G. $14,000.

This expenditure of G. $1,214,000 is now shown divided into the five main groups, as below:

Classification of Expenditure—main heads.

Operation Number	*Total Spent*	I *Relief Food*	II *Commissary*	III *Engineering*	IV *Health*	V *General*
12 A — ...	$459,000.00	$364,000.00	$31,000.00	$20,000.00	$6,000.00	$38,000.00
12 B — ...	65,000.00	36,500.00	6,000.00	19,500.00	500.00	2,500.00
12 C — ...	284,000.00	204,000.00	10,000.00	57,000.00	6,000.00	7,000.00
12 D — ...	31,000.00	19,000.00	1,000.00	10,000.00	250.00	750.00
12 E — ...	220,000.00	171,000.00	5,000.00	43,000.00		1,000.00
12 F — ...	50,000.00	48,000.00		2,000.00		
12 G — ...	2,000.00	1,000.00		500.00		500.00
12 H — ...	28,000.00	17,000.00	3,000.00	7,000.00		1,000.00
12 I — ...	27,000.00	23,000.00	1,000.00	2,000.00		1,000.00
12 J — ...	48,000.00	500.00	250.00	47,000.00		250.00
Totals, gold dollars	$1,214,000.00	$884,000.00	$57,250.00	$208,000.00	$12,750.00	$52,000.00

Regrouping Analysis.

Grouping these again, as mentioned earlier, we find that the total spent on actual cost of food, relief wages, etc., is $884,000. Adding to this amount the two items from engineering, Bridges and Culverts and Trees and Wells, we get an additional $128,500, which makes a total for direct relief work of $1,012,500. The other items listed total $201,500, so that about 16½% of our total expenditure has been for other than direct expenditure on relief. Included in this, however, is the non-expendable equipment, some of which has been sold and the remainder passed on to the organizations who are continuing, in three cases, the work begun by the American Red Cross, and in other cases left with local organizations who will use the material for keeping in repair the roads constructed by the American Red Cross, China Famine Relief.

Cost of food		$478,750.00	
Relief Wages		360,250.00	
Transportation of Food		20,000.00	
Agency Costs re Food		9,000.00	
Fuel Cost and Transportation		10,000.00	
Recruiting		6,000.00	$884,000.00
Bridges and Culverts		81,750.00	
Trees and Wells		46,750.00	128,500.00
Total for direct relief, by employment of labor			$1,012,500.00
Salaries and Wages—			
Commissary	$19,000.00		
Engineering	36,500.00		
Medical	6,500.00		
General	27,000.00	$89,000.00	
Food and Quarters for Staff		18,500.00	
Horses, autos, bicycles		11,000.00	
Other Expenses—			
Commissary	$4,500.00		
Engineering	1,000.00		
Medical	2,000.00		
General	6,750.00	$14,250.00	
Equipment—			
Commissary	$ 2,750.00		
Engineering	19,250.00		
Medical	1,500.00	$23,500.00	
Travelling Expense—			
Commissary	$ 1,500.00		
Engineering	4,250.00		
Medical	500.00		
General	10,750.00	$17,000.00	
Medicines		2,250.00	
Engineering Supplies		18,500.00	
Office Supplies		7,500.00	201,500.00
		G.	$1,214,000.00

Were these figures analyzed for the purpose of comparing the "Work" versus "Free Gift" methods of distributing relief, there will be a large part of the expenditures mentioned in this $201,500 which would have occurred anyway, i. e., travelling expenses, salaries, office supplies, and the like.

It will be noted that the expenditure under "General" classification totals G. $52,000.00 which is 4¼% of the entire sum spent. For 850 miles of road (ignoring well-digging) these "General" costs work out at G. $61.00 per mile, this including office expenses for chief Engineers and Supts. of Commissary and Health. Salaries of these personnel were charged to their respective departmental classifications. The 12A—Shantung "General" expenditure was charged throughout the operation with costs of Peking and Tientsin offices. This was because in the beginning, we had just the one operation; and then, when the others were added, the Shantung work still was the largest.

Cash for Wages.

The heading, "Relief Wages," was inserted to ascertain the total amount which we spent in direct cash payments rather than on purchases of grain. This phase has been mentioned to headquarters in earlier letters—how that in Shansi, Yellow River District, for instance, grain was available, but only because it had been fetched in from beyond the river down through the age-old mule train in the mountains. In and around Fenchowfu there had been no crops and the people were destitute. They live so closely—just one step ahead of trouble—all the time, and their livelihood is in jeopardy with such a famine as came last year. Thus, these people had no money in hand with which to buy food, although food was available. When the road work was undertaken it afforded an eagerly seized opportunity for these people to help themselves over the black days of the spring of 1921 by enabling them to earn the money with which to buy food. And the merchants of the district kept their promises when, despite the golden possibilities, they did not fatten as profiteers but maintained prices steady and reasonable. The "human interest" side of these matters, however, belongs more properly in the report of the Director of operation.

Toward the end of the work, when grain shipments were not easy to make and transportation became difficult, cash payments were made in one or two other fields.

Grain Purchased.

In purchasing grain, we have secured it from Dairen, Kalgan, and Hsuchowfu, with some smaller purchases in the local fields. That purchased at Dairen was brought by United States Army transport to Chinwangtao, there loaded to the Peking-Mukden cars and transferred to different places at which it was required. The carrying of this grain by transport saved a considerable amount of funds and was a much appreciated courtesy extended by the United States Army officials. We should mention also the assistance given to us by the representative of the Kailan Mining Administration at Chinwangtao.

The total purchases of grain which we have made have been 14,695 long tons, in addition to which the Church of the Brethren Mission donated to the work at Pingtingchow, Shansi, 475 long tons of millet, making in all 15,170 long tons of grain which has been handled by our different operations.

The division of purchases is as listed below:

	long tons
Beans	4,755
Kaoliang	4,535
Rice Bran	1,250
Bean Cake	1,120
Barley	826
Oats	794
Peanut Cake	431
Millet	376
Buckwheat	294
Cottonseed	178
Corn	118
Wheat	18
	14,695

Millet donated by Church of the Brethren Mission - -	475
Total - - - -	15,170

The different .ds receiving this grain are as follows:

	long tons
Shantung- - -	9,675
Hantan, Chihli - - -	900
Pingtingchow plus 475 .ong tons of millet donated	3,750
Peking-TientsinHighway - -	160
Tientsin-Paotingfu Highway-	210
	14,695

The total direct cost of this grain, as shown by the table on page 10, was Gold $478,750, which figures to about G. $32.50 per ton. The transportation and agency costs figure to about G. $2.00 per ton, the transportation item being mainly the carting in the field and the loading and unloading at the different points of purchase and ... very.

In addition we have used 70 ... lt, of which 60 tons were ... c ... free through the courtesy of the Salt Gabelle.

Costs

In the earlier days of the famine, the statement was made that five gold dollars (G. $5.00) would feed a man right through until harvest, or say for five months as then averaged. This meant one gold dollar per month or 3-1/3rd. gold cents per day. The estimate was based on the rate of exchange current at the time, and on the cost of grain as then quoted. Both these factors changed to the advantage of relief funds.

Grain, as noted earlier in this accounting section of the report, cost us G. $34.50 per long ton 1,680 catties (a "catty" is the unit, although variable, of Chinese weight, and is equal to about 1-1/3rd. avoirdupois pounds).

To each gang of thirty (30) men, we issued 53 catties of grain per day for the gang, plus 106 catties per day for the families (averaged at four dependents to each man). Thus, each gang and its dependents received daily 159 catties, which at 2 cents per catty totals G. $3.18 per day for 150 people, or a little more than two gold cents per day per person, and about G. $3.00 per person for five months, as actual cost of grain issued. It should be noted that this grain was sufficient to maintain the people, and even to add other dependents, as has been mentioned in preceding chapters.

To get a final figure as to how many ...ple were fed throughout the period, ...d the cost per head, is not possible. Much of our expenditure, as already explained, was in the form of indirect, as well as direct, assistance to the famine sufferers. Cash wages paid were mainly on the same basis as the grain payments, i. e., two gold cents per person per day, averaging four dependents to each workman.

If there had been sufficient personnel ... would have been possible to have gathered figures enabling such a final statement to have been made; but this would have meant quite a few additional workers at each of the operations. The actual relief work ...e such demands upon the force ... able, that nothing was attempted beyond the measures necessary for safeguarding funds and property, and for directing the forces.

Conclusion:

The co-operation of all members, both foreign and Chinese, of the Accounting Department has been greatly valued, and without it the work of the Department could not have gone forward. Any success which has been achieved has been due to the willing efforts of all.

Form C–1 Rev.

AMERICAN NATIONAL RED CROSS

CHINA FAMINE RELIEF

FIELD VOUCHER

If voucher covers gold dollar payment number must be prefixed by G.

...cher No.....

Paid by
check No.....

AMERICAN NATIONAL RED CROSS, CHINA FAMINE RELIEF

To.....Dr.

Address.....

DATE:	DETAILS	RECEIPT NUMBER	AMOUNT Chinese Dollars $	cts.
	TOTAL	L. C.	$	

I certify that this statement is correct and that the expenses listed were incurred by me in the performance of official duties.

.....
Name and Title

APPROVED

.....
Audited Title

.....

Funds and Appropriation Chargeable

	Amount
Debit:	
Allotted	
Appropriation No.	
Advance a/c	
Mr.	
Credit:	

Read Carefully 注意

名銜之職稱之公簽時
姓台員或名司貴祈款

The person whose name is shown at the top of this voucher should sign in receipt. If the name is that of a firm or c...on the name and title of the em... the voucher should be s...

...Received 款已收到
期日

..... 192 .....

.....

If signature is in Chinese it must be Witnessed:

.....
Signature of Witness.

NOTE: If used for listing several invoices to be covered by one payment, supporting invoices shall be attached.

CASH DONATIONS RECEIVED IN CHINA

THE amounts stated below are in Mexican dollars unless otherwise specified as Gold Dollars, Pesos, or Yen.

American Advisory Committee, for Yellow River Road		$250,000.00
American Community, Amoy		248.40
American Women's Club, Shanghai		125.00
Mr. and Mrs. Blakeslee		120.00
Canton Chapter, A. R. C.		399.56
Changsha Chapter, A. R. C.		2,079.43
China Central Committee		3,580.86
China Famine Relief, Manila Chapter		9,674.50
W. D. Cunningham		75.17
" "	Yen	106.00
A. E. Curlton		3,084.72
Danforth Hospital		17.00
E. Findra		5.00
S. A. Gamble	Gold	95.00
Mr. and Mrs. C. Gardner	"	200.00
Hawaiian Chapter, A. R. C.		34,391.92
Kulangsu Church		52.38
Lehr German Baptist Women's Mission	Gold	50.00
Mrs. L. Leonard		10.00
Manila Chapter, A. R. C.	Gold	200.00
Rev. T. F. McCrea		10.00
Open Door Club, Wisconsin	Gold	9.00
Dr. Perkins		106.00
Philippines Chapter, A. R. C.	Gold	300.00
" " "	Pesos	99,000.00
Presbytery of Kung Chang, Seoul		229.38
Dr. Prunemeir		50.00
Reformed Church		14.30
Mrs. M. C. Russell	Gold	1,000.00
Scottish Rite Lodge		551.78
Seventh Day Adventists, Shanghai		1,195.95
Shanghai Sanitarium		22.50
Standard Oil Company		24,937.50
S. S. China's Passengers		19.91
S. S. Nanking's Passengers		60.09
Dr. Strich		55.52
Swatow Chapter, A. R. C.		562.00
Szechwan Chapter, A. R. C.		1,372.39
Tachowfu Chapter, A. R. C.		150.00
Tan Lee		67.50
Tokyo Chapter, A. R. C.	Yen	2,310.00
Rev. Troxel		100.00
Unknown sources		255.97
" "	Gold	3.00

Mrs. M. K. Vail		$ 425.89
H. Wilder		100.00
C. I. Will	Gold	12.00
Mr. Worley		100.00
M. B. Yung		159.95

The above donations gave a total sum in Mexican Dollars of 335,532.57 which were worth $216,997.07 Gold. Since the name of the donors in many cases were not available, it is only possible to publish the agency through which it reached the American Red Cross, China Famine Relief.

In addition to this list, there were endless other donations in the form of services, property given or loaned, etc. Due to the great number of such instances and the fact that it is difficult in the majority to say where the gift ended and reimbursement began, it will not be possible to make individual mention.

However, acknowledgment must be made of the courtesy of the Wrigley Chewing Gum Company for its donation of forty-nine cases of chewing gum for distribution to the famine sufferers; Messrs. Fearon, Daniel Co. for the loan of the premises occupied by the Executive office in Peking; Messrs. Arnold Brothers for the use of the premises occupied by the Accounting Office in Tientsin; to the staff of the China Central Committee of the American Red Cross, for their services in acting as the Shanghai representatives; the Standard Oil Company and the British—American Tobacco Company, and their officers; the various mission boards and the Y. M. C. A. for the use of their property and personnel.

PERSONNEL OF AMERICAN RED CROSS, CHINA FAMINE RELIEF

E. E. Aiken VS
C. E. Akerstrom V
H. C. Appell USA
L. S. Armstrong
R. D. Arnold V
T. Attree
C. A. Bacon
F. S. Baker
J. E. Baker V
Pvt. Baker USA
C. L. Bailey
Joseph Bailie
E. H. Ballou V
L. V. Barker VS
W. T. Barker
C. P. Barkman
M. W. Belaboboff
C. C. Bell
Corp. Bellmore USMC
W. Berry
F. E. Bichel USA
H. N. Bishop VS
J. P. Bjergaarde VS
Anna V. Blough V
Lieut. Bogert USMC
W. D. Boone VS
B. Booshooef
L. R. Borghi
Bovyer VS
S. Bowman V
H. A. Boyd V
A. Boyer
Dr. Braafladt VS
V. F. Bradfield V
Pvt. Brady USA
W. J. Brehm
J. H. Bright VS
D. G. Brown VS
R. E. Brown VS
D. W. Brown USMC
Bernice Bryan
D. F. Callahan
A. G. D. Campbell
E. Campbell
R. J. Cannon USMC
T. F. Carter VS
F. E. Clark
W. C. Clark
M. de Colbert
T. M. Collester
M. G. Connor VS
A. Combs USA
S. H. Connelly VS
N. H. Coppin
C. J. Cooke
W. M. Cornwell V
Sgt. Coyne USMC
Winnie E. Cripe V
Rowland Cross V
F. H. Crumpacker V
Mrs. Crumpacker V
E. A. Davies
J. F. DeVault VS
I. Diamond
C. W. Diercks
S. M. Dixon
H. R. Dixon V
P. D. Dutton VS
V. P. Eastman V
W. J. B. Edgar
Ehlers VS
C. Elkington
C. E. Ewing V
J. B. Farmer VS
W. H. Faulkner VS
Pvt. Fell USMC
Mrs. L. Ferrier
Miss C. Flagler VS
D. E. Ford
Pvt. Forrest USMC
C. P. Gabbott
F. R. Gabbott
H. A. Gluckauff
J. A. Goette
E. G. Goldsborough
Annie Goodrick
F. J. Griffith V
J. Gardiner V

M. A. Gernacoff
Pvt. Getty USA
H. Gilbert
R. Glover USA
C. Goodrich VS
J. Gray
W. H. Grant VS
I. Greenberg USA
J. A. Griffin
T. Hagan
W. Halsall
S. Hancock
H. K. Harris USMC
G. S. Harter
A. Hausske V
Haynes V
Hildra Hawley
W. P. Hedrick VS
J. J. Heeren VS
A. D. Heininger V
W. J. Heisey VS
P. V. Helliwell V
F. F. Henke
C. Hildabrand
P. Hole V
G. C. Hood V
D. L. Horning V
L. P. Horsfall USA
A. W. Hummel V
F. R. Hurst USA
L. R. Hussell
A. M. Hutchison VS
L. Impey
R. B. Irving
L. A. Jackson
M. Jenson V
S. D. Joffick
E. J. Johanson V
C. V. Johnson
H. W. Johnson
W. W. Johnston VS
W. C. Jordan VS
Pvt. Kahn USA
Pvt. Kaplan USA
T. Kelly
P. Kiehn V
J. A. King VS
Lucia Kingman
W. Knutsen USA
L. M. Kolesnikoff
M. Koff
B. S. Kookolevsky
K. Korhonen VS
J. M. Krieger
W. I. Lacy VS
H. S. Lant USA
J. Lapin
C. C. Lee
W. Lester
A. Logan VS
C. F. Long
E. R. Long VS
J. S. Love VS
J. W. Lowe V
E. Lower USA
E. Luer
Miss R. B. Lustgarten
Bessie R. Lyons
J. R. Lyons V
Mary McClure V
T. McDermott
R. T. McDonnell VS
J. McRae VS
MacEacheron V
J. H. MacVicar V
J. W. Matzen USMC
C. E. Mitchell
J. J. Moe VS
E. C. Monroe USMC
G. E. Montoure USMC
A. P. Moonshi
Mrs. H. Mortimer VS
E. L. Mott USA
A. Mountain V
J. A. Mowatt V
G. E. Myer
M. M. Myers VS
W. L. Nash VS
J. H. Nelson USMC
Sgt. Nelson USMC
A. M. Nekrasoff
I. E. Oberholtzer V
R. A. Oliver
A. F. Olsson
L. E. Osburn
S. Ostroumoff
Pvt. Owens USMC
Cecil Palmer V
E. C. Perkins VS
W. W. Petropavlovsky
Corp. Petty USMC
J. P. Pivovarsk USMC
Mrs. M. Pollock V
B. Povitzky

R. W. Powell
Mrs. R. W. Powell
F. G. Pratt
E. Prater
J. I. Pure
W. O. Pye V
A. C. Reed V
W. R. Reeds V
A. V. Restsov
A. B. Richards V
J. Robbins
E. M. Rosario
J. Rose USA
Miss A. E. Ross V
G. M. Ross VS
E. L. Sanford VS
M. E. Saville VS
M. Schaeffer VS
E. C. Schaublin USMC
Dr. Scott V
M. H. Seelig
Mrs. R. A. Sepulveda VS
N. A. Seese V
Clarissa C. Shaw
V. A. Sheldon
Mrs. V. A. Sheldon
M. Simpson
C. C. Sollenberger VS
H. L. Sone V
Mrs H. L. Sone V
J. A. Stakkon
F. F. Stanley
C. A. Staples USA
Dr. Stearns V
M. Steele
H. H. Steinmetz
Mrs. T. Stevens
Violet Stewart V
J. W. Stillwell USA
W. H. Stout USA
Mrs. G. R. Street VS
B. B. Struthers VS
M. Sullivan
R. C. Swink, USMC
J. Subert
R. Szumigalski USMC
F. Tatlock
A. D. Terrill VS
A. Thiele
O. J. Todd
P. Torjerson V
R. A. Torry V
E. Trevor
C. W. Troxel
F. F. Tucker V
G. W. Twomey
Lulu Ullom VS
F. Vega
R. H. Wagner
S. B. Wakerfield
C. M. Walton V
E. M. Wampler V
F. J. Wampler V
Mrs. F. J. Wampler V
P. T. Watson V
Mrs. P. T. Watson V
H. S. Wavell
K. C. Weedin VS
F. C. West
F. G. Williams VS
Williams V
Jesse B. Wolfe V
Mrs. J. B. Wolfe V
W. W. Woodbury
G. Wordsworth
E. W. Young VS
L. Yow USA

V—Full volunteer
VS—Volunteer with maintenance
USA—Assigned to this service by United States Army with maintenance furnished by American Red Cross
USMC—Assigned to this service by United States Marine Corps, with maintenance furnished by American Red Cross

The volunteer service is made up of men loaned by eighteen different missionary bodies in China and one commercial firm.